

**DRAFT SCOPING REPORT  
FOR COMMENTING**

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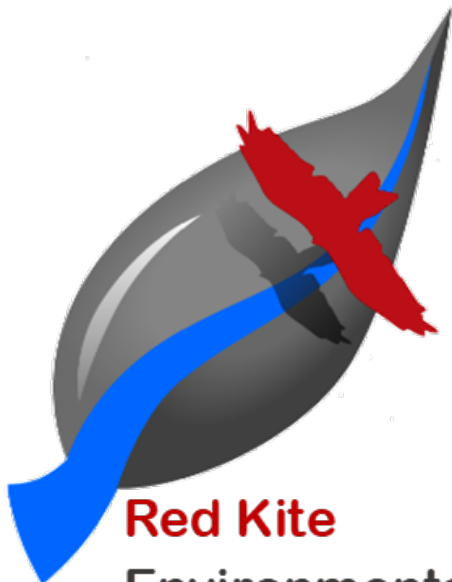
**KOOKFONTEIN MINE MR525  
S102 AMENDMENT**

**PORTIONS 5, 8, 11 AND 19 OF THE  
FARM KOOKFONTEIN 265 JQ.**

**NORTH WEST PROVINCE**

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**MAY 2021**



**Red Kite**  
**Environmental Solutions**

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**mineral resources**

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

**DRAFT FOR COMMENTING**

## **SCOPING REPORT**

### **FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND PROSPECTING.**

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

<b>Name of Applicant</b>	Nuco Chrome Bophuthatswana (Pty) Ltd
<b>Project</b>	Kookfontein Mine MR525 S102 Amendment
<b>Tel No</b>	083 450 3120
<b>Fax No</b>	N/A
<b>Postal Address</b>	PO Box 2208, Houghton, 2041
<b>Physical Address</b>	14 Bedfordview Office Park, 3 Riley Road, Bedfordview
<b>File Reference Numbers SAMRAD</b>	NW 525 MR

May 2021

### 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.



### OBJECTIVE OF THE SCOPING PROCESS

- 1) The objective of the scoping process is to, through a consultative process
  - a) Identify the relevant policies and legislation relevant to the activity;
  - b) Motivate 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 and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
  - d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
  - e) Identify the key issues to be addressed in the assessment phase;
  - f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
  - g) Identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

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## Appendices

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Appendix 3	Locality map
Appendix 4	Site layout map
Appendix 5	Public Participation Information
Appendix 6	Environmental Screening Report





## 1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

### 1.1 Details of EAP who prepared the report

<b>Name of the Practitioner:</b>	Nicole Upton
<b>Tel No.:</b>	079 555 2433
<b>Fax No.:</b>	N/A
<b>Postal address:</b>	PostNet Suite 0111, Private Bag X37, Lynnwood Ridge, 0040
<b>E-mail address:</b>	nicole@redkiteconsulting.co.za

### 1.2 Expertise of the EAP

#### 1.2.1 Qualifications of EAP (set out in Appendix 1)

Please refer to Table 1 for a summary of the qualification and experience of the EAP. Refer to Appendix 1 and 2 for more details (CV).

#### 1.2.2 Summary of EAP's past experience (set out in Appendix 1 and 2)

Please refer to Table 1 for a summary of the qualification and experience of the EAP. Refer to Appendix 2 for more details (experience).

**Table 1: Details of EAP**

<b>Name</b>	Nicole
<b>Surname</b>	Upton
<b>Company</b>	Red Kite Environmental Solutions (Pty) Ltd
<b>Position</b>	Director – Environmental Assessment Practitioner (EAP)
<b>Location</b>	2055 Cura Avenue, Equestria, Pretoria
<b>Email</b>	nicole@redkiteconsulting.co.za
<b>Telephone Number</b>	079 555 24334
<b>Education</b>	BSc Honors Animal, Plant and Environmental Sciences
<b>Professional affiliation(s):</b>	<ul style="list-style-type: none"> <li>• South African Council for Natural Scientific Professions (SACNASP) <ul style="list-style-type: none"> <li>○ (Registration Number: 121030)</li> </ul> </li> <li>• Water Institute of Southern Africa (WISA) <ul style="list-style-type: none"> <li>○ (Membership No: 39243)</li> </ul> </li> <li>• International Association for Impact Assessments (IAIAsa) <ul style="list-style-type: none"> <li>○ (No. 6185)</li> </ul> </li> </ul>
<b>Professional summary</b>	Ms. Upton has a qualification in B.Sc. (Hons) Animal, Plants and Environmental Science (Appendix 1) and has 10 years of applicable experience as a project manager on a number of Environmental Impact Assessments (EIAs) and environmental authorisations for predominately industrial and mining clients in the South African market. Nicole has extensive integrated environmental management experience, including, EIAs, implementation of environmental management programmes, environmental monitoring, compliance auditing and monitoring, project management and general environmental support. Refer to Appendix 2 for further details.
<b>Skills</b>	<ul style="list-style-type: none"> <li>• Mine Closure financial quantum determination, mine rehabilitation.</li> <li>• Management and coordination of environmental compliance aspects for opencast mining.</li> </ul>



	<ul style="list-style-type: none"><li>• Alien Invasive Plant monitoring, control and reporting.</li><li>• Water quality monitoring, measurement, reporting and data analyses including surface water, ground water, process water, sewage water and biological indicators.</li><li>• Legal compliance auditing and reporting in accordance with the National Environmental Management Acts and other associated environmental related legislation (NEMA listed activities, Water Use Licensing, Waste Licensing, etc.)</li><li>• Environmental impact assessments and Integrated Water Use License Applications, including rehabilitations plans and IWWMPs.</li><li>• Environmental Control Officer Site inspections and associated reporting and compliance.</li><li>• Specialist impact assessments for surface water and ecology.</li><li>• Conceptual and operational water balances and Water Conservation and Demand Management Plans</li></ul>
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## 2 DESCRIPTION OF PROPERTY

<b>Farm Names:</b>	Portions 5, 8, 11 and 19 of the farm Kookfontein 265 JQ.
<b>Application area (Ha):</b>	358,13 hectares
<b>Magisterial district:</b>	Rustenburg Magisterial District Rustenburg Local Municipality, Bojanala District Municipality
<b>Distance and direction from nearest town:</b>	2 km north-east of Phokeng, just north-west of Rustenburg.
<b>21-digit Surveyor General Code for each farm portion:</b>	TOJQ000000002650005 TOJQ000000002650008 TOJQ000000002650011 TOJQ000000002650019

### 2.1 Locality map

Please refer to Appendix 3 for the locality maps for the project area.

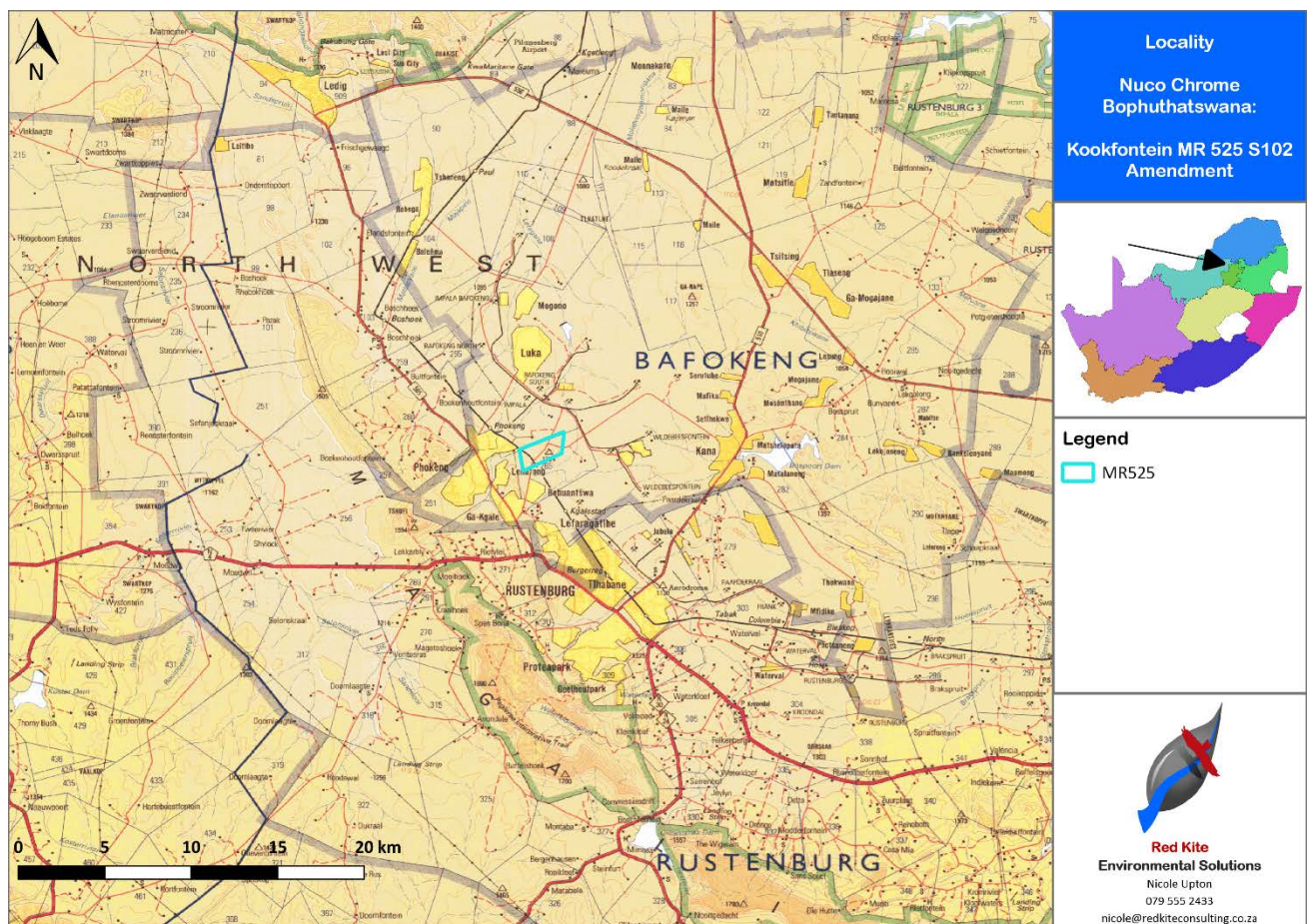


Figure 1: Mining Right area locality



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

Provide a plan drawn to scale acceptable to the competent authority but not less than 1:10 000 that shows the location, and area (ha) of all aforesaid main and listed activities, and infrastructure to be placed onsite and attached as Appendix 4.

#### 3.1 Listed and Specified activities

**Table 2: Proposed activities**

NAME OF ACTIVITY (E.g., For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route 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.)	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY  (Mark with an X where applicable or affected).	APPLICABLE LISTING NOTICE  (GNR 324, 325, 327)	WASTE MANAGEMENT AUTHORISATION  (Indicate whether an authorisation is required in terms of the Waste Management Act).  (Mark with an X)
GN325(17) 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).  <b>Opencast mining</b>	Mining Right Area = 358,13 ha  Opencast pits = 34 ha	X	GN325(17)	-
<b>Blasting</b>	-	-	Not listed	-
GN921 Category B (11) 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>Temporary overburden and waste rock stockpiling</b>	2.5 ha	-	GN921 Category B (11)	X
GN325(6) 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	2 ha	X	GN325(6)	-



NAME OF ACTIVITY  (E.g., For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route 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.)	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY  (Mark with an X where applicable or affected).	APPLICABLE LISTING NOTICE  (GNR 324, 325, 327)	WASTE MANAGEMENT AUTHORISATION  (Indicate whether an authorisation is required in terms of the Waste Management Act).  (Mark with an X)
<b>ROM stockpiling</b>				
<b>Temporary topsoil storage/and removal</b>	1 ha	-	Not listed	-
<b>Hauling and transporting</b>	-	-	Not listed	-
GN325(27) The development of a road –  <b>Road construction</b>	0.8 ha	X	GN325(27)	-
<b>Placement of fences</b>		-	Not listed	-
GN325(6) 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  <b>Dust suppression with water from PCDs</b>	3 ha	X	GN325(6)	-
GN325(15) The clearance of an area of 20 hectares or more of indigenous vegetation  <b>Removal of indigenous vegetation</b>	62.8 ha	X	GN325(15)	-
<b>Product stockpiling</b>	0.5 ha	-	Not listed	-
GN921 Category B (11) 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>Backfilling of opencast areas with overburden and waste rock material</b>	34 ha	X	GN921 Category B (11)	X
GN325(17) 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).	5 ha	X	GN325(17)	-



NAME OF ACTIVITY  (E.g., For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route 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.)	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY  (Mark with an X where applicable or affected).	APPLICABLE LISTING NOTICE  (GNR 324, 325, 327)	WASTE MANAGEMENT AUTHORISATION  (Indicate whether an authorisation is required in terms of the Waste Management Act).  (Mark with an X)
<b>Wash plant</b>				
GN325(17) 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).	1 ha	X	GN325(17)	-
<b>Crushing and screening</b>				
GN921 Category B (11) 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).  GN325(6) 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	13 ha	X	GN921 Category B (11)  GN325(6)	X
<b>Tailings Storage Facility (TSF)</b>				
<b>Workshop, administrative buildings, laydown areas and parking areas</b>	3 ha	-	Not listed	-
<b>Groundwater abstraction (boreholes)</b>	-	-	Not listed	-
<b>Storm water management infrastructure (channels, berms and pollution control dams)</b>	2 ha	-	Not listed	-
<b>Process and clean water storage</b>	-	-	Not listed	-
<b>Ablution facilities</b>	-	-	Not listed	-
<b>Dewatering of opencast mining areas</b>	34 ha	-	Not listed	-
GN327(12) The development of—	1 ha	X	GN327(12)	-



NAME OF ACTIVITY  (E.g., For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route 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.)	Aerial extent of the Activity Ha or m <sup>2</sup>	LISTED ACTIVITY  (Mark with an X where applicable or affected).	APPLICABLE LISTING NOTICE  (GNR 324, 325, 327)	WASTE MANAGEMENT AUTHORISATION  (Indicate whether an authorisation is required in terms of the Waste Management Act).  (Mark with an X)
(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;  <b>Construction of mining related infrastructure, channels, and opencast mining within 32 m of a watercourses</b>				

### 3.2 Description of the activities to be undertaken

Nuco Chrome Bophuthatswana (Pty) Ltd is the holder of a Mining Right (NW 525 MR) with an approved EMP. Nuco Chrome proposes to amend the EMP through a Section 102 amendment application. As part of this process the EMP will be updated to reflect layout and operational changes to the proposed mining activities. Thus, a Scoping and EIA process in terms of NEMA and a WULA in terms of the NWA is being undertaken.

The proposed Nuco Chrome mining site is situated in the Rustenburg Local Municipality, which falls within the jurisdiction of the Bojanala District Municipality, in the North West Province of South Africa. The proposed mining operations are situated 2 km north-east of Phokeng, just north-west of Rustenburg.

The proposed mining operations will consist of three opencast pits, overburden and ROM stockpiling and associated activities. The mine also proposes to establish a wash plant and associated facilities such as a tailings storage facility, product stockpiles and return water dam complex.

The following activities and infrastructure form part of the proposed mining project:

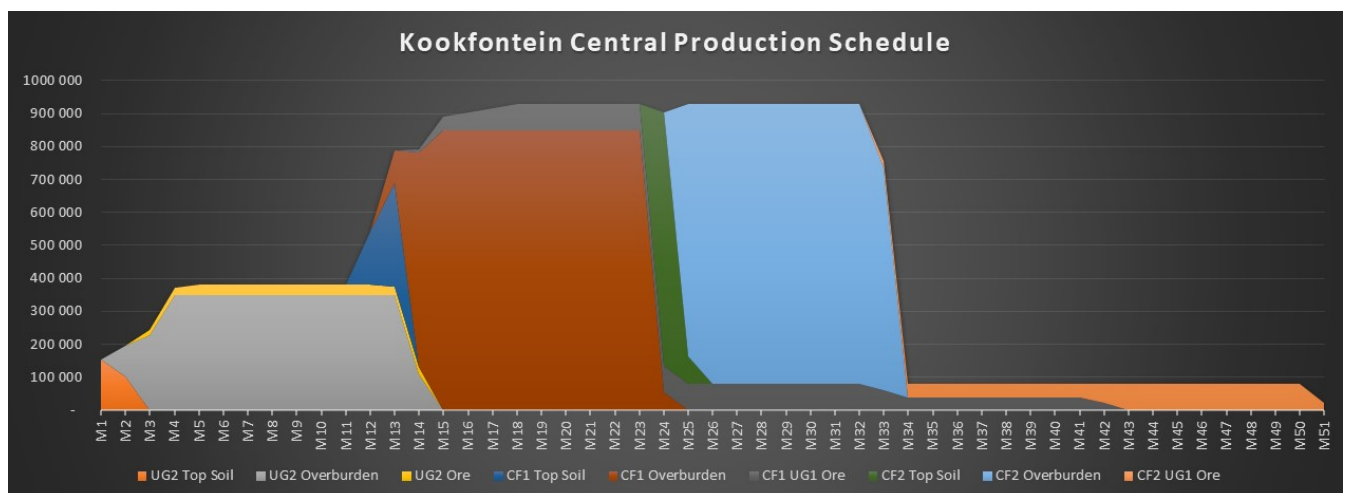
- Opencast mining
- Temporary overburden and waste rock stockpiling
- ROM stockpiling
- Topsoil stockpiling
- Backfilling of opencast pits with overburden and waste rock through roll-over mining
- Offices and workshops
- Security facilities and fencing



- Ablution facilities
- Contractor laydown areas
- Diesel Storage
- Storm water dam (PCD) and related storm water management infrastructure
- Possible water extraction from opencast pits
- Groundwater abstraction and drilling of boreholes
- Processing plant and related infrastructure, including crushing and screening
- Product stockpiles and plant feed stockpiles
- Return water dams
- Clean water storage
- Tailings Storage Facility (TSF)
- Access and hauls roads
- Parking areas

**Table 3: Activities planned over LOM development period for the Central block at Kookfontein**

PERIOD	ACTIVITY
Year 1 - 2	<ul style="list-style-type: none"> <li>• During this period, it will be required to complete study work on the additional pits on the identified high grade UG1 facies. This will include design and schedule work. Some ongoing exploration studies will be required.</li> <li>• Contractors will be appointed for mining of the UG2 pit.</li> <li>• Additional environmental studies will be required.</li> <li>• Tailings and Plant final feasibility study work and execution contractors' appointments.</li> <li>• Powerline application</li> </ul>
Year 2 -3	<ul style="list-style-type: none"> <li>• Ongoing environmental studies</li> <li>• Mining of the UG2 pit and commencement of mining the UG1 pits.</li> <li>• Ongoing exploration activities such as mapping, trenching and drilling.</li> <li>• Construction of plant and tailings facilities.</li> <li>• Closure UG2 pit</li> <li>• Ongoing UG1 Mining</li> </ul>
Year 4 to LOM	<ul style="list-style-type: none"> <li>• Ongoing mining production.</li> <li>• Ongoing processing of Chrome and PGE rich tailings at Chrome and tails plants</li> </ul>



**Figure 2: Total production scheduled for the UG2 and UG1 ores at Kookfontein**





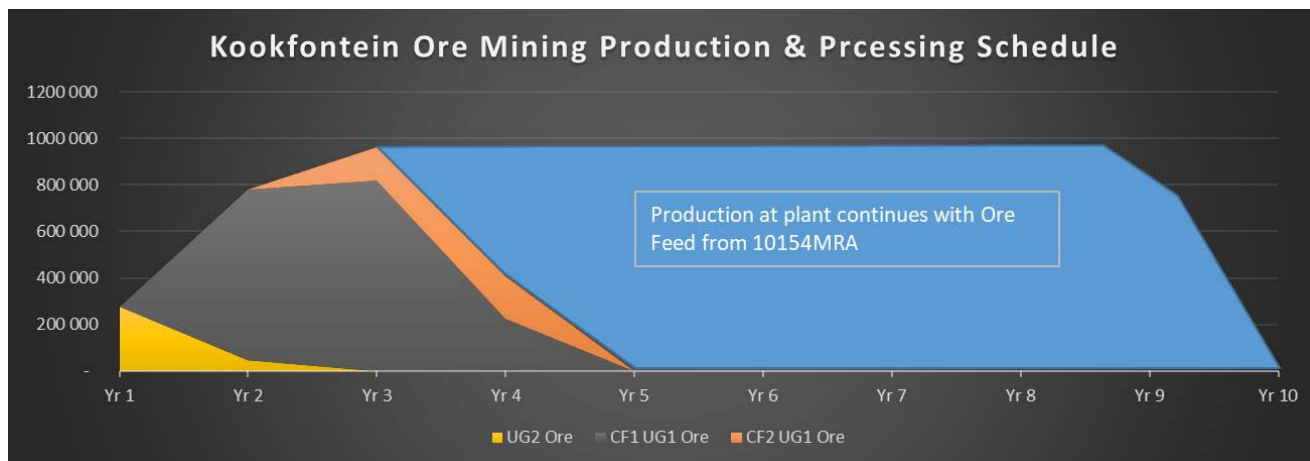


Figure 3: Total operational period inclusive of the plant operations that includes processing of ore supplied by the adjacent Right (10154MRA) owned by Nuco

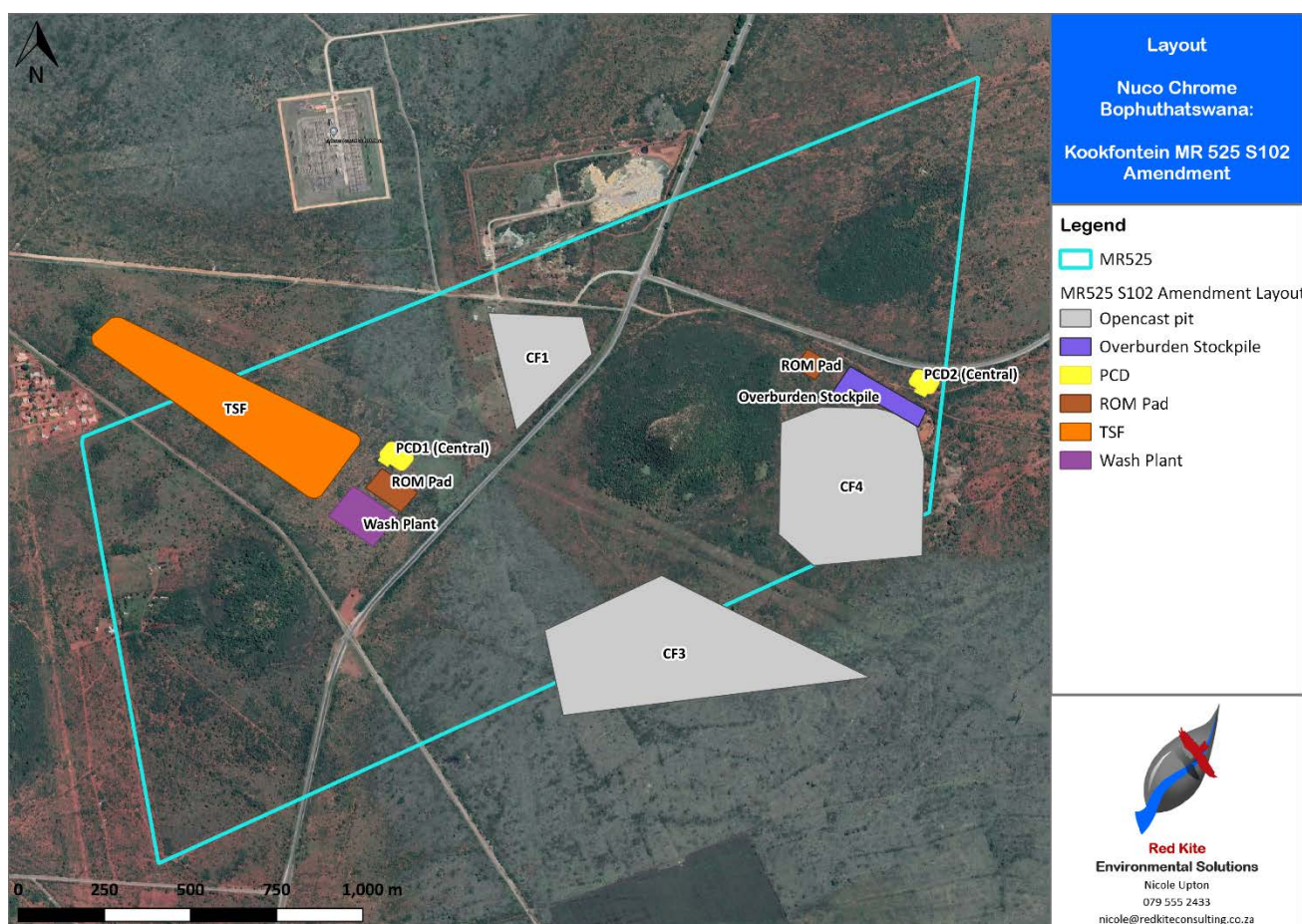


Figure 4: Preliminary layout

### 3.2.1 Mining Method

The open cast pit will be mined in a typical grid by grid truck and shovel method. Initially there will be topsoil stripping and stockpiling, then subsequent drilling and blasting of rock (interburden etc.) rock face thereafter. Handling of Run of Mine (ROM) with large front-end loaders and trucks will complete the open cast mining. Waste rock will be stockpiled until such time as there is sufficient space available inside the pit for storage of waste. Then waste rock will be placed in mined out areas as the face is advanced.



The typical mining cycle for the open pit operation would be as follows:

- **Bush-clearing and Topsoil Stripping:** The area to be mined will first be cleared by means of a tracked dozer to enable survey control and ground levels to be established. Topsoil will be stripped by means of dozing into stockpile berms on the highwall side as well as the outcrop side of the pit. Topsoil that cannot be economically dozed will be removed to stockpile by load and haul using an excavator and articulated dump trucks.
- **Establishment of Box-Cut:** A box cut will be developed to establish the initial access to the orebody. The box cut will be stepped [on the highwall side] up to surface in benches. Initially overburden from the box cut will be utilised in the construction of the tailings dam walls and haul roads.
- **Removal of Overburden:** Overburden will be excavated to stockpile using large 230 t and 400 t excavators matched with 132 t dump trucks. Overburden will initially be transported to waste rock dumps located in proximity to the highwall, until such time that sufficient in-pit void volumes has been established, whereupon it will be re-loaded and hauled for placement in-pit.
- **Drilling and Blasting:** Hard overburden will be drilled and blasted in benches. Blasted material will be excavated to stockpile.
- **Ore Mining:** Ore will be mined in daylight hours only using a 65t excavator and 40t articulated dump trucks. The hanging wall face of the exposed orebody will be swept clean by the upturned bucket of the excavator to reduce dilution to a practical minimum. The footwall wall be cleaned mechanically by the excavator.
- **Rehabilitation:** Surplus overburden from the initial box cut which has not been utilized in the construction of tailings dam walls will be placed in stockpile at the highwall position of the anticipated final voids. Material excavated for the steady state mining phase will be tipped directly back into the adjacent previously mined out voids to a predetermined profile to allow a continuous rehabilitation process to take place. Once mining is completed the remaining final voids will be filled with overburden excavated from the initial stockpiles and the rehabilitated final void will be levelled and graded to the predetermined profile. Topsoil will then be either placed or dozed from stockpile and placed and levelled on the rehabilitated pit. Separate grassing and seeding will not take place as it is likely the rehabilitated area will reseed from vegetation originally stockpiled with the topsoil.
- **Haul Road Construction:** All haul roads will be constructed with material from the mining box cut. Haul roads will be constructed out of suitable blasted material end tipped on top of the topsoil in a single layer 750mm to 1000mm thick. The material will be levelled and graded.



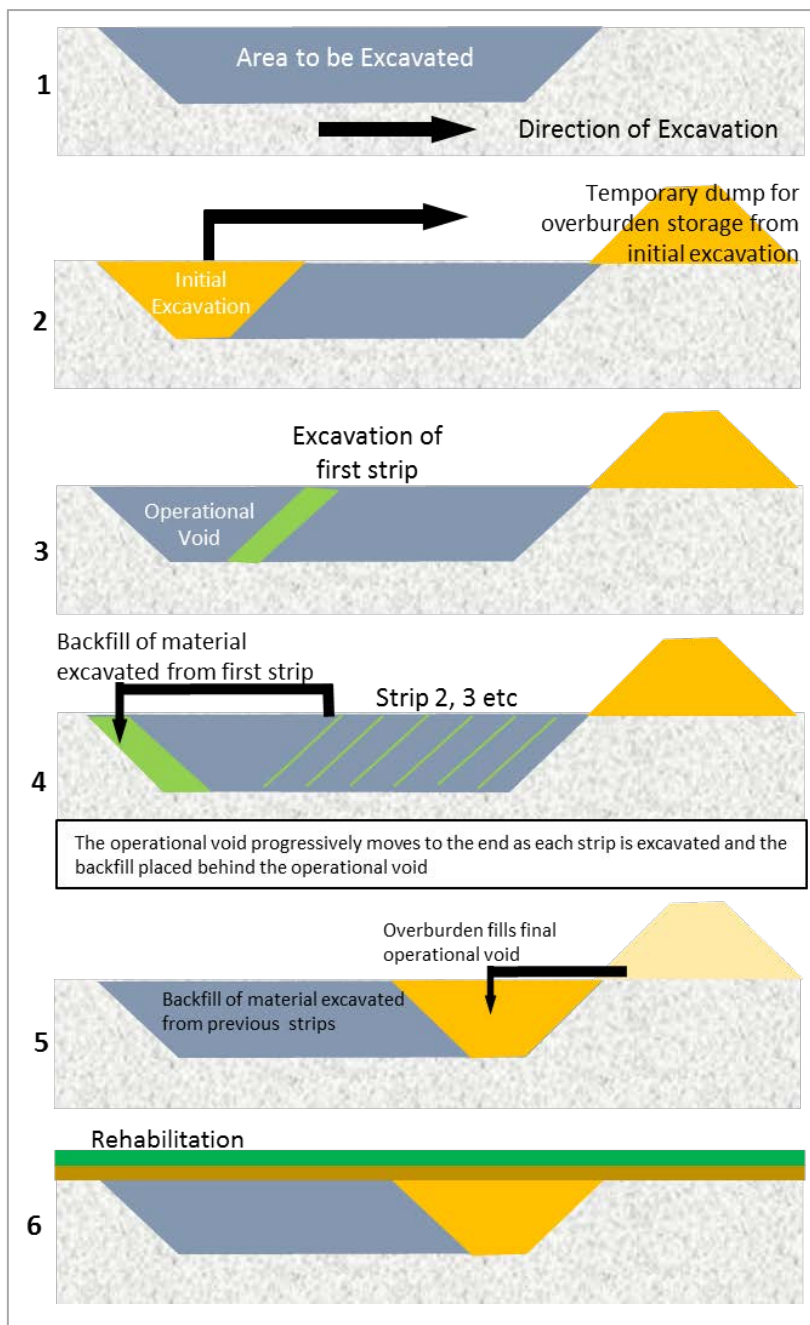


Figure 5: Roll-over mining method

### 3.2.2 Mine Infrastructure

- **Roads:** Access and haul roads will be constructed to service the mining operations.
- **Waste Rock Dump:** A waste rock dump will need to be established. Waste rock will be backfilled into the opencast void as part of the roll-over mining method.
- **Pollution Control Dams:** Storm water infrastructure will need to be designed and constructed for the proposed mining operation. A pollution control dam/s (PCD) will be required for the storage of contaminated water originating from the mining activities. Water contained within the PCD will be utilised for dust suppression and when possible for the wash plant processes. The PCD will be designed by an engineer as part of the Storm Water Management Plan.
- **Clean and Dirty Water Systems:** Storm water infrastructure will need to be constructed for the proposed mining operations. Clean and dirty water systems will need to be constructed in order to ensure clean and contaminated water is kept separated within the mine areas. A Storm Water Management Plan will be drafted as part of this



application and included in the EIA Report.

- Boreholes: Boreholes will be required to be sunk at strategic locations within the mining area. The purpose of the boreholes includes the monitoring of groundwater quality and the abstraction of groundwater.
- Offices, Storage areas, Ablution Facilities and Parking
- Diesel bays and refuelling areas
- Material loading areas
- Workshop
- Wastewater Treatment Plant: Sewage water will be treated for reuse in the onsite processes.
- Return Water Dams: Return water dam systems will be installed at the wash plant to facilitate the storage and recycling of process water
- Topsoil stockpile: Topsoil will be stripped and stockpiled for later use in rehabilitation activities
- ROM stockpile and plant feed stockpile
- Product stockpile

### **3.2.3 Water supply**

Both potable and service water will be needed for the operations throughout the life of mine. Potable water will be extracted from a borehole located on site. The water to be used at the mine will be sourced either from the local borehole on site, groundwater inflows into the opencast workings, storm water dam or a combination of the above. Water management facilities for the control of storm water and for pollution prevention such as water supply dams, pollution control dams, clean and dirty storm water controls will be designed to meet the requirements of relevant legislation. Recycling dirty/process water will be priority.

Total estimated water consumption (usage) of 30 m<sup>3</sup>/Hr.

A geohydrological study will be undertaken during the EIA Phase to assess the groundwater regime. A WULA, accompanied by an Integrated Water and Waste Management Plan (IWWMP), is being applied for as part of the Environmental Authorisations for the Mining Right.

### **3.2.4 Power supply**

Power will be supplied from either generator or through Eskom.

### **3.2.5 Processing Plant**

The ideal for Kookfontein is to construct a chrome beneficiation plant with an 80ktpm capacity. In addition to the chrome processing plants, a chrome tailings processing plant is planned to be constructed to further beneficiate the tailings and extract the PGMs.

#### **Chrome Processing Plant**

The run of mine (RoM) material from the pits is delivered to the surface stockpile via truck. The stockpiled RoM material reports to crushing, screening and milling circuits prior to de-sliming for gravity concentration by the use of spirals.

The spiral plant design is based on two chromite product streams:

- Metallurgical Grade
- Chemical and/or Foundry Grade

The spiral plant consists of the following spiral stages:

- Rougher
- Cleaner
- Re-cleaner (Foundry and/or Chemical grade product from concentrate)
- Middling Cleaner



- Scavenger
- Middling Re-cleaner (Metallurgical Grade product from concentrate)

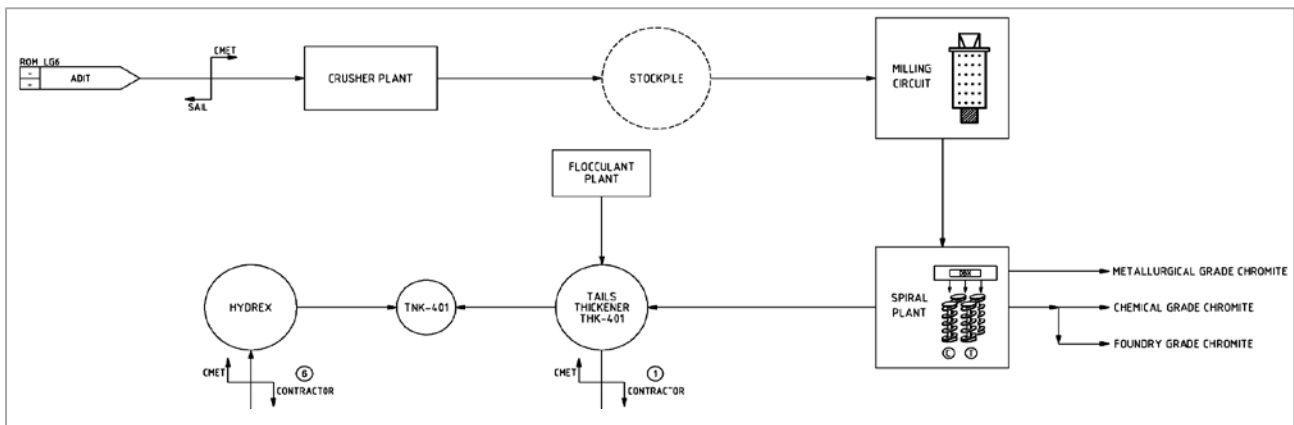


Figure 6: Chrome ore process flow diagram

### Chrome Tailings Processing Plant

Tailings material from the chromite beneficiation plant is further processed at the flotation plant. The spiral plant tailings streams from chrome plant and reports to the flotation feed thickener for process water recovery and to prepare thickened slurry for primary milling. The spiral plant tailings thickener underflow is pumped across to the Initiation Plant. The slurry reports to a primary ball mill for liberation at a finer grind. The ball mill is in closed circuit with a classification cyclone, the cyclone overflow reports to the rougher flotation condition tank prior to direct froth flotation. The main objective is to float the liberated PGM's as final product and leave the gangue minerals in the tailings stream for final tailings disposal.

The process water recovered from the TSF will be recycled back into the process to reduce the freshwater top-up requirements. The return water reports to an intermediate process water dam, the clean water from the intermediate process water dam reports to the main process water supply dam.

The final tailings are pumped through pipes to the tailings dam and process water is recycled back to the chrome beneficiation plant.

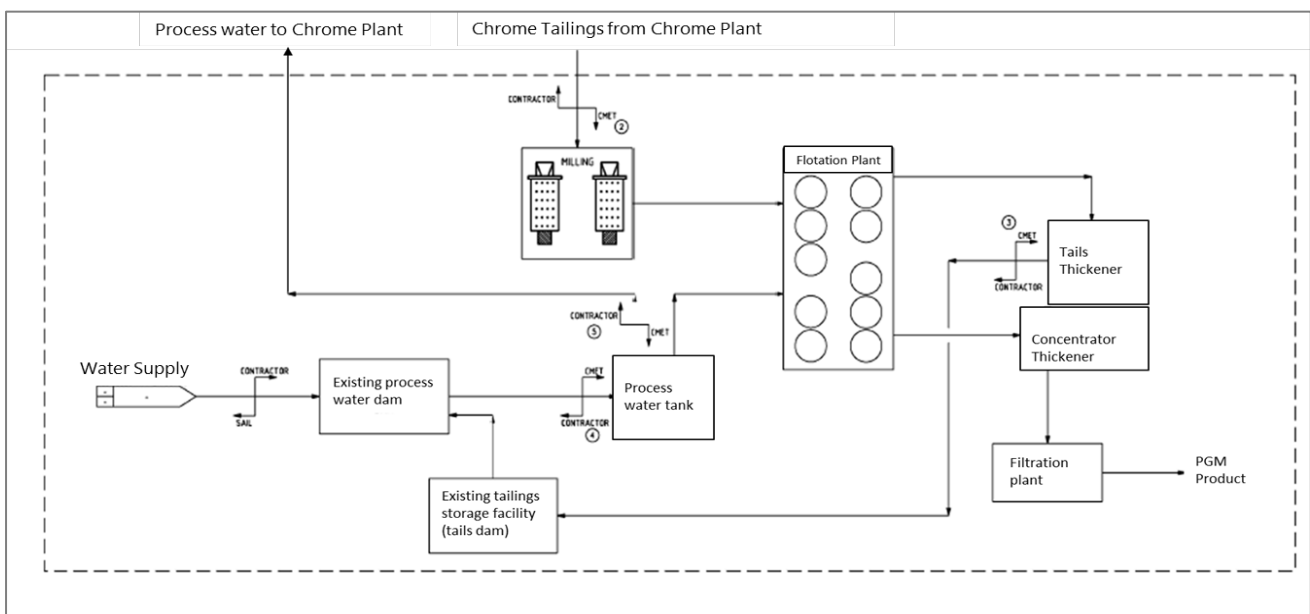


Figure 7: Chrome tailings process flow diagram



### 3.2.6 Waste management

The waste generated by the proposed activities are divided into 3 main categories, and are discussed below in summary.

#### 3.2.6.1 General Waste

The identified general waste types to be generated on site are the following:

- Scrap metal & timber
- Cans, paper, plastic and cardboard
- Inert waste
- Garden waste

#### 3.2.6.2 Tailings

*The TSF for the MR525 mining project (this project) has been designed to cater for the proposed consolidation of the mining activities relating to both the Nuco Chrome Bophuthatswana Mining Rights, i.e. MR525 and MR10154. These two Mining Rights are adjacent to one another and the intention is to consolidate the Mining Rights and operate the activities on both MRs as one operation. Hence the TSF caters for this consolidated operation and is situated on both Mining Right Areas (MR10154 and MR525). However, although the design and layout of the TSF is located over both Mining Right Areas, only the portion of the TSF located on MR 525 is applicable to this S102 EMPr amendment application. The TSF can be constructed and operated in phases.*

Tailings produced by the wash plant will be deposited to a Tailings Storage Facility (TSF). The tailings storage facility is designed to accommodate an estimated capacity of 622,246.032m<sup>3</sup>. This capacity is based on the assumption that 25% of all the mined ore material will comprise of slurry (tailings), after it has been processed through the wash plant. The TSF will be designed according to the relevant legislation and guidelines.

Subsoil drainage systems have been designed for the TSF, this allows for the drainage of sub-surface water and seepage water from the tailings facility.

The use of penstocks for this project has been replaced using a “turret”. This system is a floating water intake device that is connected to a pump. Water will be pumped from the TSF with the turret to the processing plant area after the fine materials have settled. The benefits of this system include:

- Decreases the chance for cavitation;
- Decreases the occurrence of vortexes forming on the surface of the water body;
- Allows for ease of mobility and placement of device;
- Allows for expansion, i.e., more devices can be installed/added if the need arises; and
- The device can pump water from a depth of 400mm, for shallow water bodies.

The layout geometry of the TSF is set out as shown in the figure below. The TSF layout was determined taking into consideration the 100 m railway and 40 m Eskom buffer zone. The inside and outside face of the TSF is sloped at 1V:3H.



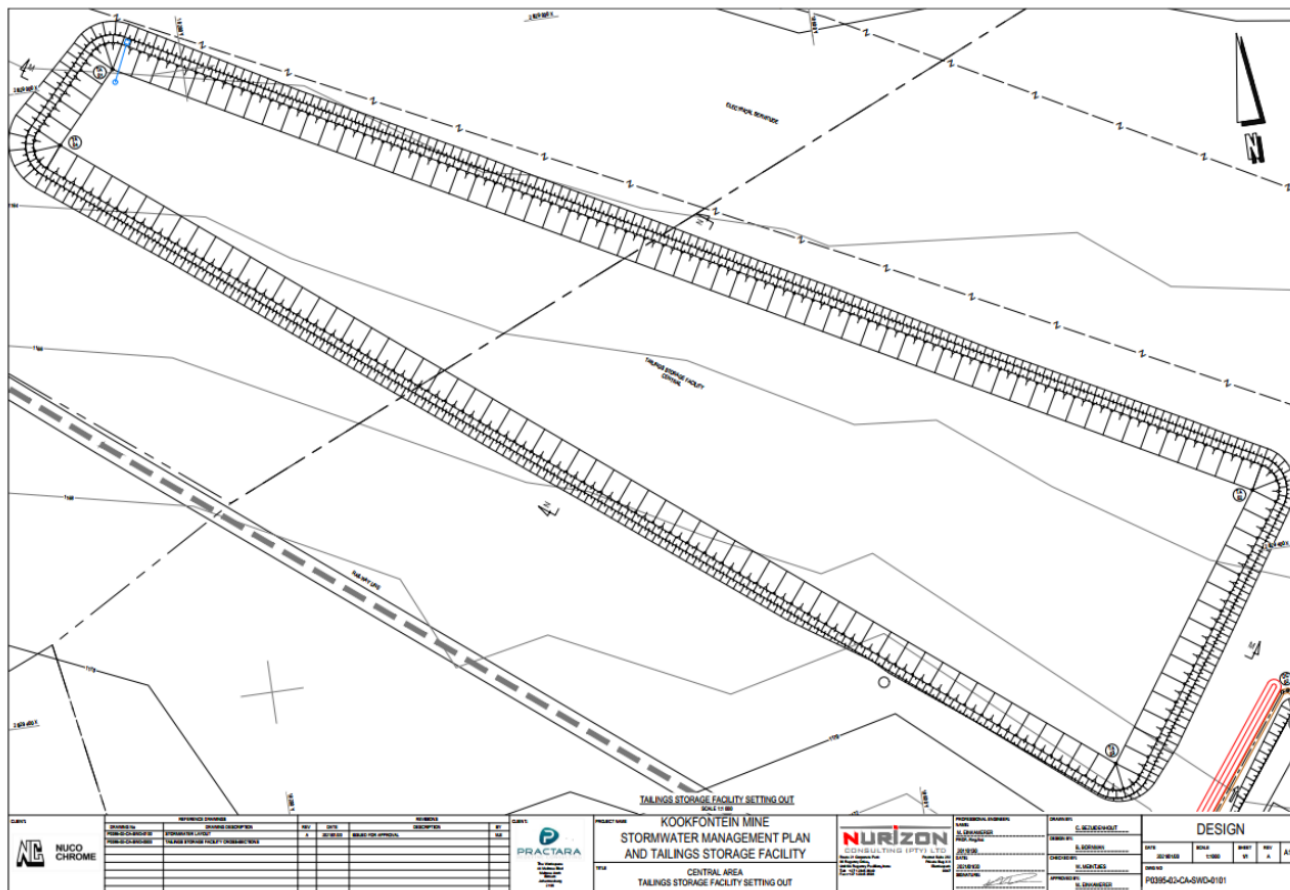


Figure 8: TSF Layout

The facility will be constructed with the appropriate barrier as prescribed by the Competent Authority. The wash plant, and tailings facility are considered dirty areas and such all water emanating from this area will be contained in a PCD for reuse in the wash plant process.

### 3.2.6.3 Hazardous Waste

Potentially Hazardous waste types that may occur on site include:

- Any tar containing waste
- Any resin containing waste
- Fluorescent light tubes
- Oil (used and clean)
- Degreaser
- Explosives
- Brake fluid
- Transmission fluid
- Sewage

All the above-mentioned wastes will be handled to guidelines given by the competent authority.



#### 4 POLICY AND LEGISLATIVE CONTEXT

Relevant South African legislation requires various authorisations prior to the commencement of the Proposed Project. Although cognisance of all applicable legislation is being taken, the following table details the relevant environmental authorisations, which are required:

**Table 4: Competent Authorities**

Authorisation	Responsible Department	Relevant Act
S102 EMPr Amendment	DMR	MPRDA
Environmental Authorisation		NEMA
Waste Management License		NEMWA
Water Use License	DWS	NWA

As part of the Scoping Phase, and to ensure all relevant South African legislation was taken into consideration, the following legislation was considered relevant as part of the overall ESIA Process to ensure legal compliance and best practice.

- The Constitution of the Republic of South Africa (No. 108 of 1996)
- Mineral and Petroleum Resources Development Act (No. 28 of 2002)
- National Environmental Management Act (No. 107 of 1998)
- National Water Act (No. 36 of 1998)
- National Environmental Management Biodiversity Act (No. 10 of 2004)
- National Environmental Management Protected Areas Act (No. 57 of 2003)
- National Environmental Management Air Quality Act (No. 39 of 2004)
- National Environmental Management Waste Act (No. 59 of 2008)
- National Heritage Resources Act (No. 25 of 1999)
- National Forests Act (No. 84 of 1998)
- Fencing Act (No. 31 of 1963)
- Hazardous Substances Act (No. 15 of 1979)
- Occupational Health and Safety Act (No. 85 of 1993)
- Mine Health and Safety Act (No. 29 of 1996)
- Provincial Ordinances and Municipal By-laws
- Guidelines

**Table 5: Applicable Legislation relevant to the Proposed Project**

Applicable legislation and guidelines use to compile the report	Application
<p><b>Constitution of the Republic of South Africa (No. 108 of 1996)</b> Since 1994 South African legislation, including environmental legislation, has undergone a large transformation and various new laws and policies was promulgated with a strong emphasis on environmental concerns and the need for sustainable development. The Constitution of the Republic of South Africa (No. 108 of 1996) (the Constitution), the supreme law in South Africa, contains far reaching clauses relevant to the environment including the environmental right, the administrative justice clause, the access to information right as well as the liberalisation of <i>locus standi</i> rule.</p> <p>In terms of Section 24, a positive obligation is placed on the State to give effect to the environmental right. The environmental right states that:</p>	<p>The purpose of the ESIA Process is to identify activities that may cause environmental and socio-economic damage from the associated impacts occurring as a result of the proposed project. The impacts will be assessed, evaluated and mitigation measures developed to minimise the negative impacts and promote positive impacts associated with the proposed project, thereby ensuring that the project is undertaken in a sustainable manner. This</p>





Applicable legislation and guidelines use to compile the report	Application
<p><i>“Everyone has the right - To an environment that is not harmful to their health or well-being; and To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i></p> <ul style="list-style-type: none"> <li><i>- Prevent pollution and ecological degradation;</i></li> <li><i>- Promote conservation; and</i></li> <li><i>- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</i></li> </ul>	<p>also ensures that the applicant does not contravene Section 24 of the Constitution.</p> <p>The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an ongoing basis throughout South Africa. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.</p>
<p><b>Mineral and Petroleum Resources Development Act (No. 28 of 2002)</b></p> <p>The primary aim of the MPRDA is to recognise the sovereignty of the State over all the mineral and petroleum resources in South Africa and to promote equitable access to the Country’s resources. The MPRDA has a number of objectives, including to:</p> <ul style="list-style-type: none"> <li>• Promote equitable access to the nation’s mineral and petroleum resources to all the people of South Africa;</li> <li>• Substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation’s mineral and petroleum resources;</li> <li>• Promote economic growth and mineral and petroleum resources development in the country;</li> <li>• Provide for security of tenure in respect of prospecting, exploration, mining and production operations;</li> <li>• Give effect to Section 24 of the Constitution of South Africa 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; and</li> <li>• Ensure that holders of mining and production rights contribute towards the socio-economic development of the areas in which they are operating.</li> </ul> <p>The MPRDA concerns equitable access to, and sustainable development of, South Africa’s mineral and petroleum resources. The MPRDA makes provision for sustainable mining and requires:</p> <p>That every person who has applied for a mining right must conduct an EIA, determine the environmental baseline, and submit an EMPR to the DMR;</p> <p>That every holder of a mining reconnaissance permit, prospecting right, mining right, mining permit or retention permit must assess and</p>	<p>In accordance with section 102 of the MPRDA, the applicant is required to conduct a Scoping and Environmental Impact Report Process and submit an EMPR for approval to the North West DMR. Red Kite Environmental Solutions will compile the Environmental Impact Assessment and Environmental Management Programme Report in accordance with the MPRDA and NEMA.</p>



Applicable legislation and guidelines use to compile the report	Application
<p>communicate the impacts of the activity on the environment; The need to rehabilitate the environment affected by prospecting or mining operations to its natural or predetermined state; and That the directors of the mining company are liable for unacceptable impacts on the environment.</p>	
<p><b>National Environmental Management Act (No. 107 of 1998)</b> The NEMA is South Africa’s overarching environmental statute concerned with integrated environmental management (IEM) and the underlying principles by which environmental management must be undertaken. Its primary objective is to provide for co-operative governance, thus binding all organs of State by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance, and procedures for co-ordinating environmental functions exercised by organs of State and to provide for matters connected therewith (Government Gazette, 1998).</p> <p>The NEMA provides for the Constitutional right to an environment that is not harmful to the health and well-being of South African citizens, the equitable distribution of natural resources, sustainable development, environmental protection, and the formulation of environmental management frameworks (Government Gazette, 1998). Section 2 of NEMA sets out principles for sustainable integrated environmental governance; the principles are further detailed in subsequent sections of NEMA.</p> <p>Section 24(5), 24M and 44 of the NEMA enables the Minister to publish regulations pertaining to environmental impact assessments. The current Environmental Impact Assessment Regulations, GNR.326 (EIA Regulations), were published on 7 April 2017. Sections 24(2) and 24D of the NEMA make provision for the Minister to publish listed activities that would require environmental authorisation prior to commencement of that activity. The Minister published the following three Regulations in terms of Sections 24(2) and 24D of the NEMA on 4 December 2014: Regulation GNR.327 of 2017 which sets out a list of identified activities which may not commence without environmental authorisation from the competent authority and which must follow the Basic Assessment (BA) procedure as provided for in Chapter 4, Part 2 of the EIA Regulations; Regulation GNR.325 of 2017 which sets out a list of identified activities which may not commence without environmental authorisation from the competent authority and which must follow the scoping and EIA procedure as provided for in Chapter 4, Part 3 of the EIA Regulations; and Regulation GNR.324 of 2017, which sets out a list of identified activities per geographical area, which may not commence without environmental authorisation from the competent authority and which must follow the BA procedure as, provided for in Chapter 4, Part 2 of the EIA Regulations.</p>	<p>In terms of Section 24(2) and 24(D) of the NEMA, authorisation is required for the following listed activities identified in terms of the following, which is detailed in Section 2(d)(i):</p> <ul style="list-style-type: none"> <li>• GN325(6)</li> <li>• GN325(27)</li> <li>• GN325(15)</li> <li>• GN325(17)</li> <li>• GN327(12)</li> </ul>
<p><b>National Environmental Management Waste Act (No. 59 of 2008)</b></p>	



Applicable legislation and guidelines use to compile the report	Application
<p>The National Environmental Management Waste Act (No. 59 of 2008) (NEMWA) serves to reform the law regulating waste management in order to protect human health and the environment. This is managed by providing reasonable measures for the prevention of pollution and ecological degradation. The Act aims to secure ecologically sustainable development while promoting justifiable economic and social development. The Act provides national norms and standards for regulating the management of waste by all spheres of government, for specific waste management measures and for matters incidental thereto.</p> <p>In terms of the NEMWA, the Minister of the DEA may publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Furthermore, the NEMWA prohibits any person to commence, undertake or conduct a waste management activity except in accordance with the requirements or standards determined in terms of the NEMWA for that activity or where a WML has been issued in respect of that activity.</p> <p>A list of waste management activities that require a WML was published in GNR.921 of 2013. GNR.921 details three categories of activities: Category A activities, which require a BA process in terms of GNR.327 to be undertaken, and Category B activities, which require a scoping and EIA process in terms of GNR.325 to be undertaken, and Category C activities require compliance with relevant Norms and Standards.</p>	<p>The following activity is considered applicable to the Proposed Project, as detailed in Section 2(d)(i):</p> <ul style="list-style-type: none"> <li>• GNR.921, Category B, Activity 11</li> </ul>
<p><b>National Water Act (No. 36 of 1998)</b></p> <p>The NWA provides for fundamental reformation of legislation relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. The purpose of the Act is stated, in Section 2 as, inter alia:</p> <p>Promoting the efficient, sustainable and beneficial use of water in the public interest; Facilitating social and economic development; Protecting aquatic and associated ecosystems and their biological diversity; Reducing and preventing pollution and degradation of water resources; and Meeting international obligations.</p> <p>The NWA presents strategies to facilitate sound management of water resources, provides for the protection of water resources, and regulates use of water by means of Catchment Management Agencies, Water User Associations, Advisory Committees and International Water Management.</p>	<p>As required by Section 40 of the NWA, the following water uses will require a WULA in terms of Section 21 the NWA, which the North West DWS will be responsible for granting. It is understood that no aspects of the project may commence prior to receipt of the relevant WUL:</p> <ul style="list-style-type: none"> <li>• Section 21 (a) for the abstraction of groundwater;</li> <li>• Section 21(c) for impeding the flow in a water course;</li> <li>• Section 21(g) for the disposing of waste in a manner that may detrimentally impact on a water resource;</li> <li>• Section 21(i) for altering the bed, banks, course or natural characteristics of a watercourse; and</li> <li>• Section 21 (j) for removing, discharging or disposing of water found underground if it is necessary</li> </ul>



Applicable legislation and guidelines use to compile the report	Application
<p>As this Act is founded on the principle that the government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, an industry (including mines) is only entitled to use water if the use is permissible under the NWA.</p> <p>Section 21 of the NWA provides a list of water uses which require a WULA prior to commencement, unless listed in Schedule 1 (of the NWA) as an existing lawful use. Applying for a WULA triggers NEMA listed activities as contemplated in terms of GNR.984 and GNR.985 of 2014.</p> <p>Water use includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. A water use must be licensed unless it is listed in Schedule 1 (of the NWA), is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a license.</p> <p>In terms of the NWA, a watercourse is defined as follows: A river or spring; A natural channel in which water flows regularly or intermittently; A wetland, lake or dam into which the Minister may, by notice in the Gazette, declare to be a watercourse, and reference to a watercourse, which includes, where relevant, its beds and banks.</p> <p>Furthermore, in terms of the NWA, a wetland is defined as follows: 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.</p>	<p>for the efficient continuation of an activity or for the safety of people.</p>
<p><b>Government Notice Regulation 704 of 1999</b></p> <p>GNR.704 of 1999 under the NWA provides regulations on the use of water for mining and related activities aimed at the protection of water resources (requirements for clean and dirty water separation). GNR.704 requires inter alia the following: Separation of clean (unpolluted) water from dirty water; Collection and confinement of the water arising within any dirty area into a dirty water system; Design, construction, maintenance and operation of the clean water and dirty water management systems so that it is not likely for either system to spill into the other more than once in 50 years; Design, construction, maintenance and operation of any dam that forms part of a dirty water system to have a minimum freeboard of 0.8m above full supply level, unless otherwise specified in terms of Chapter 12 of the</p>	<p>Cognisance has also been taken with regards to Regulation 4, Regulation 6 and Regulation 7 of GNR.704. A storm water management plan will be developed for the proposed mining activities that identifies 'dirty' and 'clean' areas within the site. All 'dirty' areas will be constructed within a cut-off trench and routed to a pollution control dam (PCD). The water within the PCD may be used for processes, potable water and dust suppression.</p>



Applicable legislation and guidelines use to compile the report	Application
<p>Act; and</p> <p>Design, construction, and maintenance of all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years.</p> <p>GNR.704 also stipulates that no person in control of a mine or activity may:</p> <p>Locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood line or within a horizontal distance of 100 m from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked;</p> <p>Place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or</p> <p>Use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1:50 year flood line of any watercourse or estuary.</p>	
<p><b>National Environmental Management Air Quality Act (No. 39 of 2004)</b></p> <p>The National Environmental Management Air Quality Act (No. 39 of 2004) (NEMAQA) allows for national, provincial and local air quality standards to be established as well as the declaration of priority areas. In addition, the NEMAQA requires that Air Quality Management Plans (AQMP) form part of the environmental implementation plan or environmental management plans to be prepared by national departments or the Province as required by Chapter 3 of the NEMA. Furthermore, the NEMAQA requires municipalities to include an AQMP into its integrated development plan (IDP).</p> <p>The NEMAQA requires the Minister of the DEA to publish a list of activities which results in atmospheric emissions which may have a detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions, ecological conditions or cultural heritage. The NEMAQA requires that an atmospheric emissions licence (AEL) be obtained for such listed activities. Such a list of activities was published in GNR.248 of 2010.</p>	<p>No activities requiring authorisation in terms of GNR.248 of 2010 of NEMAQA will be undertaken.</p>
<p><b>National Environmental Management Biodiversity Act (No. 10 of 2004)</b></p> <p>In line with the Convention on Biological Diversity, the National Environmental Management Biodiversity Act (No. 10 of 2004) (NEMBA) aims to legally provide for biodiversity conservation, sustainable use and equitable access and benefit sharing. The Act establishes the South African National Biodiversity Institute (SANBI). The NEMBA creates a</p>	<p>One of the objectives of this Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and to ensure the sustainable use of indigenous</p>



Applicable legislation and guidelines use to compile the report	Application
<p>basic legal framework for the formation of a national biodiversity strategy and action plan and the identification of biodiversity hotspots and bio-regions which will then be given legal recognition. It imposes obligations on landowners (state or private) governing alien invasive species as well as regulates the introduction of genetically modified organisms. Furthermore, the Act serves to regulate bio-prospecting, making provision for communities to share the profits of any exploitation of natural materials involving indigenous knowledge.</p> <p>A restricted activity is defined by the NEMBA as, inter alia:                      In relation to a specimen of a listed threatened or protected species:</p> <ul style="list-style-type: none"> <li>- Hunting, catching, capturing or killing any living specimen of a listed threatened or protected species by any means, method or device whatsoever, including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen;</li> <li>- Gathering, collecting or plucking any specimen of a listed threatened or protected species;</li> <li>- Picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species;</li> <li>- Having in possession or exercising physical control over any specimen of a listed threatened or protected species; and</li> <li>- Conveying, moving or otherwise translocating any specimen of a listed threatened or protected species.</li> </ul> <p>In relation to a specimen of an alien species or listed invasive species:</p> <ul style="list-style-type: none"> <li>- Importing into the Republic, including introducing from the sea, any specimen of an alien or listed invasive species;</li> <li>- Having in possession or exercising physical control over any specimen of an alien or listed invasive species;</li> <li>- Growing, breeding or in any other way propagating any specimen of an alien or listed invasive species, or causing it to multiply; and</li> <li>- Conveying, moving or otherwise translocating any specimen of an alien or listed invasive species.</li> </ul> <p>Sections 52(1)(a) and 56(1) of the NEMBA state that the Minister may publish national lists of species and ecosystems, respectively, that are threatened or are in need of protection. A list of species that are threatened or are in need of protection was published in 2013 in GNR.389, with GNR.388 detailing the regulations relating to such species. These regulations are imposed where restricted activities involve specimens of listed threatened or protected species. GNR.388 defines the requirements of permitting and the process related thereto.</p> <p>GNR.1002, published in 2011, contains the first national list of threatened terrestrial ecosystems and provides supporting information to accompany the list, including the purpose and rationale for listing</p>	<p>biological resources. In addition to regulations on Threatened, Protected, Alien and Invasive Species in South Africa, the National Biodiversity Strategies and Action Plans (NBSAP) was formulated under the National Spatial Biodiversity Assessment (NSBA) and was used to identify Terrestrial and Aquatic Priority Areas and Threatened Ecosystems for biodiversity conservation.</p> <p>Chapter 4, Part 2 (Threatened and Protected Species Regulations) of NEMBA provides for listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival. In February 2007, this was achieved as the Minister of DEA published a list of Critically Endangered, Endangered, Vulnerable and Protected Species, according to Section 56(1) of the Act.</p>



Applicable legislation and guidelines use to compile the report	Application
<p>ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed terrestrial ecosystems. It also includes individual maps and detailed information for each listed ecosystem.</p>	
<p><b>National Environmental Management Protected Areas Act (No. 57 of 2003)</b></p> <p>The National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) concerns the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes, and includes inter alia:</p> <p>The establishment of a national register of all national, provincial and local protected areas;</p> <p>The management of those areas in accordance with national standards; and</p> <p>Inter-governmental co-operation and public consultation in matters concerning protected areas.</p> <p>The ESIA will take cognisance of the NEMPAA in order to ensure compliance with South African legislation.</p> <p>The NEMPAA defines various kinds of protected areas, namely: special nature reserves, national parks, nature reserves (including wilderness areas) and protected environments, world heritage sites, marine protected areas, specially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act (No. 84 of 1998), and mountain catchment areas declared in terms of the Mountain Catchment Areas Act (No. 63 of 1970).</p> <p>Part 4 of Chapter 4 of the NEMPAA (Sections 48 to 53) lists restrictions of activities that may not be conducted in a protected area (as described above). Activities that are restricted include:</p> <p>Prospecting and mining activities;</p> <ul style="list-style-type: none"> <li>- Activities that are restricted by:</li> </ul> <p>Regulations made by the Minister;</p> <p>Regulations made by the MEC, in the case of provincial and local protected areas;</p> <p>By-laws of the relevant municipality, in the case of local protected areas; and</p> <p>Internal rules made by the managing authority of the area;</p> <ul style="list-style-type: none"> <li>- Commercial and community activities where the survival of any species is negatively affected, or the integrity of an ecosystem is significantly disrupted; and</li> <li>- Any development or other activity that is inappropriate for the area given the purpose for which the area was declared.</li> </ul>	<p>Cognisance will be taken of existing and proposed protected environments.</p>



Applicable legislation and guidelines use to compile the report	Application
<p><b>National Heritage Resources Act (No. 25 of 1999)</b></p> <p>The National Heritage Resources Act (No. 25 of 1999) (NHRA) established the South African Heritage Resources Agency (SAHRA) in 1999. SAHRA is tasked with protecting heritage resources of national significance. With regard to heritage sites, sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, dolomitic land and ridges, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure. A heritage site means a place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.</p>	<p>In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) the South African Heritage Resources Agency (SAHRA) is a commenting authority in terms of this application.</p> <p>A Heritage Assessment will be undertaken for the project footprint and the SAHRA will provided with EIA and EMPr for commenting purposes.</p>
<p><b>National Forest Act (No. 84 of 1998)</b></p> <p>The purpose of the NFA is as follows:  Promotion of the sustainable management and development of forests for the benefit of all;  Creation of the conditions necessary to restructure forestry in the State’s forests;  Provision of special measures for the protection of certain forests and trees;  Promotion of the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;  Promotion of community forestry; and  Promotion of greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.</p> <p>One of the objectives of this Act is to provide special measures for the protection of certain forests and tree species and to promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. Section 15(1) – No protected tree may be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold; except under license granted by the DWS/ DEA (or a delegated authority). GNR.767 of 2005 and GNR.716 of 2012 comprise lists of protected tree species under the National Forests Act (No. 84 Of 1998). The criteria used to select tree species for inclusion in the protected tree list are:  Red List Status (rare or threatened species);  Keystone Species Value (whether species play a dominant role in an ecosystem’s functioning);  Sustainability of Use (whether a species is threatened by heavy use of its products such as timber, bark etc.);  Cultural or Spiritual Importance (outstanding landscape value or spiritual meaning attached to certain tree species); and  Other legislation (whether a species is already adequately protected by other legislation).</p>	<p>One of the objectives of this Act is to provide special measures for the protection of certain forests and tree species and to promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. In terms of Section 15(1) of the National Forests Act (no.84 of 1998), protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the relevant authority.</p> <p>The potential for specific protected forests and tree species may occur within the project area and cognisance needs to be taken of the NFA.</p>





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<p><b>Fencing Act (No. 31 of 1963)</b></p> <p>The aim of the Fencing Act (No. 31 of 1963) is to consolidate the laws relating to fences and the fencing of farms and other holdings. When a landowner erects a fence in a designated area, he/ she may insist that the adjacent owner contribute towards the erection or maintenance costs. In areas where contributions are not mandatory/ have not been published in the Government Gazette, a contribution can be claimed from the adjacent owner if the fence offers beneficial use for such a person. The Act also makes provision for a mechanism to deal with disputes between adjacent owners regarding a contribution towards erecting or repairing a fence.</p>	<p>Of specific importance, section 17 requires that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora.</p>
<p><b>Hazardous Substances Act (No. 15 of 1979)</b></p> <p>The object of the Act is inter alia to 'provide for the control of substances which may cause injury or ill health to, or death of, human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances; for the control of electronic products; for the division of such substances or products into groups in relation to the degree of danger; for the prohibition and control of such substances.'</p> <p>In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity, and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule.</p>	<p>Dangerous substances contained onsite during the construction, operation and closure phases of the Proposed Project will need to be management in accordance with the Act and safety data sheets (SDS) will need to accompany all dangerous goods (hydrocarbons, cleaning chemicals, paints, etc.).</p>
<p><b>Mine Health and Safety Act (No. 29 of 1996)</b></p> <p>The Mine Health and Safety Act (No. 29 of 1996) (MHSA) aims to protect and promote the health and safety of employees and persons that may be affected by the activities at a mine and outlines both the rights and responsibilities of an employer, as well as the obligations of employees working thereat.</p> <p>The MHSA was developed "to provide for protection of the health and safety of employees and other persons at mines". That said the Act also provides and/ or promotes the following:</p> <ul style="list-style-type: none"> <li>A culture of health and safety;</li> <li>The enforcement of health and safety measures;</li> <li>For appropriate systems of employee, employer and State participation in health and safety matters;</li> <li>The establishment of representative tripartite institutions to review legislation, promote health and enhance properly targeted research;</li> <li>For effective monitoring systems and inspections, investigations and inquiries to improve health and safety;</li> <li>Promotion of training and human resources development;</li> <li>Regulation of employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety;</li> <li>Entrenchment of the right to refuse to work in dangerous conditions;</li> </ul>	<p>The following principles are considered applicable to the Proposed Project and are detailed below:</p> <ul style="list-style-type: none"> <li>• The primary responsibility for ensuring a health and safe working environment in the mining site is placed on the mine owner. The Act sets out in detail the steps that employers must take to identify, assess records and control health and safety hazards in the mine;</li> <li>• The right of workers to participate in health and safety decisions, the right to receive health and safety information, the right to training and the right to withdraw from the workplace in face of danger;</li> <li>• The Act requires the establishment of institutions to promote a culture of health and safety and develop policy, legislation and regulations; and</li> </ul>



Applicable legislation and guidelines use to compile the report	Application
<p>To give effect to the public international law obligations of the Republic relating to mining health and safety; and                      To provide for matters connected therewith.</p>	<ul style="list-style-type: none"> <li>The responsibility for enforcing MHSA lies with the Mine Health and Safety Inspectorate. The Inspectorate's powers are recast and include the power to impose administrative fines upon employers who contravene the MHSA. The Act also contains innovative approaches to the investigation of accidents, diseases and other occurrences that threaten health and safety.</li> </ul> <p>The applicant will be required to comply with all obligations contained in the MSHA.</p>
<p><b>Occupational Health and Safety Act (No. 85 of 1993)</b>                      The Occupational Health and Safety Act (No. 85 of 1993) (OHSA) provides a legislative framework for the provision of reasonably healthy and safe conditions in the workplace. It also places extensive legal duties on employees and users of machinery and makes major inroads on employers' and employees' common law rights.</p> <p>OHSA contains provisions that impose general obligations with regard to health and safety. More detailed and specific obligations can be found in the regulations published in terms of OHSA. These include environmental, general safety, electrical machinery, driven machinery, electrical installation, construction, asbestos, hazardous chemicals substances and noise.</p> <p>The OHSA addresses, amongst others:                      Safety requirements for the operation of plant machinery;                      Protection of persons other than persons at work against hazards to health and safety, arising out of, or in connection with, the activities of persons at work;                      Establishment of an advisory council for occupational health and safety; and                      Provisions for matters connected herewith.</p>	<p>The OHSA is applicable and states that any person involved with construction, upgrades or developments for use at work or on any premises shall ensure as far as reasonably practicable that nothing about the manner in which it is installed, erected or constructed makes it unsafe or creates a risk to health when properly used.</p>
<p><b>Subdivision of Agricultural Land Act (No. 70 of 1970)</b>                      This Act regulates the subdivision of agricultural land and its use for purposes other than agriculture. The Directorate of Resource Conservation is responsible for the enforcement thereof. Investigations are done by the Provincial Department in support of the execution of the Act. The Act also deals with aspects associated with rezoning land.</p>	<p>If agricultural land, that is productive in terms of food and/ or fibre production, becomes subdivided in some way as to make the reduced land parcel(s) uneconomic or unsustainable, then agricultural production is diminished. Such actions should be resisted wherever possible, especially where the prevailing agricultural potential is high.</p>



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<p><b>Promotion of Access to Information Act (No. 2 of 2000)</b> The Promotion of Access to Information Act (No. 2 of 2000) (PAIA) recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their right.</p>	<p>Cognisance will be made of the PAIA.</p>
<p><b>Promotion of Administrative Justice Act (No. 3 of 2000)</b> The purpose of the Promotion of Administrative Justice Act (No. 3 of 2000) (PAJA) is to govern the actions of the administration and to ensure good administrative practice, by laying down the minimum procedural requirements related to decision-making. As such, PAJA applies to all actions of the administrators, in particular environmental administrators.</p> <p>Section 1 of PAJA deals with procedures to be followed in the granting, suspending or revoking of permissions (licences, grants, permits). Sections 3 and 4 of PAJA deal with fair procedure, which requires the administrator to act in a fair manner when making a decision. Section 5 of PAJA governs the provision of reasons by the administrator and determines that an administrator provide reasons after a decision has been made (or whilst taking it), in order to justify the decision.</p>	<p>Cognisance will be made of the PAJA.</p>
<p><b>Provincial Ordinances and Municipal By-laws</b> In addition to national legislation, some of South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution of South Africa.</p>	<p><u>The North West Biodiversity Management Act, 2016 (Act No. 4 of 2016)</u></p> <p>The North-West Biodiversity Management Act, 2016 (Act No. 4 of 2016), Provincial Notice 3 of 2017 (GN No. 7721 of 3 January 2017) are applicable to the said development. This Act was amended by the North West Biodiversity Amendment Bill, 2017, Government Gazette Notice 171 of 2017 (published August 2017).</p>
<p><b>Applicable Guidelines and Forums</b> Relevant guidelines have been developed in order to assist in sustainable development within South Africa. The following guidelines are considered applicable to the Proposed Project.</p>	<ul style="list-style-type: none"> <li>• Department of Water Affairs: Best Practice Guideline Series <ul style="list-style-type: none"> <li>– DWAF: Best Practice Guideline G1: Storm Water Management;</li> <li>– DWAF: Best Practice Guideline G2: Water and Salt Balances; August 2006;</li> <li>– DWAF: Best Practice Guideline A4: Pollution Control Dams (PCDs);</li> </ul> </li> </ul>



Applicable legislation and guidelines use to compile the report	Application
	<ul style="list-style-type: none"> <li>- DWAF: Best Practice Guideline GH: Water Reuse and Reclamation, June 2006;</li> <li>- DWAF: Minimum Requirements Guideline for the Handling, Classification and Disposal of Hazardous Waste, 1998;</li> <li>- DWAF: Minimum Requirements Guideline for the Water Monitoring at Waste Management Facilities;</li> <li>- SA Water Quality Guidelines – Aquatic Ecosystems, 1996, and</li> <li>- SA Water Quality Guidelines – Domestic Water Use, 1996.</li> <li>• The Mining and Biodiversity Forum of South Africa</li> <li>• Mining and Biodiversity Guideline</li> <li>• Mining and Biodiversity Forum of South Africa</li> <li>• Mining and Biodiversity Guideline</li> <li>• National Spatial Biodiversity Assessment</li> <li>• South Africa’s National Biodiversity Strategy and Action Plan</li> <li>• Threatened, Protected, Alien and Invasive Species Regulation</li> <li>• National Aquatic Ecosystem Health Monitoring Programme and River Health Programme</li> <li>• North West Biodiversity Sector Plan</li> </ul>
<p><b>Principles of Sustainability</b></p> <p>According to the DMR (formerly known as the Department of Minerals and Energy) (Swart, 2007), the mining sector in South Africa aims to promote its vision of ‘sustainable development’ by enabling South Africans to make balanced and informed decisions regarding the extraction and utilisation of mineral resource, by measuring and assessing progress towards sustainable development objectives and by minimising negative impacts and optimising environmental management in the mining sector.</p> <p>The most widely accepted definition of sustainable development is provided in the World Commission of Environment and Development in its landmark report Our Common Future (the Brundtland Report) ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’</p>	<p>It is understood that the definition of sustainability may not necessarily encompass the underlying factor that a non-renewable resource will be extracted. However, principles of sustainability should be incorporated into the applicant’s corporate philosophy, including aspects such as economy (e.g., chrome export, etc.), social (e.g., long-term job employment, skills development, implementation of the Social and Labour Plan, etc.) and environmental programmes (e.g., adequate implementation of mitigation measures,</p>



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<p>A core principle in sustainable development is the 'precautionary principle' which implies that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p> <p>According to the Australian Centre for Sustainable Mining Practices (2011), sustainable development in the mining sector suggests that investments in mining projects should be financially profitable, technically appropriate, environmentally sound and socially responsible (i.e., balance economic, environmental and social aspects and guarantee the advantage for humanity at present and in the future).</p> <p>Businesses involved in extracting non-renewable resources should embrace the concept of sustainability into strategic decision-making processes and operations. In addition, responsible corporations can theoretically move towards sustainability by developing a range of appropriate socio-economic initiatives. Economic development, environmental impact and social responsibilities should be well managed, and productive relationships should exist between governments, industry and stakeholders.</p>	<p>environmental offsets, etc.) in order to benefit future generations whilst meeting the needs of present citizens.</p>



## 5 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

South Africa is the world’s largest producer of chrome ore and has the available infrastructure and ample capacity to accommodate in-country processing and beneficiation. Regional smelting and converting plants across the Bushveld Complex allow for easy access to these facilities. The largest ferrochrome furnaces located on the Western limb, near the Kookfontein project, include:

- Boshhoek, Wonderkop and Rustenburg smelters, owned and operated by the Glencore-Merafe Chrome Venture.
- TC Smelters and Dikwena (previously Heric Ferrochrome) smelters, owned and operated by Samancor.
- Buffelsfontein Smelters owned and operated by International Ferro Metals.
- Mogale Alloys smelter owned and operated by Afarak.

In addition to local offtake opportunities made available by the abundance of smelters in the locality of the Kookfontein project, the Eastern limb of the same Bushveld Complex supports its own vast complement of furnaces (refer to Figure 5 1).

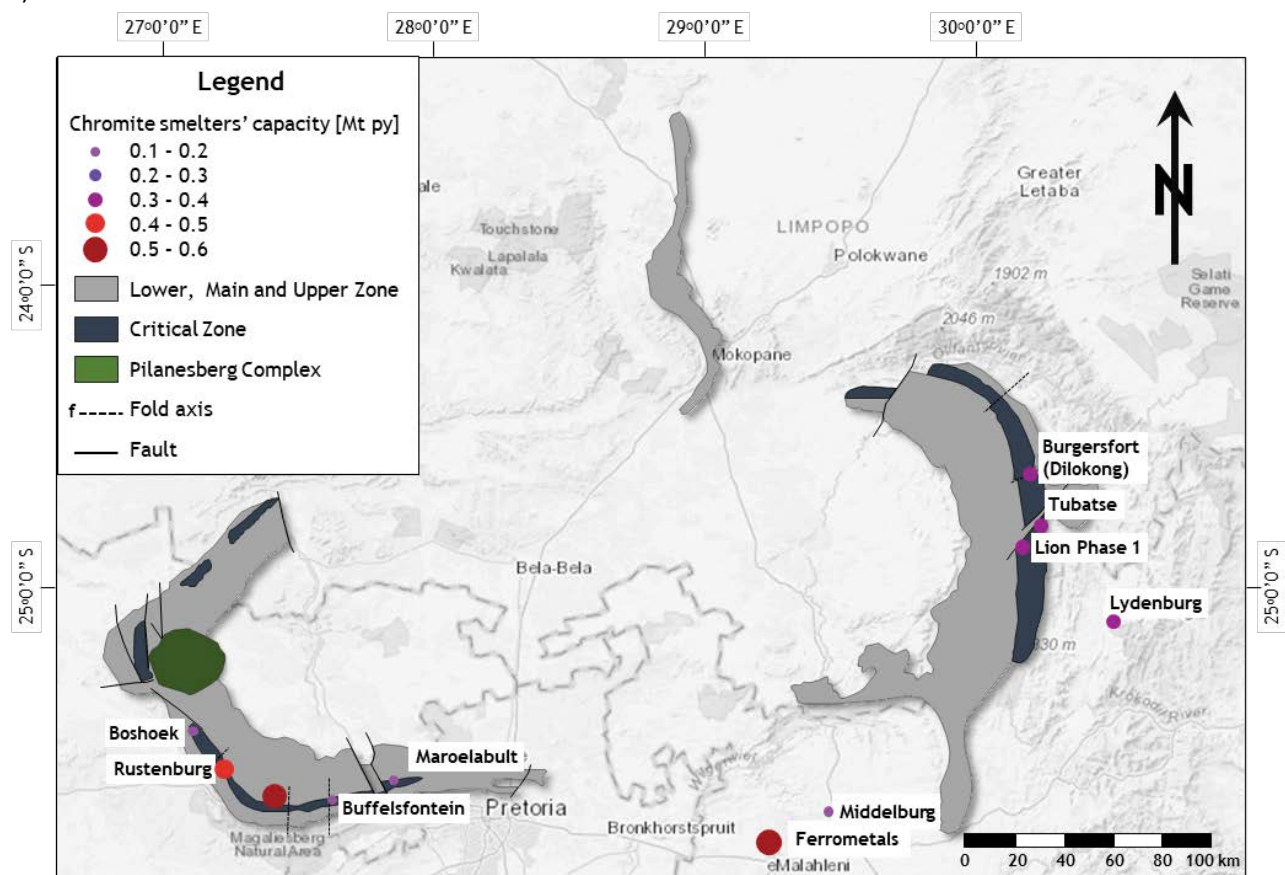


Figure 9: Location and ferrochrome capacity of chromite smelters in the Bushveld Complex (Deutsche Rohstoffagentur, 2015)

Roughly half of all the chrome ore that is produced in South Africa is exported for smelting into ferrochrome (Tharisa PLC, 2017). Opportunities for out-of-country beneficiation for chromite concentrate have been steadily increasing since 2018, along with the growth in Asian-centric ferrochrome production capacity, most notably in China, India, Indonesia and Taiwan.

### Summary of Product Consumers

Chromium, the metal contained in chromite ore, is consumed in the form of ferrochromium for the primary purpose of stainless-steel production. According to research agency Roskill, 95% of the world’s chrome consumption is attributable to metallurgical applications, with stainless steel representing 78% of consumption in 2019. Trends in stainless steel



production are, therefore, the main determinant for chromium demand.

A summarized list of product consumers, in the form of end-use industries for stainless steel and selected industrial and consumer products containing stainless steel are shown in the figure below.

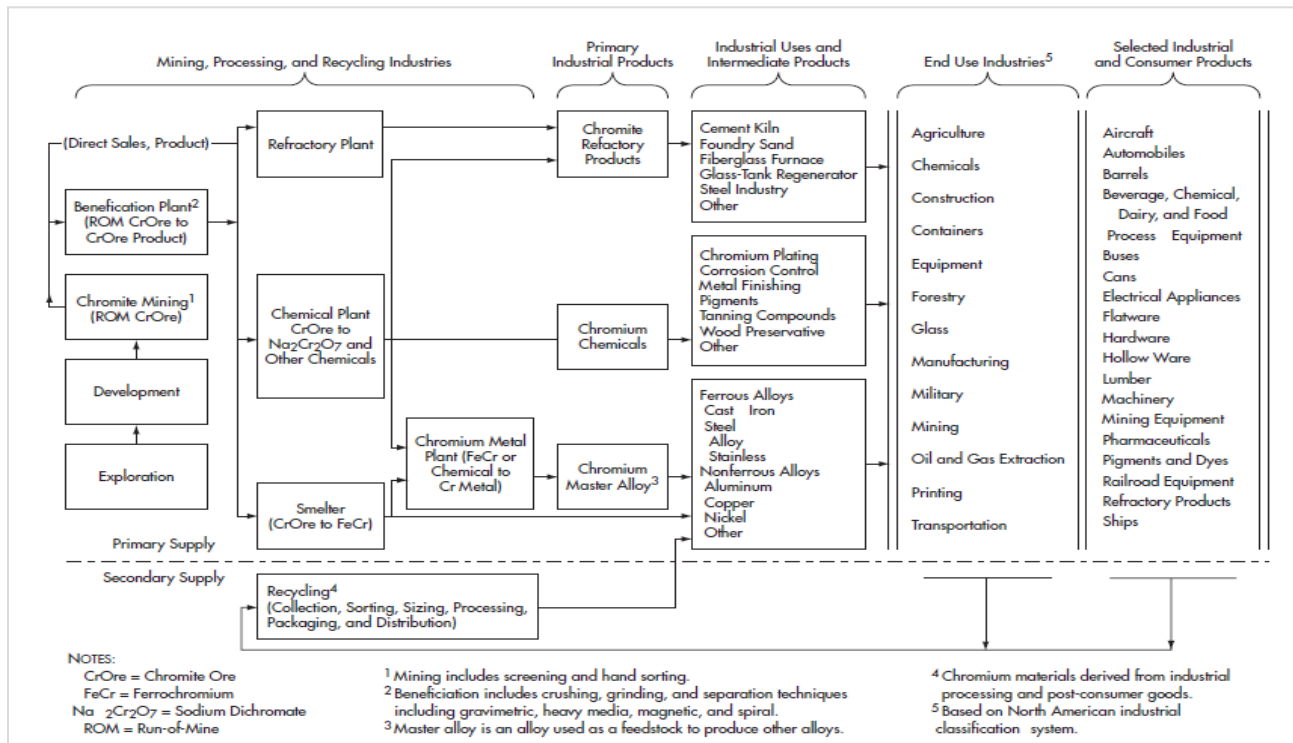


Figure 10: Chromium material flow from chromite ore mining to end use (SME Inc, 2009)

The proposed development of the Kookfontein Mine will entail the following positive impacts:

- Social upliftment;
- Job Creation with area;
- Growth of economy;
- Increased health services and medical assistance;
- Contribution of infrastructure within in area; and
- Educational upliftment.

Thus, from all the information given above the proposed Kookfontein Mine, if executed according to environmental guidelines and legislation should benefit the economy of SA as a whole, the people living in proximation to the mine, and all other industries dependent on mining for their income.

During the EIA Phase of the project and as part of the EIA Report the motivation regarding the Need and Desirability of the project will be expanded and discussed specifically regarding environmental aspects.

## 6 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Mining Works Programme makes provision for a Life of Mine (LOM) of 10 years, which includes the operation of the wash plant, followed by 3-5 years of rehabilitation. Therefore, 15 years in total.



## 7 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED SITE

The sites for the proposed opencast mining operations were selected based on availability of the chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.

The sites for the infrastructure related to the proposed mining operations are located at the various points which are practical for the mining and would have the least impact on the surrounding environment. The areas used for infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities onsite, provide details of the alternatives considered with respect to:

1. The property on which or location where it is proposed to undertake the activity
2. The type of activity to be undertaken
3. The design or layout of the activity
4. The technology to be used in the activity
5. The operational aspects of the activity
6. The option of not implementing the activity

The details of the alternatives considered are described in the sections below. The alternatives will be investigated in detail during the EIA Phase following completion of the relevant specialist studies.

### 7.1 Site Alternatives

The sites for the proposed opencast operations were selected based on availability of the chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.

The sites for the infrastructure related to the proposed mining operations are located at the various points which are practical for the mining and would have the least impact on the surrounding environment. The areas used for above ground infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered “secondary alternatives”. These areas have been determined from a preliminary evaluation of how they are most optimally configured:

- As far as feasible, outside of the 1:100 flood line.
- Away from potentially sensitive receptors, such as residences and heritage sites.
- Outside of established Eskom reserves.
- Favouring of areas for the proposed footprint on land previously disturbed farming and agricultural land.

The exact details and detailed layout plans for the infrastructure has not yet been determined, and will be evaluated within the EIA process.

During the alternative analysis in the EIA phase, a detailed assessment will be done of all these areas, to determine which of the areas would be most suitable for infrastructure, taking into consideration environmental conditions, topography, financial feasibility, the linkage between pit and surface infrastructure, access to various parts of the site and existing infrastructure.





## 7.2 Design and Layout Alternatives

### 7.2.1 Waste Stockpiles and Opencast

The proposed site layout was selected using the following guidelines, as well as the criteria set in Table 6:

- taking the position of the chromitite ore body into account;
- taking areas that have been previously disturbed into account;
- to suit the mine process flow. The process flow requires that the run of mine (ROM) be fed from the opencast area to the ROM stockpile which is situated near the plant. The selected site location prevents unnecessary material handling and ensures a compact arrangement; and
- the specific ecological sensitivities of the site in question (e.g., site biodiversity, proximity to water resources, presence/absence of elements of cultural or historic significance and/or the presence/absence of high agricultural potential soils).

The consideration of layout alternatives must also, however, ensure that such alternatives are also indeed reasonable and feasible in respect of the logistical, engineering and financial constraints applicable to the project. With this in mind, layout alternatives were considered for the placement of what were deemed to be the major surface structures and infrastructure associated with the project; where the greatest opportunity to minimise environmental impacts was identified.

Consideration will be given to the placement of the various new activities in relation to –

- The extent to which the placement thereof fragments soils with high agricultural potential;
- The extent to which the placement of the mine stockpiles can be consolidated with respect to
  - the potential, collective, visual intrusion thereof on the landscape, as well as
  - the collective pollution generating potential thereof.

Mine stockpiles as listed in Table 3 include the following:

- Waste rock stockpiling;
- ROM stockpiling;
- Temporary topsoil storage/and removal;
- Overburden stockpiles; and
- Tailings Storage Facilities.

The layout of the proposed infrastructure, relating to the mining activities, was also based on the location of watercourses in the vicinity of the mining area. The layout of the proposed infrastructure will also be located outside the 100 m buffer, where feasible.

**Table 6: Mine Infrastructure Arrangement Selection**

Aspect	Description
<b>Proposed project site.</b>	In generating alternatives, consideration was given to available space, topography and the location of sensitive receptors and environmental features.
<b>Material transport and process flow</b>	Waste rock: Material will be transported by truck, close proximity to the opencast and to cater for the waste rock that will be generated as part of the opencast footprint.
<b>Soils</b>	Dumps and infrastructure to be placed on soils with the least agricultural potential, as far as feasible.
<b>Potential dust nuisance to residence</b>	Mining activities will be placed as far as possible from any residences.
<b>Potential for contamination of</b>	All waste facilities and mine infrastructure will be located at least 100 m from any streams, or outside the 1:50 year flood lines of any water course, as far as possible.



Aspect	Description
surface water.	Although, the development of a new opencast pit across a watercourse, to access the chromitite on the Mining Right area, is proposed as part of the application, which will be included and managed according to the WUL issued for the project.
Geology and fracture/ fault intensity	Waste disposal sites and, to the extent practically possible, the mine infrastructure, should be not be located on any major aquifer.
Potential exposure to spills and seepage	Facilities that could release contaminants to the groundwater should as far as practically possible be sited away from major fractures or surface water resources.
Safety	Safety considerations include haul road distances.
Integration with the process	The layout of the infrastructure and waste facilities must be suitable to the process flow.
Relative Pollution potential of each facility	The relative pollution potential of each waste type and the plant were considered in assessing the relative risk posed by waste material to surface and groundwater contamination.
Potential ecological harm due to spill	Facilities that could release contaminants to the groundwater should as far as practically possible be sited away from major fractures or surface water resources.
Visual intrusion	No feasible alternatives were identified for this impact.

### 7.2.2 Storm water Management and PCD's Layout

Storm water infrastructure will need to be constructed to cater for the proposed mining area. Pollution control dams (PCD) will be required for the storage of contaminated water originating from the mining activities. Water contained within the PCD will be utilised for dust suppression. The PCD will be designed by an engineer as part of the Storm Water Management Plan and should be lined and constructed in accordance with the Department of Water and Sanitations Best Practice Guidelines. The proposed storm water management infrastructure will be placed so as to ensure compliance with GN704 to separate clean and dirty storm water thus no alternatives were investigated and the final layout plan as proposed by the Engineers will be constructed.

### 7.2.3 Tailings Dam

The site selection for the TSF is based largely on the following:

- Geotechnical and topography considerations
- Optimisation of the wash plant process flow
- Outside of the 1:100 flood line
- Away from potentially sensitive receptors, such as residences and heritage sites.
- Outside of established Eskom reserves.

## 7.3 Activity Alternatives

Alternative activities to the mining currently taking place is grazing of livestock, crop production, residential developments and wilderness. Alternate developments are likely to reduce potential income in the area in terms of salaries and the GDP for the economy and thus is not the preferred activity.

## 7.4 Process Alternatives

Options pertaining to the alternatives with regards to the processes to be used on site will be evaluated in more details and the options will be taken into consideration to ensure the most efficient ore extraction and processing methods are used. Various options will also be investigated pertaining to the proposed infrastructure which will be required for the proposed mining operations in determining that the correct and most viable process alternatives are acquired.



## **7.5 No Go Option**

The no-go option refers to the alternative of the proposed development not going ahead at all. This alternative will avoid potentially positive and negative impacts on the environment and the status quo of the area would remain. The implications of the no-go option will be evaluated as part of the EIA, focusing on comparing potential impacts from the proposed project with the status quo and will be particularly relevant should it be found that detrimental impacts cannot be managed to an acceptable level.



## **8 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED**

Red Kite Environmental Solutions conducted the public participation activities in such a way to involve the necessary I&APs.

Refer to Appendix 5 for full details of the Public Participation Process undertaken to date.

The following groups were identified as potential Interested and Affected Parties (I&APs):

- Community Representatives and Members;
- Relevant Government Departments;
- Relevant Institutional/Organisational Representatives;
- Relevant Municipal Representatives, including the relevant Ward Councillors;
- Landowners/Occupiers;
- Directly affected Surrounding Landowners/Occupiers;
- Land Claimants; and
- Non-Government Organisations and Agencies.

### **8.1 Notification of I&APs**

#### **Site Notices**

To inform surrounding and immediate communities, landowners, mine workers and passers-by of the proposed project, A2 notices will be erected at visible and accessible localities throughout the study area. These will be erected at appropriate points in pairs consisting of one English Notice and one Setswana Notice. Photographic evidence of the site notices to be erected will be attached to the Final Scoping Report and succeeding reports for submission to the relevant Departments.

#### **Newspaper Advertisements**

To inform a broad base of individuals who might want to register as I&APs, newspaper advertisements will be placed in one local newspaper and one regional newspaper. Consultations will be held with the Royal Bafokeng Nation to determine the most appropriate newspapers for advertisement placement.

#### **Written Notifications**

Identified I&APs will be directly informed of the application processes and availability of the reports for Public Commenting by means of email and hand delivery, as well as by Text Message (SMS). Proof of written notifications sent will be provided in the Final Scoping Report and succeeding reports for submission to the relevant Departments.

### **8.2 Notification of I&APs of Reports Availability**

Potential I&APs will be informed of the availability of the Draft Reports for Public Commenting in due course. I&APs will be encouraged to submit any comments or questions on or before the relevant commenting closing date. Notifications will be sent by means of advertisements, site notices, hand delivery, email and text message (SMS). Acknowledgement of receipt for the hand delivered documents for Public Commenting will be attached to the Final Scoping Report and succeeding reports for submission to the relevant Departments. Further to the hard copies left at the relevant Community Representatives a Dropbox link to an electronic copy will also be provided in email notifications, whereas all other notifications will specify that the link could be provided upon request from the Environmental Assessment Practitioner.

### **8.3 Access and Commenting Opportunity**

#### **Registration and Draft Scoping Report**

A 30-day commenting period will be provided for as part of the Registration and Draft Scoping phase of this Public Participation Process. This will be conducted in line with Section 41(4)(ii) of the National Water Act (NWA), 1998 (Act No. 36 of 1998) which indicates that a commenting period of no less than 60 days should be provided for and in accordance with Clause 3(8) of the NEMA EIA Regulations (GN No. 326 of 07 April 2017) which indicates that any public participation process must be conducted for a period of at least 30 days. However, note that the entire process will remain transparent and allow for I&APs to register and comment throughout. The local community will be taken into consideration by distributing



hard copies of the relevant documents for Public Commenting to the Representatives of the Royal Bafokeng Nation. Furthermore, as mentioned earlier in this report a Dropbox link to an electronic copy will also be provided to ensure easy access to the documents available for public commenting.

#### **Draft EIA Report and Draft WULA**

A 30-day commenting period will be provided for as part of the Draft EIA and Draft WULA phase of this Public Participation Process. This will be conducted in line with Section 41(4)(ii) of the National Water Act (NWA), 1998 (Act No. 36 of 1998) which indicates that a commenting period of no less than 60 days should be provided for and in accordance with Clause 3(8) of the NEMA EIA Regulations (GN No. 326 of 07 April 2017) which indicates that any public participation process must be conducted for a period of at least 30 days. However, note that the entire process will remain transparent and allow for I&APs to register and comment throughout. The local community will be taken into consideration by distributing hard copies of the relevant documents for Public Commenting to the Representatives of the Royal Bafokeng Nation. Furthermore, as mentioned earlier in this report a Dropbox link to an electronic copy will also be provided to ensure easy access to the documents available for public commenting.

#### **8.4 Public Participation Meetings**

The option of holding Public Participation Meetings and/or Key Stakeholder Meetings will be discussed with the Royal Bafokeng Nation. All registered I&APs will be informed of the meetings (dates, time, venue etc.) should these become a requirement.

#### **8.5 Regulatory Consultation**

Commenting Authorities include the following Departments:

- Department of Mineral Resources and Energy;
- North West Department of Economic Development, Environment, Conservation and Tourism;
- Department of Water and Sanitation;
- Department of Agriculture, Land Reform and Rural Development;
- South African Heritage Resources Agency;
- Rustenburg Local Municipality; and
- Bojanala Platinum District Municipality.

#### **8.6 Disclosure of I&APs' Interests**

All registrations, comments, questions, etc. by all means received will be made available to the public and Departments to view. No discussions will be kept private.

#### **8.7 Registrations and Comments Received**

Identified I&APs will be encouraged to submit their Registration and Response forms to Red Kite Environmental Solutions for them to receive further correspondence regarding the Kookfontein Mine project currently underway. However, comments and registrations received via all methods (Registration Forms/email/telephonic/public participation meeting) will be captured and will be provided in the Final Scoping Report and succeeding reports for submission to the relevant Departments.

#### **8.8 Addressing Comments and Concerns**

An Issues and Response Report will be compiled as part of the Public Participation Process for the Kookfontein Mine project currently underway. This document will record the issues of concern, questions and suggestions contributed by stakeholders during the course of the Integrated Environmental Authorisation Process and the Water Use License Application Process. This report will also include the responses provided by relevant parties.

It should be noted that the Issues and Response Report is an active document which will be updated throughout the process as comments and concerns are received. However, following submission of all final documents to the Department of Mineral Resources and Energy, all additional comments should be directed directly to the Department.



## 9 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES

This Section provides a brief description of the existing biophysical and built/social environment within the immediate vicinity of the proposed activities. It draws on existing knowledge from previous investigations, discussions with various role-players, site visits and the project team’s knowledge. It serves to present the context against which the potential positive and negative impacts associated with the various aspects of the proposed project can be identified.

The information in this section is largely sourced from the EIA and specialist studies performed for Nuco Chrome Bophuthatswana (Pty) Ltd from 2005 till 2019. The specialist studies were undertaken for various applications over the Kookfontein Mining Right areas (NW525 MR and NW 10154 MR). The map below illustrates the locality of the Mining Right areas.

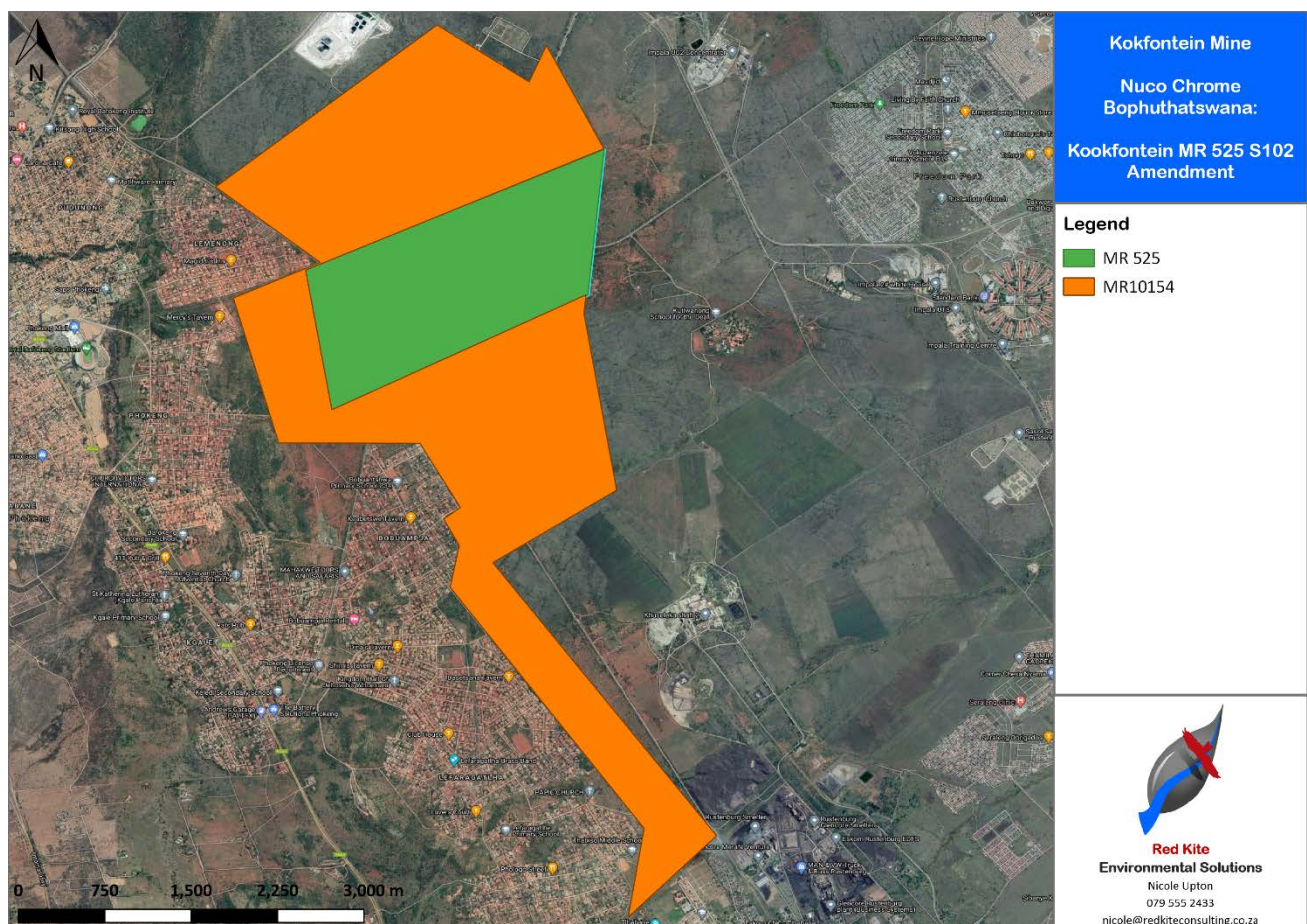


Figure 11: Kookfontein Mine consolidated project area

### 9.1 Regional Location

The site is situated on Portions 5, 8, 11 and 19 of the farm Kookfontein 265 JQ. The operation falls in the North-West Province under the jurisdiction of Rustenburg Local Municipality, situated within the Bojanala Platinum District Municipality. The mining area is located just off the R565 road, approximately 3 km east of Phokeng and 5 km north north-west of Rustenburg and falls in the topographical area 2527CA (Quarter degree square grid cell).

### 9.2 Climate

This area is characterised by summer rainfall and dry winters with a Mean Annual Precipitation that ranges between 600 mm and 700 mm. Mean monthly maximum and minimum temperatures are 35.3°C and -1.4°C for December and July,



respectively.

### 9.2.1 Temperature

Warm to very hot summers and cold winters are typical for this area. According to Figure 1, the highest temperatures are observed during the summer months (December – February), with maximum hourly average temperatures detected between 14:00 – 15:00. Minimum temperatures are typically during winter months (June – August), with minimum hourly average temperatures detected between 05:00 – 07:00.

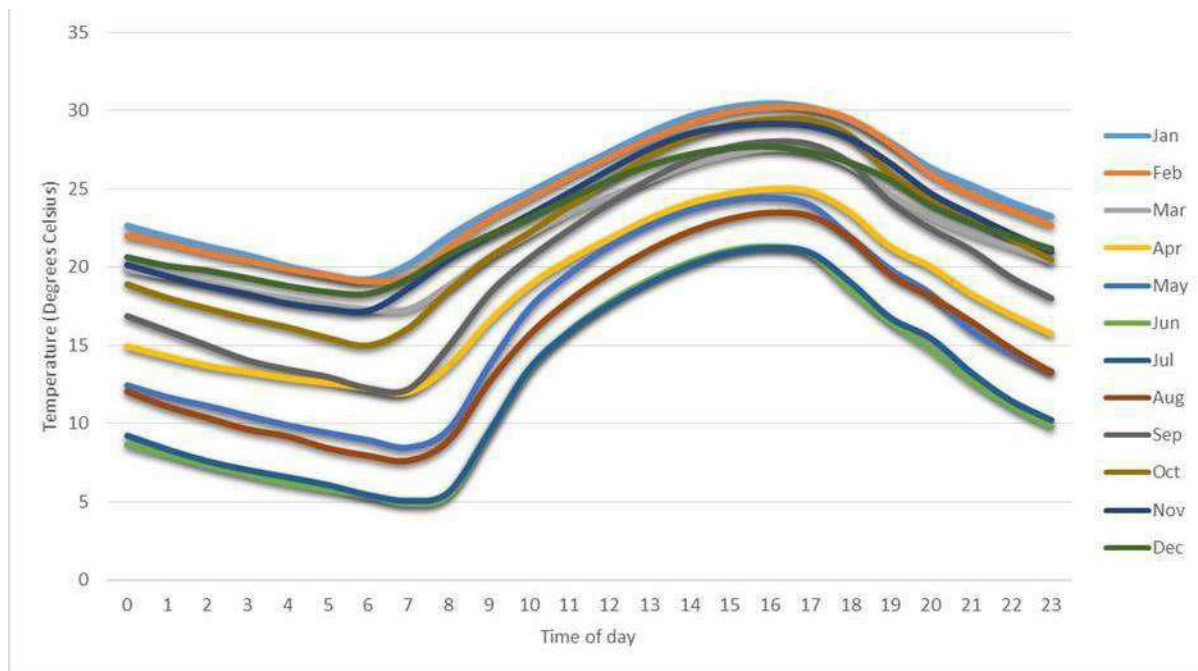


Figure 12: Monthly diurnal temperature (°C) profiles for Nuco Chrome Mine for the period January 2012 - December 2014.

### 9.2.2 Precipitation and Evaporation

The Mean Annual Precipitation (MAP) for the area is ranges from approximately 570 mm to 670 mm per annum. Figure 2 shows monthly rainfall data for the period January 2012 to December 2014. The area experiences spring and summer rainfall, receiving most of its rainfall in September to March. Little to no rainfall is observed during the winter season from June to August.



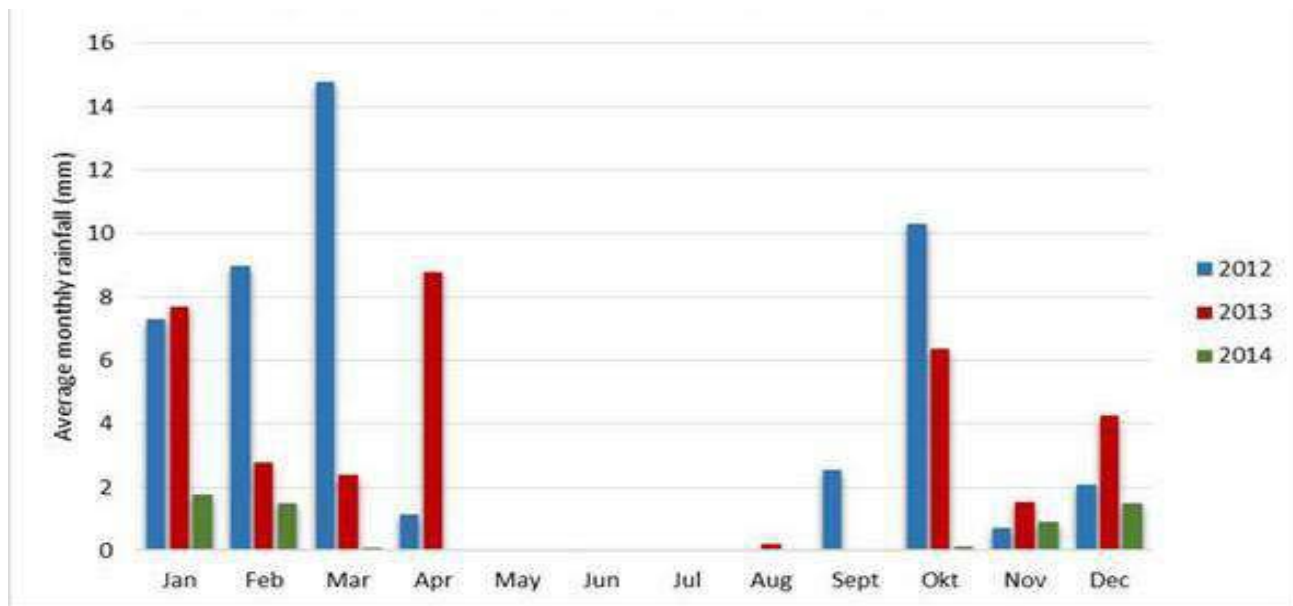


Figure 13: Monthly average rainfall (mm) for Nuco Chrome Mine for the period January 2012 - December 2014

According to the figure below the mean annual evaporation in the project area is between 2200 mm and 2400 mm, which far exceeds the annual rainfall.

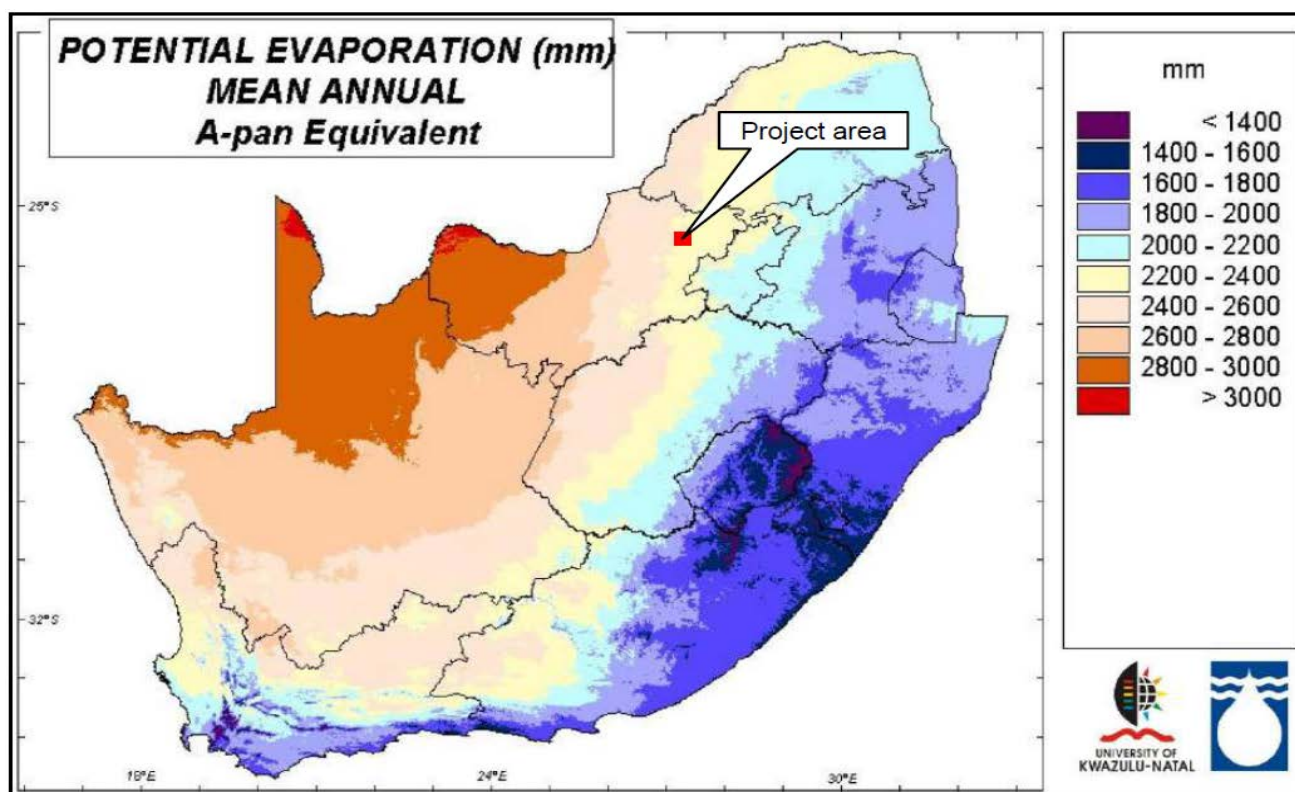


Figure 14: Mean Annual Evaporation for project area

### 9.2.3 Wind

The spatial and annual variability in the wind field is evident in the figure below. The predominant wind direction and frequency distribution of wind velocities for January 2012 to December 2014 are given below. These following wind rose plots represent the prevailing wind fields at Nuco Chrome Mine. The predominant wind direction is westerly with additional high frequency winds observed from the south-eastern sector and the south-southwestern component. Wind





speeds are slow to moderate with calm conditions, defined as wind speeds less than 1 m/s, observed for 12.9% of the time.

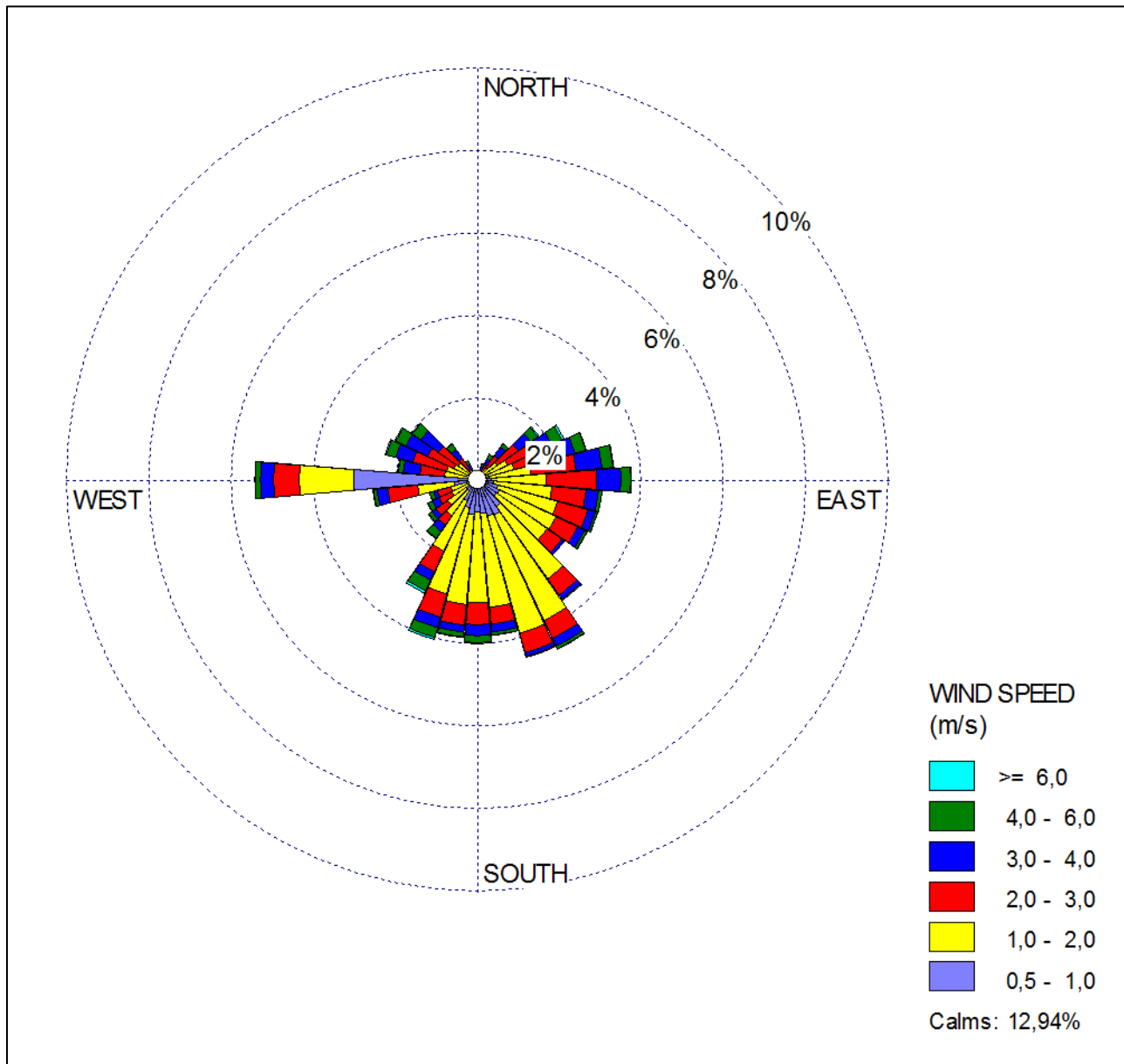


Figure 15: Period wind rose for Nuco Mine for the period January 2012 - December 2014

Diurnal variation in the wind field data are shown. During the day, a high frequency of winds is observed from the west, northwest, east, east-northeast, and south-eastern sector. During the night-time, prevailing winds are observed from the west and southern sector. A higher frequency of calmer winds can be observed during the night compared to the day.

Seasonal variation in winds for Nuco Chrome Mine is shown in the figure below. During the spring and summer seasons, winds originate predominantly from the southeast, east-northeast, and eastern sectors. However, in autumn and winter, the predominant wind direction is observed from the west and from the southern component. Slightly stronger wind speeds are observed during the spring and summer seasons compared to the autumn and winter seasons where a higher percentage of calmer winds are observed.



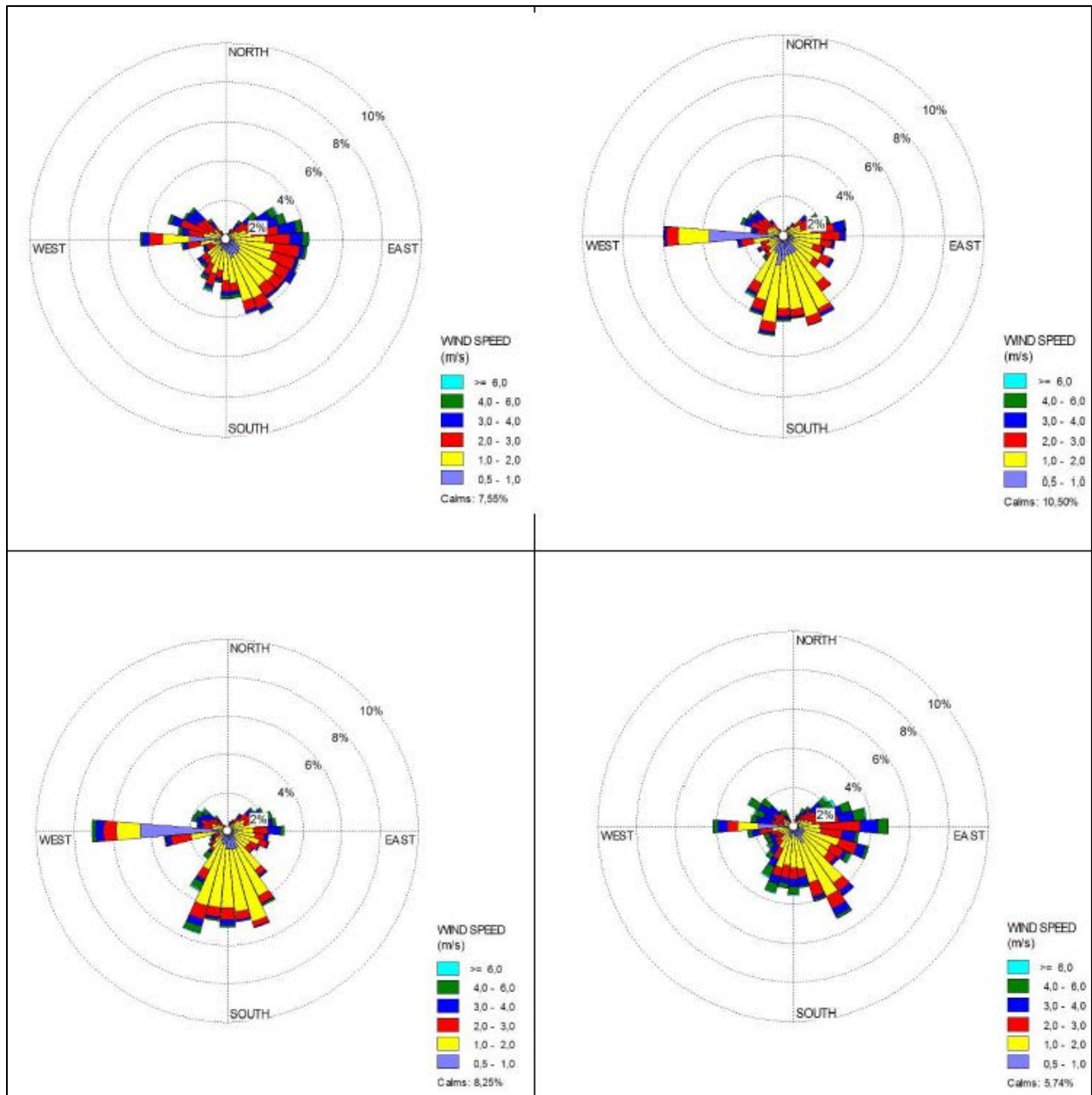


Figure 16: Seasonal variation of winds for Nuco Chrome Mine for the period January 2012 - December 2014

### 9.3 Topography

As illustrated by the Digital Elevation Model (DEM), the project site is located at a mean elevation of approximately 1160 m above sea level. The DEM shows the prominence of the Magaliesberg Mountains west of the project site and the relative flat and undulating terrain elsewhere in the municipality.



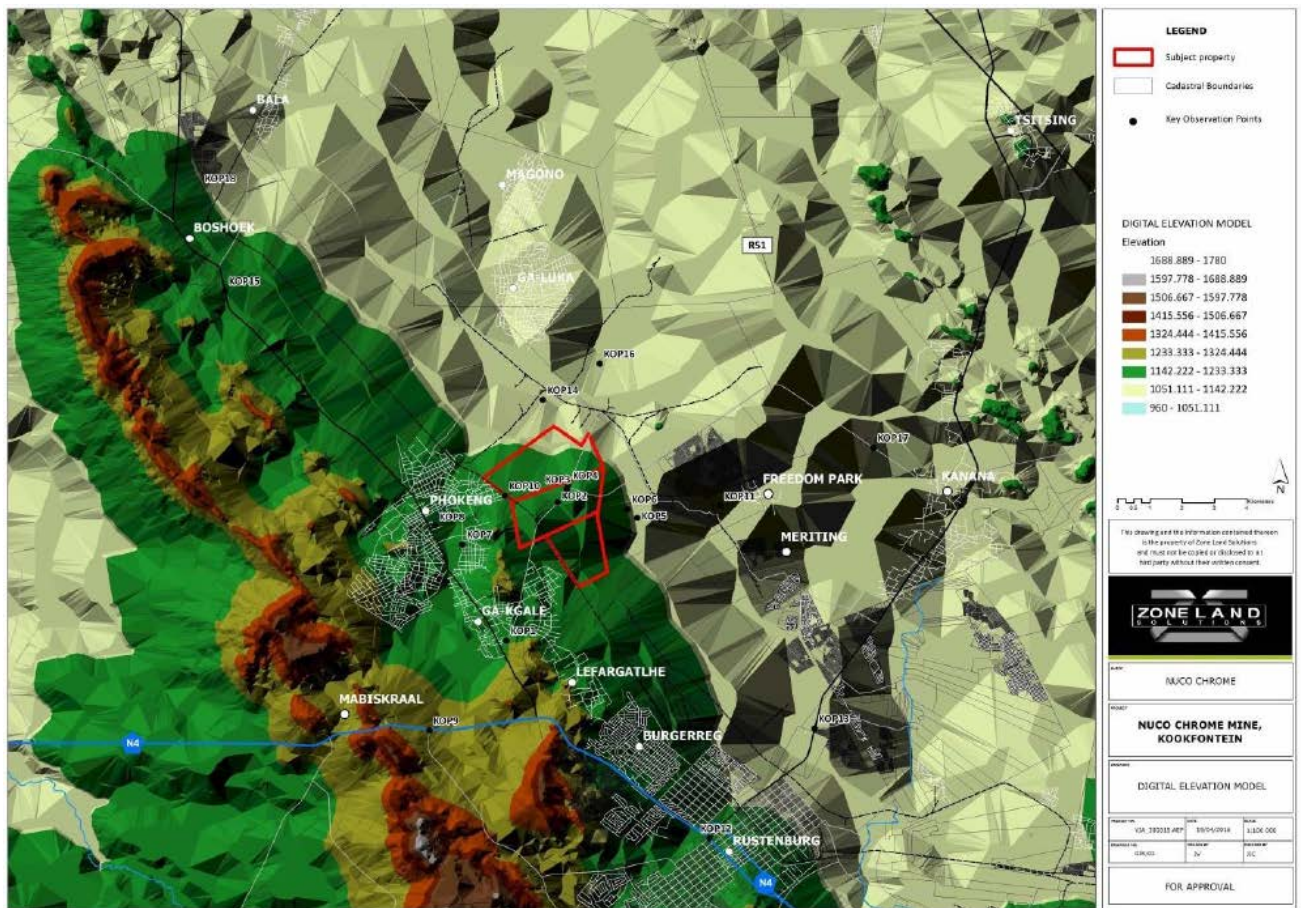


Figure 17: Digital Elevation Model illustrating the major topographical features of the area

#### 9.4 Geology

The project area is underlain by igneous rocks of the Bushveld Complex and is located just east of the contact between the igneous intrusion and the older Transvaal Supergroup rocks. The Bushveld Complex is divided into a lower mafic phase and upper acid phase. The lower mafic phase is further subdivided into five zones:

- **Marginal zone:** Occurs at the base of the mafic phase and may in some instances contain xenoliths of the Transvaal sedimentary rocks into which it intruded. This zone varies greatly in thickness and is of no known economic value.
- **Lower zone:** This zone is primarily composed of pyroxenite but may also contain harzburgite and dunite, which are both olivine-rich.
- **Critical zone:** This zone contains the majority of chromitite and platinum-group metals, which are hosted in the UG3, Merensky and Plat reefs.
- **Main zone:** This zone is largely composed of norite, which grades upwards into gabbronorite. The Main zone is mostly mined for dimension stone.
- **Upper zone:** Magnetite defines the base of this zone, which contains 25 magnetite layers altogether. The immediate footwall of the main magnetite layer is composed of anorthosite, which regularly contains minor sulphide and PGM mineralization. The main magnetite layer is mined for its economic vanadium and iron deposits.



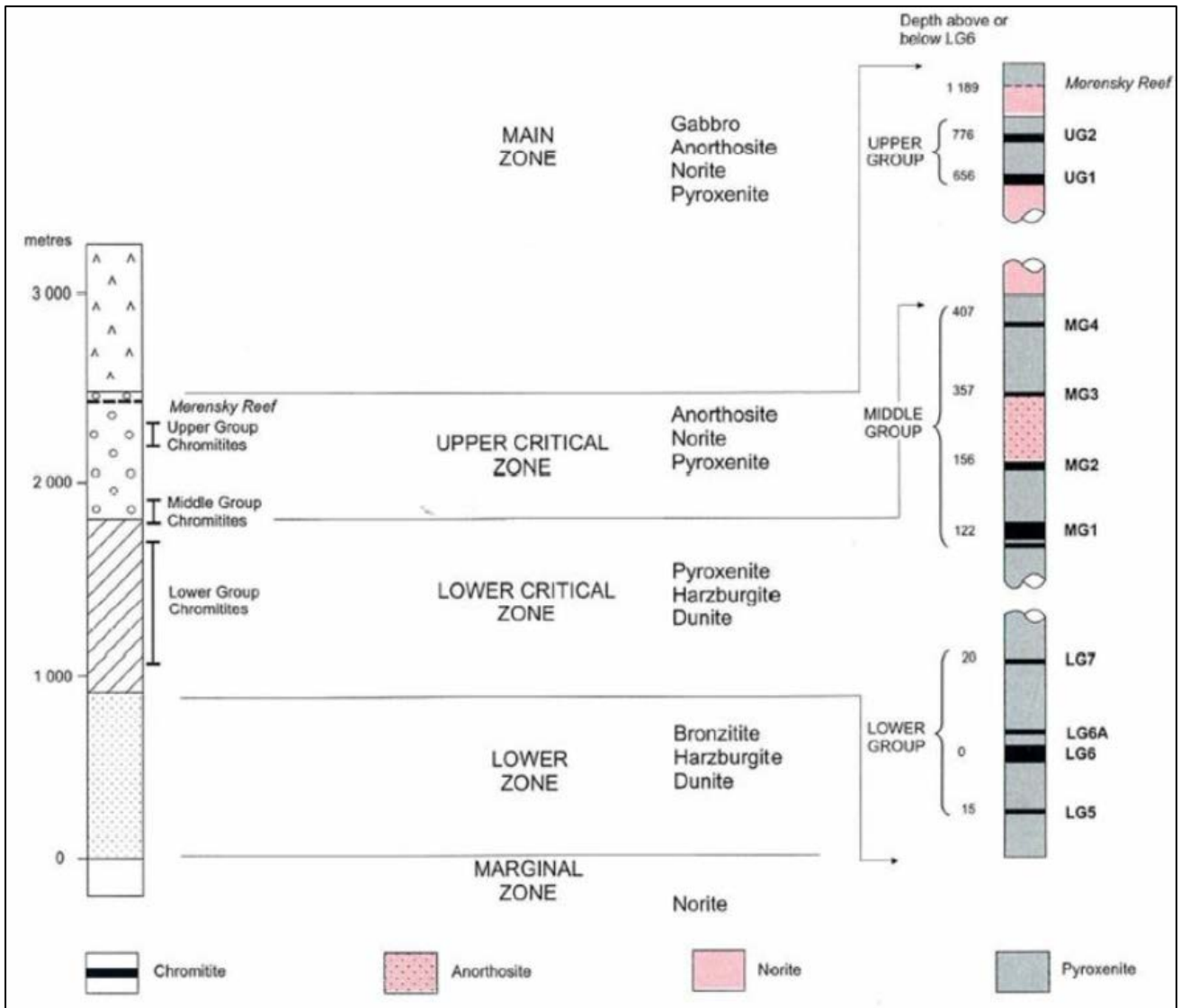


Figure 18: Subdivision of lower mafic phase of Bushveld Complex



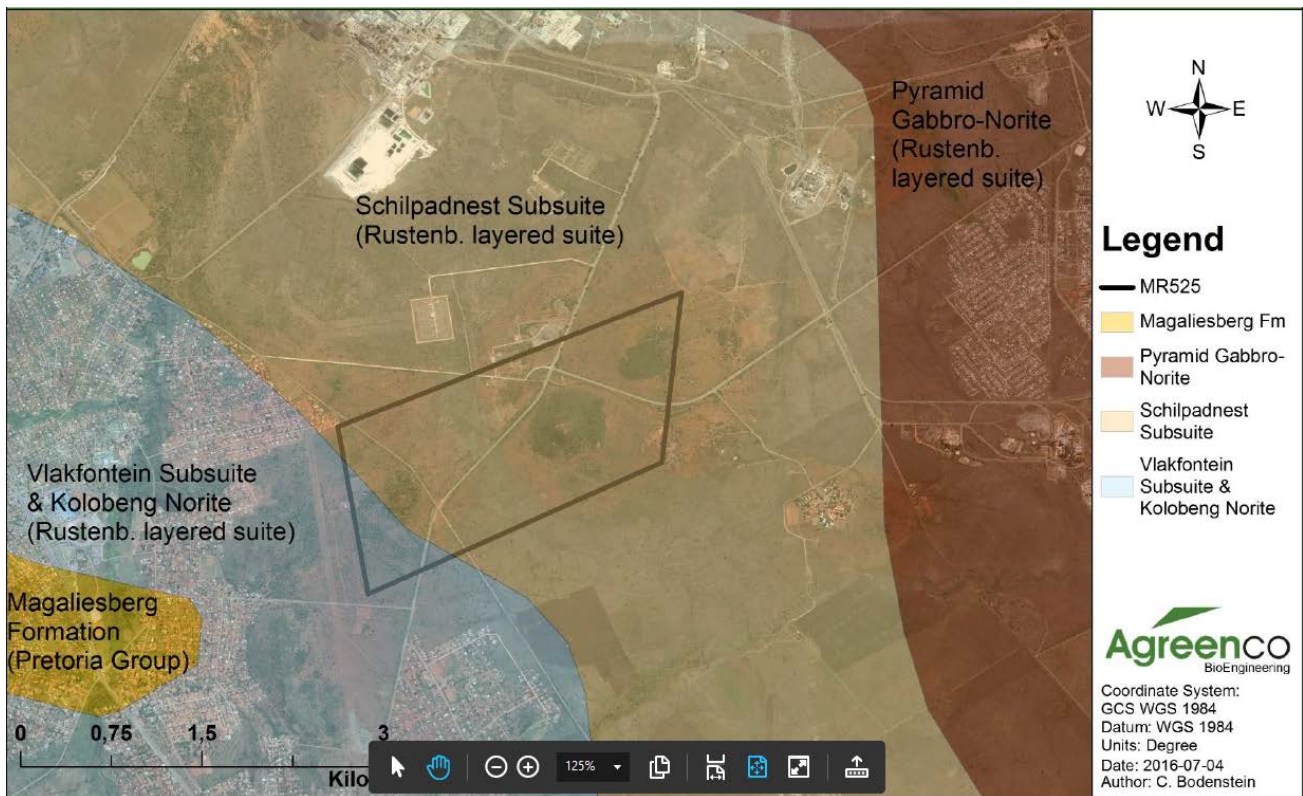


Figure 19: Local geological characteristics of the Nuco Chrome mining operation

### 9.5 Hydrogeology

Static groundwater levels in and around the project area generally vary between  $\pm 10$  and 22 meters below surface. Due to the generally low transmissivities of the aquifer host rock the pumping causes deep drawdown of the groundwater levels/piezometric heads and depression cones form that are deep but limited in lateral extent. Impacts on the natural groundwater level already exist due to groundwater extraction for domestic and/or irrigation purposes. The highest static water level elevation within the immediate vicinity of the project area is approximately 1 240 mamsl and occurs in the topographic higher region of the Magaliesberg. The lowest static water elevation where no impact from groundwater extraction occurs is at approximately 980 mamsl in the northern down gradient direction towards the Elands River.



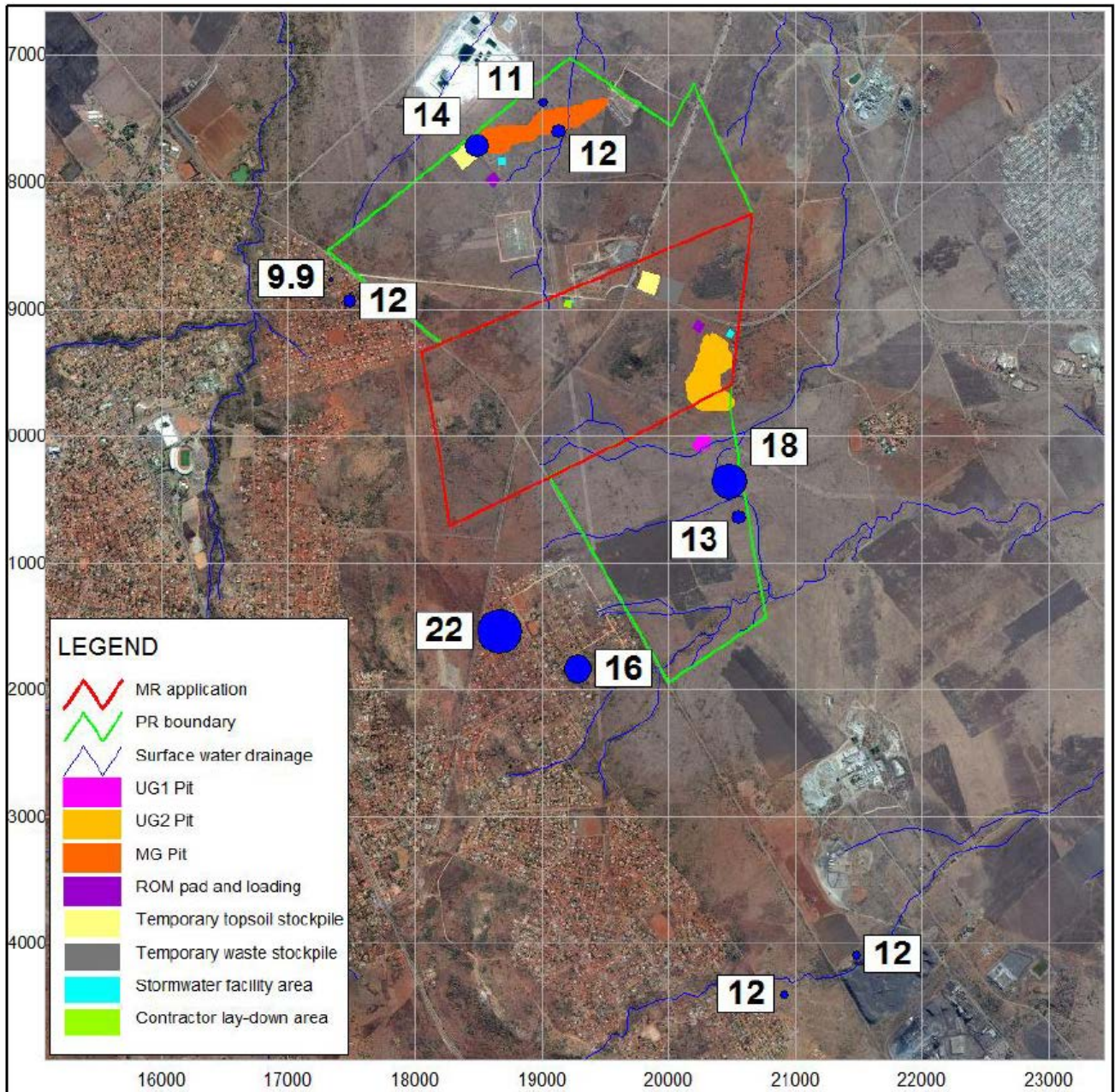


Figure 20: Thematic map of groundwater level depths (mbs).

According to the Vegter (1995) recharge map, the mean annual recharge to the aquifer underlying the project area is in the order of 32 mm, which based on an average rainfall of approximately 620 mm/a translates to a recharge percentage of  $\pm 5\%$ . Where outcrops occur, the effective recharge percentage can be slightly higher while in low-lying topographies where discharge generally occurs and thicker sediment deposition, the effective recharge will be lower or even zero.



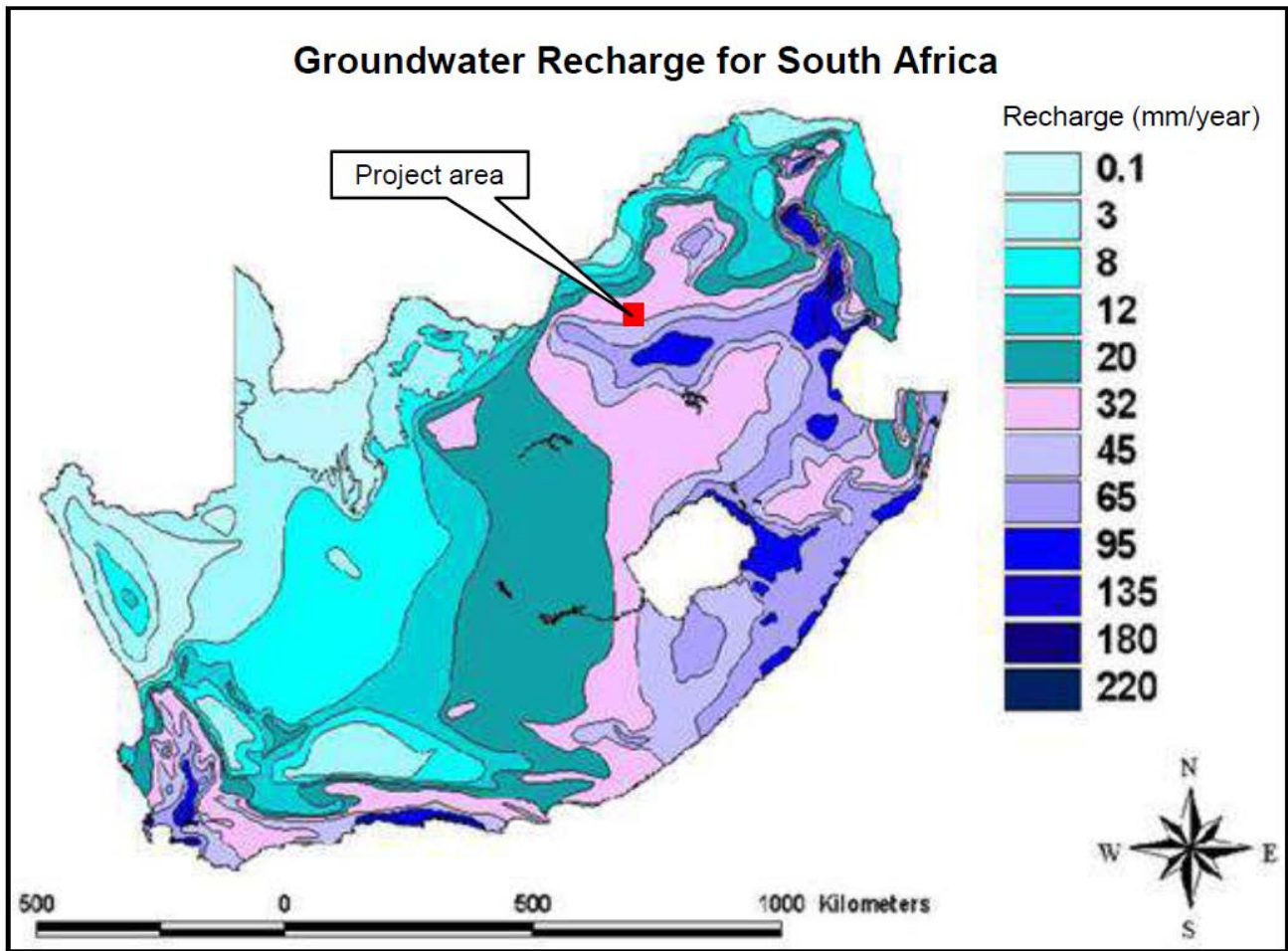


Figure 21: Mean annual aquifer recharge for South Africa (Vegter, 1995)

## 9.6 Surface Water

The study area falls within the A22F Quaternary Catchment, which form part of the Limpopo Water Management Area (WMA).

The only major drainage occurring in the area is the Leregrane Stream. One non-perennial stream traverses the property on which mining is proposed (MR 525). It is a tributary of the Leregane Stream, which is a tributary of the Elands River that is a tributary of the Crocodile River.



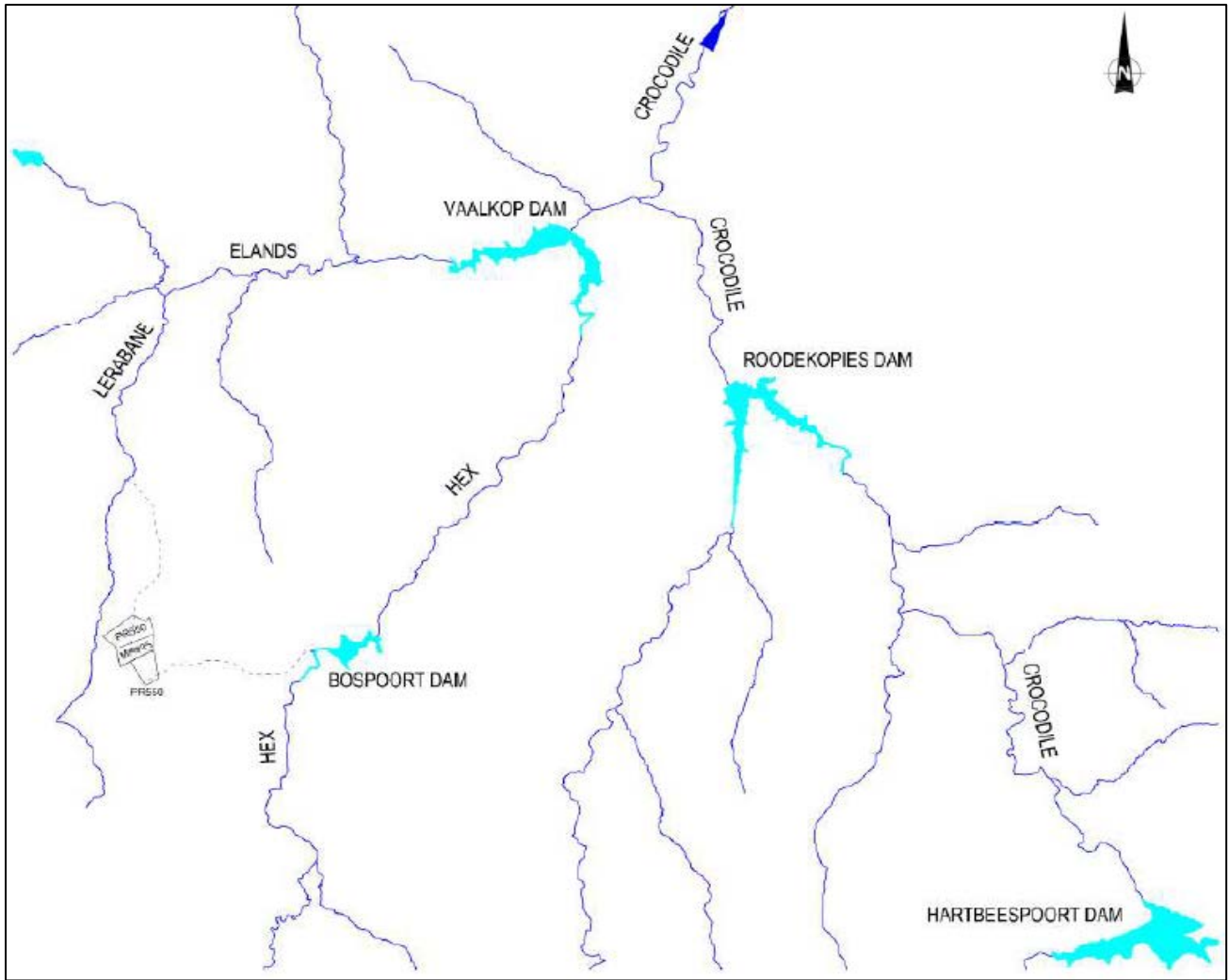


Figure 22: Regional drainage map





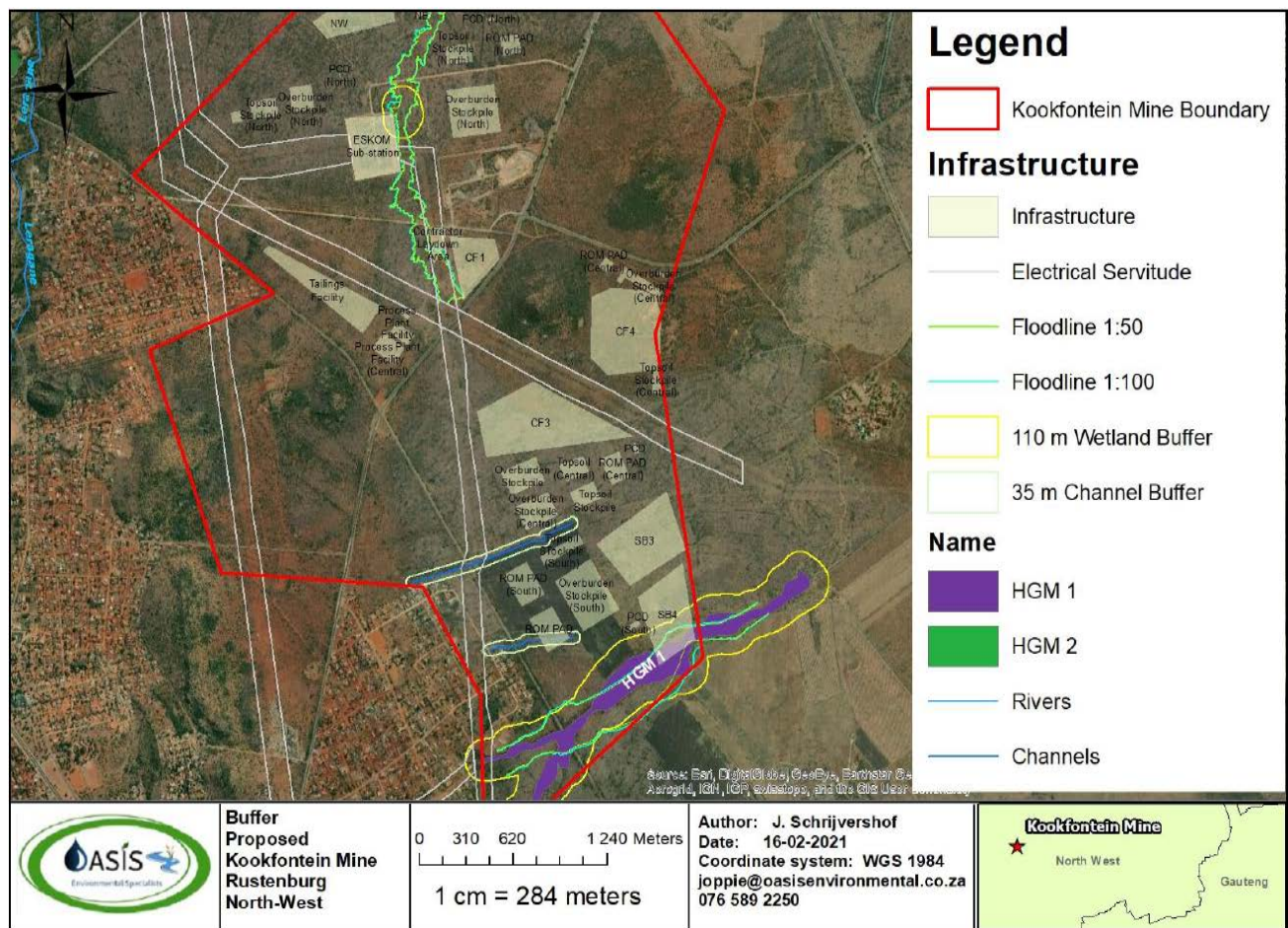


Figure 23: Wetlands and water sources situated on the MR525 and MR10154 areas

The non-perennial Legadigadi River occurs approximately 1 km west of the mining area and is a tributary of the perennial Elands River ( $\pm 23$  km towards the north). The perennial Hex River occurs  $\pm 11$  km to the east of the study area and flows in a north/north-easterly direction.

## 9.7 Soils

### 9.7.1 Land Types

Minimal information was obtained from the Agricultural Research Council (Land Type Survey Staff, 2003) which entails the division of land into land types, typical terrain cross sections and dominant soil types for each terrain unit. Land types are identified based on similarity in soil distribution patterns, terrain, and climate.

According to the Land Type Survey Staff (2003), the study area is comprised of two land types, namely Ea3 and Ae62. The figure below illustrates the distribution of the different land types present within the study area. The table below illustrates the characteristics of these land types.

Table 7: Characteristics of land types associated with study area

Land Type	Soil Form	Percentage Cover (%) of total land type	Average Depth (mm)	Clay Content (%)	Characteristics
Ea3 (Land type Ea3 dominates the biggest)	Arcadia	70	450 - 1200	43 - 68	-
	Hard Rock	10	-	-	-
	Oakleaf	6	600 – 1200	>35	Calcareous in B-horizon.



Land Type	Soil Form	Percentage Cover (%) of total land type	Average Depth (mm)	Clay Content (%)	Characteristics
part of the study area)	Mispah	5.8	50 - 250	15 - 20	-
	Hutton	3.9	600 - 1200	>55	Non-calcareous B-horizon.
	Shortlands	3.2	600 - 1200	35 - 55	Non-calcareous B-horizon.
	Swartland	0.9	150 - 350	15 - 35	B-horizon colour predominantly non-red.
Ae62 (Present in south-western part of study area)	Hutton	66.4	600 - 1200	15 - 35 35 - 55	Non-calcareous B-horizon. Clay content may differ.
	Shortlands	15.2	600 - 1200	35 - 55	Non-calcareous B-horizon.
	Mispah	4.7	50 - 300	15 - 30	Non-calcareous B-horizon. Material underlying A-horizon classified as Ferricrete.
	Willowbrook	4.7	600 - 1100	15 - 35	Calcareous in upper G.
	Valsrivier	4.6	150 - 400	15 - 35	B-horizon colour predominantly red. Calcareous in B or C.



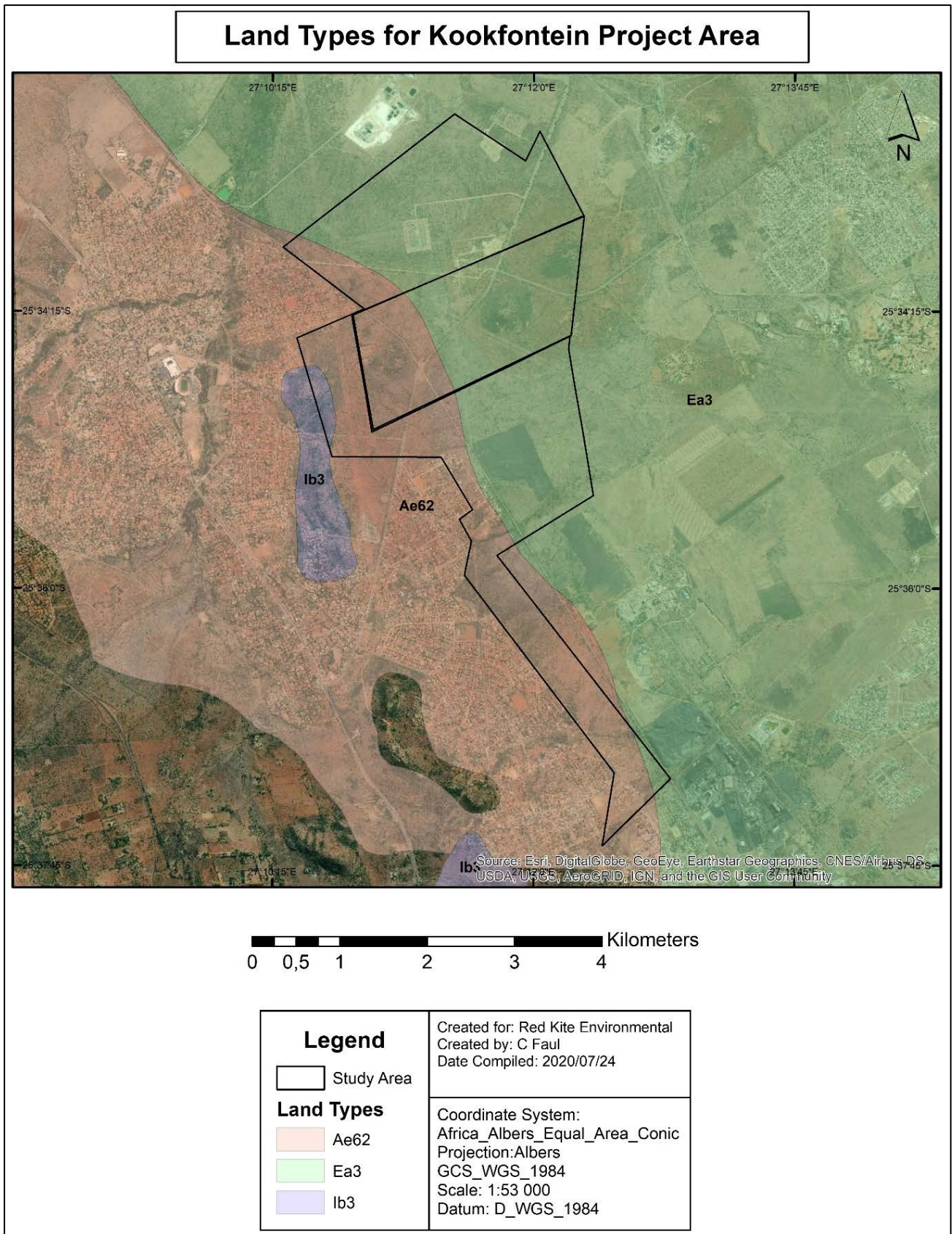


Figure 24: Land type map of the proposed Kookfontein Project area

The soils in the study area are predominantly vertisols, red-structured, orthic-A and red apedal soils. The latter soil types are generally superimposed by an orthic A-horizon. The soils of the area exhibit relatively good drainage and very few



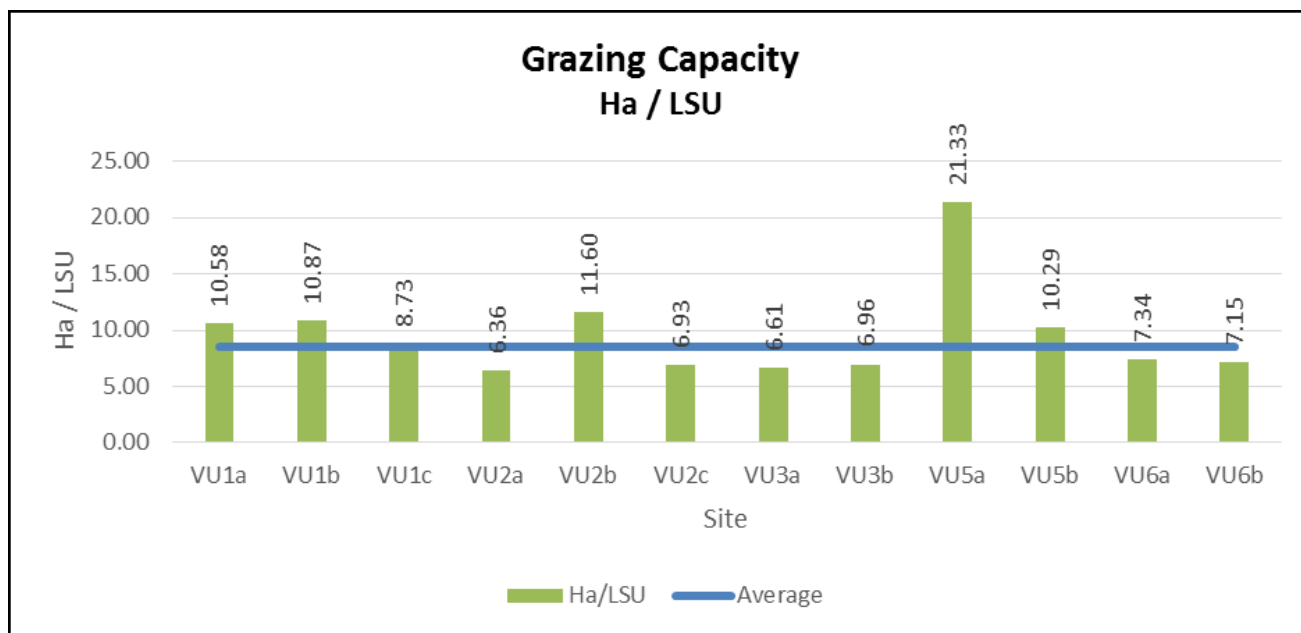
signs of water accumulation within the soil profile. The vertisols of the site pose a water-logging hazard, even when the pedogenic features do not clearly exhibit it. The inherent high clay content (swelling clays) cause a very small range between drought and waterlogging. This characteristic makes the Vertic A-horizon difficult to manage in terms of irrigation, and even more so with dryland agriculture.

The risk of water erosion on the soils of the area are assessed in terms of the capacity of the soil to transfer water laterally through the soil profile. The greater the capacity of the soil to absorb water the less likely it will be to have runoff and subsequent erosion. The soils present on the study area exhibit a low to moderate risk of water erosion. A relatively high clay fraction that is accompanied by a fine sand fraction is considered to have a low wind erodibility, as is the case with the soils present at this site.

**9.7.2 Agricultural Potential**

The area’s soil fertility is generally not poor. This may be attributed to the vertisols that are found on site. These soils commonly have high base saturation and can store large amounts of nutrients. The red soils of the area are generally better drained and have lower clay content than vertisols, and therefore have a lower nutrient status. Both the topsoil and the subsoil have a good nutrient status. Even though the soil has a good natural fertility, water and crop management on vertisol soils can be challenging. These management practices require significant financial input and expertise.

The average veld condition over the whole site is 50.9%. This value implies that future mining activities and its impacts on the condition of the veld will need to be effectively managed in order to avoid degradation. Current non-mining activities, for example grazing, may also contribute to the degradation of veld conditions. The current maximum grazing capacity for the site is shown in the figure below.



**Figure 25: Grazing capacity of the study area, expressed as ha/LSU**

The grazing capacity results indicate that an average of 8.55 ha is needed per large stock unit (LSU). The higher the value (21.33 ha/LSU) indicates the site with the poorest grazing capacity. The lower the ha/LSU value, the better the site’s grazing capacity.

**9.7.3 Land Use**

The area consists mostly of natural savanna vegetation with a few existing gravel roads permitting access to the site. Cultivated fields as well as an Eskom Power Station is visible on site. Several mining activities are present in close proximity



to the study area. The figure below indicates current land uses associated with the greater study area as well as the surrounding area.

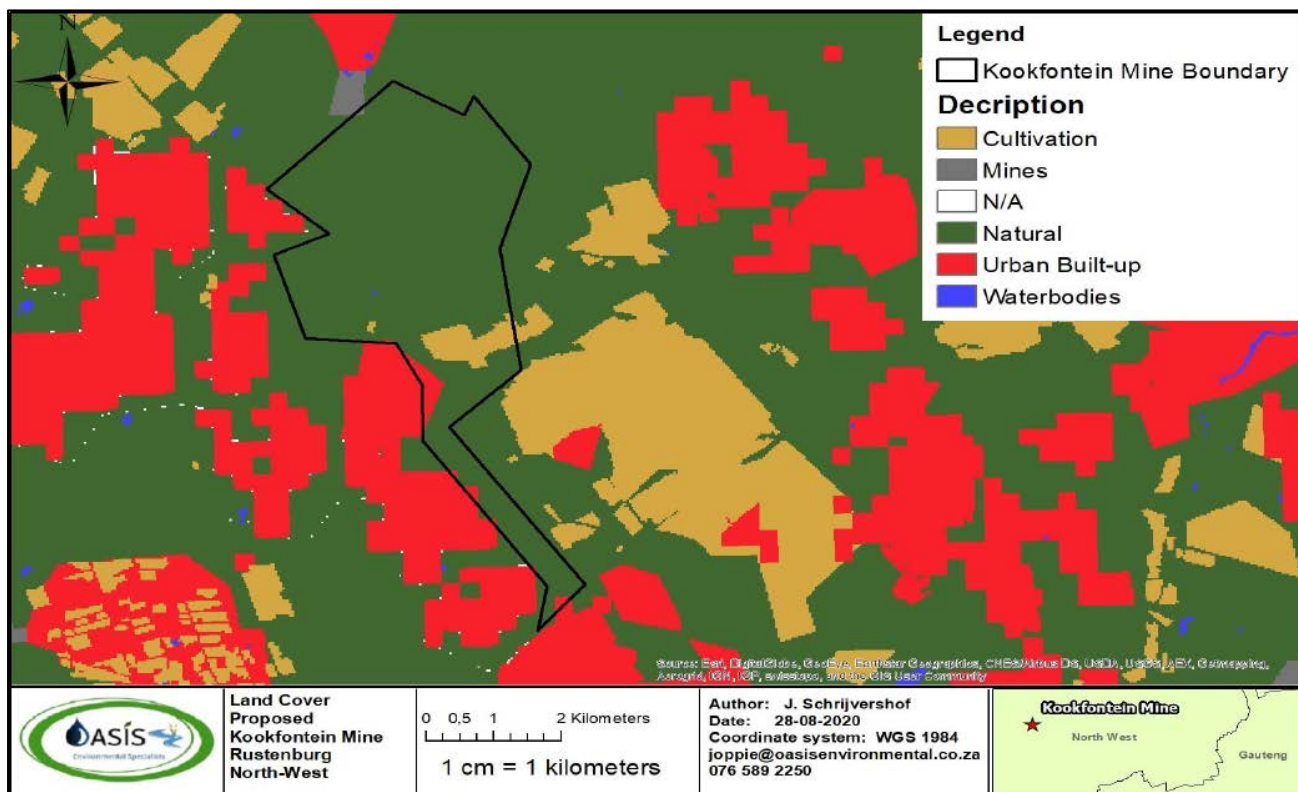


Figure 26: Current Land Uses associated with the study area and surrounding area

#### 9.7.4 Land Capability

The land capability of the site is based on the geomorphological characteristics in relation to the larger landscape. Each landscape forms part of one of the following terrain morphological units: escarp, midslope, foot slope and valley bottom. The landscape of the proposed NuCo Chrome Mining area generally resides on midslope, footslope and valley bottom areas. The study area falls within three land capability classes namely, Class III, Class IV and Class VII.

Land Capability Class III is not suited for crop production due to climatic limitations and soils with low production status. These areas will be better suited as veld for light/controlled grazing. Land Capability Class IV is severely restricted in terms of soil parameters and climate. On the study area, the restricting criteria are the soil depth and mechanical limitations. Surface infrastructure further complicate intensive management of the area. Land Capability Class VII is restricted by limited soil depth and poor workability of the soil. Furthermore, the area has very steep slopes, thereby making it impractical for any use other than grazing, woodland, and wildlife. The figure below illustrates the distribution of Land Capability Classes on the study area.



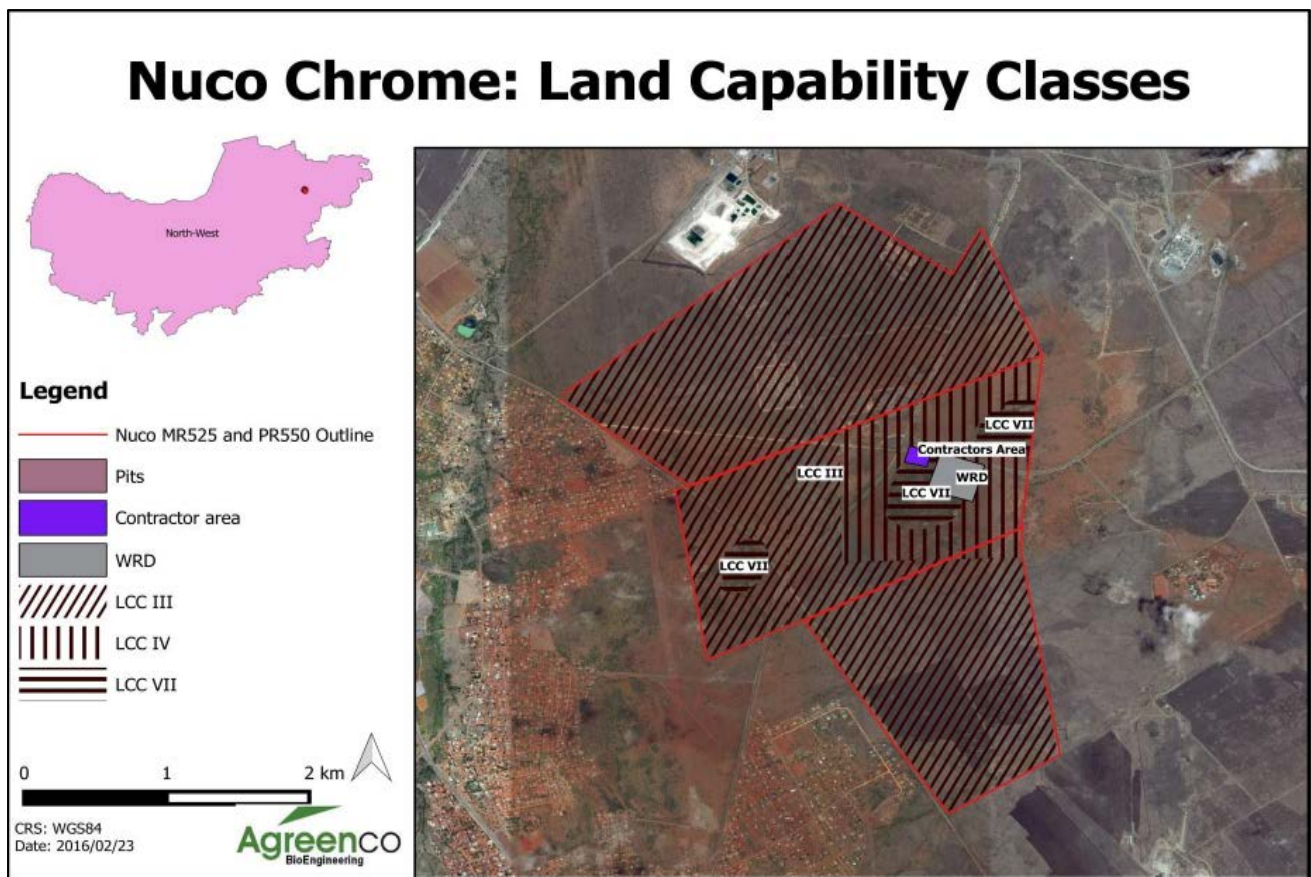


Figure 27: Land capability class map of the proposed study area

## 9.8 Terrestrial Ecology

### 9.8.1 Flora Evaluation

The proposed development is located within the Savanna Biome, within the Central Bushveld Bioregion and most of the site is classified as Marikana Thornveld vegetation (SVcb6) with a very small portion consisting of Moot Plains Bushveld (SVcb8).

The Marikana Thornveld (SVcb6) vegetation type is generally characterized by valleys and slightly undulating plains and some lowland hills. It occurs in Gauteng and North-West Provinces from the Rustenburg area in the west, through Marikana and Brits to Pretoria eastwards. The vegetation of SVcb6 is characterized by open Acacia karroo woodland, with denser shrubby vegetation along drainage lines, on termitaria and rocky outcrops and other habitats that are protected from fires. The conservation status of the SVcb6 is endangered. Less than 1% is statutorily conserved, while 48% of the vegetation type has been transformed, mainly in the form of cultivated lands and by urban areas.

Table 8: Dominant and other taxa associated with SVcb6 (Marikana Thornveld vegetation type) (Mucina & Rutherford, 2006).

Trees and woody shrubs:		
<i>Acacia karroo</i>	<i>Acacia nilotica subsp. kraussiana</i>	<i>Acacia tortilis subsp. heteracantha</i>
<i>Acacia caffra</i>	<i>Acacia gerrardii</i>	<i>Ziziphus mucronata</i>
<i>Searsia lancea</i>	<i>Searsia pyroides var. pyroides</i>	<i>Combretum mole</i>
<i>Grewia flava</i>	<i>Diospyros lycioides subsp. guerkei</i>	
Significantly represented grasses:		
<i>Elionurus muticus</i>	<i>Eragrostis Lehmanniana var. lehmanniana</i>	<i>Fingerhuthia Africana</i>



<i>Setaria sphacelata</i>	<i>Heteropogon contortus</i>	<i>Themeda triandra</i>
<b>Important herbaceous species:</b>		
<i>Hermannia depressa</i>	<i>Ledebouria revoluta</i>	<i>Ipomoea obscura</i>
<i>Barleria macrostegia</i>	<i>Vernonia oligocephala</i>	

The Marikana Thornveld has a status of Endangered in terms of the NBA 2018. It had a previous status of Vulnerable in terms of the NBA 2011.

The study site does not overlap with any formally Protected Areas. Therefore, the location of the study site is not expected to have an impact on any formally protected areas.

The eastern section of the study site is located on areas categorised as CBA2 in terms of the NWBSP. These CBA areas are associated with the koppies located on the study site. Note that although some of the infrastructure is located within the buffers of the koppies (CBA2), no infrastructure is proposed on the koppies.

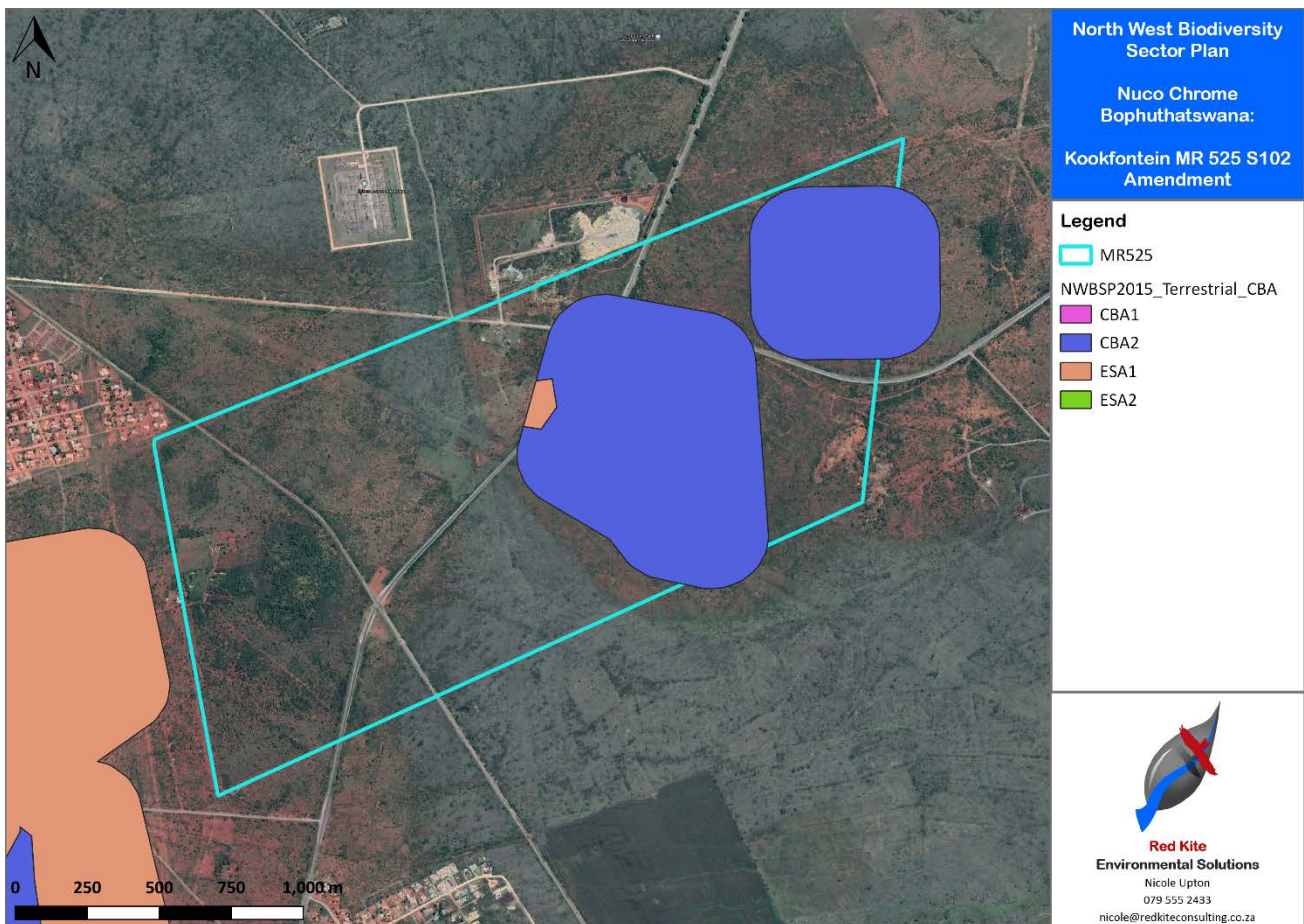


Figure 28: North West Biodiversity Sector Plan (NWBSP)

### 9.8.2 Fauna Evaluation

#### - Aves

The Magaliesberg IBS (Important Bird and Biodiversity Area) is situated towards the south of the site. Most of this IBA falls within the Magaliesberg Protected Natural Environment. Previously known as the Magaliesberg and Witwatersberg IBA, this IBA consists mainly of the Magaliesberg range, which extends in an arc from just north-west of Rustenburg in the west to the N1 in the east near Pretoria. To the south, the Witwatersberg range runs parallel to the Magaliesberg, extending from the town of Magaliesburg in the west to Hartbeespoort Dam in the east. The most important trigger species in the IBA is the globally threatened Cape Vulture (*Gyps coprotheres*) which breeds at Nooitgedacht and at



Skeerpoort. The Secretary bird is the other globally threatened species in the IBA. Regionally threatened species are Lanner Falcon (*Falcon biarmicus*), Half-collared Kingfisher, African Grass Owl, African Finfoot and Verreaux's' Eagle. Biome-restricted species include White-bellied Sunbird (*Cinnyris talatala*), Kurrichane Thrush (*Turdus libonyanus*), White-throated Robin-chat (*Cossypha humeralis*), Kalahari Scrub Robin (*Erythropygia paena*) and Barred Wren-Warbler. The most important threat to the trigger species in this IBA is the expansion of commercial, recreational, and housing developments, which have decreased the area of land available for wild ungulates and domestic livestock, and hence the availability of food for vultures. Collisions with man-made structures such as power lines is also a concern.

#### - Mammals

Table 4 below lists all the mammal species possibly occurring on the proposed site according to the Animal Demography Unit (2019) and Skinner and Chimimba (2004), alongside the designated statuses of those species in the South African Red list of Mammals (2012), Threatened or Protected Species List (ToPS) (NEMBA, 10 of 2004) and the North West Biodiversity Bill (23 of 2006) Schedule 2: Specially protected species. Four species listed on the most recently produced Red list of South African Mammal species (2012) have the potential to occur in the general area of the study area. The White-tailed rat is listed as endangered, Serval and Honey badger as Near threatened, and Pangolin as Vulnerable. Serval and Aardvark are classified as Protected and Pangolin as Vulnerable under the ToPS list in accordance with NEMBA (10 of 2004). Cape clawless otter, Short Snouted Elephant Shrew, African wild cat, Rock Dormouse, White tailed rat and Aardvark are listed as Specially protected in Schedule 2 of the North West Biodiversity Bill (2016).

**Table 9: List of Mammals possibly occurring on site (ADU, 2019).**

<i>Acomys spinosissimus</i>	<i>Aethomys namaquensis</i>	<i>Aethomys chrysophilus</i>
<i>Aonyx capensis</i>	<i>Atelerix frontalis</i>	<i>Canis mesomelas</i>
<i>Caracal caracal</i>	<i>Cynictis penicillata</i>	<i>Cryptomys hottentotus</i>
<i>Dendromus melanotis</i>	<i>Elephantulus brachyrhynchus</i>	<i>Felis lybica</i>
<i>Galago moholi</i>	<i>Galerella sanguinea</i>	<i>Genetta genetta</i>
<i>Genetta tigrina</i>	<i>Graphiurus murinus</i>	<i>Graphiurus parvus</i>
<i>Graphiurus platyops</i>	<i>Hystrix africae australis</i>	<i>Ichneumia albicauda</i>
<i>Ictonyx striatus</i>	<i>Lemniscomys rosalia</i>	<i>Leptailurus serval</i>
<i>Lepus saxatilis</i>	<i>Mastomys coucha</i>	<i>Mastomys natalensis</i>
<i>Mellivora capensis</i>	<i>Mus minutoides</i>	<i>Mus musculus</i>
<i>Mastomys albicaudatus</i>	<i>Otomys angoniensis</i>	<i>Orycteropus afer</i>
<i>Oreotragus oreotragus</i>	<i>Paraxerus cepapi</i>	<i>Papio ursinus</i>
<i>Pedetes capensis</i>	<i>Poecilogale albinucha</i>	<i>Procavia capensis</i>
<i>Procavia welwitschii</i>	<i>Procedure cyanea</i>	<i>Pronolagus rupestris</i>
<i>Raphicerus campestris</i>	<i>Rhabdomys pumilio</i>	<i>Tetera afra</i>
<i>Tatera brantsii</i>	<i>Tatera leucogaster</i>	<i>Thaliomys paedulcus</i>
<i>Thryonomys swinderianus</i>	<i>Saccrostomus campestris</i>	<i>Smutsia temminckii</i>
<i>Steatomys pratensis</i>	<i>Sylvicapra grimmia</i>	<i>Vulpes chama</i>

#### - Herpetofauna

The local occurrences of reptiles and amphibians are closely dependent on broadly defined habitat types, terrestrial, arboreal (tree-living), repiculous (rock dwelling) and wetland-associated vegetation cover. No large bodies of surface water or pans are present close by or within 500 m of the study area. All Amphibian species are of Least Concern (LC), however the Northern Pygmy Toad (*Poyntonophrynus fenoulheti*), Giant Bull Frog (*Pyxicephalus adspersus*), and the African Bullfrog (*Pyxicephalus edulis*), are all of special conservation concern according to the North West Biodiversity Bill.

Four reptile species possibly occurring on site is protected under NEMBA (2004), namely the Horned Adder (*Bitis caudalis*), the Transvaal Gecko (*Pachydactylus affinis*), the Cape Gecko (*Pachydactylus capensis*) and the Southern African





Rock Python (*Python natalensis*). These species are also of special conservation concern in terms of the North West Biodiversity Bill, along with the following: Flap-neck Chameleon (*Chamaeleo dilepis dilepis*), Jones' Girdled Lizard (*Cordylus jonesii*), Common Girdled Lizard (*Cordylus vittifer*), Eastern Tiger Snake (*Telescopus semiannulatus semiannulatus*), Southern Rock Monitor (*Varanus albigularis albigularis*) and the Nile Monitor (*Varanus niloticus*).

**Table 10: List of Amphibians possibly occurring on site (Du Preez & Curruthers, 2009; IUCN, 2019).**

<i>Amietophrynus garmani</i>	<i>Amietophrynus poweri</i>	<i>Amietophrynus rangeri</i>
<i>Amietia angolensis</i>	<i>Breviceps adspersus</i>	<i>Cacosternum boettgeri</i>
<i>Kassina senegalensis</i>	<i>Phrynomantis bifasciatus</i>	<i>Phrynomantis natalensis</i>
<i>Poyntonophrynus fenoulheti</i>	<i>Ptychadena anchietae</i>	<i>Ptychadena mossambica</i>
<i>Ptychadena porosissima</i>	<i>Pyxicephalus adspersus</i>	<i>Pyxicephalus edulis</i>
<i>Schismaderma carens</i>	<i>Strongylopus fasciatus</i>	<i>Tomopterna cryptotis</i>
<i>Tomopterna krugerensis</i>	<i>Tomopterna tandyi</i>	<i>Tomopterna natalensis</i>
<i>Xenopus laevis</i>		

**Table 11: List of Reptiles possibly occurring on site (Bates et al., 2014; IUCN, 2019).**

<i>Acanthocercus attricollis attricollis</i>	<i>Acontias occidentalis</i>	<i>Afroablepharus wahlbergii</i>
<i>Afrotrophlops bibronii</i>	<i>Agama aculeata distanti</i>	<i>Agama atra</i>
<i>Aparallactus capensis</i>	<i>Atractaspis bibronii</i>	<i>Bitis arietans arietans</i>
<i>Bitis caudalis</i>	<i>Boaedon capensis</i>	<i>Causus rhombeatus</i>
<i>Chamaeoeo dilepis dilepis</i>	<i>Chondrodactylus turneri</i>	<i>Cordylus jonesii</i>
<i>Cordylus vittifer</i>	<i>Crotaphopeltis hotamboeia</i>	<i>Dasypeltis scabra</i>
<i>Dendroaspis polylepis</i>	<i>Dispholidus typus</i>	<i>Gerrhodaureus flavigularis</i>
<i>Hemachatus haemachatus</i>	<i>Leptotyphlops distanti</i>	<i>Leptotyphlops scutifrons</i>
<i>Lycodonomorphus rufulus</i>	<i>Lycophidion capense</i>	<i>Lygodactylus capensis</i>
<i>Meroles squamulosus</i>	<i>Mochlus sundevallii</i>	<i>Naja annulifera</i>
<i>Naja mossambica</i>	<i>Nucras intertexta</i>	<i>Pachydactylus affinis</i>
<i>Pachydactylus capensis</i>	<i>Pelomedusa subrufa</i>	<i>Philothamnus hoplogaster</i>
<i>Philothamnus namalensis occidentalis</i>	<i>Philothamnus semivariegatus</i>	<i>Prosymna bivittata</i>
<i>Prosymna sundevallii</i>	<i>Psammophis angolensis</i>	<i>Psammophis brevirostris</i>
<i>Psammophylax rhombeatus</i>	<i>Psammophylax tritaeniatus</i>	<i>Pseudaspis cana</i>
<i>Python natalensis</i>	<i>Rhinotyphlops lalandi</i>	<i>Stigmochelys pardalis</i>
<i>Telescopus semiannulatus semiannulatus</i>	<i>Thelotornis capensis capensis</i>	<i>Trachylepis capensis</i>
<i>Trachylepis punctatissima</i>	<i>Trachylepis varia</i>	<i>Varanus albigularis albigularis</i>
<i>Varanus niloticus</i>		

- **Butterfly Desktop study**

A comprehensive list of possibly occurring butterfly species was compiled from Mecenero et al., (2013). A total of 158 species are listed by Mecenero et al., (2013), with four of these species listed as least concern (Endemic). No species in this region are currently protected by NEMBA (10 of 2004), through the ToPS list. Seven species are however listed on the North West Biodiversity Bill especially protected species listed in Schedule 2. The vast majority of listed species are considered common. All species listed on the North West Biodiversity Bill are savanna or woodland habitat orientated with the exception of the Roodepoort Copper, which is more prone to rock ledge associated grasslands. Most of the other listed butterfly species have wide distributions.



## 9.9 Air Quality

The air quality in the Rustenburg area is generally poor, largely as a result of mining and associated industrial activities in the area. Platinum smelting, in particular, results in unacceptably high sulphur dioxide emissions. Various airborne pollutants are particularly common to the mining and minerals processing industry. These include particular matter (often containing heavy metals and silica), sulphur oxide (SO), nitrogen oxide (NO) and carbon oxides (CO). Mineral processing plants, in particular platinum smelters and ferrochrome plants release significant quantities of sulphur dioxide (SO<sub>2</sub>) to atmosphere. Chrome processing plants and smelters emit hexavalent chromium (Chromium VI), which is produced when chromium is smelted in the presence of oxygen. The air quality in the vicinity of Rustenburg is already poor due to mining activities in the surrounding areas. Background Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>) are variable and often exceed legislated thresholds during certain periods. Background dust-fall levels are generally not in exceedance of threshold levels.

The following observations can be made based on the air quality monitoring data and results obtained from a near-by mine for the period January 2012 to December 2014:

- Dust fallout concentrations recorded at the residential sites were relatively low and did not exceed the residential area standard of 600 mg/m<sup>2</sup>/day (milligram per square meter per day) for the period January 2012 to December 2014;
- Dust Fallout concentrations recorded at some of the industrial sites were relatively high and exceeded the non-residential area standard of 1200 mg/m<sup>2</sup>/day for the period January 2012 to December 2014;
- Daily average PM<sub>10</sub> concentrations recorded for the three-year period was high and exceeded the South African National Standard of 75 µg/m<sup>3</sup> (microgram per cubic meter) on several occasions with maximum exceedances observed over the winter and spring seasons;
- Daily average PM<sub>2.5</sub> concentrations recorded for the three-year period was also relatively high and exceeded the current South African National Standard of 65 µg/m<sup>3</sup> on several occasions during the winter season in 2012 and once in June 2013. No exceedances of the current South African National Standard of 65 µg/m<sup>3</sup> was observed in 2014;
- High daily and Hourly average SO<sub>2</sub> concentrations that were measured from a nearby mine exceeds both the 24-hour and 1-hour South African National Standards of 48 ppb (parts per billion) and 134 ppb over the three-year period. Maximum concentrations were observed over the autumn and winter seasons.

Existing sources of emissions surrounding the proposed MR 525 area includes industrial activity, mining activity, domestic fuel burning, vehicle entrainment on unpaved roads and wind erosion from exposed areas. Based on the analysis of the air quality monitoring data, existing sources of dust emissions surrounding the project site are having a significant impact on air quality in the area.

## 9.10 Noise

The following are noise sources in the vicinity of and the boundaries of the study area:

- Heavy duty vehicle noise.
- Mine activity noises.
- Distant traffic noise from the abutting feeder roads.
- Mine ventilation noises.
- Railroad noise and hooting at intersections.
- Domestic noise.
- Insects.
- Birds.
- Wind noise.



The prevailing ambient noise levels are created by traffic noise, distant mine activity noise, vehicle hooting, train activity noise, mine ventilation type noise, and domestic noises. The distance between the different mine blocks and the abutting residential areas is for direct line of sight and in many cases, there are vertical structures such as trees, a hill between the proposed site and the residential areas.

### 9.11 Archaeology and Heritage

The stone walled sites can be rated as having a very high significance considering criteria such as the following:

- The stone walled sites are located in a Bafokeng sphere of influence. The Bafokeng occupied the Rustenburg area from AD1600 or AD1700 onwards and it is therefore possible that the complexes may have cultural and historical ties with the early Bafokeng;
- The stone walled sites are well preserved and only Complex 01 (Nuco west) and Complex 02 (Nuco central) have slightly been affected in the past. It appears as if Complex 03 (Nuco east) is still in a pristine condition;
- The stone walled complexes have research potential as they, collectively with other stone walled settlements in the larger project area, represent an important cultural historical occurrence that has a bearing on the Late Iron Age and the Historical Period of the North West Province;
- The Bafokeng's prehistory and history are understudied and would benefit if these stone walled sites could be investigated.

Several heritage surveys have been conducted for mining activities, power lines and other developmental activities in the larger project area during the last ten years. These studies indicated that the most common heritage resources in the region are the following:

- Stone walled sites that date from the Late Iron Age are relatively common in the region and can be associated with pre-historical and historical Tswana spheres of influence;
- Farmstead complexes that can be associated with colonial farmers.

Heritage resources that are scarce in the larger project area include the following:

- Stone Age sites with dense concentrations of stone tools on the surface of the land;
- Historical platinum and chrome mining activities (when these occur they are associated with limited infrastructure).

The Phase I heritage survey revealed the following types and ranges of heritage resources as outlined in Section 3 of the NHRA (No 25 of 1999) in the project area, namely:

- Three stone walled complexes that date from the Late Iron Age and the Historical Period.

#### **The complexes were found around and on top of the koppies:**

Stone walled settlements such as Seretube, Rathipa, Boithumelo, Mhutle and others occur to the east of the project area, whilst the Ga-Nape mountain range with its extensive occurrence of stone walled sites are located to the north-east. The project area therefore is part of a cultural landscape that warrants a brief description to demonstrate its place in the North West Province's cultural history. The larger project area has been subjected to development for longer than a century, particularly in the north and in the south where tobacco and citrus were cultivated from as early as the second half of the nineteenth century, whilst platinum mining commenced in the early 1920's and 1930's and was soon followed by chrome mining.



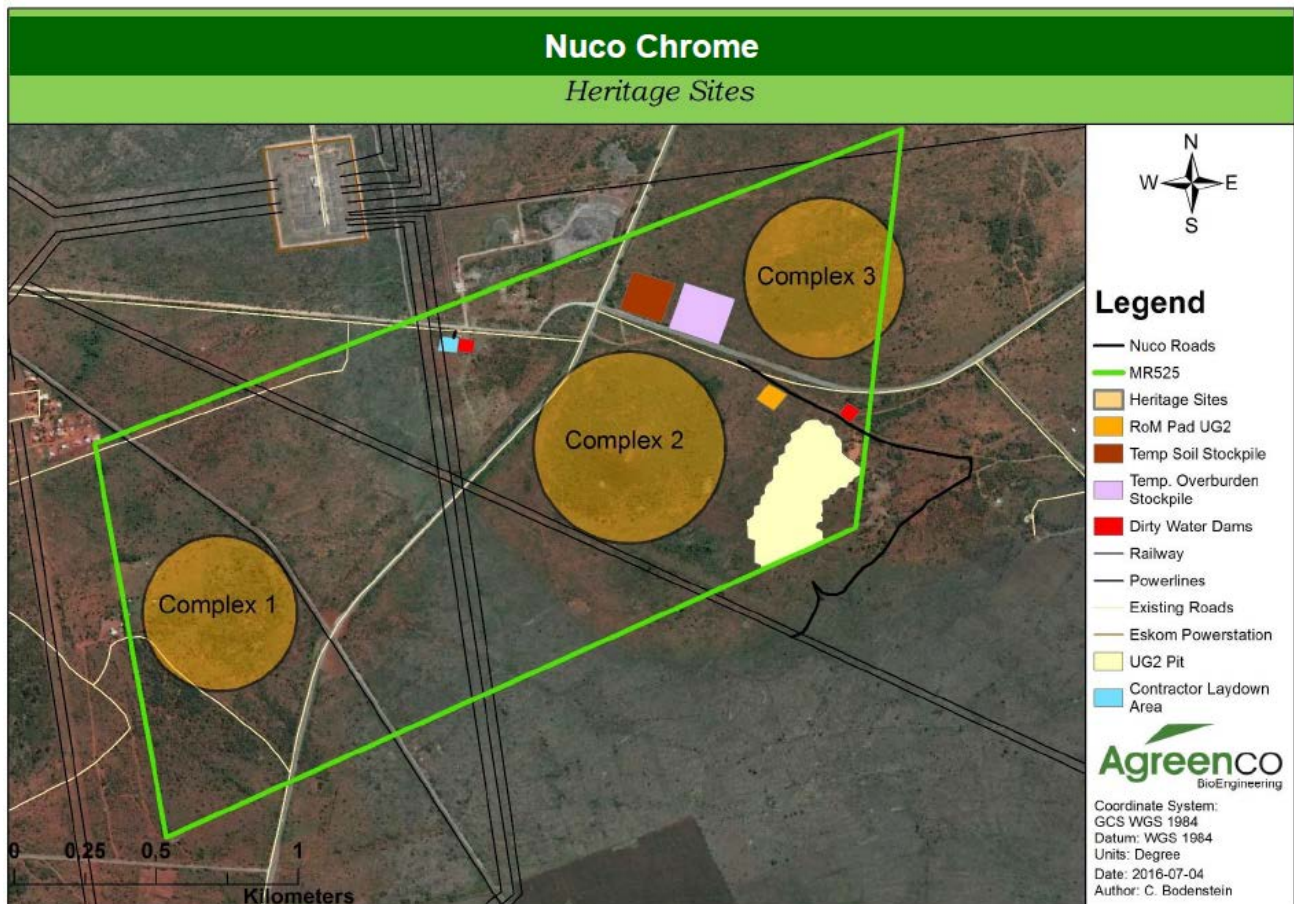


Figure 29: Heritage sites located in MR525 area

### 9.12 Socio-economic

The Rustenburg Local Municipality is a category B municipal council consisting of 45 wards. It is located in the eastern parts of the North-West Province and is accessible to a number of major South African urban centers. These centers include Johannesburg and Tshwane, which are located approximately 120km from Rustenburg. Smaller centers surrounding Rustenburg are Madibeng, Mogale City and Zeerust in the Ramotshere Moilwa Local Municipality.

Rustenburg is linked to the above urban centres through an extensive regional road network. The most notable of these is the N4 freeway or Platinum Corridor, which links Rustenburg to Tshwane in the east and Zeerust to the west. The R24 links Rustenburg to Johannesburg in the south and the Pilanesberg to the north. Rustenburg Local Municipality (RLM) is one of five municipalities within the Bojanala District Municipality in the North-West Province and is divided into 45 wards.

The total population is 626 522 people, comprising of 54% males and 46% females. The significant growth in Rustenburg is largely attributed to the impact of the world’s four largest mines in the immediate vicinity of the town, namely, Anglo Platinum, Impala Platinum, Xstrata and Lonmin. Approximately 97% of the total platinum production occurs in Rustenburg, with the mining sector providing around 50% of all formal employment.

**Population:** Table 2-1 provides an overview of the total population within the RLM, indicating the distribution of gender and age groups from 2011 to 2016. It is clear that overall, the population increased from 2011 to 2016 and is steadily growing mostly due to the mining activities in the area. In terms of gender distribution, it is shown that the majority of the population in RLM is male with 55% in 2011 and 54% in 2016. This phenomenon could be attributed to labour migration to Rustenburg due to more males migrating to the city to obtain job opportunities.



Rustenburg has a population of 626 522 persons as per the Community Survey (Stats SA, 2016).

The gender breakdown is as follow:

Male	Female	Total
342 865	283 657	626 522

The total youth (15-34 years) population as per the Community Survey (Stats SA, 2016) is 225 181 persons and the gender breakdown is as follow:

Male	Female	Total
121810	103 371	225 181

**Poverty Statistics:** According to the Community Survey (Statistics South Africa, 2016), Rustenburg Local Municipality (662 NW373), sub-category B1 registered 29.3% of 2015 Grants and subsidies received as a % of Total Income. The 2016 poverty headcount stands at 8% and the municipality has intensity of poverty of 44.6%.

Rustenburg Local Municipality has a total of 27.9% living in poverty. A household is considered to be subject to poverty if the individuals therein earn a combined income which is less than the poverty income threshold. This poverty income threshold is defined as the minimum monthly income needed to sustain a household. The poverty income used by IHS - within the context of this assessment - is based on the Bureau of Market Research's Minimum Living Level. Currently, the poverty income threshold for a household of 4 people is set at R2 544 per month. Individuals in Rustenburg Local Municipality considered functionally literate constitutes 84.67% of the population (IHS).

**Food Security:** According to the Community Survey (Stats SA, 2016), a total number of 41 291 households (15.7%) "Run out of money to buy food in past 12 months". A total number of 26 005 households (9.9%) "Running out of money to buy food for 5 or more days in past 30 days". A total number of 30 584 households (11.6%) "Skipped meal in past 12 months". a total number of 17 237 households (6.6%) "Skipping meal for 5 or more days in the past 30 days".

**Economy:** The economic growth forecast is expected that Rustenburg Local Municipality will grow at an average annual rate of 12.34% from 2013 to 2018 (IHS). These growth projections are not spontaneous, but based on measures take to improve the local economy of Rustenburg.

The economy is overly and unsustainably resource intensive (New Growth Path). Amongst the key considerations is to transform Rustenburg from a resource-based to knowledge-based economy. The local economy needs to transit from a mining-dominant economy to a more balance and diversified one, with more secondary and tertiary sector employment opportunities. The secondary and tertiary sectors will be a major contributor to the economy. It is projected to provide about 130,000 jobs in manufacturing and 170,000 service-related jobs by 2040 (IMP, 2014).

The NWP economy, with the exception of the mines, is characterised by small, medium and micro enterprises (SMMEs). Given the sensitivity of the province's economy to world mineral prices, the NWP plans to reduce its dependence on the mining sector, with an increased diversification to tourism and non-mining related manufacturing industries, evident in the recent 2.5% growth in this sector.

**Expected from the RLM in the next five years: 2017/22:** The RLM has set out seven key areas of performance in ensuring that they achieve their intended goals especially in the following areas:

- Efficient provision of quality basic services and infrastructure within a well-planned spatial structure
- Drive diversified economic growth and job creation
- Ensure municipal financial viability and management
- Maintain clean, green, safe and healthy municipal environment for all
- Transform and maintain a vibrant and sustainable rural development



- Uphold good governance and public participation principles
- Drive optimal municipal institutional development, transformation and capacity building.

**Table 12: Residential areas and informal settlements within 10 km of the project site**

Receptor	Type of Receptor	Distance from centre of site (km)	Direction from site
Bobuamja	Residential	~ 2	South
Freedom Park	Residential	~ 6	East
Ga-Luka	Residential	~ 8	North
Kgale	Residential	~ 4	South-southwest
Lefaragatlh	Residential	~ 5	South
Masosobane	Residential	~ 6	Southwest
Meriting	Residential	~ 6	Southeast
Phokeng	Residential	~ 3	Southwest
Pudunong	Residential	~ 3	West
Seraleng	Residential	~ 7	Southeast
Tlhabane	Residential	~ 8	South

### 9.13 Environmental and current land use map

Refer to section 9.7.3, Figure 29: Heritage sites located in MR525 area, Figure 28: North West Biodiversity Sector Plan (NW BSP), and Figure 23: Wetlands and water sources situated on the MR525 and MR10154 areas.

The area consists mostly of natural savanna vegetation with a few existing gravel roads permitting access to the site. Cultivated fields as well as an Eskom Power Station is visible on site. Several mining activities are present in close proximity to the study area. The figure below indicates current land uses associated with the greater study area as well as the surrounding area.

One non-perennial stream traverses the property on which mining is proposed (MR 525). It is a tributary of the Leregane Stream.

The proposed development is located within the Savanna Biome, within the Central Bushveld Bioregion and most of the site is classified as Marikana Thornveld vegetation (SVcb6) with a very small portion consisting of Moot Plains Bushveld (SVcb8). The Marikana Thornveld has a status of Endangered in terms of the NBA 2018. It had a previous status of Vulnerable in terms of the NBA 2011.

The eastern section of the study site is located on areas categorised as CBA2 in terms of the NW BSP. These CBA areas are associated with the koppies located on the study site. Note that although some of the infrastructure is located within the buffers of the koppies (CBA2), no infrastructure is proposed on the koppies.

Three stone walled complexes that date from the Late Iron Age and the Historical Period are situated on the Mining Right area.



### 9.13.1 Sensitive landscapes

The occurrence of possible sensitive landscapes at the project site is outlined in the table below.

**Table 13: Sensitive Landscapes within the Proposed Mining Site**

Types of sensitive landscapes	Occurrence at the Proposed Mining Site
<p>Nature conservation or ecologically sensitive areas - indigenous plant communities (particularly rare communities and forests), wetlands, rivers, riverbanks, lakes, islands, lagoons, estuaries, reefs, inter-tidal zones, beaches and habitats of rare animal species.</p>	<p>No protected areas in terms of the NEMPAA are located within 5 km of the Mining Right area.</p> <p>The Marikana Thornveld has a status of Endangered in terms of the NBA 2018.</p> <p>No wetlands are located on the project footprint.</p> <p>The eastern section of the study site is located on areas categorised as CBA2 in terms of the NWBSP. These CBA areas are associated with the koppies located on the study site. Note that although some of the infrastructure is located within the buffers of the koppies (CBA2), no infrastructure is proposed on the koppies.</p> <p>One non-perennial stream traverses the property on which mining is proposed (MR 525). It is a tributary of the Leregane Stream.</p>
<p>Sensitive physical environments - such as unstable soils and geo-technically unstable areas.</p>	<p>None</p>
<p>Important natural resources - river systems, groundwater systems, high potential agricultural land.</p>	<p>One non-perennial stream traverses the property on which mining is proposed (MR 525). It is a tributary of the Leregane Stream.</p>
<p>Sites of special scientific interest</p>	<p>Three stone walled complexes that date from the Late Iron Age and the Historical Period are situated on the Mining Right area.</p>
<p>Sites of social significance - including sites of archaeological, historic, cultural, spiritual or religious importance and burial sites.</p>	<p>Three stone walled complexes that date from the Late Iron Age and the Historical Period are situated on the Mining Right area.</p>
<p>Sites of outstanding natural beauty, panoramic views and scenic drives</p>	<p>A visual assessment will be undertaken as part of the EIA phase of the project.</p>
<p>Green belts or public open space in municipal areas</p>	<p>Not applicable.</p>



## **10 IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS CAN BE MANAGED**

### **10.1 Impacts Identified**

The Proposed Project may cause impacts to the immediate, surrounding and regional cultural, biophysical and socio-economic environment. Specific cultural, environmental and socio-economic impacts are anticipated to occur at different phases of the project during the life of mine. These phases include:

- Construction
  - Including the planning and implementation phases, construction of associated infrastructure, development of opencast area, access ramps and roads, haul roads, waste facilities (mineral and non-mineral), mine residue stockpiles, product stockpiles, handling areas, and ore processing facilities.
- Operation
  - Including general mining activities, ore transportation, mine development, storage of waste material (including mine residues) as well as processing of ore.
- Decommissioning
  - Including scaling down of activities ahead of temporary or permanent closure, cessation of mining production and associated ore processing, implementation of rehabilitation programme, monitoring and maintenance for prescribed period after cessation of operations.
- Closure
  - Including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring and maintenance.

The impacts associated with each of these phases will be specific to the mineral commodity, cultural, environmental and socio-economic context, mining method, spatial and temporal aspects of the operation and stated rehabilitation goals. For the purpose of this report, anticipated/ potential impacts have been identified, although this was determined from a desktop approach. This approach also took into consideration typical impacts previously identified from similar projects within the area. Specific cultural, environmental and socio-economic impacts associated with the Proposed Project will be assessed and quantified during the EIA Phase of the project. The methodology that will be utilised is detailed in **Section 10** of this report.

Please note that the significance, probability and duration of the anticipated impacts will need to be quantified during the EIA Phase of the project and as such, have not been included herein.

The following cultural, environmental and socio-economic impacts associated with the Proposed Project have been assessed in this document. The impacts include all aspects of the mining, processing and associated activities during the construction, operation, decommissioning and post-closer phases.

- Geology;
- Topography;
- Climate;
- Air quality;
- Soil, land use and land capability;
- Biodiversity;
- Hydrology and geohydrology;
- Noise;
- Traffic;
- Visual aspects;





- Sites of archaeological, historic or cultural interest;
- Socio-economic aspects; and
- Mine closure.

Anticipated impacts associated with the Proposed Project are included in the table below.

**Table 14: Anticipated Impacts associated with the Proposed Project**

<b>Environment</b>	<b>Anticipated Impact (excluding mitigation)</b>
<b>Geology</b>	<ul style="list-style-type: none"> <li>• The Proposed Project may have an impact on the rock masses that influence the groundwater and topography on the project site, and may impact post-mining slope stability.</li> <li>• Excavation of rock and ore for the opencast pit will influence the underlying geology of the site as a void will be created, that may have a steep gradient or stepped highwalls.</li> <li>• Resultant impacts from blasting and vibrations may impact on geology.</li> <li>• The extraction of ore and waste rock from the opencast mines will result in the permanent removal of geology/ lithology.</li> <li>• Apart from specific rock types or outcrops which are of scientific interest or cultural significance, the direct impact of mining on geology is seldom highly significant unless the long-term effects on groundwater or topography have important ramifications.</li> <li>• Disturbance and removal of the geological strata due to excavation and subsequent removal of the reef.</li> </ul>
<b>Topography</b>	<ul style="list-style-type: none"> <li>• Disturbance of topography as a result of the opencast pits, stockpiling of stripped topsoil for the associated mining infrastructure, stockpiling of tailings material, overburden and waste rock.</li> <li>• Potential aesthetic impact resulting from the opencast pit, processing plant and activities, waste rock dump and tailing storage facilities, soil and product stockpiles and mine infrastructure.</li> <li>• Site clearing and topsoil removal and establishment of mining infrastructure and access as well as the clearing of vegetation and topsoil associated with the surface laydown area.</li> </ul>
<b>Climate</b>	<ul style="list-style-type: none"> <li>• Regional and local rainfall and wind characteristics should not be affected by activities associated with the Proposed Project.</li> <li>• Local atmospheric conditions (i.e., temperature) within the immediate area could be affected due to the increase of equipment, machinery and vehicles as well as processing activities potentially affecting the local lower regions of the troposphere above the project site.</li> <li>• An increase in greenhouse gas emissions associated with increase burning of fossil fuels for vehicles, machinery and equipment as well as activities associated with the mining and processing is anticipated.</li> <li>• Resultant decrease in non-renewable fuel sources in the area resulting with the increase fuel requirements associated with the Proposed Project.</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>• The generation of fugitive dust and particulate matter (PM) from the construction, operational and closure phases of the Proposed Project is anticipated (land clearing, drilling and blasting, transportation of ore via road and conveyor, crushing, processing activities, stockpiling waste rock and tailings material, soil and ore, etc.). <ul style="list-style-type: none"> <li>– Dust may impact on the health and safety of employees and the surrounding community through respiratory, visual and aesthetic impacts.</li> <li>– Dust may contain toxic metals and may have direct on the community and fauna in the area.</li> <li>– Dust fallout retards vegetation growth and reduces the palatability of plants to animals.</li> </ul> </li> <li>• Drilling, blasting and abrasion of hard rock overburden may generate dust.</li> <li>• Vehicle activity associated with mining may generate dust.</li> </ul>



Environment	Anticipated Impact (excluding mitigation)
	<ul style="list-style-type: none"> <li>• Topsoil and overburden removal and stockpiling, drilling and blasting, deposition of waste rock and tailings material may contribute to the generation of dust.</li> <li>• Crushing activities within the concentrator may have the potential to contribute to the generation of dust and PM.</li> <li>• Use of vehicles, equipment and machinery could result in the release of volatile organic compounds (VOCs) associated with burning of fossil fuels.</li> </ul>
<b>Soils, land use and land capability</b>	<ul style="list-style-type: none"> <li>• Excavation and soil stockpiling during site preparation may result in the dilution of highly fertile organic components within the soil and may result in the loss of topsoil on the site.</li> <li>• Excavation and soil stockpiling during site preparation may result in the ingress of alien invasive plant species to the area, impacting on the future sustainable land use potential and land capability after mining.</li> <li>• Development of the opencast pits may result in the dilution of highly fertile organic components within the soil and may result in the loss of topsoil on the site. This may also result in the ingress of alien invasive plant species to the area, impacting on the future sustainable land use potential and land capability after mining.</li> <li>• Transport network construction, excavation and associated mining activities have the potential to compact topsoil which can cause an increase of sheet-water runoff resulting in erosion (e.g., storm water runoff). This results in a loss of fertile topsoil resources and increase particulate solids in runoff that could impact on surrounding surface water bodies.</li> <li>• The compaction of soil may also concentrate surface water runoff from the site, resulting in downstream erosion, flooding or loss of biodiversity.</li> <li>• Leachate from waste rock dumps, ROM stockpile and the storage of tailings material may contaminate soils from infiltration, resulting in surface and groundwater contamination.</li> <li>• Soil contamination may occur from spillages and leakages of hydrocarbons, contaminated water, wash plant runoff, etc. onsite.</li> <li>• Contamination from the poor management of wastes generated onsite may impact negatively on the soil of the area, resulting in a decrease of land use and resultant land capability.</li> <li>• Potential loss of grazing capacity and cultivated agriculture (land use) as a result of mining and associated activities.</li> <li>• Potential acid mine drainage from waste rock dumps and tailings storage facilities could result in acidic and saline soils, making conditions unsuitable for vegetation growth.</li> <li>• Subsidence of mine area may impact on the land capability and land use of the area.</li> <li>• Mining may not comply with land use potential and land capability of the area.</li> </ul>
<b>Biodiversity</b>	<ul style="list-style-type: none"> <li>• Mining and associated activities may have an impact on the site-specific ecosystem, and could result in a loss of vulnerable, critically endangered, endangered and near threatened sensitive species (flora and fauna).</li> <li>• The mining activities may have a potential loss of Red Data species that could occur across the surface laydown area which will be transformed from associated mining activities.</li> <li>• Mining and associated activities may disturb indigenous flora in the area.</li> <li>• Resultant impacts on the flora and fauna may have a direct impact on ecological sensitivity in the area.</li> <li>• Potential isolation of sensitive areas may result in the degradation of indigenous flora and fauna species, and changes in populations reliant on movement or interchange between habitats.</li> <li>• Potential impact on biodiversity through mismanagement of dangerous goods and hazardous materials.</li> <li>• Mining activities may result in the generation of alien vegetation, which may encroach and impact on the surrounding ecosystem.</li> </ul>



Environment	Anticipated Impact (excluding mitigation)
	<ul style="list-style-type: none"> <li>• Mining activities may impact on the groundwater table, impacting on floral species dependant on groundwater in the area.</li> <li>• Potential subsidence may have an impact on slopes and ridges in the project area, resulting in a loss of potentially unique habitat conditions. This may affect sensitive breeding species associated in the mountainous areas within the project area.</li> <li>• Contamination from the poor management of wastes generated onsite may affect sensitive fauna and flora species within the area.</li> <li>• Potential loss of habitats resulting from uncontrolled burning and the spread of fires in the area.</li> <li>• The accumulative effect of emissions into the air (fugitive dust, PM, etc.) could have an adverse effect on the flora and fauna populations within the receiving environment.</li> <li>• Release, spillages and leakages of dangerous goods and hazardous materials such as chemicals, hydrocarbons and sewage may lead to a depletion of the natural ecosystem.</li> <li>• Impact of traffic and transport activities on flora and fauna species (construction, operation, decommissioning).</li> </ul>
<b>Hydrology (surface water) and geohydrology (groundwater)</b>	<ul style="list-style-type: none"> <li>• Impacts on surface water and groundwater recharge due to modification of infiltration rates from compaction of surfaces.</li> <li>• Erosion activities may result in the increase of sedimentation of runoff water which could alter flow rates, discharge rates and erosion/ sedimentation patterns of nearby rivers downstream.</li> <li>• Oxidisation of sulphur compounds in waste rock result in acid rock drainage which lowers acidity. The runoff may affect surface water quality, groundwater and biodiversity in the area.</li> <li>• Contamination of substances associated with the explosives used for mining activities can affect the surface water quality, groundwater and biodiversity in the area.</li> <li>• Potential impacts on surface water as a result of runoff contamination from the waste rock dump, tailings storage facility, wash plant area and product stockpile area.</li> <li>• Potential surface and groundwater contamination from spillages and release of process water from wash plant areas that diffuse and infiltrate the surrounding environment.</li> <li>• Potential pollution or impact on the hydrology and geohydrology resulting from incorrect storage and management of dangerous goods and hazardous materials and/ or other contaminants.</li> <li>• Pumping of groundwater required for safe mining conditions may have a direct impact on the water table (reducing natural groundwater recharge), and could have impacts on ecosystems and resultant loss of flora and fauna species.</li> <li>• Pumping of groundwater also increases the volume of discharge in the area, potentially altering downstream ecosystems and biota.</li> <li>• Release, spillages and leakages of chemicals, hydrocarbons and sewage (treated sewage) may lead to an impact on the surface and groundwater of the area.</li> <li>• Physical disruptions of aquifers may occur from blasting, causing groundwater to seep to lower aquifers, which could result in cross contamination of aquifer resources.</li> <li>• Potential impact from failures from mining activities and infrastructure (e.g., pollution control dam, tailings storage facilities, etc.).</li> </ul>
<b>Noise and vibration</b>	<ul style="list-style-type: none"> <li>• Noise is anticipated to be generated from blasting, mining operations, transportation, crushing, machinery etc. which may have a negative impact on the surrounding biophysical and socio-economic environment.</li> <li>• Construction and operational activities may lead to an increase in noise levels of the ambient environment noise levels.</li> <li>• Vibrations from blasting may impact on the underlying geology of the site, and could result in displacement of fauna species.</li> </ul>



Environment	Anticipated Impact (excluding mitigation)
<b>Traffic</b>	<ul style="list-style-type: none"> <li>• There may be an increase in traffic within the immediate area which would result in the generation of dust, noise, air emissions and hydrocarbon spillages.</li> <li>• Increase traffic could cause road deterioration and have a negative impact on the movement of affected parties in the region (all phases of the project).</li> </ul>
<b>Visual</b>	<ul style="list-style-type: none"> <li>• The site clearance, opencast pit, mining, processing and associated activities may have an impact on the aesthetics of the area and impact on the general 'sense of place'.</li> <li>• The generation of dust and smoke may have visual impact within the surrounding area, resulting in associated health and safety impacts.</li> </ul>
<b>Archaeological, cultural and heritage</b>	<ul style="list-style-type: none"> <li>• The Proposed Project may have an impact on sites of archaeological, historic and cultural importance/ significance.</li> <li>• Potential artefacts that may be identified onsite could be affected from mining and associated activities (e.g., mining employees), including subsidence in the area.</li> <li>• Identified and unidentified graves may be impacted on from mining related activities and subsidence in the area.</li> <li>• Impacts of the road construction on sites of heritage significance may occur.</li> <li>• Impact on resultant fauna and flora species may result in a cultural impact for communities in the area.</li> </ul>
<b>Socio-economic</b>	<ul style="list-style-type: none"> <li>• Chrome mining in South Africa is supported by the country possessing over 70% of the world's chrome reserves. An expected increase in the demand for chrome is expected for the future due to stricter emissions legislation globally and a rise in the growth of vehicle production and sales. Due to increased development and demand for chrome, there is an increased need for chrome mines to produce precious metals for the market.</li> <li>• Job opportunities may be made available to the surrounding local communities.</li> <li>• Training may be provided to employees resulting in an improvement of the local skills base.</li> <li>• The mine may invest in social capital by undertaking a Social and Labour Plan, and promote sustainable local economic development in the surrounding areas.</li> <li>• Support may be given to the local and national economy by the purchase of goods and services required by the Proposed Project.</li> <li>• The production of metals will contribute towards: <ul style="list-style-type: none"> <li>– Local development within the Local Municipality;</li> <li>– South Africa's foreign revenue; and</li> <li>– The anticipated generation of export income.</li> </ul> </li> <li>• Socio-economic conditions in the project area will be impacted on both positively and negatively.</li> <li>• The Proposed Project may have negative impacts on the health and safety of the surrounding community and future employees from the generation of dust, air emissions (noxious gases and smoke), noise, vibrations, traffic, and contamination of surface and groundwater on downstream water users.</li> <li>• The mine may have an aesthetic impact on the surrounding communities.</li> <li>• The 'sense of place' may be affected, thereby impacting on the surrounding community.</li> <li>• Impact of the Proposed Project may result in a decreased of indigenous plants used for medicinal purposes having an effect on the community.</li> <li>• The project may create employment opportunities for the surrounding community.</li> <li>• Increase in economic growth and local economic development.</li> <li>• Training and skills development may be provided to unskilled labourers in the area, thereby expanding the local skills base.</li> <li>• The mine may result in an increase of individuals into the area.</li> <li>• Increased individuals may result in the establishment of illegal settlements.</li> </ul>



Environment	Anticipated Impact (excluding mitigation)
	<ul style="list-style-type: none"> <li>• The increase in individuals in the area may impact on social pathologies, such as social ills such as HIV/ AIDS, petty crime, stock theft, etc.</li> <li>• The presence of non-residents, perceived “outsiders” and contractors within the local environment could cause localised social tension due to the rural nature of the area. The opposition expressed by certain local communities and stakeholders, may result in conflict causing disruption to the local communities and the Proposed Project.</li> <li>• Social changes resulting from the Proposed Project including conflict for resources, conflict of cultures, and a change in nature of the area resulting in social change and potential for disputes.</li> <li>• Labour conflict with the mining company, regarding aspects such as wages and resources, could result in local social unrest.</li> <li>• Opportunities for entrepreneurial development could commence as a result of the Proposed Project.</li> <li>• The employment of local people could lead to the growth in the multiplier factor as the impact will extend to family members and other supporting services.</li> </ul>

### 10.2 Issues raised by Interested and Affected Parties

The following still needs to be conducted; once it has been conducted an impact assessment will be provided to the relevant parties. Refer to section 8 for the issues raised by IAPs.

### 10.3 Specialist Investigations

The impacts considered of sufficient importance as to warrant mitigation measures and management during the construction and operational phases of the proposed project will be assessed by specialists of the relevant field. The potential impacts and key issues which must be thoroughly investigated during the EIA include the following:

- Groundwater and contamination;
- Surface water and aquatic ecology;
- Noise;
- Terrestrial ecology;
- Archaeological;
- Palaeontology;
- Blasting and vibration;
- Socio-Economic;
- Visual;
- Soil and land capability; and
- Air quality.

During the EIA phase of the project all the potential impacts will be discussed in detail. Each specialist report as mentioned above will be used for the identification of the impacts and mitigation measures will be set up regarding those impacts.



## 11 METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

### 11.1 Assessment Criteria

The criteria for the description and assessment of environmental impacts were drawn from the EIA Guidelines, National Environmental Management Act (Act No. 107 of 1998): EIA Regulations (2014) and as amended from time to time.

The level of detail as depicted in the EIA Guidelines was fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

An explanation of the impact assessment criteria is defined below.

**Table 15: Impact Assessment Criteria**

<b>EXTENT</b>	
<b>Classification of the physical and spatial scale of the impact</b>	
<b>Footprint</b>	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
<b>Site</b>	The impact could affect the whole, or a significant portion of the site.
<b>Regional</b>	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
<b>National</b>	The impact could have an effect that expands throughout the country (South Africa).
<b>International</b>	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
<b>DURATION</b>	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.	
<b>Short term</b>	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
<b>Short to Medium term</b>	The impact will be relevant through to the end of a construction phase (1.5 years).
<b>Medium term</b>	The impact will last up to the end of the development phases, where after it will be entirely negated.
<b>Long term</b>	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.
<b>Permanent</b>	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
<b>INTENSITY</b>	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as	
<b>Low</b>	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
<b>Medium</b>	The affected environment is altered, but functions and processes continue, albeit in a modified way.
<b>High</b>	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.



PROBABILITY	
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:	
<b>Improbable</b>	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
<b>Possible</b>	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
<b>Likely</b>	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
<b>Highly Likely</b>	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
<b>Definite</b>	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

The status of the impacts and degree of confidence with respect to the assessment of the significance must be stated as follows:

- **Status of the impact:** A description as to whether the impact would be positive (a benefit), negative (a cost), or neutral.
- **Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full-lifecycle of the proposed development, including construction, operation and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

## 11.2 Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

### 11.2.1 Determination of Significance-Without Mitigation

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:



**Table 16: Significance-Without Mitigation**

<b>NO SIGNIFICANCE</b>	The impact is not substantial and does not require any mitigation action.
<b>LOW</b>	The impact is of little importance, but may require limited mitigation.
<b>MEDIUM</b>	The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
<b>HIGH</b>	The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

### 11.2.2 Determination of Significance- With Mitigation

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

**Table 17: Significance- With Mitigation**

<b>NO SIGNIFICANCE</b>	The impact will be mitigated to the point where it is regarded as insubstantial.
<b>LOW</b>	The impact will be mitigated to the point where it is of limited importance.
<b>LOW TO MEDIUM</b>	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.
<b>MEDIUM</b>	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
<b>MEDIUM TO HIGH</b>	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
<b>HIGH</b>	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

### 11.3 Assessment Weighting

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

#### 11.3.1 Ranking, Weighting and Scaling

For each impact under scrutiny, a scaled weighting factor is attached to each respective impact (refer Table 7). The purpose of assigning weights serves to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.





**Table 18: Description of assessment parameters with its respective weighting**

EXTENT		DURATION		INTENSITY		PROBABILITY		WEIGHTING FACTOR (WF)		SIGNIFICANCE RATING WITHOUT MITIGATION (SR WOM)	
Footprint	1	Short term	1	Low	1	Improbable	1	Low	1	Low	0-19
Site	2	Short to Medium	2			Possible	2	Low to Medium	2	Low to Medium	20-39
Regional	3	Medium term	3	Medium	3	Likely	3	Medium	3	Medium	40-59
National	4	Long term	4			Highly Likely	4	Medium to High	4	Medium to High	60-79
International	5	Permanent	5	High	5	Definite	5	High	5	High	80-100
MITIGATION EFFICIENCY (ME)				SIGNIFICANCE RATING WITH MITIGATION (SR WM)							
High				0.2		Low		0 – 19			
Medium to High				0.4		Low to Medium		20 – 39			
Medium				0.6		Medium		40 – 59			
Low to Medium				0.8		Medium to High		60 – 79			
Low				1.0		High		80 – 100			

### 11.3.2 Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

#### Equation 1:

$$\text{Significance Rating (WOM)} = (\text{Extent} + \text{Intensity} + \text{Duration} + \text{Probability}) \times \text{Weighting Factor}$$

### 11.3.3 Identifying the Potential Impacts With Mitigation Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

### 11.3.4 Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation efficiency (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

#### Equation 2:

$$\text{Significance Rating (WM)} = \text{Significance Rating (WOM)} \times \text{Mitigation Efficiency}$$

or  $\text{WM} = \text{WOM} \times \text{ME}$

### 11.3.5 Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.



## **12 THE POSITIVE AND NEGATIVE IMPACTS IN TERMS OF THE SITE LAYOUT THAT THE PROPOSED ACTIVITY AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED**

The sites for the infrastructure related to the proposed mining operations are located at the various points which are practical for the mining and would have the least impact on the surrounding environment. The areas used for above ground infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered “secondary alternatives”. These areas have been determined from a preliminary evaluation of how they are most optimally configured between the open pits, and away from potentially sensitive areas, in favour of proposed positioning on previously disturbed land.

Similar positive and negative impacts are anticipated for alternative site locations as identified in Section 10.1 above. Specific alternatives will be assessed as part of the EIA Phase in collaboration with the relevant specialist studies.



### 13 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

The following proposed mitigations have been sourced from similar projects, the EAP's experience and from discussions with stakeholders during the social scan. Please note that as the impacts from the Proposed Project have not been quantified and that additional input will be required from specialists and stakeholders, the possible mitigation measures proposed hereunder may be amended accordingly. Potential mitigation measures are included in the table below, which takes cognisance of construction, operational and closure phases of the Project.

It must be noted that proposed mitigation measures cannot be read individually as various mitigation measures relate to more than one aspect/ environment. Furthermore, it should be noted that the classification of an issue as a key issue during the Scoping Phase does not necessarily imply that a significant impact will result. The significance of an impact can only be ascertained once a specialist study has been conducted.

**Table 19: Proposed Mitigation Measures**

<b>Environment</b>	<b>Proposed Mitigation Measure</b>
<b>Geology</b>	<ul style="list-style-type: none"> <li>• Formulate and implement a blasting design that will ensure the least impact on the environment.</li> <li>• The minimal amount of soils will be stripped on the sections to be blasted in order to reduce the potential for air blasts.</li> <li>• Blasting may only be undertaken by registered personnel.</li> <li>• Blasting schedules will be distributed to all surrounding communities.</li> <li>• Warning sirens will sound prior to the initiation of blasting to inform the surrounding employees and other stakeholders and to ensure safety of all people in the vicinity of the blast area.</li> <li>• The blasting area will be cordoned off prior to each blasting activity.</li> </ul>
<b>Topography</b>	<ul style="list-style-type: none"> <li>• All structures and infrastructure must be designed and operated with the aim of closure in mind.</li> <li>• Contractors and employees will be limited to the clearly defined access routes and areas to be constructed in order to limit site disturbance.</li> <li>• Rip compacted surfaces during closure.</li> <li>• Reshape footprint area to mimic natural topography as far as possible and to facilitate hydrological runoff.</li> <li>• Revegetation of support berms to veld grasses.</li> </ul>
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>• All activities onsite will comply with the requirements of the National Environmental Management Air Quality Act (No. 39 of 2004).</li> <li>• Dust suppression techniques (i.e. wet suppression) will be implemented on unpaved roads and the co-disposal discard dump to limit the dispersion of dust. It is recommended that a chemical binding agent be incorporated to make the dust suppression techniques more efficient.</li> <li>• Limit the speed of vehicles on unpaved roads to 40 km per hour.</li> <li>• Vehicles carrying any loose aggregates or materials should be covered with tarpaulins or sheets at all times.</li> <li>• Limit the generation of dust from stockpiles onsite during construction, operation and closure.</li> <li>• Windbreaks in the form of shade cloth screens may be erected at exposed areas.</li> <li>• Where excessive dust exists watering down of blasts prior to blasting should be undertaken.</li> <li>• Blasting will be carried out in accordance with relevant legislation and using only the required amount of explosives. Blasting should occur on calm days to reduce the possibility of dust travel.</li> </ul>



Environment	Proposed Mitigation Measure
<p><b>Soils, land use and land capability</b></p>	<ul style="list-style-type: none"> <li>• Ensure that discard dumps, waste rock dumps, tailing storage facilities, etc. development allow for benching of slopes to facilitate operation phase vehicle access for the application of topsoil for rehabilitation purposes. Incorporate management plan which would allow for a phased expansion of the discard dumps, waste rock dumps, tailing storage facilities, etc. where topsoil from the expansion areas are utilised directly on the rehabilitation of the previously disturbed face. This would allow for topsoil not to be sterilised by stockpiling.</li> <li>• Prior to the commencement of construction activities, the project site will be clearly demarcated with fencing. Temporary barriers should be erected to protect surrounding habitats from construction activities and dumping of rubble and waste.</li> <li>• At least 300 mm of soils or until hard rock (if the soil cover is less than 300 mm deep) is reached will be removed from the area over which infrastructure will be placed. The topsoil (first 300 mm) is expected to have a higher fertility than the subsoil horizons and holds the vegetation seed bank.</li> <li>• Large areas of soil excavation should be phased to limit the erosion potential during rainfall events (more common between September and February). Construction activities outside of the designated development areas should be limited.</li> <li>• The topsoil should be stockpiled in designated areas and will be vegetated where required or possible to minimise erosion in accordance with the relevant procedures for use in ongoing rehabilitation purposes.</li> <li>• Topsoil should be kept separate from sub-soils during stockpiling. The stockpile shall be located away from seepage zones, floodlines, water courses and other ecological sensitive areas. Stockpiles will not exceed 2 m in height.</li> <li>• Sustainable erosion control measures (for wind and water erosion) will be implemented and maintained where necessary in areas disturbed by the construction (and operation) activities. Erosion control measures include, but are not limited to swales, sandbags, planting of vegetation, hydroseeding of topsoil and subsoil stockpiles and retention of vegetation.</li> <li>• Vegetation removal should be kept to a minimum and limited to the area of development. Where an impact to the vegetation outside of the development footprint occurs, rehabilitation measures need to be undertaken to maintain the baseline vegetation population and health. Weed and invader species growth needs to be appropriately managed within the mine area to maintain the baseline vegetation health.</li> <li>• Due to the potential for soil compaction resulting from vehicles, traffic should be limited to existing or proposed roadways as far as possible. The construction of roads should be limited in width and length as far as is practical to limit impacts. Where possible already disturbed areas will be utilised.</li> <li>• All disturbed areas should be rehabilitated as soon as possible during the life of mine in accordance with design specifications to reduce soil erosion.</li> <li>• Dirty and clean water will be separated by implementing clean and dirty water systems/ structures prior to construction to prevent pollution of clean water runoff or the existing dirty and clean water systems will be maintained.</li> <li>• The clean and dirty water systems and structures will be properly designed (according to GNR.704 of the National Water Act (No. 59 of 1998)) to prevent contamination of clean water sources and the erosion and scouring of the infrastructure.</li> <li>• All waste generated onsite will be adequately stored, and collected and disposed of by a reputable waste management contractor. No waste is to be burned or disposed of onsite.</li> <li>• Draw up a Waste Management Plan that will ensure that the principles stated in the 'waste hierarchy' are included and that all other waste is correctly classified and disposed of at the</li> </ul>



Environment	Proposed Mitigation Measure
	<p>appropriate registered waste disposal site. The plan is to include procedures for each waste stream generated onsite.</p> <ul style="list-style-type: none"> <li>• All waste management and waste disposal activities are to be undertaken in accordance with the National Environmental Management: Waste Act (No. 59 of 2008).</li> <li>• Draw up and enforce site rules for employees and contractors to ensure good housekeeping practices with respect to general waste.</li> <li>• All waste streams generated should be classified (as general, hazardous or recyclable wastes) and separated at source, in accordance with GNR.634 of 2013.</li> <li>• A waste management contractor is to be identified, a contract agreed upon and the waste management contractor is to collect all waste generated from the site and remove it to a permitted waste disposal facility.</li> <li>• All waste collection storage areas will be managed effectively to avoid any potential surface and groundwater contamination, including the generation of litter.</li> <li>• All access routes must be adequately maintained (potholes, erosion damage, corrugations, etc.).</li> <li>• The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. A procedure for the storage, management and application of herbicides and pesticides is to be developed. Herbicides and pesticides should not be applied on very windy days and at all times their application should be directed away from surrounding land, to prevent damage to organisms in the surroundings. Ensure herbicides and pesticides are only directed to areas required and only applied by a certified person.</li> <li>• Fertilisers should not be used excessively, and slow release fertilisers and organic products should be used in preference to highly soluble and inorganic fertilisers. Only natural fertilisers should be utilised.</li> <li>• The use of herbicides and pesticides will be applied in compliance with the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No. 46 of 1947).</li> <li>• Fires will only be allowed in facilities specially designed and constructed for this purpose within the project site. No open fires or uncontrolled fires will be permitted as outlined in The National Veld and Forest Fire Act (No. 101 of 1998).</li> <li>• Firefighting measures, such as fire extinguishers, will be located in strategic locations onsite and the workforce will be made aware of fire prevention and firefighting measures.</li> <li>• Soil and water contamination from diesel spills, particularly at the storage tanks, will be prevented by ensuring these areas are adequately constructed on barrier foundations with the statutory bund walls.</li> <li>• A comprehensive Material Safety Data Sheet (MSDS) must be obtained from the suppliers for all dangerous goods and chemicals stored and/ or utilised onsite. All MSDS's must be displayed where dangerous goods and/ or chemicals are stored and utilised. MSDS's will take cognisance of the storage, handling, transportation and disposal of chemicals and hazardous materials. MSDSs are to be updated on a regular basis.</li> <li>• An Emergency Preparedness and Response Plan (RPRP) is to be developed and updated regularly.</li> <li>• All spillages and leakages must be reported as indicated on the EPRP.</li> <li>• All chemicals and other hazardous materials are to be stored in designated and bunded areas, where the bunded area is impermeable and is impervious to the stored substance. The bunded area will contain 110% volume of the largest container stored.</li> </ul>



Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• All bunded areas are to be adequately signposted identifying the material, volume and appropriate SANS code. Furthermore, safety signs indicating "No Smoking" and "Danger" are to be placed in and around flammable storage areas.</li> <li>• Any water that collects in bunds will not be allowed to stand. Should the water be contaminated, it is to be removed from site as hazardous waste. Clean storm water contained within the bunds may be reused in the wash plant as process water.</li> <li>• Used fuels, oils, paints, solvents and greases should be stored in drums or other suitable containers in a bunded area. These should be labelled, sealed and disposed of at an appropriate disposal or recycling facility. Under no circumstances are the substances to be disposed of on-site or into the surrounding environment.</li> <li>• All waste fuel, oily and chemically impregnated rags will be stored in leak-proof containers including a lid and will be disposed of at an appropriate disposal facility.</li> <li>• A procedure for the storage, handling and transportation of the different dangerous goods, chemicals and hazardous materials has been drawn up for the mine and must be strictly enforced.</li> <li>• Material Safety Data Sheets will be updated regularly and be available onsite.</li> <li>• If a major spillage or leakage occurs the contractor will be called out to clean the contaminated area and rehabilitate the soils, as appropriate.</li> <li>• If any other minor spillage or leakage occurs the spillage will be cleaned immediately, and the contaminated area will be rehabilitated, as appropriate.</li> <li>• Contracts will include specifications that make employees and contractors aware of the necessity to prevent spillages by the implementation of good housekeeping practices.</li> <li>• A procedure for the storage, handling and transportation of the different hazardous materials has been drawn up for the mine and must be strictly enforced. The plan is to comply with the requirements of SANS 10234, 10228 and 10229.</li> <li>• An Environmental Awareness Programme will be instituted.</li> <li>• The maintenance of the chemical toilets will be the responsibility of an external contractor. Ablution facilities shall be within 100 m from places of work, but further than 100 m from any watercourse or borehole. Remove the sewage from the temporary toilets and dispose thereof in a controlled manner. Records of all sewage removed from site and safely disposed of/ treated are to be provided to the mine and maintained onsite.</li> <li>• Sewage contained within the septic tank is to be removed by an external contractor on a weekly basis.</li> </ul>
<p><b>Biodiversity</b></p>	<ul style="list-style-type: none"> <li>• Animals should be given sufficient time to relocate from the project area prior to the initiation of construction activities.</li> <li>• Protected floral and faunal species will require permits for destruction/ translocation.</li> <li>• Locate, translocate and monitor Conservation Important (CI) flora and fauna.</li> <li>• Include biodiversity conservation in staff and contractor training and inductions. Toolbox Talks are to include aspects of biodiversity.</li> <li>• All structures and infrastructure must be designed and operated with the aim of closure in mind.</li> <li>• Prohibit the disturbance of biodiversity beyond the construction and operation footprints.</li> <li>• Prohibit driving off the main access route.</li> <li>• Rehabilitate existing alien-invaded wetlands within the area as an offset option.</li> <li>• Water collected in the cut-off trench should remain clean, and be returned to the receiving environment. The release of water into the receiving environment should be dissipated to prevent erosion.</li> </ul>



Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• If roads pass along steep gradients (<math>\geq 1</math> in 10), erosion control measures should be implemented, as deemed appropriate by registered civil engineers. Effective storm water management measures should be implemented and maintained along these roads.</li> <li>• All vehicles and equipment will be serviced regularly and will be kept in good working order within designated areas.</li> <li>• An Alien and Invasive Management Plan should be developed for the Proposed Project. A detailed “on-the-ground” assessment of alien species within the greater study area, their density and distributions should form the baseline. Furthermore, stakeholder engagement strategies should be included into the planning phase of the programme. By ensuring that effective consultation takes place with local communities and all affected parties, any potential misunderstandings and disagreements can be resolved or accommodated in advance.</li> <li>• A monitoring programme will be implemented that will ensure that all weeds and alien species will be eradicated in and around the project area. Measures will also be implemented to prevent the spreading of these species throughout the life of mine.</li> <li>• At least 300 mm of soils or until hard rock (if the soil cover is less than 300 mm deep) is reached will be removed from the area over which infrastructure, including co-disposal discard dump facility) will be placed. The topsoil (first 300 mm) is expected to have a higher fertility than the subsoil horizons and holds the vegetation seed bank.</li> <li>• The movement of any animals intending to flee the impacted area will not be obstructed. Abuse and hunting/ chasing of animals by workers will not be allowed.</li> <li>• Stockpiles should be kept clear of weeds and alien vegetation.</li> <li>• Collection of traditional medicinal plants will not be permitted. No area will be cleared of vegetation for camping purposes.</li> <li>• Should a complaint be received relating to wildlife interaction, the Environmental Coordinator will respond to the complaint within 24 hours. All complaints will be reported in a complaints register.</li> <li>• Photographs of the project site before, during construction, operation, rehabilitation and after closure should be taken and maintained on record.</li> <li>• No marking or disfiguring of natural rocks, trees and vegetation is permitted. Marking may be done by stakes and tags.</li> <li>• If an electrical boundary fence is constructed, this will be inspected regularly for accidental mortalities of animals such as tortoises.</li> <li>• An on-going rehabilitation programme will be drafted that will provide best management guidelines for the restoration and rehabilitation of the remnant portions of biodiversity.</li> <li>• The harvesting of natural vegetation for fuel wood or any other purposes will be strictly prohibited.</li> <li>• The poaching and hunting of animals will be strictly prohibited.</li> </ul>
<b>Hydrology (surface water) and geohydrology (groundwater)</b>	<ul style="list-style-type: none"> <li>• Clean and dirty water systems are to be installed and well maintained throughout the life of mine.</li> <li>• Where significant pollution potential is identified in terms of the clean and dirty water systems, these areas will be lined (i.e. PCDs, tailings storage facilities, etc., storm water cut-off trench and clean: dirty water systems are to be lined).</li> <li>• All topsoil stockpiles will have storm water diversion berms for protection against erosion and contamination by dirty water.</li> <li>• Where significant pollution potential is identified in terms of the clean and dirty water systems, these areas will be lined.</li> </ul>



Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• Do not discharge waste of any nature, or any foreign material into any watercourse or associated buffer.</li> <li>• No untreated water should enter the receiving environment. Water released into the receiving environment must comply with the Resource Quality Objectives or if these have not been set then the Target Water Quality Range for the protection of the receiving environment.</li> <li>• A comprehensive surface and groundwater monitoring programme will be implemented.</li> <li>• Crossings of any water resources should include effective implementation of drainage control, such as the building of bridges, placement of culverts or drifts, as deemed appropriate by registered civil engineers.</li> <li>• The mine must ensure that the necessary water licenses are in place for the dewatering activities, as well as for water discharge purposes.</li> <li>• Any activity impacting on a watercourse, or associated buffer, should only occur after authorisation by the relevant authorities.</li> <li>• Dirty water and process water will be recycled. No contaminated water will be discharged directly into the environment. All contaminated water originating onsite will be stored within the PCDs which are designed to cater for the 1:100 year flood event.</li> <li>• Spill response procedures are to include removal and disposal of potentially contaminated/contaminated water and any used absorbent materials.</li> <li>• Should vehicle, machinery or equipment spillages or leakages be observed on-site, drip trays are to be placed to ensure no soil contamination occur. Should a spill or leak occur, the resultant spillage will be cleaned immediately.</li> <li>• Adequate spill kits should be placed in strategic locations throughout the project site.</li> <li>• Soils that may be contaminated by leakages and spillages associated with construction and operational activities are to be removed as soon as possible to prevent further contamination of the soils or underlying groundwater. Contaminated soil will be treated as hazardous waste and disposed of at an appropriate disposal facility offsite.</li> <li>• Water pipelines on the site will be inspected for defects, cracks and leakages.</li> <li>• To limit the generation of dirty water during the decommissioning of the plant and administration area, it is recommended that the storm water management infrastructure associated with these areas (channels and PCD) remain to capture dirty runoff.</li> <li>• Once the site has been fully decommissioned, there should be limited water quality impacts, provided that the site is properly rehabilitated. To limit erosion, it should be ensured that the soils maintain their pre-development characteristics as far as is practicable to ensure infiltration and vegetation rooting. The vegetation health should be returned to the baseline health where practically feasible.</li> <li>• Formulate and implement a comprehensive water quality monitoring plan.</li> <li>• Groundwater abstraction is a critical issue in area, and water should also be sourced from an alternative supply such as from rainwater harvesting.</li> <li>• The comprehensive groundwater monitoring programme for water levels and the management thereof will be undertaken.</li> <li>• Should any negative effects groundwater be identified, the surrounding neighbours as well as the relevant authorities will be notified.</li> <li>• The boreholes onsite will be monitored for quality and quantity on a monthly basis and results supplied to DWS. These results will be communicated to relevant stakeholders biannually.</li> <li>• Should it be determined by geohydrological studies that dewatering activities have an impact on the surrounding groundwater users the mine will put a plan in place to supply these users.</li> </ul>





Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• Water abstracted for dewatering activities should be returned to the receiving environment under the requirements of the Resource Quality Objectives or if these have not been set then the Target Water Quality Range for the protection of the receiving environment. The requirements of the Reserve Determination must also be taken into consideration in terms of volume and timing of releases. Should it not be possible to discharge the water to the receiving environment it must be reused in the mining processes.</li> <li>• Ensure that pollution control dams on surface are adequately sized to accommodate excess water from the opencast pits. The pollution control dams must be lined to prevent seepage to the underlying aquifers.</li> <li>• Should dewatering activities be required, an application for a water use license will be made to the DWS.</li> <li>• Prevent dirty water runoff from leaving the general mining area.</li> <li>• All dirty water from the plant area must be contained in the plant pollution control dams and reused in the mining process.</li> <li>• The objective at mine closure is to negotiate with, and get the groundwater closure objectives approved by Government during the closure phase of the project, based on the results of the monitoring information obtained during the construction and operational phases of the Proposed Project.</li> <li>• Continued groundwater quality and groundwater level monitoring for a period of two years after mining ceases is required to establish post-closure groundwater level and quality trends. The monitoring information will be used to update, verify and recalibrate the predictive tools used during the study to meet legal requirements.</li> </ul>
<b>Noise and vibration</b>	<ul style="list-style-type: none"> <li>• Construction activities should be limited to daylight hours in noise sensitive areas. Where construction activities are required after dark, notification is to be sent to affected landowners/ communities.</li> <li>• Blasting activities are to be controlled to minimise noise, air blast and timing of explosives.</li> <li>• Construction and operation activities will comply with the standard requirements of the Occupational Health and Safety Act (No. 85 of 1993) and the Mine Health and Safety Act (No. 29 of 1996).</li> <li>• All equipment, machinery and vehicles are to be kept in good working order and inspected regularly to ensure integrity and reliability and prevent excessive noise. Vehicles, machinery and equipment generating excessive noise should be fitted with appropriate noise abatement measures.</li> <li>• Staff working in areas of excessive noise (above 75 dBa) should be provided hearing protection equipment (personal protective equipment).</li> <li>• Where noise becomes a nuisance management measures will be investigated and implemented to address these.</li> <li>• Comprehensive noise monitoring must be undertaken, and mitigation measures implemented where required. This will be applied to night conditions.</li> <li>• Selecting construction equipment with lower sound power levels.</li> <li>• Reduce noise generation during the operational phase of the project (enclose conveyor systems, enclosing of continuous noise sources (i.e. pumps) within sound absorbing enclosures, regular maintenance of equipment to reduce the generation of additional unwanted noise).</li> <li>• Vehicles will be equipped with mufflers where practical to reduce the emission of noise.</li> </ul>
<b>Traffic</b>	<ul style="list-style-type: none"> <li>• The applicant will ensure that all contracted logistics companies have professional driver training programmes in place.</li> </ul>



Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• Ensure safety aspects are implemented to reduce traffic collisions and increase pedestrian safety.</li> <li>• Increase the visibility of heavy vehicles by utilising sufficient reflectors and active headlights.</li> <li>• Signs will be erected indicating the road speed.</li> <li>• Traffic notification signs will be erected along the access roads used by for the mine. These signs will include speed, stop, high accident zones, water courses, etc.</li> <li>• Erect lighting at high-risk populated areas</li> <li>• Mine management is to respond immediately to any incident involving a mine vehicle.</li> <li>• Vehicle speed will be managed and will not exceed 40 km per hour on unpaved, haul and mine roads.</li> <li>• All construction and mine vehicles travelling on public roads will adhere to the relevant traffic laws and regulations.</li> <li>• General road rules will be enforced and complied with at all times.</li> <li>• No deviation from approved access routes will be permitted.</li> <li>• During fuel/ chemical delivery, the tanker driver and associated qualified staff are to be present at all times during product offloading.</li> <li>• All vehicles and equipment will be serviced regularly and will be kept in good working order within designated areas.</li> <li>• Vehicles will be equipped with mufflers where practical to reduce the emission of noise.</li> <li>• Vehicles should not be overloaded with building material or ore.</li> <li>• Vehicles should not be overfilled at the fuelling depots. Re-fuelling must be supervised. Any spillage or accidental discharge of fuel onto the soil or vegetation must be reported to the mine's environmental coordinator and the necessary management measures should be in place for the cleaning of spillages.</li> </ul>
<b>Visual</b>	<ul style="list-style-type: none"> <li>• The minimum amount of existing vegetation, borrow material and topsoil should be removed from construction areas. Wherever possible, utilise existing natural vegetation in site design and landscaping. Eradication of vegetation should be done in 'natural manner', avoiding harsh straight lines.</li> <li>• An ecological approach to rehabilitation and vegetative screening measures, as opposed a horticultural approach to landscaping, should be adopted. An appropriately qualified person should be consulted for this purpose.</li> <li>• Ensure litter is not generated onsite. Staff and contractors found littering will be punished by fines.</li> <li>• Remove all structures and hard surface road materials in line with closure and rehabilitation plan.</li> <li>• Rehabilitate transformed footprints area to veld grasses and other indigenous plants, restoring agricultural land uses.</li> </ul>
<b>Archaeological, cultural and heritage</b>	<ul style="list-style-type: none"> <li>• Much heritage material, by its very nature, occurs below ground. The contractors should therefore keep in mind that heritage sites might be exposed during the construction work. If a grave, midden or archaeological artefact is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves/ middens will be stopped and the Environmental Coordinator informed of the discovery. If anything is noticed once work has commenced, work in the area should be stopped immediately and the occurrence should immediately be reported to the South African Heritage Resources Agency (SAHRA), or a museum, preferably one at which an archaeologist is available. The archaeologist should then investigate and evaluate the finding.</li> </ul>



Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• The removal of a Heritage site must be undertaken by means of controlled excavation of the site by qualified personnel, prior to construction. The necessary permits must be obtained from SAHRA. The removal of a site will be done by a qualified archaeologist and in consultation with the SAHRA.</li> <li>• The Environmental Coordinator is to be kept informed of all activities relating to heritage.</li> <li>• Work may only resume once clearance is given in writing by an archaeological consultant.</li> <li>• Where necessary, heritage sites will be fenced off in order to protect the sites during construction activities.</li> <li>• Any measures applied by an archaeologist, in the sense of excavation and documentation, should, if merited, be published in order to bring this information into the public domain.</li> </ul>
<b>Socio-economic</b>	<ul style="list-style-type: none"> <li>• The mine must capture all public complaints in a grievance mechanism housed within an Environmental Management System.</li> <li>• Grievance mechanisms should be appropriate to respond to community concerns around risks and potential adverse impacts of the Proposed Project.</li> <li>• Establish a procedure for receiving, addressing, and recording/ documenting complaints. This procedure should clearly define who can raise complaints, and ensure that the confidentiality of the persons raising the complaint is protected. It should also be easily accessible and understandable to the members of the affected community and should be communicated to the affected community.</li> <li>• A public complaints register is to be available at the security office at the entrance to the mine.</li> <li>• All issues/ complaints received by stakeholders, authorities, etc. will be documented, and the necessary corrective and preventive actions identified.</li> <li>• An open channel of communication will be maintained throughout the life of the project to ensure that all issues are raised and addressed.</li> <li>• Displacement of communities should be minimised as far as practically possible. When displacement cannot be avoided, the Mining Right holder will offer displaced communities and persons compensation for loss of assets at full replacement cost. A Resettlement Action Plan or Livelihood Restoration Plan will be developed and implemented by the Mining Right holder.</li> <li>• As far as possible, labour will be sourced from the local, nearby formal (not squatter) settlements, where appropriate skills exist.</li> <li>• The Mining Right holder will encourage contractors to utilise local employment, services and consumables.</li> <li>• The recruitment philosophy as part of the Social and Labour Plan will be provided to the contractors.</li> <li>• Non-core activities related to the construction phase of the project will be identified and out-sourced to local service providers, where the skills exist.</li> <li>• Contractors must make all efforts to obtain services and consumables from local entrepreneurs. The Mining Right holder will ensure that contractors having a local SMME policy and that the policy is adequately implemented.</li> <li>• The mine will comply with their Social and Labour Plan.</li> <li>• No informal settlements will be allowed on mine property.</li> <li>• PPE must be made available to all employees and contractors, during construction, operation and closure.</li> <li>• Draw up a safety and health plan specifying the required safety related requirements during the construction phase.</li> <li>• Condoms will be made available to all staff and workers.</li> </ul>



Environment	Proposed Mitigation Measure
	<ul style="list-style-type: none"> <li>• Strict penalties will be built into tenders to deal with issues such as petty crime, stock theft, fence cutting, trespassing, the closing of farm gates etc.</li> <li>• The mine will routinely inspect the boundary fences around the mine.</li> <li>• The mine will ensure that an HIV/ AIDS strategy is in place and effectively implemented at the mine.</li> <li>• A grievance mechanism will be put in place and all employees and project-affected parties will be made aware of its existence and the procedures contained therein.</li> <li>• Principles of equality, BBEEE, gender equality and non-discrimination will be implemented.</li> <li>• The contractor is to ensure that all staff onsite will be in possession of a South African identity document, or suitable valid work permit from the Department of Home Affairs.</li> <li>• All contact with external stakeholders shall be courteous at all times, and the rights of the stakeholders should be respected at all times.</li> <li>• All visitors to site, contractors and employees will be inducted in site health and safety procedures.</li> <li>• Access of all construction and material delivery vehicles will be controlled through one security entrance.</li> <li>• Areas for the storage of fuels and other flammable materials will comply with standard fire safety regulations and may require approval from the Municipal Fire Department.</li> <li>• Adequate sanitary facilities and ablutions will be provided for construction staff, with a recommended maximum ratio of 15 workers to one ablution facility.</li> <li>• Sufficient drinking water will be made available to all contractors, sub-contractors and onsite staff. The drinking water container will be strategically located and will be signposted as potable water.</li> <li>• Demarcated areas for food preparation should be designated and provided with adequate washing, seating and general refuse receptacles, Refuse bins should be removed from food preparation areas at least three times a week, or as directed by health regulations.</li> <li>• The site is to have 24 hour security.</li> <li>• Unauthorised social activities are to be prohibited, which include, but are not limited to, consumption of or illegal selling of alcohol, drug utilisation or selling, and onsite prostitution.</li> <li>• Driving under the influence of alcohol is prohibited.</li> <li>• No firearms are to be permitted onsite.</li> <li>• Activities undertaken onsite are to be in accordance with an Occupational Health and Safety Plan, Community Security Plan as well as the Emergency Preparedness and Response Plan.</li> <li>• First aid facilities will be available onsite.</li> <li>• SABS standards and specifications governing dangerous and high risk processes will be applied.</li> <li>• High risk areas, including but not limited to scaffolding, heights and open excavations will be demarcated and clearly marked and include, where relevant, adequate warning signs.</li> <li>• Emergency numbers for the police, fire department, clinic and relevant responsible staff will be made available in conspicuous locations.</li> <li>• All warning signs will be made available in English and applicable local languages.</li> <li>• All necessary measures to ensure that job seekers do not flock to the project site or local villages looking for work will be undertaken.</li> </ul>



## **14 THE OUTCOME OF THE SITE SELECTION MATRIX, FINAL SITE LAYOUT PLAN**

Please note that a final site layout plan has not been developed as this will be engineered during the EIA Phase of the project following the completion of specialist studies and stakeholder input. Furthermore, details regarding the site layout will be considered during the EIA Phase with the input of relevant independent specialists.

Refer to Appendix 4 which shows the preliminary site layout plan.

## **15 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED**

The sites for the proposed opencast mining operations were selected based on availability of the Chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.

The sites for the infrastructure related to the proposed mining operations are located at the various points which are practical for the mining and would have the least impact on the surrounding environment. The areas used for above ground infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered “secondary alternatives”. These areas have been determined from a preliminary evaluation of how they are most optimally configured between the open-pits, and away from potentially sensitive areas, in favour of proposed positioning on previously disturbed farming and agricultural land. The exact details and detailed layout plans for the infrastructure has not yet been determined, and will be evaluated within the EIA process.

During the alternative analysis in the EIA phase, a detailed assessment will be done of all these areas, to determine which of the areas would be most suitable for aboveground infrastructure, taking into consideration environmental conditions, topography, financial feasibility, the linkage between pit and surface infrastructure, access to various parts of the site and existing infrastructure

## **16 STATEMENT MOTIVATING THE PREFERRED SITE**

Refer to section above.



## 17 PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

### 17.1 Description of alternatives to be considered including the option of not going ahead with the activity

In the case of the Proposed Project, possible alternatives will need to be identified through discussions with authorities, discussions with stakeholders (public and focus group meetings), reviewing of existing environmental data, specialist inputs/ studies and the design team. The following categories to assess alternatives for the Proposed Project will be undertaken during the EIA Phase of the project and will include the following:

- Location alternatives
  - Location of tailings storage facility;
- Layout alternatives
  - Layout of waste rock dumps
  - Layout of the plant
  - Layout of the tailings storage facilities
- Service alternatives
  - Water provision
  - Energy alternatives
  - Access alternatives
  - Waste disposal
- Technology alternatives
  - Tailings storage facility construction alternatives
- The “no-go” alternative

The above-mentioned alternatives will be assessed during the EIA Phase of the project.

Please refer to Section 8 for alternatives already considered. Should any environmental fatal flaws be identified during the specialist investigation, these will be included within the alternative investigations in order to determine the possible implications thereof on the proposed development.

### 17.2 Description of the aspects to be assessed as part of the environmental impact assessment process

The key environmental issues identified during the initial Scoping phase were determined through an internal process based on similar developments, desktop analysis, specialist consultation, revision of existing information, historical data, consultation with Interested and Affected Parties and the relevant Stakeholders. Potential risk sources/impacts were identified by the Red Kite Environmental Solutions team and various specialists who have been on site to appraise the environment and identify the potential impacts of the development.

The EAP hereby undertakes to assess the following aspects which are related to the proposed impacts of the proposed mining operation which was identified in Section 3.1:

- Groundwater and contamination;
- Surface water and aquatic ecology;
- Noise;
- Terrestrial ecology;
- Archaeological;
- Palaeontology;
- Blasting and vibration;
- Socio-Economic;
- Visual;
- Soil and land capability; and



- Air quality.

### 17.3 Description of Aspects to be assessed by Specialists

The specialist will assess the following aspects which are related to the proposed impacts of the proposed mining operation, which were identified in Section 3.1: Groundwater and contamination; Surface water and aquatic ecology; Noise; Terrestrial ecology; Archaeological; Paleontology; Blasting and vibration; Socio-Economic; Visual; Soil and land capability; and Air quality.

The identification and initial assessment of environmental aspects revealed the following potentially significant environmental aspects which require further detailed assessment, to be conducted during the EIA-phase (**Table 13**).

**Table 20: List of Specialists and Specialist Studies**

Specialist Study	Specialist
Socio-economic Impact Assessment	Gudani Consulting
Soil and Land Capability Assessment	Elemental Sustainability
Air Quality Impact Assessment	EcoElementum
Heritage Impact Assessment	A Pelsers Archaeological Consulting
Visual Impact Assessment	Elemental Sustainability
Blasting and Vibration Assessment	Blast Management and Consulting
Environmental Noise Impact Assessment	Enviroroots
Geohydrological and Contamination Assessment (including Waste Classification)	Groundwater Complete
Surface water and Wetland Assessment	Oasis Environmental Specialists
Terrestrial Ecology Assessment	Enviridi Environmental Consultants
Stormwater Management Plan and engineering designs (including TSF, waste rock and PCD)	Nurizon Consulting
Palaeontology Assessment (desktop)	Marion Bamford Consulting
Public Participation	Red Kite Environmental Solutions

The specialists are to provide an outline of the approach used in the study. Assumptions and sources of information must also be clearly identified. The knowledge of local people should be incorporated in the study. The description of the study approach shall include a short discussion of the appropriateness of the methods used in the specialist study in terms of local and international trends and specific or best practice.

All specialist studies will be undertaken as per relevant guidelines and legislative requirements.

The specialists will employ the following basic methodology:

- Site visits;
- Sampling, where necessary;
- Desk top studies;
- Assessment of baseline data;
- Assessment of impacts;
- Development of appropriate mitigation measure; and
- Documentation of the findings in the form of reports.



### **17.3.1 Description of the Affected Environment**

A description of the affected environment must be provided. The focus of this description must be relevant to the specialist's field of expertise. The specialist must provide an indication of the sensitivity of the affected environment. Sensitivity, in this context, refers to the "ability" of an affected environment to tolerate disturbance, for example, if disturbance of the natural habitat results in the permanent loss of its biodiversity. The affected environment could be categorised as having a "low tolerance" to disturbance and is, therefore, termed a highly sensitive habitat. If, on the other hand, a habitat is able to withstand significant disturbance without a marked impact on its biodiversity, the affected environment could be categorised as having a high tolerance to disturbance (i.e. "low sensitivity" habitat).

### **17.3.2 Legal requirements**

As per the requirements, the specialist should identify and list the relevant South African legislation and permit requirements pertaining to the development proposals. He/she should provide reference to the procedures required to obtain permits and describe whether the development proposals contravene the applicable legislation.

### **17.3.3 Impact Identification and Assessment**

The specialist must make a clear statement, identifying the environmental impacts of the construction, operation and management of the proposed development. As far as possible, the specialist must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out below. Each impact will be assessed and rated. The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgements based on his/her professional expertise and experience.

The impact assessment will provide an evaluation of the significance of each of the three phases of the project i.e. design / construction, operational phases and closure/post closure.

### **17.3.4 Mitigation Measures**

Mitigation measures should be recommended in order to enhance benefits and minimise negative impacts and they should address the following as discussed.

#### **Mitigation Objectives: What level of mitigation must be aimed at?**

For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an "educated guess" based on his/her professional experience.

#### **Recommended Mitigation Measures**

For each impact the specialist must recommend practical mitigation actions which can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided.

#### **Effectiveness of Mitigation Measures**

The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible

### **17.3.5 Recommended Monitoring and Evaluation Program**

The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits must, wherever possible, be expressed as measurable targets. National standards or criteria are examples, which can be stated as mitigation objectives.





Once the above objectives have been stated, feasible management actions, which can be applied as mitigation, must be provided. A duplicate column on the impact assessment tables described above should indicate how the application of the proposed mitigation or management actions has reduced the impact. If the proposed mitigation is to be of any consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

#### **17.4 Proposed Method of Assessing the Environmental Aspects Including the Proposed Method of Assessing Alternatives**

Please refer to Section 11 that explains the methodology to be used for assessing the environmental aspects including the proposed method of assessing alternatives.

#### **17.5 Proposed method of assessing duration and significance**

Section 11 also includes the proposed method of assessing duration and significance.

#### **17.6 The Stages at which the Competent Authority will be consulted**

Subsequent to the submission of the Scoping Report, Red Kite Environmental Solutions would require additional consultation with the following Departments regarding the way forward:

- Department of Water and Sanitation;
- Department of Mineral Resources and Energy;
- North West Department of Economic Development, Environment, Conservation and Tourism (DEDECT); and
- South African Heritage Resources Agency (SAHRA).

The Public Participation process as conducted by Red Kite Environmental Solutions has already started. All comments will be included in the final comments and response report, as an appendix within the EIA for submission.

#### **17.7 Particulars of the public participation process with regard to the Impact Assessment process that will be conducted**

All Registered I&APs will be kept informed and will be able to provide input into every phase of the EIA process.

Comments and responses will be incorporated into the following documents involved in the EIA process: The following documents will be made available to the communities within the area. The communities will be informed of the locations of where the draft documents will be and to whom the comments and issues raised need to be sent.

- Scoping Report
- Specialist Reports
- EIA and EMPr Report

Once all the comments and responses from all the I&AP's have been received, it will be incorporated into the final document. The issues and comments will be addressed and mitigation measures will be set for each issue. Once all the before mentioned aspects have been addressed the documents will be finalised and the final documents will be submitted to the relevant Departments for authorisation.

Once the department gives authorisation for the proposed project, all the Registered I&AP's will be notified thereof, and they will be informed of the commencement dates of the proposed mining operations.

The proposed public participation process for the remainder of the Environmental Impact Assessment will consist of the following as outlined below:



### **17.7.1 Report Comment Periods**

- Presenting all registered Interested and Affected Parties, stakeholders and government departments with the opportunity to read and comment on environmental impact assessment reports, including all specialist reports;
- Presenting registered Interested and Affected Parties, stakeholders and government departments with the opportunity to read and comment on draft environmental management plans compiled in terms of regulations;
- Presenting registered Interested and Affected Parties and stakeholders with the opportunity to read and comment on IWWMP

### **17.7.2 Public Meetings and Open Days**

A public information session/meeting to present and discuss the findings of the Environmental Impact Assessment and related specialist reports will be held. This information session and discussion will give stakeholders and any other members of the public the opportunity to come and read reports, discuss the project with specialists and EIA consultants and have access to photos and reports during the day. The information provided will include the site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land.

Once I&AP's have had the chance to review the draft documents, public meetings will be held to discuss these reports.

### **17.7.3 Description of the information to be provided to Interested and Affected Parties**

The following documents will be made available to the communities within the area as well as all registered Interested and Affected parties:

- Draft Scoping Report;
- Specialist Reports; and
- EIA/EMPr Report.

All information obtained within these documents, including the site plans and impacts expected as well as all the relevant information as required by the competent authority as contained within the prescribed DMR format EIA/EMP will be made available to the I&APs for comment.

Once all the comments and responses from all the registered I&AP's have been received, it will be incorporated into the final document. The issues and comments will be addressed, and mitigation measures will be set for each issue.

## **17.8 Description of the tasks that will be undertaken during the environmental impact assessment process**

During the Impact Assessment Phase of the EIA, issues identified during scoping are assessed by environmental specialists. The outcome of the assessments will be presented in the draft EIA, which together with an Environmental Management Programme (EMPr), will be made available for interested and affected parties to comment on.

Based on the findings in the EIA / EMPr, the Responsible Government Authority will decide, in consultation with other relevant authorities, whether the proposed project and associated infrastructure activities may proceed or not, and under what conditions.

The application process followed for the mining right has been designed to meet the requirements of both the Mineral and Petroleum Resource Development Act (Act 28 of 2002) and National Environmental Management Act (Act 107 of 1998; amended 2006). The authorisation process includes:

- Scoping Phase:
  - Stakeholder Notification;
  - Authority Consultation;



- Capturing of Issues and Concerns;
- Compilation of a Stakeholder Database;
- Identification of Potentially Significant Impacts;
- Identification of Potentially Sensitive Environmental Aspects;
- Identification of Required Specialist Studies;
- Compilation of a Scoping Report (this document), including:
  - Plan of Study for SIA/EIA/EMP.
  - Comments and Response Report; and
  - Stakeholder Review of Documentation;
  - Submission and approval of Scoping Report by relevant authorities.
- Impact Assessment Phase:
  - Undertake necessary specialist studies;
  - Assessment of environmental impacts;
  - Compilation of management plans;
  - Compilation of an EMP Report;
  - Stakeholder document review and comment;
  - Submission of final report for decision-making.

The EMPr Report includes a description of the proposed project, a list of identified environmental and social aspects that will potentially be impacted upon by the proposed mining project, and impact assessment for these aspects, and environment management programme for the mitigation and management of the identified impacts.



**18 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED.**

ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
Opencast Mining	Dangerous excavations	Control access to the site	Low
	Loss of land capability	Remedy the area as close as possible to original land use	Low – Medium
	Impact on geology	Mine within demarcated areas only	High
	Less water reaching the surface water resource	Control storm water	Medium
	Influx of groundwater into mine workings	Control through pumping of water	Low
	Impact on external users' boreholes	Control through monitoring	Low-Medium
	Impact on mine water quality	Control through monitoring	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime Noise Impact	Control through noise control	Low-Medium
	Night time Noise Impact	Control through noise control	Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
	Lighting during night time	Control lighting during night times	Low – Medium
	Destruction of heritage or cultural aspects	Control through fencing and demarcations	Low-Medium
Blasting	Impact on habitat for floral species	Control area of disturbance	Low
	Impact on important species	Control through establishment of nursery	Low
	Loss of faunal habitat	Control buffer zones	Low
	Impacts on RDL species	Modify through training of personnel	Low
	Impact on availability of groundwater	Control through pumping of water	Low
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Impact on geology	Mine within demarcated areas only	High
	Destruction of heritage or cultural aspects	Control through fencing and demarcations	Low-Medium
Waste rock stockpiling	Impact on geology	Mine within demarcated areas only	High
	Soil compaction	Control area of disturbance	Medium-High
	Soil erosion	Control through management	Low – Medium



ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Less water reaching the surface water resource	Control storm water	Medium
	Deterioration in water quality	Control pollution sources	Low-Medium
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
Temporary Topsoil storage	Impact on geology	Mine within demarcated areas only	High
	Soil compaction	Control area of disturbance	Medium-High
	Soil erosion	Control through management	Low – Medium
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Deterioration in water quality	Control pollution sources	Low-Medium
	Less water reaching the surface water resource	Control storm water	Medium
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
Temporary overburden stockpiles loading	Impact on geology	Mine within demarcated areas only	High
	Soil compaction	Control area of disturbance	Medium-High
	Soil erosion	Control through management	Low – Medium
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Deterioration in water quality	Control pollution sources	Low-Medium
	Less water reaching the surface water resource	Control storm water	Medium
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
Loading	Chemical soil pollution	Control through the installation of subsoil drains	Low
	Soil compaction	Control area of disturbance	Medium-High



ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Deterioration in water quality	Control pollution sources	Low-Medium
	Less water reaching the surface water resource	Control storm water	Medium
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Night time noise impact	Control through noise control	Medium
	Lighting during night time	Control lighting during night times	Low – Medium
Hauling and Transporting	Chemical soil pollution	Control through the installation of subsoil drains	Low
	Soil compaction	Control area of disturbance	Medium-High
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Impact on important species	Control through establishment of nursery	Low
	Impact on habitat for floral species	Control area of disturbance	Low
	Loss of faunal habitat	Control buffer zones	Low
	Impacts on RDL species	Modify through training of personnel	Low
	Deterioration in water quality	Control pollution sources	Low-Medium
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Night time noise impact	Control through noise control	Medium
	Lighting during night time	Control lighting during night times	Low – Medium
	Destruction of heritage or cultural aspects	Control through fencing and demarcations	Low-Medium
Road construction	Dangerous excavations	Control access to the site	Low
	Soil compaction	Control area of disturbance	Medium-High
	Soil erosion	Control through management	Low – Medium
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Chemical soil pollution	Control through the installation of subsoil drains	Low
	Impact on habitat for floral species	Control area of disturbance	Low
	Impact on important species	Control through establishment of nursery	Low
	Loss of faunal habitat	Control buffer zones	Low
	Impacts on RDL species	Modify through training of personnel	Low



ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
	Loss of wetland habitat and structure	Control buffer zones	Medium – High
	Less water reaching the surface water resource	Control storm water	Medium
	Alteration of drainage patterns	Control storm water	Low-Medium
	Deterioration in water quality	Control pollution sources	Low-Medium
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Night time noise impact	Control through noise control	Medium
	Lighting during night time	Control lighting during night times	Low – Medium
	Destruction of heritage or cultural aspects	Control through fencing and demarcations	Low-Medium
Water abstraction from opencast	Influx of groundwater into mine workings	Control through pumping of water	Low
	Reduction in resources	Control through training and awareness	Low
	Impact on external users' boreholes	Control through monitoring	Low-Medium
Dust suppression	Soil erosion	Control through management	Low - Medium
	Deterioration in water quality	Control pollution sources	Low-Medium
	Impact on availability of groundwater	Control through pumping of water	Low
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
Removal of indigenous vegetation	Impact on habitat for floral species	Control area of disturbance	Low
	Impact on important species	Control through establishment of nursery	Low
	Loss of wetland habitat and structure	Control buffer zones	Medium – High
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
Administration and office buildings	Dangerous excavations	Control access to the site	Low
	Soil compaction	Control area of disturbance	Medium-High
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Chemical soil pollution	Control through the installation of subsoil drains	Low
	Loss of faunal habitat	Control buffer zones	Low
	Impacts on RDL species	Modify through training of personnel	Low
	Less water reaching the surface water resource	Control storm water	Medium



ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
	Deterioration in water quality	Control pollution sources	Low-Medium
	Reduction in resources	Control through training and awareness	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Night time noise impact	Control through noise control	Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
	Lighting during night time	Control lighting during night times	Low – Medium
Workshops & Change Houses	Dangerous excavations	Control access to the site	Low
	Soil compaction	Control area of disturbance	Medium-High
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Chemical soil pollution	Control through the installation of subsoil drains	Low
	Loss of faunal habitat	Control buffer zones	Low
	Impacts on RDL species	Modify through training of personnel	Low
	Less water reaching the surface water resource	Control storm water	Medium
	Deterioration in water quality	Control pollution sources	Low-Medium
	Reduction in resources	Control through training and awareness	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Night time noise impact	Control through noise control	Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium
Lighting during night time	Control lighting during night times	Low – Medium	
On site sanitation	Dangerous excavations	Control access to the site	Low
	Soil compaction	Control area of disturbance	Medium-High
	Chemical soil pollution	Control through the installation of subsoil drains	Low
	Loss of wetland habitat and structure	Control buffer zones	Medium – High
	Less water reaching the surface water resource	Control storm water	Medium
	Deterioration in water quality	Control pollution sources	Low-Medium
	Reduction in resources	Control through training and awareness	Low
	Impact on groundwater quality	Control seepage and runoff	Low
Impact on external users' boreholes	Control through monitoring	Low-Medium	
Diesel storage	Deterioration in water quality	Control pollution sources	Low-Medium





ACTIVITY	POTENTIAL IMPACT	MITIGATION TYPE	POTENTIAL FOR RESIDUAL RISK
	Reduction in resources	Control through training and awareness	Low
	Impact on groundwater quality	Control seepage and runoff	Low
Product stockpiling	Sterilization of topsoil layer	Modify fertility of the soils	High
	Soil compaction	Control area of disturbance	Medium-High
	Deterioration in water quality	Control pollution sources	Low-Medium
	Reduction in resources	Control through training and awareness	Low
	Less water reaching the surface water resource	Control storm water	Medium
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
Wash plant	Soil compaction	Control area of disturbance	Medium - High
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low
	Night time noise impact	Control through noise control	Low
	Deterioration in surface water quality	Control pollution sources	Low-Medium
	Deterioration in groundwater quality	Control pollution sources	Low-Medium
Tailings Storage	Soil compaction	Control area of disturbance	Medium-High
	Soil erosion	Control through management	Low – Medium
	Sterilization of topsoil layer	Modify fertility of the soils	High
	Less water reaching the surface water resource	Control storm water	Medium
	Deterioration in water quality	Control pollution sources	Low-Medium
	Impact on groundwater quality	Control seepage and runoff	Low
	Fugitive dust	Control through dust suppression	Low
	Daytime noise impact	Control through noise control	Low-Medium
	Alter overall landscape	Control through vegetated screens/berms	Low – Medium



## **19 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

### **19.1 Impact on the socio-economic conditions of any directly affected person**

This information will be updated following completion of the stakeholder engagement process for the Scoping Phase. A Socio-economic Impact Assessment specialist study will be undertaken as part of the EIA process. Additional information required by the competent authority as well as commenting authorities will be included in the EIA Report.

### **19.2 Impact on any National Estate referred to in Section 3(2) of the National Heritage Act**

The impact on any National Estate will be included in the EIA Report following the completion of the archaeological, cultural and heritage specialist impact assessment.

### **19.3 Other Matters required in terms of Section 24(4)(a) and (b) of the Act**

No specialist studies have been undertaken for the Proposed Project in order to assist with the location of the site layout during the Scoping Phase of the project. Furthermore, an engineered site layout has not yet been developed for the project. A number of alternatives are being investigated – no motivation is required in terms of sub-regulation 22(2)h. This will be compiled during the EIA Phase of the project.



## 20 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I, Nicole Upton, herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.



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Signature of the EAP

DATE: 24 April 2021

## 21 UNDERTAKING REGARDING LEVEL OF INFORMATION

I, Nicole Upton, herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected parties and stakeholders has been correctly recorded and reported herein.



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Signature of the EAP

DATE: 24 April 2021

- END -

