SCOPING REPORT
NORTHAM ZONDEREINDE PLATINUM MINE 3 SHAFT, THABAZIMBI CITY LOCAL MUNICIPALITY

PUBLIC REVIEW

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Mineral Resources
REPUBLIC OF SOUTH AFRICA

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).

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	Name	**Signature**	**Qualifications and Certifications**	**Date**
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Amendments on Document

Date	Report Reference Number		Description of Amendment

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The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge as well as available information. The report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken and Prism Environmental Management Services and its staff reserve the right to modify aspects of the report including the recommendations when new information becomes available from ongoing research or further work in this field or pertaining to this investigation.

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Please note that maps and/or drawings included in this report are to provide context only and A3 copies are included in the appendices.

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LIST OF ABBREVIATIONS

BID	Background Information Document
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
I&AP	Interested and Affected Party
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LOM	Life of Mine
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended]
MRA	Mining Right Area
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended]
NWA	National Water Act, 1998 (Act No. 36 of 1998) [as amended]

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

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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SCOPING REPORT

1 INTRODUCTION

Northam Platinum Limited Zondereinde Division (hereinafter referred to as Northam Platinum) intends to develop a shaft complex on their existing mining right area on a part of the remainder of the Farm Elandsfontein 386 KQ and the remainder of the Farm Zondereinde 384 KQ (hereinafter referred to as 'the study area'). The study area is situated 0.77 km Southeast of the R510 road and is approximately 3.73 km Southeast of Thabazimbi, within the Thabazimbi Local Municipality, Limpopo Province.

The new shaft complex to be known as 3 Shaft, will allow improved access to the western block of Northam Platinum's Zondereinde Mine securing economic viability of the Zondereinde Mine and also further extend the life of mine, which will generate new mining related work opportunities associated with additional production.

Prism Environmental Management Services (hereinafter referred to as Prism EMS) as the independent Environmental Assessment Practitioner (EAP) was appointed to undertake the required environmental authorisation processes required by a host of environmental legislation. Such process referred to as an ***Environmental Authorisation process*** and the details of which are discussed and described in the contents of this scoping report.

1.1 Report Outline

The format of the Scoping Report has been aligned with the requirements contained in Appendix 2 of the EIA Regulations, 2014 promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] and the template provided by the Department of Mineral Resources. The required report contents and how it is structured in this report is indicated in Table 1.

Table 1: Required contents of the scoping report

Appendix 2 of the EIA Regulations, 2014 [as amended]	Reference in Report
2(a) Details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae;	 Section 1.2 Appendix 1
2(b) The location of the activity, including- (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) Co-ordinates of the boundary of the property;	 Section 2 Section 2 Section 2 Table 4
2(c) Plan locating the proposed activity	Section 2.2 Figure 1
2(d) description of the scope of the activity (i) Listed activities; and (ii) Description of the activities to be undertaken including associated structures and infrastructure	 Section 3.1 Section 3.2

Appendix 2 of the EIA Regulations, 2014 [as amended]	Reference in Report
2(e) Policy and legislative context including legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments	Section 4
2(f) Motivation for the need and desirability for the proposed development	Section 5
(previously (g) Period for which the environmental authorisation is required (in template of DMR Scoping Report, not in EIA Regulations, 2014 [as amended]).	Section 5.4
2(g) Description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including-	
(i) Alternatives;	Section 6.1
(ii) Public participation process and copies of documents and inputs;	Section 6.2
(iii) Summary of issues raised by interested and affected parties;	Section 6.2.2.5 Appendix 5
(iv) Environmental attributes;	Section 6.4
(v) The potential impacts and risks which have informed the identification of each alternative;	Section 6.5
(vi) Methodology to identify and rank potential impacts and risks;	Section 6.6
(vii) Positive and negative impacts	Section 7.9 and Table 23
(viii) Possible mitigation measures and level of residual risk;	and Table 26
(ix) Outcome of the site selection matrix;	Section 6.9
(x) Motivation for not considering alternatives; and	Section 6.10
(xi) Concluding statement indicating preferred alternatives, including the preferred location of the activity;	Section 6.11
2(h) Plan of Study	Section 7
(i) Alternatives;	Section 7.1
(ii) A description of the aspects to be assessed as part of the environmental impact assessment process;	Section 7.1
(iii) Aspects to be assessed by specialists;	Section 7.2
(iv) Method of assessing environmental aspects, including aspects to be assessed by specialists;	Section 7.4
(v) Method of assessing duration and significance;	Section 7.5
(vi) Stages when competent authority is to be consulted;	Section 7.6
(vii) Public participation particulars;	Section 7.7
(viii) Tasks to be undertaken in EIA process; and	Section 7.8
(ix) Management measures and monitoring.	Section 7.9 and Table 26
2(i) Undertaking: EAP	Section 10
2(j) Undertaking: Level of Agreement	Section 11
2(k) Information specified by the competent authority	None specified at this stage
2(l) Any other matter	Section 9

1.2 Details of the EAP

Prism EMS have been appointed to undertake the required Environmental Authorisation Application National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended].Details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the scoping report is provided in Table 2 and Curriculum Vitae and proof of qualifications is appended in Appendix 1 and 2.

1.2.1 The EAP who prepared the report

Table 2: Details of the EAP

EAP:	Monica Niehof			
Company:	Prism Environmental Management Services			
Address:	PO Box 1401, Wilgeheuwel, 1736			
Tel:	087 985 0951			
Fax:	086 601 4800			
Email:	monica@prismems.co.za			
Prism EMS Team				
Contact Details	Post: PO Box 1401, Wilgeheuwel, Johannesburg, 1736		Tel: 087 985 0951 Fax: 086 601 4800 Email: prism@prismems.co.za www.prismems.co.za	
Designation	**Name**	**Qualification**	**Professional Registration**	**Experience**
Project Director and Principal EAP	De Wet Botha	M.A. (Env.Man.) PHED *(Refer to Appendix 1)*	Founder Member of Environmental Assessment Practitioners Association of South Africa (EAPASA) Member of the International Association for Impact Assessors (IAIAsa) (1653) Member of the Gauteng Wetland Forum Member of the South African Wetland Society SACNASP Pr.Sci.Nat. (119979)	16 Years
Senior Environmental Assessment Practitioner	Monica Niehof	BSc. (Hon) (Env.Man) *(Refer to Appendix 1)*		12 Years

1.2.2 Expertise of the EAP

1.2.2.1 The qualifications of the EAP

(With evidence attached as Appendix 1)

Refer to Table 2.

1.2.2.2 Summary of the EAP's past experience

Table 3: EAP's Experience

Monica Niehof	
Years' Experience:	12 years in the field of environmental consulting
Work Experience:	Monica Niehof has been involved in the compilation of several Environmental Management Programmes and/or Environmental Management Plans and been involved in the compilation of mining/prospecting permit/rights and environmental authorisation applications. Refer to Appendix 2 for a full description of all experience.
De Wet Botha	
Years' Experience:	16 years in the field of environmental consulting
Work Experience:	De Wet Botha has been involved in the compilation of several Environmental Management Programmes and/or Environmental Management Plans and been involved in the compilation of mining/prospecting permit/rights and environmental authorisation applications. Refer to Appendix 2 for a full description of all experience.

(Attach the EAP's curriculum vitae as Appendix 2.)

2 LOCALITY

2.1 Description of the property

Table 4: Property Description

Farm Name:	Elandsfontein
	Zondereinde
Application area (Ha)	Approximately 15 Hectares
Magisterial district:	Waterberg
Distance and direction from nearest town	Approximately 12 km Northeast of Northam
21-digit Surveyor General Code for each farm portion	T0KQ00000000038600000 T0KQ00000000038400000
Coordinates of the boundaries of the properties	24° 50'53.81" S, 27° 18'40.86" E (Centre coordinates)

2.2 Locality map

(show nearest town, scale not smaller than 1:250000 attached as Appendix 3)

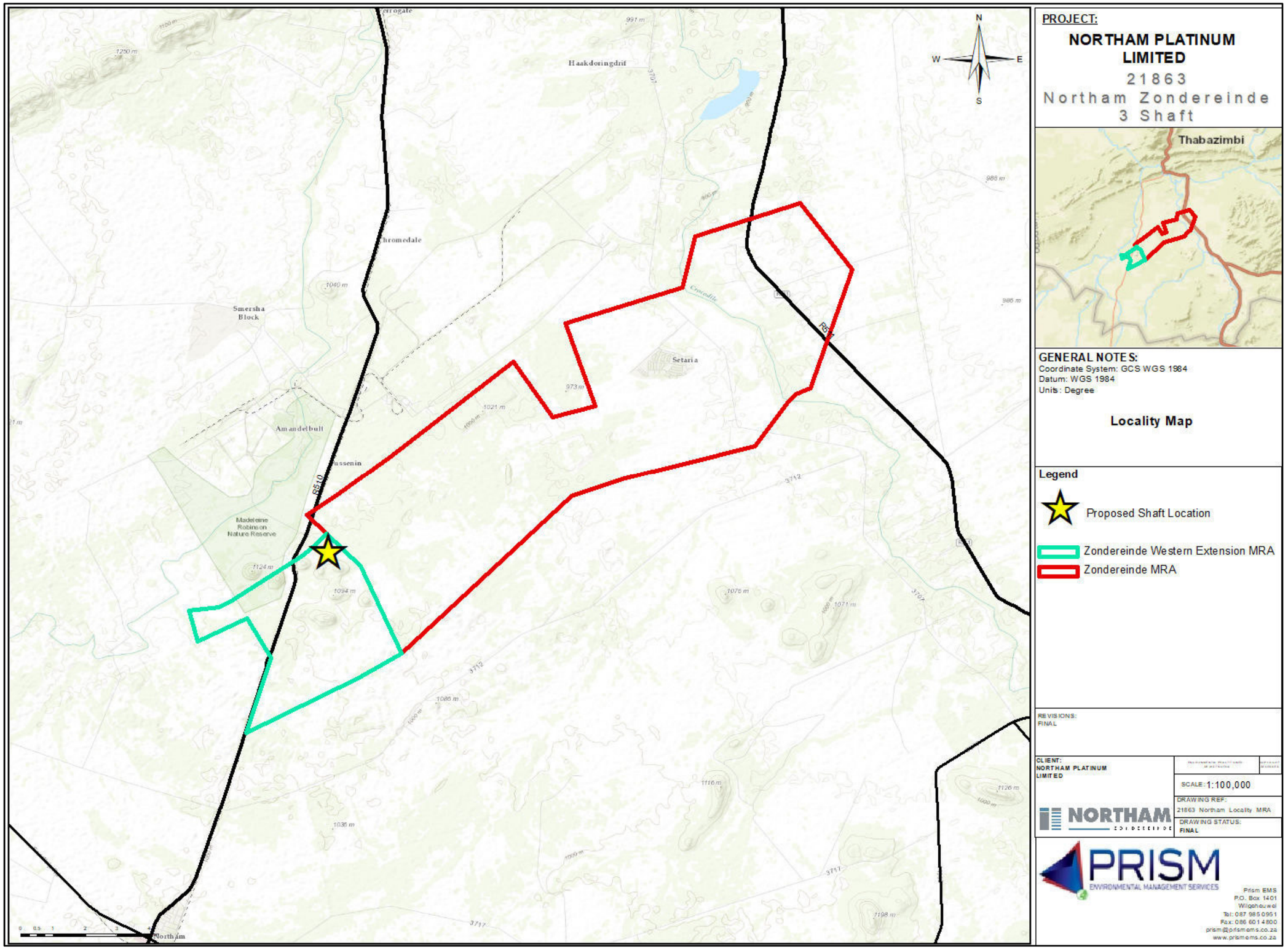


Figure 1: Locality map of the Proposed Shaft Complex Area in relation to major roads

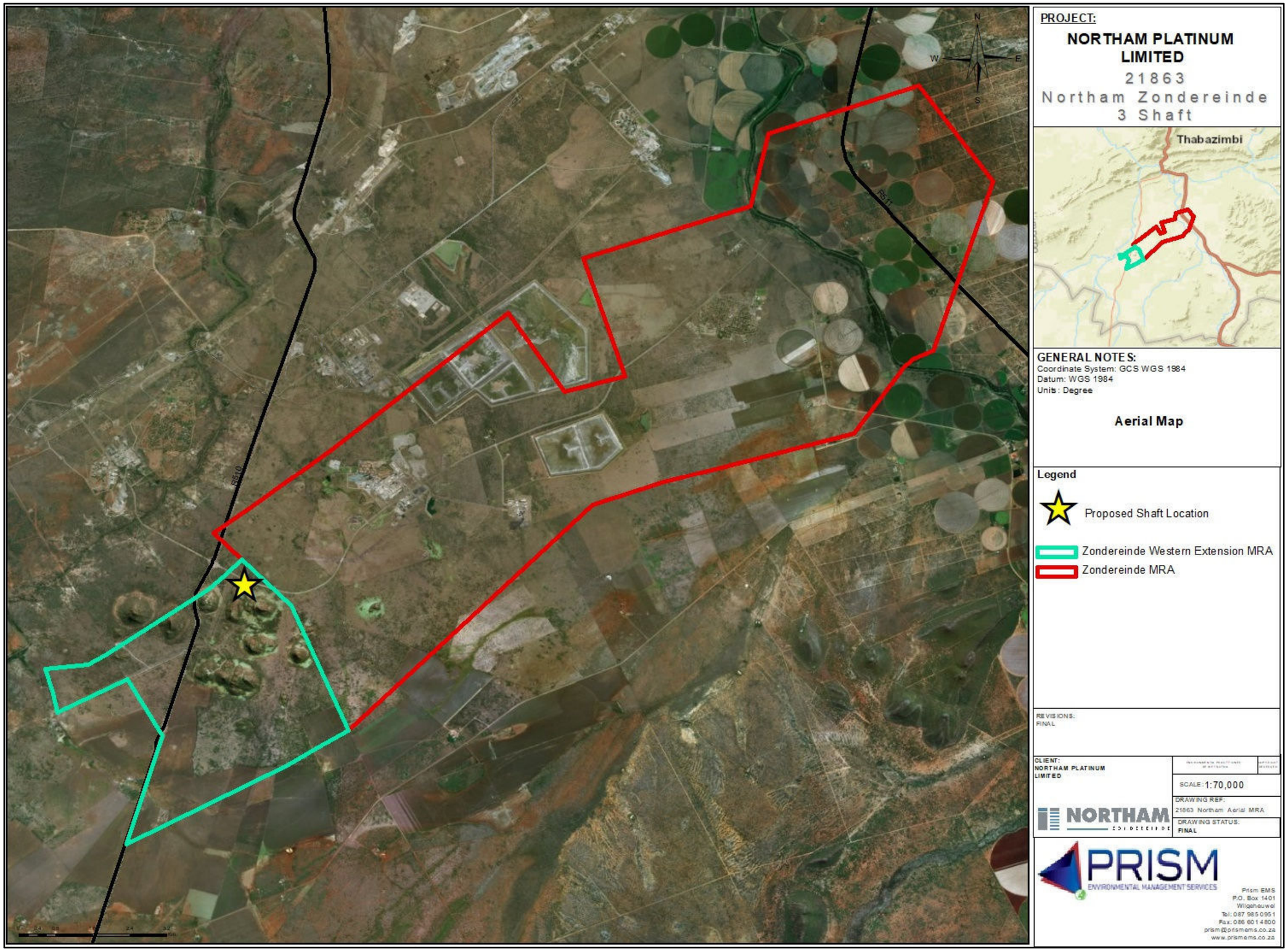


Figure 2: Aerial Photograph of the Proposed Shaft Complex Area in relation to major roads

3 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

3.1 Listed and specified activities

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

Table 5: Listed and specified activities

NAME OF ACTIVITY *(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)*	**AERIAL EXTENT OF THE ACTIVITY** *(Ha or m²)*	**LISTED ACTIVITY** *Mark with an X where applicable or affected.*	**APPLICABLE LISTING NOTICE** *(GNR 544, GNR 545 or GNR 546)/NOT LISTED)*
Establishment of Construction Camp and installation and operation of construction support services, including chemical toilets and water tanks as well as generation of power.	Less than 1 Ha	N/A	N/A
Site preparation: Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and wastewater pipelines, powerlines and stormwater management infrastructure.	Approximately 5 Ha	X	Listed activity 27 GNR 983
Generation and disposal of domestic waste, construction and hazardous waste.	-	N/A	N/A
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	-	N/A	N/A
Construction: Construction of surface infrastructure including: Terrace 1: • To house two up-cast ventilation shafts equipped with ventilation fans;	Approximately 15 Ha	X	Listed activity 12, 19 and 28 GNR 983 and Listed activity 12 GNR 984

NAME OF ACTIVITY *(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)*	**AERIAL EXTENT OF THE ACTIVITY** *(Ha or m²)*	**LISTED ACTIVITY** *Mark with an X where applicable or affected.*	**APPLICABLE LISTING NOTICE** *(GNR 544, GNR 545 or GNR 546)/NOT LISTED)*
• Overhead powerlines; • Stormwater drain around perimeter of Terrace; • Sump with pump; • Gate house with single toilet and hand basin, septic tank; • Fencing and gate; • Unpaved road from existing mine paved road to Terrace entrance. Terrace 2: Housing full shaft infrastructure that supports the downcast and access shafts including: • Stormwater storage dam adjacent to terrace; • Stormwater drains on and around the periphery of the terrace; • Fencing with two entrance/exit points namely for pedestrians and delivery and commercial vehicles; • Security gate houses; • Shaft bank area; • Two headgears; • Transfer conveyor belt from headgear to silos; • Reef silo; • Waste silo; • Salvage yard; • Store yard;			

NAME OF ACTIVITY *(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)*	**AERIAL EXTENT OF THE ACTIVITY** *(Ha or m²)*	**LISTED ACTIVITY** *Mark with an X where applicable or affected.*	**APPLICABLE LISTING NOTICE** *(GNR 544, GNR 545 or GNR 546)/NOT LISTED)*
• Store building; • Explosive yard; • Compressor house; • Two winder houses; • Refrigeration plant; • Bulk air coolers; • Potable water tank; • Service water tank; • Stormwater dam and drainage; • Parking; • Taxi//bus rank; • Office blocks; change houses; • Backfill remix tanks; • Engineering workshop; • Lamp room; • Eskom yard; • Main consumer substation; • Emergency generators; • Terraced area; • Sewerage sump; • Servitude with water, railway, sewage, backfill slurry, power cables and overhead power lines between the current Zondereinde operations and Terrace 2; Servitude between Terrace 1 and 2 with stormwater and overhead powerlines.			
• Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads.	-	X	**Listed activity 12, 19 and 28 GNR 983 and Listed activity 12 GNR 984**

NAME OF ACTIVITY *(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)*	**AERIAL EXTENT OF THE ACTIVITY** *(Ha or m²)*	**LISTED ACTIVITY** *Mark with an X where applicable or affected.*	**APPLICABLE LISTING NOTICE** *(GNR 544, GNR 545 or GNR 546)/NOT LISTED)*
• Stockpiling of construction and excavated materials.			
Raise bore drilling and drill rig and sinking of shafts and vent raises.	-	X	**Listed activity 17 GNR 984**
• Civil works including establishment of infrastructure on site including the pollution control dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, wastewater pipeline, electrical substation and powerlines. • Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing.	-	X	**Listed activity 12, 19 and 28 GNR 983 and Listed activity 6, 12 & 17 GNR 984**
Energy, water, raw materials and fuel consumption.	-	N/A	N/A
• Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp. • Rehabilitation of construction camp and other construction areas, including along the raw water and wastewater pipelines and access and haul roads.	-	N/A	N/A
OPERATIONAL PHASE			
Mining: Raise bore drilling and raise bore drill rig		X	**Listed activity 17 GNR 984**
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.		X	**Listed activity 17 GNR 984**

NAME OF ACTIVITY *(All activities including activities not listed: e.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc..)*	**AERIAL EXTENT OF THE ACTIVITY** *(Ha or m²)*	**LISTED ACTIVITY** *Mark with an X where applicable or affected.*	**APPLICABLE LISTING NOTICE** *(GNR 544, GNR 545 or GNR 546)/NOT LISTED)*
Dewatering of underground mine, if required.		X	**Listed activity 17 GNR 984**
Operation of conveyor belts		X	**Listed activity 17 GNR 984**
Exhausting of mine ventilation air		X	**Listed activity 17 GNR 984**
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw water pipelines, wastewater pipelines, access and haul roads etc.		X	**Listed activity 6 &17 GNR 984**
Energy, fuel, water consumption and depletion of minerals		X	**Listed activity 17 GNR 984**
Operation of the Shaft Complex		X	**Listed activity 17 GNR 984**

3.2 Description of the activities to be undertaken

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

Due to Northam Platinum realising that it will be more feasible to sink an additional shaft for various reasons, which is discussed under Section 5 of this report, the following shafts and surface infrastructure and associated activities are now required, which also requires environmental authorisation.

The shafts will be positioned on two constructed terraces one for the up-cast ventilation shafts (Terrace 2) and one for the two access shafts and one downcast ventilation shaft (Terrace 1). (Refer to Figure 4). The two terraces will require a servitude between them for services. The servitude will carry power cables, overhead power lines, storm water from terrace 1 and potable water. A servitude will be required between the current Zondereinde operations and terrace. This servitude will carry service water, sewerage, backfill slurry, power cables and overhead power lines. Overhead power lines will be installed to connect terrace 1 to the adjacent Eskom high voltage overhead lines. A potable water line will be installed from the Magalies Water main pipeline adjacent to the R510 to terrace 1. The current paved road from the R510 to the current shaft and concentrator

facility will be diverted around terrace 1 and an additional unpaved road will be required from the existing paved road to terrace 2.

3.2.1 Terrace 1

The purpose of Terrace 1 is to house the two up-cast ventilation shafts (3b and 3c shafts) each equipped with two ventilation fans. The shafts will be positioned 75 m apart. The ventilation shafts will be raise-bored, unlined and will be 4.6 m diameter hole once completed. The fans are connected to the shafts by means of steel ventilation ducts. The fans will discharge the underground air vertically from the fan chambers. Overhead medium voltage (11 kV) power lines will feed a substation which will provide the fans and its ancillary equipment with power.

The terrace will be constructed by excavating and removing the heaving clay layer of approximately 2 m and filling and compacting graduated fill to provide a stable base for the mounting of the fans and substation (The clay will be stored for rehabilitation on the existing topsoil storage facility and the fill material will be sourced from waste rock available on the mine site). The storm water runoff will be collected in a drain that is constructed around the perimeter of the terrace. The water will be collected in a sump and pumped to terrace 2 where it will flow into the storm water reservoir. A gate house with single toilet and hand basin will be constructed at the entrance to the terrace (A septic take will serve as waste collection for the toilet and basin). The terraced area will be secured with fencing and a gate to prevent unauthorised entry to the machinery. To the terrace will be by unpaved road from the existing mine paved road.

3.2.2 Terrace 2

The purpose of Terrace 2 is to house a full shaft infrastructure that supports the downcast and access shafts.

The terrace will be constructed by excavating and removing the heaving clay layer of approximately 2 m and filling and compacting graduated fill to provide a stable base for the mounting of the facilities (The clay will be stored for rehabilitation on the existing topsoil storage facility and the fill material will be sourced from waste rock available on the mine site).

A storm water storage dam will be provided adjacent to the terrace. The storm water will be collected from a series of storm water drains on and around the periphery of the terrace.

The terrace will be secured with fencing and will have two entrance/exit points namely for pedestrians and for delivery and commercial vehicles. Personnel will enter the shaft complex from either the parking area or from the designated bus and taxi rank. Each of the entry points will be provided with security gate houses.

In order to effectively utilise the two access shafts and the down cast ventilation shaft the following facilities will be provided for on the terrace:

- Shaft bank Area
- Two headgears
- 3 Shafts

- Transfer conveyor belt from headgear to silos
- Reef silo
- Waste silo
- Salvage yard
- Store yard
- Store building
- Explosive yard
- Compressor house
- Two winder houses
- Refrigeration plant
- Bulk air coolers
- Potable water tank
- Service water tank
- Storm water dam and drainage
- Parking
- Taxi/bus rank
- Gate houses
- Office blocks
- Change houses
- Backfill remix tanks
- Engineering Workshop
- Lamp room
- Eskom yard
- Main consumer substation
- Emergency generators
- Terraced area
- Sewerage sump.

The sections following provide a functional description of the infrastructure that will be installed on terrace 2.

3.2.2.1 No 3 Shaft

No 3 Shaft is a rock hoisting shaft that will hoist rock from 3 level (1,320 m below collar) to surface. The shaft is 4.6 m diameter and will be lined with shotcrete and equipped with steel shaft guides. Various mining services will also be installed into the shaft. The shaft will be equipped with a steel headgear which allows for the discharge of rock from underground into a headgear bin from where it will be discharged into road trucks and driven to the existing concentrator or the existing waste rock dump (No new waste rock dump will be required).

Hoisting will be done with a ground mounted double drum winder housed in a winder house adjacent to the shaft and headgear.

The shaft will be equipped with two conveyances mounted in bridles. During the initial phases of construction both rock and men will be transported in the shaft, later when No 4 Shaft is complete only rock will be transported in this shaft.

Cooled air will be pumped underground in this shaft. The air cooled by refrigeration plants will pass through a bulk air cooler via a ventilation duct into the shaft.

3.2.2.2 No 4 Shaft

No 4 Shaft is a men and material hoisting shaft that will transport men and material to and from 3 level (1,320 m below collar) to surface. The shaft is 4.6 m diameter, will be lined with shotcrete and equipped with steel shaft guides. Various mining services will also be installed into the shaft. The shaft will be equipped with a steel headgear.

Hoisting will be done with a ground mounted double drum winder housed in a winder house adjacent to the shaft and headgear.

The shaft will be equipped with one conveyance and a counterweight.

Cooled air will be pumped underground in this shaft. The air cooled by refrigeration plants will pass through a bulk air cooler via a ventilation duct into the shaft.

3.2.2.3 No 3a Shaft

No 3a shaft is a bald downcast shaft. The shaft is 4.6 m diameter, will be unlined. The shaft will be equipped with a cover connected to a ventilation duct. Cooled air will be pumped underground in this shaft. The air cooled by refrigeration plants will pass through a bulk air cooler via a ventilation duct into the shaft.

The Project will provide access to the reef horizon for men, material and mining services as well as ore removal to surface.

3.2.2.4 Shaft Bank Area

An open area around No 3 and 4 Shafts is utilised for the staging of men and material that is to go underground via the shafts. The area has a series of rails that lead into No 4 shaft for material cars.

The bank area is concreted and sloped away from the shafts to prevent storm water running into the shaft.

3.2.2.5 Shaft Headgears

A steel headgear is installed on each of No 3 and No 4 Shaft.

The No 3 Shaft headgear provides mountings for rope sheaves, safety devices and an overrun in case of an emergency. It also has a tipping scroll and bin where the skips from underground are emptied of rock into the headgear bin.

No 4 Shaft headgear provides for rope sheaves, safety devices and an overrun in case of an emergency. No bin is installed.

3.2.2.6 Transfer Conveyor Belt

Rock hoisted to surface is tipped into the headgear bin of No 3 Shaft. The bin in turn feeds a conveyor belt that transfers the rock to two storage silos. The silos are situated side by side. The conveyor is equipped with a tripper car that allows the rock to be deposited in either silo. The silos store reef and waste respectively. The silos are situated outside of the shaft security area to allow easy access by road. The rock in the silos is then transferred by road to the concentrator or waste rock dump.

3.2.2.7 Reef Storage Silo

The reef storage silo will store reef rock from underground. It will hold 1 day hoisting capacity that is 4,000 tons. Two hydraulically operated discharge chutes will be fitted below the silo. The chutes will discharge into road trucks that transfer the reef to the concentrator.

3.2.2.8 Waste Storage Silo

The waste storage silo will store waster rock from underground. It will hold 2 days hoisting capacity that is 1,500 tons. Two hydraulically operated discharge chutes will be fitted below the silo. The chutes will discharge into road trucks that transfer the reef to the existing waste dump.

3.2.2.9 Salvage Yard

The shaft salvage yard will be a fenced off area with one vehicle gate. The area will be left unpaved except for a concrete area of 20 m × 30 m. There will be no buildings in the salvage yard.

3.2.2.10 Store Yard

The store yard will be a fenced area with one pedestrian gate and one vehicle gate. The yard will include two buildings. The first 50 m × 20 m will be a roofed area with concrete floor for storage of bulk supplies, the second a closed steel and brick clad building with three offices and racking inside for storage of small and security sensitive equipment.

3.2.2.11 Explosive Bay

The explosive bay will be a fenced area with one pedestrian gate and two vehicle gates. The area of 30 m × 30 m will have a concrete floor. There will be rail and road access to the bay.

3.2.2.12 Compressor House

The compressor house is a concrete floored and steel roofed structure that will house three Atlas Copco compressors (20 m × 10 m).

3.2.2.13 Winder Houses

There are two winder houses, one for the men and material hoist and one for the rock winder. The winders will be housed separately. The buildings will be steel clad.

3.2.2.14 Refrigeration Plant

The refrigeration plant feeds cold air via ventilation ducts to No 3, 4 and 3a Shafts. The refrigeration plant will consist of three bulk air coolers, refrigeration machines, Hot, cold and service water tanks, Condenser water cooling towers and fans and ancillaries (Refer to Figure 3).

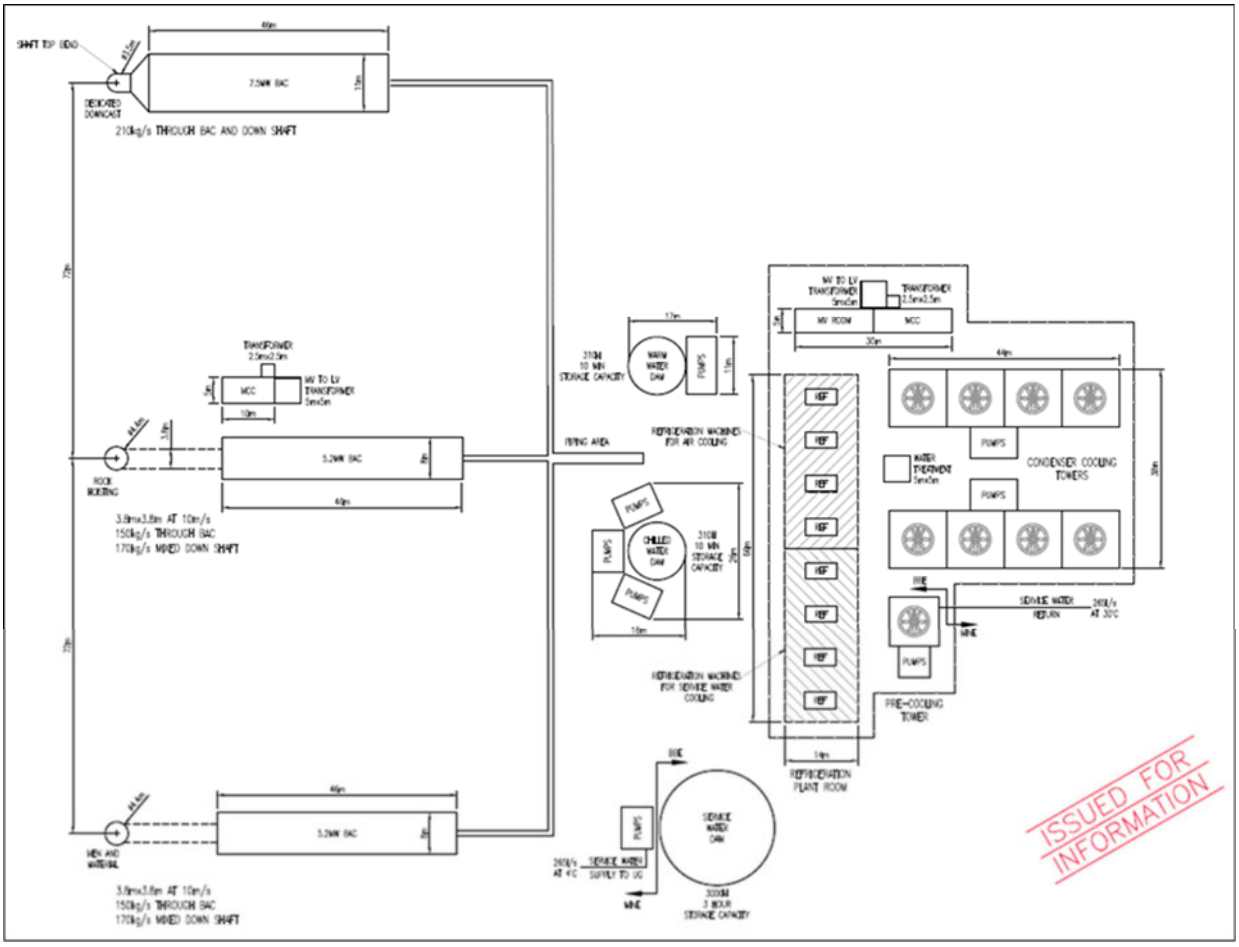


Figure 3: Conceptual Layout of Refrigeration Plant

3.2.2.15 Potable Water Tank

A Braithwaite type potable water storage tank of 400 kl will be installed on a raised structure.

3.2.2.16 Return Water Dam

Two Erickson type water storage dams are constructed on the terrace. The capacity of each will be 25 Ml (45 m Diameter).

3.2.2.17 Storm Water Dam

Storm water will be collected in drains and gravity fed to a storm water dam for evaporation or to be used to top up the service water on the shaft. The dam will be excavated from the heaving clay layer and lined with PVC sheeting. The dam will be 30 m × 50 m.

3.2.2.18 Parking

A parking area will be laid out with 200 covered parking bays and 200 uncovered parking bays. The area will be unpaved and access control will be provided.

3.2.2.19 Taxi and Bus Rank

A taxi and bus rank will be provided.

3.2.2.20 Security Gate Houses

Security gate houses will be constructed at the following shaft entrances:

- Pedestrian entrance adjacent to the parking and taxi rank
- Vehicle entrance

3.2.2.21 Office Blocks

An office block will be constructed to provide the following facilities:

- Male and female bathrooms
- 2 Kitchens
- Three meeting/boardrooms
- 6 Management offices
- 25 Supervisor offices

3.2.2.22 Change Houses

A double story change house will be provided as follows:

- Male - Management and Visitors – 20 People
- Female – Management and Visitors – 20 People
- Male – Mine Overseer – 20 People
- Female – Mine Overseer – 10 People
- Male – Foreman and Shift Overseer – 40 People
- Female – Foreman and Shift Overseer – 20 People
- Male – Tradesmen and Miners – 100 People
- Female – Tradesmen and Miners – 100 People
- Male – Industrial facility – 600 People
- Female – Industrial facility – 200 People

3.2.2.23 Backfill Remix Tanks

2 Steel backfill remix tanks adjacent to the No 3 and 4 Shafts.

3.2.2.24 Engineering Workshop

One general engineering workshop 60 m × 20 m. All heavy engineering work will be carried out at the central facilities.

3.2.2.25 Lamp Room

A lamp room with issuing cubicals, repair stations and racks to house 1,200 lamps and SCSRs.

3.2.2.26 Eskom Substation

The Eskom substation will be positioned on the terrace perimeter closest to the existing Eskom power lines. This will house the supplier transformers and switching yards.

3.2.2.27 Main Consumer Substation

The Mine substation will be positioned adjacent to the Eskom substation and will provide switching for the mine.

3.2.2.28 Emergency Generator Building

A building to house two emergency generators with area to expand to six units will be situated adjacent to the Main consumer substation.

3.2.2.29 Sewerage Reticulation

Sewerage from the shaft facilities will be gravity fed to a transfer sump from where it will be pumped to the central sewerage plant.

Figure 4: Northam Zondereinde 3 Shaft Proposed Layout

4 POLICY AND LEGISLATIVE CONTEXT

This section provides a description of the policy and legislative context within which the triggered activities form part of the environmental authorisation application (i.e. the Shaft Complex). The legislative context detailed below is only applicable to the activities proposed at and associated with the Shaft Complex and does not include the legislation relating to activities within the Existing MRA.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)*	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** *(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)*
Constitution of the Republic of South Africa, 1996 Section 24 Everyone has the right to: a. an environment that is not harmful to their health or well-being; and b. have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that: i. prevent pollution and ecological degradation; ii. promote conservation; and iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Section 7	This basic environmental right contained in the Constitution is included throughout the environmental legislation. The particulars regarding the impact assessment process is described in Section 7 of this Report. To give effect to Section 24 of the Constitution, an application for environmental authorisation is being made in terms of reasonable legislative and other measures.
National Environmental Management Act (NEMA), Act No. 107 of 1998 Sections 24(2), 24(5), 24D and 44 Regulations pertaining to identification of activities which may not commence without authorisation and procedures to be followed. The NEMA is the umbrella legislation for	Section 1.1 Section 3.1	A scoping and EIA process is being followed in terms of the EIA Regulations for an activity listed under Listing Notice 2 (2014), as amended. This report constitutes the scoping report circulated to Interested and Affected Parties and Organs of State, in the EIA process being undertaken.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)*	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** *(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)*
which all environmental principles, concerns, issues or impacts must be addressed including: EIA Regulations (2014), as amended.		
Environmental Impact Assessment Regulations, GN R 982 of 4 December 2014 Regulation 21 – 26 and Regulation 39 - 44 These Regulations set out the process required to undertake the scoping and EIA process, including the public participation process that must be undertaken as part of the EIA.	Section 1.1 Section 3.1	A scoping and EIA process is being followed in terms of the EIA Regulations for activities listed under Listing Notice 2 (2014), as amended. This report constitutes the scoping report circulated to Interested and Affected Parties and Organs of State, in the EIA process being undertaken.
National Environmental Management: Waste Management Act (NEM:WA), 2008 (Act No. 59 of 2008) The NEM:WA aims to regulate waste management in South Africa in order to protect health and the environment through the provision of reasonable measures for the prevent pollution and ecological degradation. The Act includes regulations which provide a list of waste management activities that require a waste management licence terms of NEM:WA (GN 921 of 29 November 2013). Activities related to treatment of effluent, wastewater or sewage are however excluded and do not require a waste management licence.		No waste management licence is required for the proposed Shaft Complex. Waste will be collected and disposed of at the Zondereinde Mine.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)*	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** *(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)*
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) NEMBA aims to provide for the management and conservation of South Africa's biodiversity within the framework of NEMA. The purpose of NEMBA is to protect ecosystems and the species within as well as the promoting of sustainable use of indigenous biodiversity. During any environmental authorisation process the following regulations are considered and researched if at any stage the following regulations are applicable: • Alien and Invasive Species Regulations; • Alien and Invasive Species List; • Lists of Critically Endangered, Endangered, Vulnerable and Protected Species; • Threatened or Protected Species Regulations.	Section 7	A Biodiversity Impact Assessment will be undertaken to confirm the presence of any threatened species and will be included in the EIA Report.
National Environmental Management: Air Quality Act (NEMAQA), 2004 (Act No. 39 of 2004) and the National Dust Control Regulations, 2013 The aim of NEMAQA is to regulate air quality to protect the environment from pollution and ecological degradation. The development itself will not impact on air quality, however, the surrounding land uses such as old mine	Section 7	The dust control regulations will be applicable mainly during the construction phase of the project. Dust control measures will be included in the Environmental Management Programme.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)*	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** *(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)*
tailings, quarrying and landfill sites, might have an impact on the proposed development.		
National Water Act (NWA), Act No. 36 of 1998 Section 21 water uses The NWA provides for fundamental reform of the law relating to water resources, where the ultimate aim of water resource management is to achieve the sustainable use of water for the benefit of all users. Water uses that are often associated with underground mining that require a water use licence ("**WUL**") include taking water from a water resource; and removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for safety of people.	Will be addressed in detail the EIR/EMPR.	An amendment of the existing Water Use Licence will be applied for, for all water uses. It will be established during the EIA phase which water uses will be triggered, however, it is expected that the shaft complex may trigger the following water uses: a), c), g), i) & j).
National Heritage Resources Act (NHRA), Act No. 25 of 1999 The NHRA promotes good management of the national estate, and to enable and encourage communities to nurture and conserve their legacy so that it may be bequeathed for future generations.	Section 7	Due to the size of the development, a Heritage Impact Assessment will be undertaken to determine the impact to heritage resources (if any).
Mineral and Petroleum Resources Development Act (MPRDA), Act No. 28 of 2002 The MPRDA makes provision for equitable access to and sustainable development of the nation's mineral and petroleum resources. The recent amendments to NEMA and the MPRDA resulted in changes to align specific		Northam already holds the Zondereinde Mining Rights and EMPs granted and approved under the MPRDA. Stemming from the one environmental management system, the decision of the environmental authorisation application will be

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)*	**REFERENCE WHERE APPLIED**	**HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT** *(E.g. In terms of the National Water Act: -Water Use Licence has/has not been applied for)*
environmental legislation associated with mining activities and sections of NEMA and MPRDA to provide for one environmental management system. NEMA is now the primary legislation for the environmental regulation of mining and associated activities.		decided by the Minister, or a delegated authority.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996)	Will be addressed in the EIR/EMPR	Northam Platinum Limited: Zondereinde Division already complies with the Mine Health and Safety Act, 1996 (Act No. 29 of 1998) and the complete act will be applicable to the new Shaft Complex.
Provincial	Will be addressed in the EIR/EMPR	Will be addressed in the EIR/EMPR
Local By-Laws	Will be addressed in the EIR/EMPR	Will be addressed in the EIR/EMPR
2016 -2021 Integrated Development Plan 2016/17 ("IDP") Mine developments boost the local economy	Will be addressed in detail the EIR/EMPR. Section 5	One of the opportunities listed within the IDP is the availability of mineral resources. The project is aligned with such opportunity to access mineral resources.

5 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

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

5.1 Need of the Proposed Activity

Northam Platinum Limited (Northam) plans to increase its production by 100 ktpm from the Zondereinde Western Block that has been acquired from Anglo American Platinum.

Production of an additional 100 ktpm of Merensky Ore is matched to the capacity of the existing Merensky concentrator. The Western Block is situated to the West of the original mining right and adds approximately 4 km o strike to the Merensky and UG2 ore reserve of Zondereinde Platinum Mine.

Due to its distance from the existing 1 and 2 Shaft which access the ore body it was decided to provide additional access to the ore body nearer to the mining operations. This access will be via two raise bored shafts from surface to 5 level which is 1,520 m below collar. In addition, these new mining areas will require additional ventilation which will be provided by a downcast ventilation shaft and 2 up-cast ventilation shafts; five vertical shafts in total.

5.2 Desirability of the Proposed Activity

The proposed shaft complex will have several socio-economic benefits including, but not limited to:

- it will secure economic viability of the mine (300kozpa PGM and 9200 current staff);
- it will further extend Zondereinde life of mine to approximately 35 years; and
- it will generate 1 000 new mining related work opportunities associated with additional production of 100kozpa PGM.

5.3 Environmental Impact

Any Environmental impacts will be accommodated within the boundary of the proposed Shaft Complex. Refer to Section 6.5 for a description of potential environmental impacts that may occur as a result of the proposed development. These impacts will be assessed in detail during the EIA phase of the Environmental Authorisation application.

The following questions have also been addressed in line with the Guideline for Need and Desirability (Notice 891 of 2014).

Table 6: Need and Desirability Assessment

Questions from the Need and Desirability Guideline	Response
Securing ecological sustainable development and use of natural resources	
How will this development (and its separate elements / aspects) impact on the ecological integrity of the area?	A site assessment and preliminary desktop assessment was undertaken, and no sensitivities were identified. **Based on this, it is not expected that the proposed development will significantly impact on the ecological integrity of the area.**
How were the following ecological integrity considerations taken into account? • Threatened Ecosystems;	This Scoping Report considered the ecological integrity of the area in the following way:

Questions from the Need and Desirability Guideline	Response
• Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, 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; • Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"); • Conservation targets; • Environmental Management Framework; • Spatial Development Framework; and • Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	• An initial sensitivity map was compiled to identify potential ecological sensitivities. This map considers CBAs, ESAs, watercourses, Important Bird Areas (IBAs) etc. (refer to Figure 13). • Based on the initial sensitivity map, it was determined that a Biodiversity Impact Assessment is required; • A Biodiversity Impact Assessment will therefore be undertaken and will consider aspects such as threatened and sensitive ecosystems etc. A detailed final sensitivity map will be compiled based on the findings of the study and included in the EIA/EMPr. • The findings of the Biodiversity Impact Assessment will be used to determine and assess impacts related to the development. A detailed impact assessment which will assess the proposal, alternative and no-go option will be compiled.
How will this development disturb or enhance ecosystems and / or result in the loss or protection of biological impacts that could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits (i.e. such as the use of local labour where possible).
How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits (i.e. such as the use of local labour where possible).

Questions from the Need and Desirability Guideline	Response
What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimize, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits (i.e. such as the use of local labour where possible). Further, a waste management plan will also be included in the EMPr which will include measures to reduce and recycle waste.
How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits (i.e. such as the use of local labour where possible).
How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? • Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits. This will include an assessment of resources required for the proposed development. As mentioned, a preliminary desktop assessment was conducted which did not identify any ecological sensitivities.

Questions from the Need and Desirability Guideline	Response
does it reduce resource dependency (i.e. de-materialized growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life). • Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?). • Do the proposed location, type and scale of development promote a reduced dependency on resources?	Further, as the site is in parts impacted by previous activities and is located close to available services (roads, water, sanitation etc.), it is a good site for the proposed development, as it will not cause any additional impacts to the adjacent areas.
How were a risk-averse and cautious approach applied in terms of ecological impacts? • What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? • What is the level of risk associated with the limits of current knowledge? • Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	A risk-averse and cautious approach is undertaken throughout the process including the compilation of specialist studies, the impact assessment and the EMPr. In particular, it is and will be incorporated in the following ways: • The specialist will identify gaps which will be noted in both the specialist report and EIA Report. • The detailed impact assessment will specifically deal with gaps identified by specialists and/or lack of information through the assessment of 'Level of Confidence'. • The EMPr will provide numerous mitigation measures to ensure that even impacts that will be identified to be a 'low' risk would be further mitigated. In all cases, the level of risk associated with the current knowledge was deemed sufficient for

Questions from the Need and Desirability Guideline	Response
	undertaking the impact assessment for providing a recommendation. It is therefore the EAP's opinion that a risk averse and cautious approach can be applied to the development.
How will the ecological impacts resulting from this development impact on people's environmental right in terms of the following: • Negative impacts e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? • Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits.
Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	Due to the fact that the preliminary desktop assessment concluded that it is not expected that the site will be sensitive, it is not expected that there will be opportunity costs related to the development.
Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	Due to the fact that the preliminary desktop assessment concluded that it is not expected that the site will be sensitive, it is not expected that the proposed development will negatively impact on the ecological targets of the area.
Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?	Two layouts will be assessed, namely: • The Proposal; and • Alternative 1. When assessing these alternatives, the following will be considered: • The findings of the specialist studies undertaken; • The results of the impact assessment; and

Questions from the Need and Desirability Guideline	Response
	• The need for the project. Based on the findings of the specialist study and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative will be made, however, at this preliminary stage, the Proposed layout is the preferred alternative based on the fact that the area is already disturbed. However, the preferred layout/location may be affected by the results of the specialist studies, especially the in-depth geological investigation.
Promoting justifiable economic and social development	
What is the socio-economic context of the area, based on, amongst other considerations, the following considerations? • The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any strategic plans, frameworks of policies applicable to the area. • Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.). • Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and • Municipal Economic Development Strategy ("LED Strategy").	Please see Section 6.4.1.10 of the Scoping Report which provides an overview of the socio-economic context of the area. 2016 -2021 Integrated Development Plan 2016/17 ("IDP") One of the opportunities listed within the IDP is the availability of mineral resources. The project is aligned with such opportunity to access mineral resources. In summary, the proposed development is in line with the planning of the area. The spatial priorities, characteristics, and LED strategy of the local authority will be discussed in detail in the EIA/EMPr.
Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? • Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits.

Questions from the Need and Desirability Guideline	Response
How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits.
Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	The proposed development will create employment during construction and operation, which will result in economic multiplier effects and social upliftment in the local community. The establishment of the Shaft Complex will provide access to the Western block of the Zondereinde Mine, which will result in the extension of the Life of Mine of the Zondereinde Mine to approximately 35 Years.
In terms of location, describe how the placement of the proposed development will: • Result in the creation of residential and employment opportunities in close proximity to or integrated with each other; • Reduce the need for transport of people and goods; • Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport); • Compliment other uses in the area; • Be in line with the planning for the area for urban related development; • Make use of underutilised land available with the urban edge; • Optimise the use of existing resources and infrastructure opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that	The proposed location of the proposed development considered a number of aspects including: • The need for access to the approved extended Mining Right Area i.e. the 'Western Block'; • The ecological sensitivity (or lack thereof) of the site; • Geological conditions; • Services required for the development; and • Access roads required for the development. The following can also be noted: • The proposed development will create employment during construction and operation; • Additional employment will result in economic multiplier effects and social upliftment in the local community; • It will extend the life of mine.

Questions from the Need and Desirability Guideline	Response
reflects the spatial reconstruction priorities of the settlement); • Discourage "urban sprawl" and contribute to compaction/densification; • Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs; • Encourage environmentally sustainable land development practices and processes; • Take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.); • The investment in the settlement or area in question will generate the highest socio=economic returns (i.e. an area with high economic potential); • Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area; and • In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	
How were a risk-averse and cautious approach applied in terms of socio-economic impacts? • What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)? • What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge? • Based on the limits of knowledge and the level of risk, how and to what extent was a	A risk-averse and cautious approach is undertaken throughout the process including the compilation of specialist studies, the impact assessment and the EMPr. In particular, it is and will be incorporated in the following ways: • The detailed impact assessment will specifically deal with gaps and/or lack of information through the assessment of 'Level of Confidence'. • The EMPr will provide numerous mitigation measures to ensure that even impacts that

Questions from the Need and Desirability Guideline	Response
risk-averse and cautious approach applied to the development?	will be identified to be a 'low' risk would be further mitigated. In all cases, the level of risk associated with the current knowledge was deemed sufficient for undertaking the impact assessment for providing a recommendation. It is therefore the EAP's opinion that a risk averse and cautious approach can be applied to the development.
How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following: • Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimize, manage and remedy negative impacts? • Positive impacts. What measures were taken to enhance positive impacts?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits.
Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	Please refer to Section 6.8 and Appendix 6 for the preliminary impact assessment which identified the potential impacts as well as the recommended and suggested mitigation measures that reduce negative impacts and enhance benefits. Further, a detailed and site specific EMPr for will be compiled during the EIA phase that will include all mitigation measures. Including measures to enhance benefits.
What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Two layouts will be assessed, namely: • The Proposal; and • Alternative 1. When assessing these alternatives, the following will be considered: • The findings of the specialist studies undertaken; • The results of the impact assessment; and • The need for the project.

Questions from the Need and Desirability Guideline	Response
	Based on the findings of the specialist study and impact assessment and considering the successful implementation of the EMPr, a recommendation as to the preferred alternative will be made, however, at this preliminary stage, the Proposed layout is the preferred alternative based on the fact that the area is already disturbed and in close proximity to services. However, the preferred layout/location may be affected by the results of the specialist studies, especially the in-depth geological investigation.
What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?	A detailed impact assessment process will be undertaken including the development of alternatives which will be assessed. In addition, in line with the requirements of the EIA Regulations, 2014, the EIA Report will be made available for review and I&APS will be provided with an opportunity to comment on the impact assessment. It is the opinion of the EAP, that no impacts assessed will be distributed in such a way to discriminate against any disadvantaged person. The alternatives assessed do allow for the best practicable environmental option to be determined and the EAP is of the opinion that no further alternatives need to be assessed.
What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	The proposed development will create employment during construction and operation, which will result in economic multiplier effects and social upliftment in the local community.
What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development’s life cycle?	In identifying the impacts associated with the development as well as the development of the EMPr, the full lifecycle of the proposed development will be assessed. Further, the full EMPr will include the roles and responsibilities for the development and will ensure

Questions from the Need and Desirability Guideline	Response
	that the responsibility of the implementation of the EMPr falls to the developer.
What measures were taken to: • ensure the participation of all interested and affected parties; • provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation; • ensure participation by vulnerable and disadvantaged persons; • promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means; • ensure openness and transparency, and access to information in terms of the process; • ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge; and • ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were promoted?	A detailed public participation process is being undertaken as part of the EIA process. Please see Section 6.2 for more information on this process.
Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area).	The proposed development will provide employment opportunities to numerous individuals and it is not expected that any categories of people will be disadvantaged by the development.
What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human	The Mine has a Health and Safety Programme and is required by law to comply with the Mine Health and

Questions from the Need and Desirability Guideline	Response
health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Safety Act. Some health and safety mitigation measures will be also be included in the EMPr.
Describe how the development will impact on job creation in terms of, amongst other aspects: • the number of temporary versus permanent jobs that will be created; • whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area); • the distance from where labourers will have to travel; • the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits); and • the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	The following can be noted in regard to this: • The access to the Wester extension is essential to ongoing LoM at Zondereinde Mine; • It will secure economic viability (300KOZPA pgm and 9 200 current staff; • It will further extend LoM to approximately 35 years; • Approximately 300 employment opportunities will be created during the construction phase and approximately 1000 new job opportunities during the operational phase; • Prism EMS will indicate in the EMPr, that local employment should be encouraged to promote skills transfer and development. This will enhance the general area and provide job opportunities to potential job seekers and manage it in the best suitable way; • An assessment of the social environment of the area suggests that there is labour available in the area; • The proposed development will not result in any losses of any jobs and job-related opportunity costs are not expected.
What measures were taken to ensure: • That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment; and • That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	National Legislation i.e. NEMA, NWA, NHRA, NEM:WA, NEM:BA were consulted in the preparation of this Scoping Report. Provincial guidelines also formed part of the literature review. Spatial development tools also aided the EAP to assess and provide information pertaining to the proposed development.

Questions from the Need and Desirability Guideline	Response
	Any comments received from I&APs or organs of state will be included in the comments and response register.
Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	The EMPr will be site specific and include realistic and achievable mitigation measures which aim to reduce any negative impacts as well as to enhance any benefits associated with the project.
What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	A detailed EMPr will be compiled and will include detailed roles and responsibilities. In addition, a penalty system for contractors will also be included.
Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Two layouts were assessed, namely: • The Proposal; and • Alternative 1. When assessing these alternatives, the following will be assessed: • The findings of the specialist studies to be undertaken; • The results of the impact assessment during the EIA phase; and • The need for the project.

5.4 Period for which the environmental authorisation is required

The authorisation is required from the date of commencement of authorisation for approximately 35 years.

6 DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED SITE

(NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.)

The aim of this section is to provide the details of the alternatives considered as part of this project with reference to the property on which the activity will occur, the type of activities to be undertaken; the design or layout of the activities; the technology to be used; the operational aspects and the option of not implementing the activities. The initial proposed site plan is to be reviewed and potentially changed throughout the scoping phase after consideration of the following:

- Environmental features;
- Current land uses;
- Issues raised by Interested and Affected Parties; and
- Alternatives.

6.1 Details of all alternatives considered

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

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.)

According to the 2014 EIA Regulations, alternatives are defined as:

“Different means of meeting the general purpose and requirements of the activity, which may include alternatives to the-

(a) property on which or location where the activity is proposed to be undertaken;
(b) type of activity to be undertaken;
(c) design or layout of the activity;
(d) technology to be used in the activity; or
(e) operational aspects of the activity;

-and includes the option of not implementing the activity.”

In line with the Regulations, the following alternatives have been assessed for the proposed development:

- Layout alternatives

One layout alternative to the Proposed layout (Appendix 4) will be developed and will be assessed in detail during the EIA phase. In order to understand the development of the proposed site layout and the alternative site layout, a summary of the site constraints identified by the professional team (and then considered in the layouts) will be provided.

- The No -Go Option.

The option of not establishing the Shaft Complex, also known as the "No-go option" will result in the Western Block of the Mining Right Area not being as accessible as it could be and may potentially decrease the LoM of the Zondereinde Mine. The new mining area will also require additional ventilation, which can be provided by the proposed activity.

Should the LoM decrease the following benefits may not realise full:

- Securing economic viability of the mine (300kozpa PGM and 9200 current staff);
- Generation of 1 000 new mining working opportunities associated with additional production of 100kozpa PGM.

6.2 Details of the Public Participation Process Followed

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

6.2.1 Objectives and Purpose of Public Participation

The purpose of the public participation process is to provide information regarding the proposed project to any potentially interested and/or affected person for use and consideration throughout the environmental assessment process. The information usually involves a combination of the technical project scope, environmental attributes and sensitives, cultural and heritage aspects as well as socio-economic factors that may be potentially beneficial or problematic to various role players.

The dissemination of such information is intended to assist the public with understanding how the proposed project and/or development may impact them and the environment in either a positive and/or negative manner, and especially where impacts are determined or perceived as significantly high, how such impacts may be influenced by project changes (layout or design aspects) or management measures may be implemented to reduce or minimise the significance of any identified impacts.

As a registered I&AP, members of the public of any affiliation are awarded the opportunity to remain informed of the steps, actions and decisions made within the environmental impact assessment process and are able to

actively participate by reviewing all information provided by the EAP to the I&AP's in a reasonable period in order to provide comments, objections, suggestions or any other information that will assist the project to develop in a favourable for all manner or contribute to the competent authority's knowledge in order to make an informed decision on the application for environmental authorisation.

6.2.2 Notification Phase of Public Participation

The public participation process commenced with identifying and notifying all potential Interested and Affected Parties (I&AP's). Background information documents and comment forms were provided as a basic source of information or notices were viewed and potential interested and/or affected members of the public were invited to register as I&AP's for the remainder of the Scoping and Environmental Impact Reporting phases of the process (refer to Section 6.2.2.2 to 6.2.2.4).

6.2.2.1 Identified I&AP's

The following potential I&AP's were identified:

- Department of Mineral Resources;
- Department of Water and Sanitation;
- Thabazimbi Local Municipality;
- Ward Councillors (Wards 5, 6, 8 & 11);
- South African Heritage Resources Agency (SAHRA);
- Limpopo Heritage Resources Agency (LIHRA);
- Limpopo Department of Economic Development, Environment and Tourism (LEDET);
- Limpopo Department of Rural Development and Land Reform (DRDLR);
- Limpopo Department of Public Works, Roads and Infrastructure;
- Roads Agency Limpopo (RAL);
- South African National Roads Agency Limited (SANRAL);
- Surrounding Landowners / Occupiers; and
- Other interested and affected parties.

Refer to Appendix 5.1 for the I&AP Database & Register.

6.2.2.2 Newspaper Notice

A notice was published in the following newspaper on the specified date:

Local: The Platinum Bushvelder newspaper published on 28 June 2019.

Please refer to Appendix 5.2 for proof of the newspaper notice that was published on 28 June 2019.

6.2.2.3 Site Notice

Three site notices were placed on the boundary or close to the study area on 01 July 2019:

- On the northern boundary of the study area; and
- Off the R510 at the intersection with the unnamed road leading to the entrance of the Northam Zondereinde Mine.

Please refer to Appendix 5.3 for proof of Site Notices placed on or close to the study area on 01 July 2019.

6.2.2.4 Written Notifications

The landowner of the property on which the shaft complex is proposed was notified in writing in the form of a letter and attached BID, containing information on the activities and process to be undertaken.

The surrounding landowners and/or occupiers and organs of state were notified of the proposed development and environmental application in writing via email on 01 July 2019.

Proof of Written Notification to landowner, surrounding landowners, organs of state and other I&AP's will be included in the final scoping report to be submitted to the Competent Authority in Appendix 5.4.

6.2.2.5 Comments Raised by Interested and Affected Parties

Comments received to date are summarised in the Comments and Response table attached in Appendix 5.7. Copies of comments will be included in Appendix 5.6 of the final scoping report to be submitted to the Competent Authority.

6.2.3 Scoping Phase Comment Period

The Scoping Report (this report) are available for comment to all registered interested and affected parties and relevant organs of state for a period of 30 days from 10 July 2019 to 11 August 2019.

All I&AP's were notified via email and provided with access to the Draft Scoping Report. Proof will be included in the Final Scoping Report in Appendix 5.5.

All comments received during this period are considered and incorporated into the Final Scoping Report and documented in the Comments and Response Report to be attached in Appendix 5.7 of the Final Scoping Report to be submitted to the Competent Authority.

6.2.4 Impact Assessment Phase Comment Period

Upon acceptance of the scoping report by DMR, the applicant/EAP will proceed and continue with the tasks contained in the plan of study (Section 7 of this report).

Subsequently an impact assessment report will be compiled and made available to all registered interested and affected parties and relevant organs of state for a period of 30 days. This comment period is planned for approximately **September 2019 – October 2019**.

6.2.5 Public Meeting

Please note that public meetings will only be held if the level of interest in the project is justified. If there is only interest by a small group of I&AP's it may be beneficial to meet one on one, or to discuss via telephone.

6.2.6 Outcome of the Decision

Registered I&AP's will be notified in writing of the outcome of the decision at either the scoping phase and/or whether the environmental authorisation is refused/granted at the end of the impact assessment phase. The notification will include details of the process and timeframes in which to appeal the outcome of the decision made by the competent authority, DMR.

6.3 Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses) ***Full list available in the Appendix 5.1.***

Table 7: Summary of issues raised by I&APs

Interested and Affected Parties *(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)*		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Consultation Status** *(consensus dispute, not finalised,etc)*
AFFECTED PARTIES		Comments to be included after the comment period: 10 July 2019 to 11 August 2019			
Landowner/s	**X**				
Lawful occupier/s of the land	**X**				
Landowners or lawful occupiers on adjacent properties	**X**				
Municipal councillor	**X**				
Local Municipality	**X**				
District Municipality	**X**				
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS etc.	**X**				
Department of Water and Sanitation	**X**				
Limpopo Road Agency	**X**				
South African Roads Agency Limited	**X**				
Eskom	**X**				
South African Heritage Resources Agency	**X**				
Limpopo Heritage Resources Agency	**X**				
Communities					
Dept. Land Affairs	**X**				

Interested and Affected Parties *(List the names of persons consulted in this column, and mark with an X where those who must be consulted were in fact consulted.)*		**Date Comments Received**	**Issues raised**	**EAPs response to issues as mandated by the applicant**	**Consultation Status** *(consensus dispute, not finalised,etc)*
Department of Rural Development and Land Reform					
Traditional Leaders					
Dept. Environmental Affairs – Limpopo Department of Economic Development, Environment and Tourism (LEDET)	**X**				
Other Competent Authorities affected					
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					

6.4 The Environmental attributes associated with the sites

6.4.1 Baseline Environment

(Type of environment affected by the proposed activity i.e. its current geographical, physical, biological, socio-economic, and cultural character.)

This section describes the baseline environmental conditions and attributes including socio-economic, social, heritage, cultural, geographical, physical and biological aspects relevant to the site (including both the Existing MRA and the new surface infrastructure proposed).

There are no specific sensitive environmental features noted within the study area at this preliminary desktop stage.

Please note that the following information has mostly been extrapolated from the Zondereinde amended EIA/EMPR, submitted in 2017. The purpose of this section is to provide a baseline description for the area and to identify the scope of work for the EIA phase.

6.4.1.1 Climate

The climate of the region is typical of the arid north-western regions of South Africa, with hot and dry summers and cold winters with frost. Frost occurs mainly between May to mid- September, with an average of 51 frost days per years. Mean high daily maximum temperatures of more than 30°C are experienced from October to February. Temperatures during the winter months (May to August) are mild, varying on average between 12.6°C and 16.5°C. Average mean minimum temperatures do not drop below 17.7°C in summer and 2.6°C in winter for the Limpopo Province.

Figure 5 below illustrates the average temperatures during December 2009 to December 2018 for Thabazimbi. The hottest and most extreme temperatures for the area were recorded during the 2015 / 2016 December / January period, whilst the coldest temperature was recorded during July 2011 (www.worldweatheronline.com) [Date accessed: 24 January 2019].

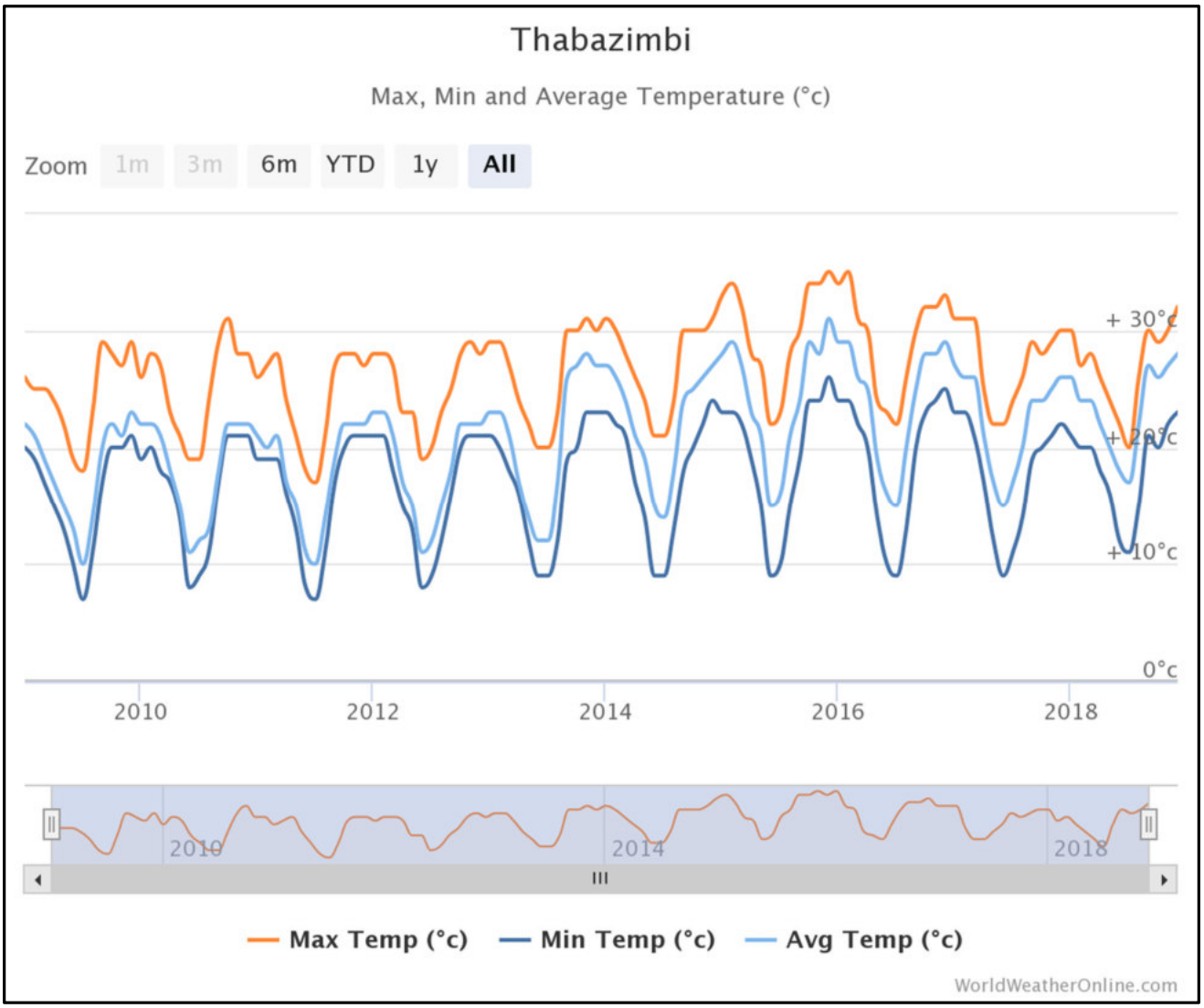
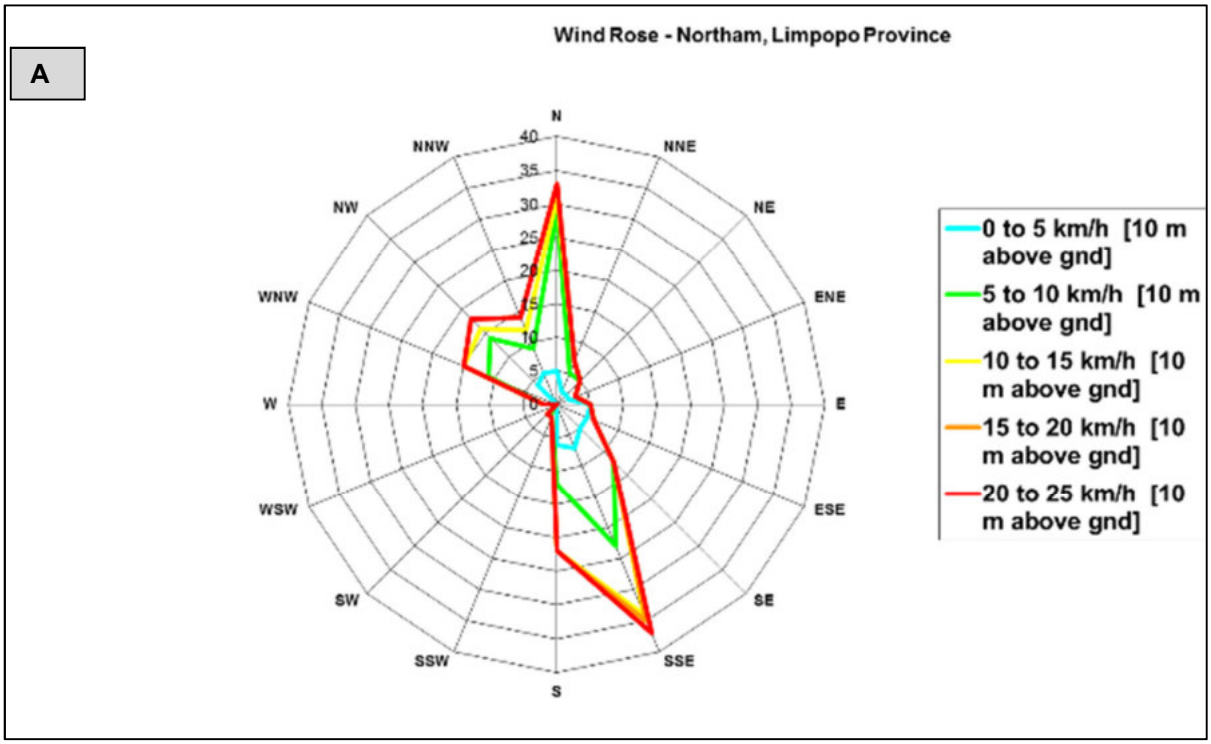


Figure 5: Maximum, minimum and average temperatures for Thabazimbi over a 10-year period (reproduced from www.worldweatheronline.com)



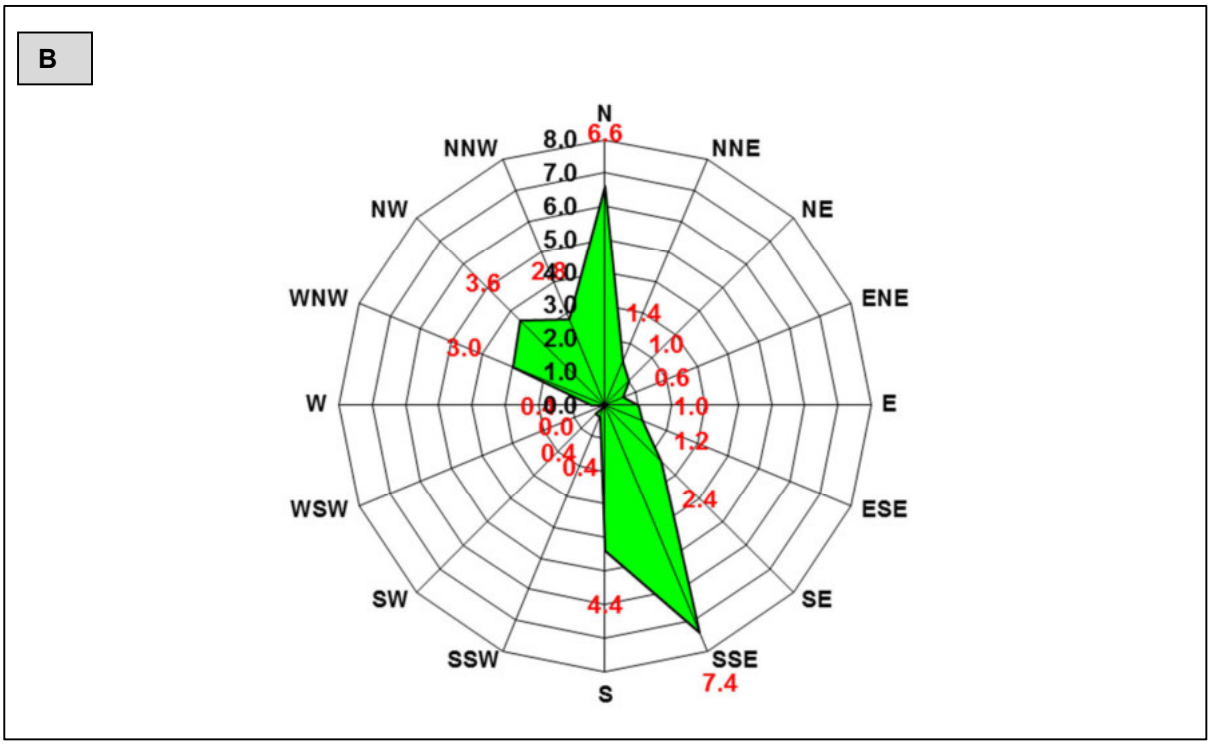


Figure 6: Wind rose for Limpopo Province based on hour sum; B. Average Wind Speed for Limpopo Province (reproduced from www.meteoblue.com, 2017)

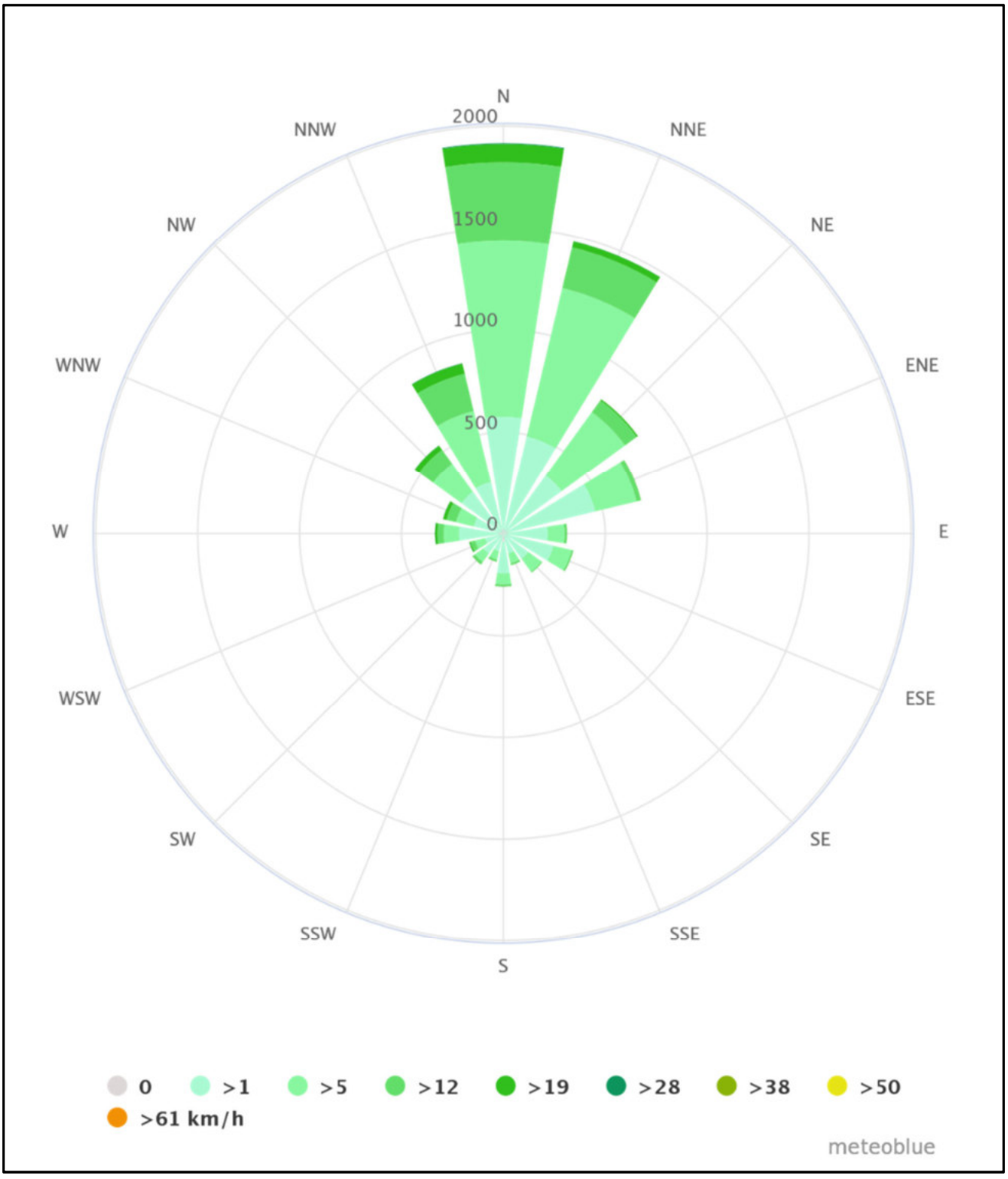


Figure 7: Wind rose for Thabazimbi (reproduced from www.meteoblue.com, 2017)

The wind rose for Thabazimbi shows how many hours per year the wind blows from the indicated direction. Example SW: Wind is blowing from South-West (SW) to North-East (NE). The wind blows for an average of 553 hours/year at >1 km/hour, 863 hours/year at >5 km/hour, 385 hours/year at >12 km /hour, 90 hours/year at >19 km/hour and 4 hours/year at >28 km/hour in Thabazimbi.

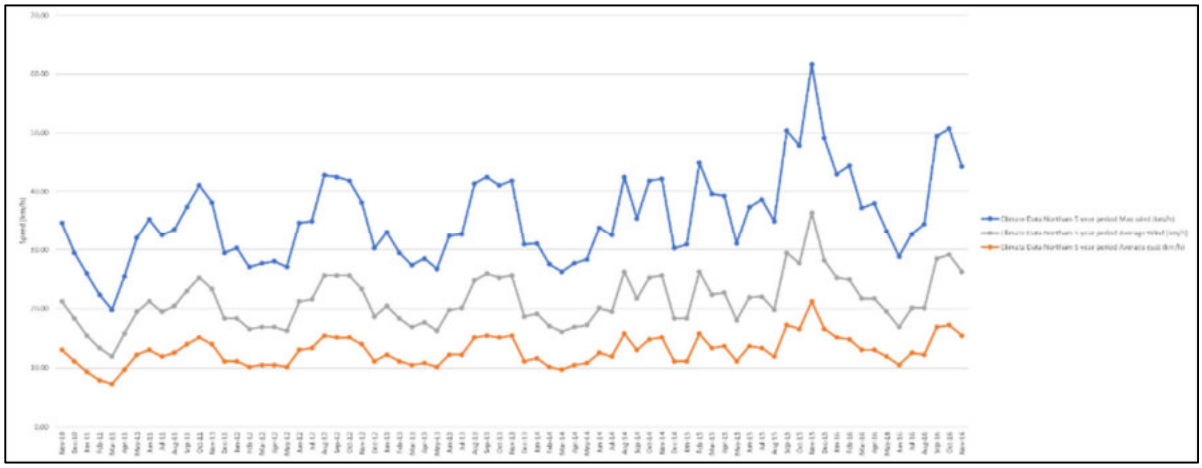


Figure 8: Gusts, average wind and maximum wind speeds recorded over a 5-year period for Limpopo (reproduced from www.worldweatheronline.com)

Winds are variable both in terms of the time of day as well as seasons. Wind (10m) blows mostly from the SSE with a 5%, while for 20 to 25 km/h (10m) 1%. In comparison, winds based on the hourly sum blow from the SSE and secondary wind blows from N and NW. The predominant wind direction for the project area is N and SSE (www.meteoblue.com) [Date accessed: 13 June 2017].

When comparing the average wind, gusts and maximum wind speeds for Northam, it is evident that for the 5-year period the trend is that the average winds, gusts and maximum wind blows predominantly during October months. March months tend to indicate the lowest wind days (www.worldweatheronline.com) [Date accessed: 12 June 2017].

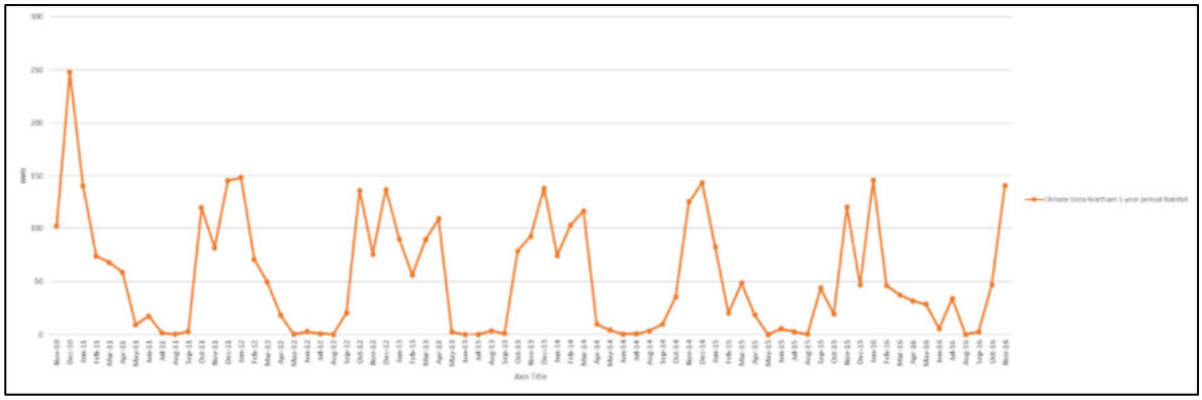


Figure 9: Average rainfall for Limpopo in millimetres for a period of 5years (reproduced from www.worldweatheronline.com)

Rainfall: Due to the warmer season, rainfall is usually in the form of convectional thunderstorms, which are usually accompanied by thunder and lightning, strong winds, heavy rainfall and the occasional hail. Rainfall varies significantly over short distances because of uneven surface heating and upward atmospheric streams. Figure 9 shows the average rainfall for Limpopo in millimetres for a period of 5 years. This figure clearly indicates that rainfall mainly occurs during the summer months in Northam, Limpopo Province (www.worldweatheronline.com) [Date accessed: 12 June 2017].

According to the rainfall data available for Northam, Limpopo Province for the above 5-year period, 2010 was recorded as the wettest year with 248.12mm rainfall. The driest year was 2013 when only 661.07mm rainfall was recorded (www.worldweatheronline.com) [Date accessed: 12 June 2017].

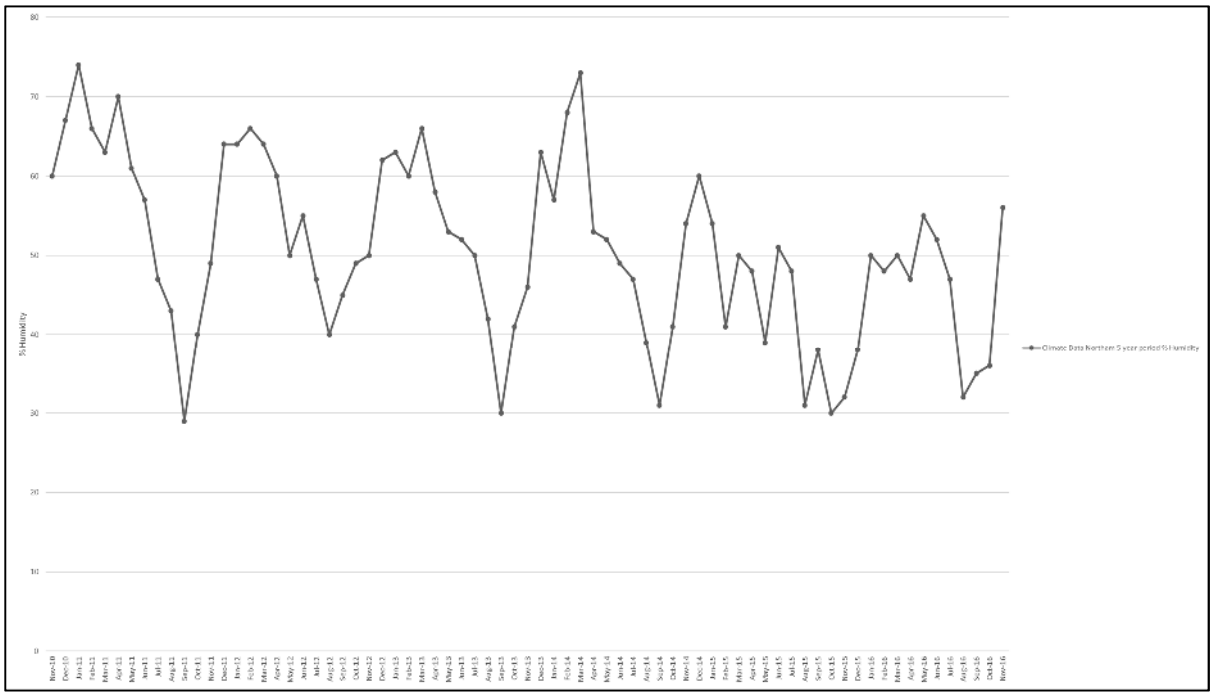


Figure 10: Percentage humidity for Limpopo Province for a 5-year period (reproduced from www.worldweatheronline.com)

Humidity: The humidity in Limpopo Province for a 5-year period from November 2011 to November 2016 is illustrated in Figure 10. The humidity peaked every year during December/January, with lowest humidity percentages during the September months of each year (www.worldweatheronline.com) [Date accessed: 12 June 2017].

Evaporation: Evaporation data for the area is recorded at Thabazimbi, which is located approximately 35km north of Zondereinde Mine. Gross annual 'A' pan evaporation is 2 479.1mm/a. If this is compared with the average annual rainfall, it is obvious that Zondereinde Mine is located in an extreme water deficit area, with average evaporation exceeding rainfall 4.4 times. A summary of the climate data for the Zondereinde Mine and surrounding areas is presented in Table 8. This information is sourced from the 1998 EMP and the Northam Weather Station data (up until 2012).

Table 8: Temperature, rainfall and evaporation data summary

MONTH	AVERAGE RAINFALL (mm)	MAX RAINFALL IN 24HRS mm (date)	MEAN MONTHLY TEMP °C	AVERAG DAILY TEMPERATURES °C		MEAN MONTHLY EVAPORATION (mm)
				MAX	MIN	
Jan	110.0	69 (31/01/1955)	25.0	31.3	18.8	247.3
Feb	95.5	75 (13/02/1955)	24.3	31.0	17.7	213.1
Mar	80.5	73 (21/03/1956)	22.8	29.3	16.4	195.7
Apr	36.4	46 (03/04/1938)	19.6	27.6	11.6	182.6

MONTH	AVERAGE RAINFALL (mm)	MAX RAINFALL IN 24HRS mm (date)	MEAN MONTHLY TEMP °C	AVERAG DAILY TEMPERATURES °C		MEAN MONTHLY EVAPORATION (mm)
				MAX	MIN	
May	9.39	32 (07/05/1952)	15.6	25.0	6.2	152.6
Jun	6.45	31 (10/06/1957)	12.6	22.6	2.6	152.6
Jul	2.59	14 (16/07/1939)	12.8	23.1	2.6	146.1
Aug	4.14	21 (24/08/1957)	16.5	27.3	5.8	220.9
Sep	10.6	38 (25/09/1942)	20.4	29.1	11.7	219.4
Oct	51.9	62 (17/10/1944)	23.4	31.2	15.7	276.5
Nov	86.3	185 (29/11/1939)	24.0	31.2	16.9	217.5
Dec	109.8	133 (30/12/1955	24.4	31.1	17.8	254.8

6.4.1.2 Geology

Regional Geology: The information gathered from the Geotechnical Report (a Geotechnical Report for Northam Platinum Limited: Northam Zondereinde, Raisebore Surface Infrastructure, Jones & Wagener, 2019), indicates that the site is underlain by gabbro, noritic at base and locally anorthositic, belonging to the Bushveld Igneous Complex.

Local Geology and Soils: The report is a result of a preliminary geotechnical investigation that was conducted in May 2019. The report indicates that very soft to soft rock norite is present across the site from a depth of between 1.6 m and 2.2 m. The profile as encountered in the borehole indicates that soft to medium hard rock norite extends to a depth of 4.37 m. This is underlain by very hard rock norite that extends to a depth of at least 51.82 m. A layer of very hard rock anorthosite is present from a depth of 23.96 m to 24.56 m. Groundwater seepage was not encountered in any of the test pots excavated during the investigation. The standing groundwater level in the borehole couldn't be determined at the time of the investigation. The borehole was terminated at a depth of 51.82 m in very hard rock norite.

The laboratory test results of the samples taken indicated the following:

Residual Norite

- According to the Unified Soil Classification (USC) the residual norite is classified CH, indicating that the material is a clay with high plasticity.
- The tested material has a Plasticity Index (PI) ranging between 45 to 49 and has a very high potential expansiveness rating.
- The silty clay, residual norite, is not classifiable as per the COLTO specifications and the material is considered as worse than G9 quality material.
- The residual norite has a PRA classification of A-7-5 which indicates that the material is a highly compressible silty clay, with a fair to poor subgrade rating.
- The specific gravity of the silty clay residual norite ranges between 2.727 and 2.762.

Crushed soft rock norite

- According to the Uniaxial Compressive Strength (UCS), the crushed soft rock norite is classified SC-SM, indicating that the crushed rock material is a clayey sand or silty sand.
- The tested material has a Plasticity Index of 8 and a low potential expansiveness rating.
- The crushed soft rock norite is classified as G6 quality material according to COLTO specifications.
- The crushed soft rock norite has a PRA classification of A-2-4 which indicates that the material is a sand and gravel with low plasticity silty fines and has an excellent to good subgrade rating.
- The specific gravity of the crushed soft rock norite is 2.814.

It must be noted that the UCS testing was carried out on intact sections of rock taken from the corebox. The results, therefore, reflect the strength of the more competent and harder sections of the rock material and do not reflect the strength of the rock mass. The rock mass strength is influenced by the rock mass properties such as the presence of discontinuities and weaker layers.

Geotechnical evaluation:

Founding Conditions

The general profile across the site comprises firm becoming stiff, shattered and slickensided, silty clay residual norite that contains occasional hard rock norite corestones up to 1.2m in diameter.

The residual norite extends to a depth of between 1.6m and 2.2m.

The laboratory test results indicate that the silty clay, residual norite is highly expansive. Assuming a scenario with a 2.2m thick layer of highly expansive residual norite, the estimated heave is calculated as approximately 120mm, using the method suggested by Van der Merwe (1964).

The residual norite is therefore not considered a suitable founding medium due to the high clay content and the highly expansive nature of the material. Furthermore, consolidation settlement is also expected in the silty clay, residual norite.

Very soft to soft rock norite is present across the site from a depth of between 1.6m and 2.2m.

Medium hard rock norite was generally encountered from a depth of between 1.8m and 2.7m.

The following allowable bearing pressures can be assigned to varying degrees of rock hardness:

- Very soft rock norite – 500kPa
- Soft rock norite – 1MPa
- Medium hard rock norite – 5MPa

Refusal of the tracked excavator occurred in all the test pits at a depth of between 1.8m and 2.7m on medium hard rock norite. The norite rock is considered a competent founding medium.

Groundwater

Groundwater seepage was not encountered in any of the test pits excavated during the investigation. The standing groundwater level in the borehole was not recorded on completion of drilling.

The sidewalls appeared stable in all of the test pits and in-situ profiling was conducted.

Excavation Conditions

Based on the SABS 1200 excavation classifications, 'soft' excavation conditions can generally be expected across the site in the residual norite and very soft to soft rock norite to a depth of between 1.8m and 2.7m.

'Hard' excavation conditions can be expected beyond these depths within the medium hard rock to very hard rock norite.

'Soft' excavation is that in which material can be easily removed by conventional excavation plant.

'Hard' excavation is that in which material is removed with heavy ripping, use of power tools and/orblasting being necessary.

Stability of Sidewalls for Deep Excavations

No deep excavations are expected for this project. However, for any excavation up to a depth of 3.0m, a batter of 1:1 (V:H) is recommended in soil for temporary slopes. For permanent slopes in soil, a batter of 1:1.5 (V:H) is recommended. Should seepage be encountered, slopes are to be flattened to 1:2 (V:H) or flatter.

Material Usage

Structural fill material should conform to at least G7 quality as per the COLTO specifications.

The laboratory test results indicate that the silty clay, residual norite, is not classifiable as per the COLTO specifications and is considered as worse than G9 quality material. Therefore, the residual norite is not suitable for use as either structural or general fill due to the high clay content.

The crushed soft rock norite classifies as G6 quality material according to COLTO specifications and the material is suitable for use as both general and structural fill.

It is recommended that all foundation excavations are inspected by a suitably qualified and experienced geotechnical engineer/engineering geologist to ensure that the in-situ geotechnical conditions are not at variance to those described herein.

6.4.1.3 Topography

The proposed Shaft Complex lies within the Bushveld Igneous Complex that is characterised by a relative flat landscape, with intermittent typical hills and torso. The regional topographical description included in the 1998 EMP further indicated that the majority of the region is relatively flat, with an elevation of between 950m and 1, 050m above mean sea level (mamsl). ENPAT data-layers indicate a 0–9% slope for the study area.

From Thabazimbi to the north a line of low hills and a ridge extend to the south-west for approximately 65km. The plain slopes down from this ridge's base towards the Limpopo River valley in the west and the Crocodile River in the north and east. From the Crocodile River the land rises to the Bosmanberg's base to the east, with its highest peak at 639mamsl. The highest mountains in the region are the Kransberge, to the north-east of Thabazimbi, which reaches a height of 2,088mamsl.

The highest point of the watershed of the Crocodile River on the western side of the Existing MRA is approximately 996mamsl; from here the landscape gradually slopes towards the Crocodile River to a lowest elevation on the Existing MRA at 913mamsl. From the Crocodile River the land rises again to the east to an approximate elevation of 934mamsl on the boundary of the Existing MRA. As with the Crocodile River, the highest point of the western watershed (Bierspruit catchment) is also at 996mamsl before descending again to an elevation of 960mamsl on the Existing MRA boundary.

6.4.1.4 Soil, Land use and Soil Potential

For the EIA/EMPR for the extended Mining Right Area (MRA), a desktop study was conducted to identify the soil description of the surrounding area using ENPAT data-layer. The majority of the Extended MRA is situated on one or more of a vertic, melanic and red structured diagnostic horizons, which are undifferentiated. The northern section of the Proposed Extended MRA is situated on Glenora and Mispah forms (this is where the proposed 3 Shaft Complex is planned).

Lime is generally present within low-lying soils but rare or absent within the upland soils. The desktop study reveals that the soil depth in and around the Extended MRA is relatively even and ranges between 450 mm and 750 mm (ENPAT, 2001).

Most of the soil in and around the Extended MRA is classified as intermediately suitable for arable agriculture, where climate permits. The north-eastern section of the site contains soils which are not suitable for arable agriculture but are suitable for forestry or grazing, where the climate permits. This is mainly due to the topography of the northern section of the Extended MRA.

6.4.1.5 Biodiversity

Biome and Bioregion: The site occurs within the Savanna Biome and the Central Bushveld Bioregion, as classified by Mucina and Rutherford (2006). This Bioregion has the highest number of vegetation types and covers most of the high-lying plateau encompassing the majority of Limpopo Province, the northern portion of the North-West Province and Gauteng and the north-westerly portions of Mpumalanga Province.

Vegetation: The site is located within the Savanna Biome. This biome represents 32.8% of South Africa and occupies most of the far-northern part of the Northern Cape, North-West, western parts of Free State, northern Gauteng and almost the entire Limpopo Provinces. Savannas are largely tropical and occupy the greater area of the southern continents.

Further, the site is situated within the **Central Bushveld Bioregion**. According to Mucina and Rutherford (2006)[1] the site is situated within the *Dwaalboom Thornveld* vegetation type (refer to Figure 11). This vegetation type is found throughout the Limpopo and North-West Provinces. It's most commonly found on the flats north of the Dwarsberge and associated ridges mainly west of the Crocodile River in the Dwaalboom area, north of the Pilanesberg to the Northam area (study site) between 900 – 1200 meters above sea-level.

This vegetation group is not regarded as threatened, with about 14% of the land area transformed mainly by cultivation and other agricultural activities. The vegetation group is subject to little or very low levels of erosion due to the topography of the site. The conservation status for this vegetation unit is considered less threatened, with a target of 19%. Approximately 6% of this vegetation type is conserved, mostly within the Madikwe Game Reserve. The main use of the unit is cattle grazing. Key indicator species of this vegetation type include those shown in Table 9.

Table 9: Dwaalthorn Vegetation Type Key Indicator Species

DESCRIPTION	SPECIES
Tall Trees	*Vachellia erioloba*
Small trees	*Vachellia erubescens* *V. nilotica* *V. tortilis subsp. heteracantha,*
Shrubs	*Vachellia hebeclada* *Combretum hereroense*
Grasses	*Aristida bipartite* *Bothriochloa insculpta*
Forbs	*Kalanchoe rotundifolia* *Talinum caffrum*

[1] Mucina, L. & Rutherford, M.C. (Eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelizia 19.* South African National Biodiversity Institute, Pretoria.

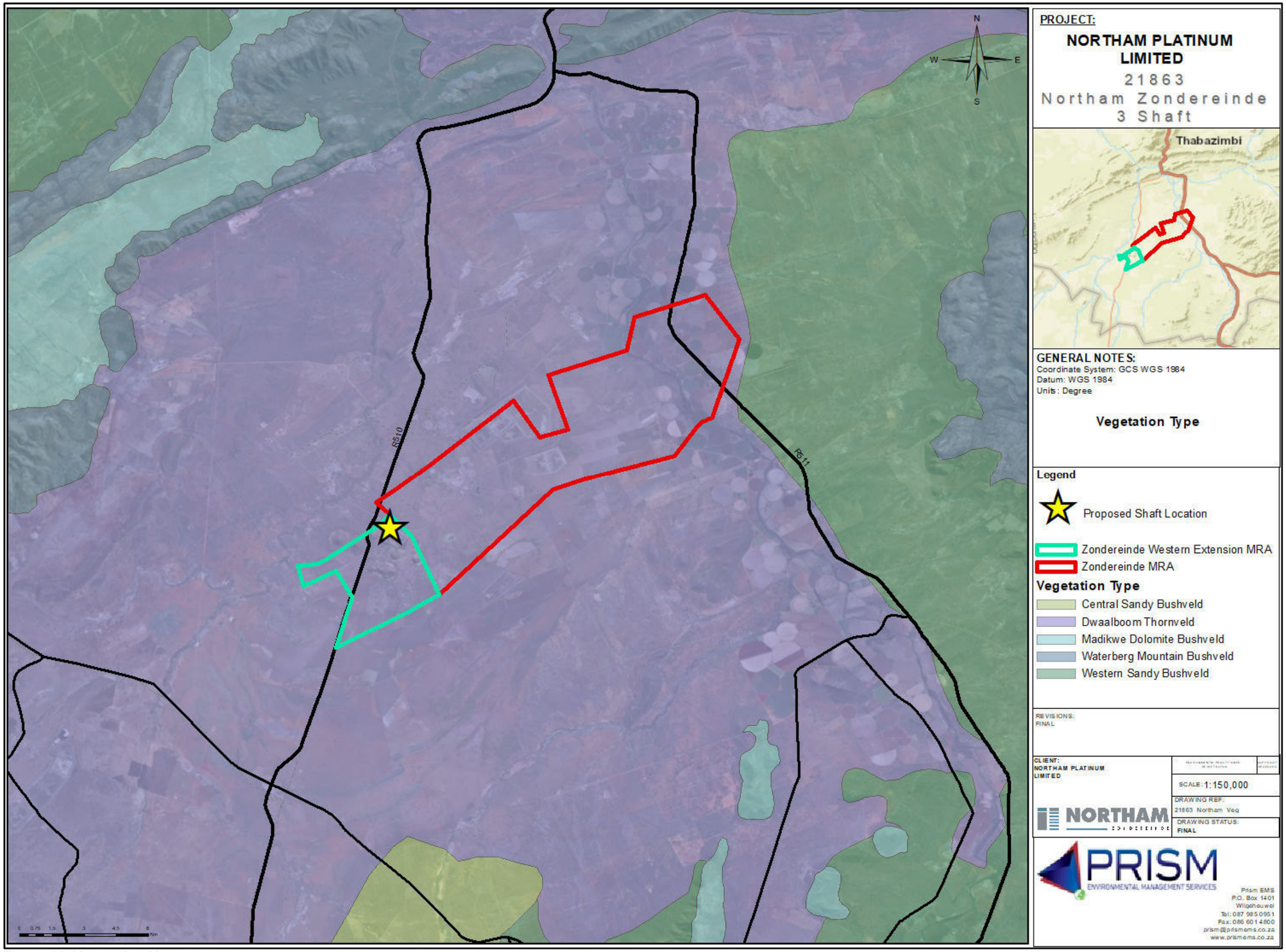


Figure 11: Vegetation Map

Current Ecological Condition: The ecological condition of the Proposed Extended MRA is regarded as being moderate, as ecological functioning has been retained in spite of impacts of mining and agriculture.

Limpopo Critical Biodiversity Area: 40% of the Province has been identified as Critical Biodiversity Areas and 22% as Ecological Support Areas.

Fauna:

Mammals: A number of game species are managed in the fenced game areas of Northam in the area. These are managed by Anglo Platinum's adjacent Amandelbult Mine. Mammal species present in the game area include impala, kudu, reedbuck, zebra, blue wildebeest, giraffe, steenbok, waterbuck, duiker, ostrich, warthog and Nyla.

Birds: A number of bird species databases exist for South Africa, most notably the Roberts list. The Roberts list for the quarter degree square was collated with the Ecofin database of birds. The Extended MRA (western block) is within the habitat range of the Yellow Throated Sandgrouse and the South African population is likely to number less than 300 breeding pairs. The secretary bird is also listed as near threatened but with a much wider distribution in South Africa.

Herpetofauna: The reptile species that have been recorded in the area and immediate surrounds (for the quarter degree 2427CD) identified by ADU (2017) for the period 1990 to 2017, is indicated in Table 10.

Table 10: Reptile species recorded for the area

COMMON NAME	SCIENTIFIC NAME	RED LIST CATEGORY	NO RECORDS
Boaedon capensis	Brown House Snake	Least Concern (SARCA 2014)	1
Naja annulifera	Snouted Cobra	Least Concern (SARCA 2014)	3
Varanus Albigularis subsp. albigularis	Rock Monitor	Least Concern (SARCA 2014)	1
Bitis Arietans subsp. arietnas	Puff Adder	Least Concern (SARCA 2014)	6
Matobosaurus validus	Common Giant Plated Lizard	Least Concern (SARCA 2014)	1

Amphibians: The eleven (11) species known to occur in the area are presented in

Table 11. None of these species are indicated as having any conservation threat status. The conservation status is as determined by the LEDET database (Bates *et al*. In prep.).

Table 11: Amphibian species known to occur within the area

SCIENTIFIC NAME	COMMON NAME	RED LIST CATEGORY	ATLAS REGIONAL	LIMPOPO STATUS
Breviceps adspersus	Bushveld rain frog	Least Concern	0	Least Concern
Amietophrynus garmani	Eastern olive toad	Least Concern	0	Least Concern
Schismaderma carens	Red toad	Least Concern	0	Least Concern
Kassina senegalensis	Bubbling kassina	Least Concern	0	Least Concern
Phrynomantis bifasciatus	Banded rubber frog	Least Concern	0	Least Concern
Ptychadena anchietae	Plain grass frog	Least Concern	0	Least Concern
Ptychadena mossambica	Broad-banded grass frog	Least Concern	0	Least Concern
Cacosternum boettgeri	Boettger's caco	Least Concern	0	Least Concern
Pyxicephalus edulis	African bullfrog	Least Concern	0	Least Concern
Tomopterna cryptotis	Tremelo sand frog	Least Concern	0	Least Concern
Chiromantis xerampelina	Southern foam nest frog	Least Concern	0	Least Concern

Invertebrates:

Records indicate that a two (2) Red Data Lepidopteran species of conservation concern are known to occur in the vicinity of the Extended MRA, namely *Dingana jerinae* and *Erikssonia edgei*. Two (2) scorpion species listed as protected under the List of Critically Endangered, Vulnerable and Protected Species, published under the National Environmental Management: Biodiversity Act 10 of 2004 ("**TOPS List**") are known to occur in the vicinity of the Proposed Extended MRA, namely *Hadogenes troglodytes* and *Opistothalmus glabrifrons*.

Hadogenes troglodytes (flat rock scorpion): A species known to occur in drier bushveld areas that receive less than 600mm of mean annual rainfall. This genus is restricted to areas with a type of rock that will split to form cracks for them to live in. This includes sandstone and granite that is largely absent from the area. They seem to prefer living at the bottoms of hills rather than higher up. Adults usually occupy cracks about 1.5cm in width, with juveniles occupying smaller cracks so as to decrease competition with adults. They can be quite dense in some areas, getting to the point where almost every available crack will have a scorpion in it. This species can reach up to 20cm in length and is commonly sold on the pet market. All members of this genus are listed as protected under the TOPS List.

Opistophthalmus glabrifrons (yellow legged burrowing scorpion): Known to dry areas with different temperature regimes. This species is relatively widespread, and, like all members of its genus, it is sought after by the pet trade. It is known to stridulate, and burrows vary from 10mm to 1m deep, depending on how hard the soil is. Burrows in softer soil are usually shorter than burrows in harder soil. Sandy soils are often completely avoided. All members of this genus are listed as protected under the TOPS List.

Dingana jerinae (Jerine's Widow): Only known from one population on the upper southern scree slopes of the Kransberg in Marakele National Park. This specimen only flies early in the morning and is usually off the wing by 11 am. The species is single brooded and only flies in November. It is highly unlikely that this species will be present on the Extended MRA.

Erikssonia edgei: A recently described species of butterfly. It was formerly considered to be *Erikssonia craeina*, a species that has been recorded in the southern parts of the Democratic Republic of the Congo, southern and south-eastern Angola and western and north-western Zambia (*Mongu Kataba and Mundwiji Plain*). The South African population on the Waterberg is now treated as *Erikssonia edgei*. Adults are on the wing through most of the summer months, having been recorded from October to April, with a peak in activity from January to March. The only breeding population of this rare ant-associated butterfly is known to occur in Marakele National Park. This species was recently listed as being critically endangered by the IUCN.

6.4.1.6 Surface Water

The Extended MRA is located within the A24F Quaternary Catchment, situated in the Limpopo Water Management Area (WMA1). This WMA was only gazette in 2016 and this area was previously part of the Crocodile (West) and Marico WMA. The Bierspruit River is regarded as a large tributary within WMA 1. The Bierspruit River flows in a north-easterly direction, approximately 800 meters west of the Extended MRA. The confluence of the Bierspruit and Crocodile Rivers is just north of Thabazimbi. Runoff within the A24F Quaternary Catchment is in the direction of the Bierspruit River, to the west of the Extended MRA. The desktop study revealed a single drainage line flowing through the southern corner of the Extended MRA. The drainage line flows in a north-north west direction towards the Bierspruit River, underneath the R510. It originates from a small wetland catchment area (indicated as an aquatic resource) within the Extended MRA. No data was found on the status of the wetland, however, the land area around the Extended MRA has been severely altered and modified through cultivation and other agricultural activities.

The site is located within the Lower Crocodile sub-management area of the Crocodile (West) and Marico Water Management Area (WMA) (now part of the Limpopo WMA), or previously WMA 3 (Now WMA 1). The Lower Crocodile has two large tributaries, namely the Sand River and the Bierspruit, which join the Crocodile River west of the town of Thabazimbi.

The Bierspruit runs in a north-easterly direction approximately 3km west of the Zondereinde Mine, while the Crocodile River runs in a north-westerly approximately 10km east of Zondereinde Mine. The confluence of the two rivers is just north of Thabazimbi. The natural Mean Annual Runoff (MAR) for the Lower Crocodile sub-catchment is 138 million m/a, while the Ecological Reserve Demand is 25 million m^3.

As the new Limpopo WMA boundary was only gazetted in 2016, no formal strategies occur however, information on catchment management for the Crocodile (West) and Marico WMA are provided below.

The Internal Strategic Perspective, 2004 (ISP) for the Crocodile (West) and Marico Water Management Area indicates that irrigation is the dominant water demand in the Lower Crocodile sub-management area, although mining demand is increasing in the area north of the Pilansberg. It is, however, estimated that the demand for water from mining in the area will stabilise on 34 million m/a in 2030 (estimated on a high growth scenario) in

the Lower Crocodile sub-management area. Irrigation areas in quaternary catchment A24C (of which the eastern portion of Zondereinde Mine falls in) and A24F (of which the western section of Zondereinde Mine falls in) has not increased since 1998 and currently stands on 1409.8ha and 278.1ha respectively. This can be attributed to the mining development in these two quaternary catchments.

Quaternary Catchment and Surface Hydrology: Zondereinde falls within the A24F and A24C quaternary catchments.

There is one unnamed tributary of the Bierspruit running to the west of the Shaft Complex and wastewater treatment works ("WWTW"). Runoff within the A24F quaternary catchment is in the direction of the Bierspruit to the west and that within the A24C quaternary catchment flows towards the Crocodile River to the east. All other water bodies present are man-made process water dams.

6.4.1.7 Groundwater:

The following information has been provided from a desktop Groundwater Assessment undertaken by Future Flow Groundwater Management Solutions.

Hydrogeology:

Three aquifers occur in the area:

- alluvial aquifer material;
- shallow weathered fractured material; and
- underlying competent and fractured rock material.

Alluvial Aquifer: The alluvial aquifer is composed of unconsolidated layers of sand and silt deposits. It is unconfined and laterally discontinuous, localised within the immediate vicinity of the riverbanks and the floodplains, and therefore does not extend regionally throughout the total study area. These aquifers are usually fairly high yielding due to their interaction with the surface water bodies, coupled with the relatively high storage capacity of the unconsolidated sediments. The interaction between the alluvial aquifer and the river depends on the differences between the surface water and groundwater levels and the presence or absence of an impervious streambed which would affect the hydraulic connection.

Shallow weathered fractured material: The upper aquifer forms due to the vertical infiltration of recharging rainfall through the weathered material being retarded by the lower permeability of the underlying competent rock material. Groundwater collecting above the weathered / unweathered material contact migrates down gradient along the contact to lower lying areas.

Based on data collected from previous drilling programs performed in the area, it is estimated that the upper 2m of the soil consists of the semi-confining black turf layer. The Bushveld Igneous Complex norite weathers to form a dark brown to black, very clayey vertisol soil horizon. During dry weather the soil forms deep open fissures or shrinkage cracks, while the soil becomes sticky and slow draining during wet weather. This results in varying hydraulic conductivities in the expansive clay layer. When saturated the clays are highly impermeable but allows for infiltration and recharge through the surface cracks during dry conditions.

The upper weathered aquifer is below the turf layer and has an average depth of approximately 9 to 12m. These average values are not absolute values for the entire study area. Deeper weathering can also occur. However, the mentioned values are considered to provide a good general indication of the Proposed Extended MRA's conditions.

The borehole yields in this aquifer are seasonally variable due to the strong dependence on rainfall recharge. The groundwater quality in undisturbed areas is good due to the dynamic recharge from rainfall. This aquifer is, however, more likely to be affected by contaminant sources situated on surface.

Fractured Rock Aquifer: Although the lower permeability of the unweathered rock material will retard vertical infiltration of groundwater, a percentage of the water in the shallow aquifer will recharge the fractured rock aquifer.

The ultramafic / mafic Rustenburg Layered Suite consists of relatively low permeability sediments that have been subjected to extensive faulting associated with the intrusion of the Bushveld sediments.

Groundwater flows in the fractured rock aquifer are associated with the secondary fracturing in the competent rock and, as such, will be along discrete pathways associated with the fractures. Faults and fractures in the competent rock can be a significant source of groundwater, depending on whether the fractures have been filled with secondary mineralisation.

Groundwater Levels:

A groundwater monitoring program is undertaken, where the depth to groundwater level in the boreholes is monitored in the Existing MRA. The monitoring is being conducted on a monthly basis. A total of 38 monitoring borehole points was found from the latest Aquatico Monitoring Report for July 2016. The results of the 25 monitoring runs between January 2014 and July 2016, the latest (July 2016) groundwater level and details of the boreholes included in the monitoring program were analysed. Details of the groundwater levels are contained in the Groundwater Assessment (refer to). The groundwater levels vary throughout the general area. The deepest groundwater levels are observed in borehole NPG13, which is located east of the Smelter area at the Existing MRA. There is no certainty around the reason for the low groundwater level in borehole NPG13. The depth to groundwater levels in the other monitoring boreholes are shallower, ranging between 0.9 and 24.1 m below ground level (mbgl).

The changes in groundwater levels over time between January 2014 and July 2016. The groundwater levels within individual boreholes remained within a similar range during the time January 2014 to July 2016.

In areas where there are no large-scale external impacts on the groundwater environment, such as the lowering of groundwater level through dewatering, it is expected that the groundwater level contours will reflect topographical contours. Plotting groundwater level elevation versus topographical elevation yields an 86.7% correlation. From this, it is concluded that the groundwater levels generally mimic topography in the areas where the boreholes are located and there is no indication of the aquifers being dewatered.

Underground Mining Area:

The existing underground mine area is located at depths of 1,294 to 2,300 mbgl. The Extended MRA will be at similar and greater depths. It is not expected that there will an active aquifer at those depths. The Shaft will be lined, and it is not expected that after closure, when the underground mine area is eventually submerged, there will be significant seepage from the Shaft area into the surrounding aquifers. Additionally, there are no groundwater users accessing water from that depth.

Based on this, it is considered that the proposed Shaft Complex is not a major risk to the active aquifers at depths shallower than 100 to 150 mbgl.

Groundwater Quality:

The groundwater quality at the Existing MRA is monitored by boreholes in close proximity to potential pollution sources. The monitoring data indicates that there is no widespread contamination in the Existing MRA but limited to within less than 400 m from sources. During 2014 six additional monitoring boreholes (NPG37 to NPG43) were drilled near the identified pollution sources in order to confirm the contamination sources in the Existing MRA and better monitor contaminant plume development.

Aquifer Characterisation:

- Groundwater Vulnerability: For aquifer vulnerability reference is made to the aquifer vulnerability map of South Africa, which shows a low aquifer vulnerability for the project area.
- Aquifer Classification: The aquifers present in the area are classified as minor aquifer but of high importance to the local landowners as it is their sole source of water for domestic and agricultural (stock watering and irrigation) purposes.

6.4.1.8 Noise

The proposed site is partially disturbed, but with some natural vegetation in undisturbed areas, and is surrounded by ridges and koppies and the Madeleine Robinson Nature Reserve to the north-west.

The existing noise levels within the study area are generally quiet. Even though there are many intruding noise sources (use of the main road and agricultural practises to the southwest), these are not perceived to be particularly disturbing.

6.4.1.9 Visual

In relation to the Existing MRA:

- a visual assessment was undertaken as part of the 1998 EMP. Since then no other intrusive infrastructure has been constructed and, as such, the visual intrusion (with the exception of the tailings storage facility ("**TSF**")) has not changed. Zondereinde Mine's location between the R510 and R511 makes it visible for road users. From the south, the view of Zondereinde Mine is mainly obscured by the Tors Hills' low range. Once past the hills the view is Amandelbult Mine and TSF with the addition of Zondereinde Mine mining infrastructure.

- due to the distance to the R510, the view is limited. From the R511 and D56 side, it is mainly the smokestack of the Smelter Plant, which is visible, together with Setaria Village from a closer distance. Emissions from the Stack are visible in the form of a white smoke. Setaria Village is visually less intrusive, as it mainly consists of one-story housing and commercial development. The trees and gardens associated with the Village serve as a visual mitigation. Even though the water tower is relatively high, the natural topography ensures that it is not intrusive in the skyline from the access roads. The TSF is mainly obscured as a result of the Amandelbult TSF from the R510.

6.4.1.10 Socio-Economic Baseline

The information in this section has been obtained from the StatsSa website. The information provided is divided for Northam A and B local regions.

Population and Demographics: Northam A has a total population of 4259 people, while Northam B contains 27 611 people. The majority of the population in both areas is Black African, 86% (Northam A) and 95% (Northam B). Setswana is more prevalent in Northam A (25%) followed by Xhosa (21%). In Northam B, Xhosa is more prevalent (32%) proceeded by Setswana (26%).

Table 12: Comparison of the population and demographics between Northam A and B

	Northam A	**Northam B**
Population Groups		
Black African	86.1	95.6
Coloured	0.9	0.6
Indian/Asian	0.4	0.3
White	12.0	2.8
Other	0.7	0.7
Languages		
Afrikaans	17.5	3.6
English	4.3	2.6
IsiNdebele	0.4	0.9
IsiXhosa	21.1	32.1
IsiZulu	2.5	2.9
Sepedi	5.3	5.9
Sesotho	8.5	6.8
Setswana	25.2	26.3
Sign Language	0.5	0.5
SiSwati	1.7	1.6
Venda	0.6	1
Xitsonga	11.6	13.3
Other	0.8	2.7
Higher Education		
No Schooling	8.6	7.4

	Northam A	Northam B
Some Primary	8.7	14.4
Completed Primary	3.5	7.1
Some Secondary	29.6	41.5
Matric	36	26.1
Higher Education	13.5	3.4

Source: Statistics South Africa (Stats SA) 2011

Living Conditions: are explained in terms of the type of energy used/accessible to use for cooking, heating and lighting, refer to Table 13.

Table 13: Comparison of general living conditions between Northam A and B

	Northam A	Northam B
Energy for Fuel for Cooking		
Electricity	76.2	51.9
Gas	0.5	1.3
Paraffin	20.5	44.2
Solar	0.2	0.1
Candles	0	0
Wood	2.4	2.2
Coal	0	0.2
Animal Dung	0.1	0
None	0.2	0.1
Energy for Fuel for Heating		
Electricity	74.3	50
Gas	0.7	1
Paraffin	17.6	21.4
Solar	0.5	0.2
Candles	0	0
Wood	5.4	22.4
Coal	0.1	0.2
Animal Dung	0.1	0.1
None	1.2	4.7
Energy for Fuel for Lighting		
Electricity	74.3	50
Gas	0.7	1
Paraffin	17.6	21.4
Solar	0.1	0.2
Candles	5.4	22.4
Wood	0	0
Coal	0	0

	Northam A	Northam B
Animal Dung	0	0
None	0.1	0.1
Access to Internet		
Home	11.5	3.2
Cellphone	18.7	18.3
Work	13.6	2.9
Elsewhere	1.1	3.5
No Access	55.1	72.1
Settlement Type		
Rented	54.5	41.7
Owned (not yet paid off)	0	8.3
Occupied (rent free)	18.2	16.7
Owned (paid off)	9.1	8.3
Other	9.1	0
Owned (fully paid off/paying off)	9.1	25
Source of Water		
Regional	71.2	52.2
Borehole	3.5	4.4
Spring	0.1	0.2
Rain Water Tank	0.1	0.2
Dam Pool Stagnant Water	0.3	0.1
River / Stream	0	0.1
Water Vendor	10.7	1.1
Water Tanker	9.9	39.7
Other	4.1	1.9
Toilet Facilities		
None	4.8	1.8
Flush Toilet (sewerage)	75.3	47.9
Flush Toilet (septic)	0.7	1.1
Chemical	0	1
Pit Toilet (ventilation)	0.3	2
Pit Toilet (no ventilation)	18.4	38.2
Bucket	0.2	1.2
Other	0.2	6.8
Refuse Disposal		
Removal (at least once/week)	74.6	48.3
Removal (less often)	0.8	1.7
Communal Refuse Dump	0.2	1.3
Own Refuse Dump	13.9	40.2
No Rubbish Disposal	9	6.8

	Northam A	Northam B
Other	1.4	1.6

Source: Statistics South Africa (Stats SA) 2011

Economy: the economic contribution is described by the average household income (refer to Table 14Table 14).

Table 14: Average household income for Northam A and B

	Northam A	Northam B
No Income	9.2	20.1
R1 – R4 800	0.6	2.7
R4 800 – R 9 600	1.3	3.9
R 9 601 – R 19 600	7.1	5.6
R 19 601 – R 38 200	6.7	14.3
R 38 201 - R 76 400	17.6	29.5
R 76 401 – R 153 800	20.2	16.5
R 153 801 – R 307 600	22.8	5.3
R 307 601 – R 614 000	11.1	1.5
R 614 001 – R 1 228 800	2.8	0.4
R 1 228 801 – R 2 457 600	0.4	0.2
R 2 457 601 +	0.1	0.1

Source: Statistics South Africa (Stats SA) 2011

6.4.1.11 Cultural Heritage Resources

On the 1.50 000 map sheet 2427 CD several sites are on record for the larger study area at the Wits Archaeological database. Several previous Cultural Resources Management Surveys are on record for the larger study area e.g. van Schalkwyk (2004) Huffman (2006) and vd Walt (2010). These sites consist of MSA open air sites, LIA stone walled settlements and graves.

*Genealogical Society and Google Earth Monument*s: Neither the Genealogical Society nor the monuments database at Google Earth (Google Earth also include some archaeological sites and historical battlefields) have any recorded sites in the Proposed Extended MRA.

Background Information for Proposed Extended MRA: South Africa has one of the longest archaeological sequences in the world because humanity evolved in the area stretching from the Cape to Ethiopia. Most of this sequence covers the times when our ancestors used stone tools. It is worthwhile, thus, to review the archaeological records for southern Africa and to place in context the known occurrences. The archaeology of the area can be divided into the Stone Age, Iron Age and Historical timeframe. These can be divided as follows:

Stone Age: The Stone Age is divided in Early; Middle and Late Stone Age and refers to the earliest people of South Africa who mainly relied on stone for their tools.

Earlier Stone Age: The period from ± 2.5 million yrs - ± 250 000 yrs ago. Acheulean stone tools are dominant: The Early Stone Age in southern Africa is defined by the Oldowan complex, primarily found at the sites Sterkfontein, Swartkrans and Kroomdraai, situated within the Cradle of Humankind, just outside Johannesburg (Kuman, 1998). Within this complex, tools are more casual and expediently made and tools consist of rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals. This industry is unlikely to occur in the study area. The second complex is that of the more common Acheulean, defined by large handaxes and cleavers produced by hominids at about 1.4 million years ago (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds. No Acheulian sites are on record near the Proposed Extended MRA, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site.

Middle Stone Age ("MSA"): Various lithic industries in SA dating from ± 250 000 yrs – 22000 yrs before present: During the MSA, significant changes start to occur in the evolution of the human species. These changes manifest themselves in the complexity of the stone tools created, as seen in the diversity of tools; the standardisation of these tools over a widespread area; the introduction of blade technology; and the development of ornaments and art. What these concepts ultimately attest to is an increase or development of abstract thinking. By the beginning of the MSA, tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland. These hunters are classified as early humans but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa and it is an important point in debates about the origins of modern humanity. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999). Accordingly, if there are caves in the study area, they may be sites of archaeological significance. MSA artefacts are common throughout southern Africa, but unless they occur in undisturbed deposits, they have little significance. Some MSA sites are on record close to the Proposed Extended MRA.

Later Stone Age ("LSA"): The period from ± 22 000-yrs before present to the period of contact with either Iron Age farmers or European colonists: By the LSA, human beings are anatomically and culturally modern. Tools associated with this time period are specialised and commonly associated with hunter-gatherer groups. It is also within this period that contacts with migrating groups occur throughout southern Africa. Initial contact was between hunter-gatherer groups and expanding Bantu farming societies, and secondly with the arrival of colonist along the coast. San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). Several rock art sites are on record to the north and east of the general project area. In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued but LSA people also hunted small game with bows and poisoned arrows. Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. If there are rock shelters or caves in the Proposed Extended MRA, they may contain LSA sites of significance.

Iron Age (general): The Iron Age as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- Early Iron Age: Most of the first millennium AD;
- Middle Iron Age: 10th to 13th centuries AD; and
- Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living.

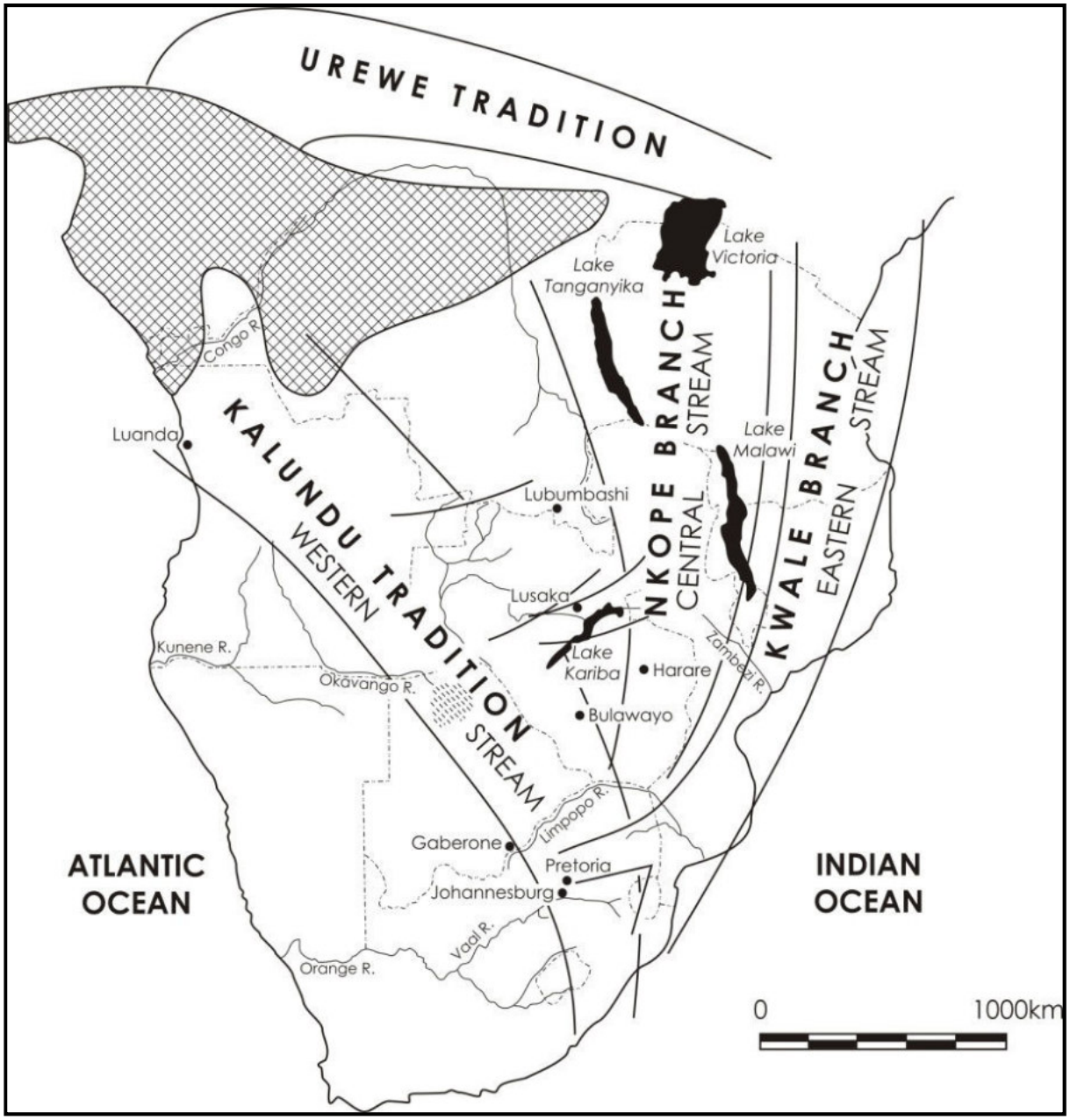


Figure 12: Movement of Bantu speaking farmers (Huffman 2007)

Early Iron Age: Early in the first millennium AD, there seem to be a significant change in the archaeological record of the greater part of eastern and southern Africa lying between the equator and Natal. This change is marked by the appearance of a characteristic ceramic style that belongs to a single stylistic tradition. These Early Iron Age people practised a mixed farming economy and had the technology to work metals like iron and copper. A meaningful interpretation of the Early Iron Age has been hampered by the uneven distribution of research conducted so far; this can be partly attributed to the poor preservation of these early sites. Sites belonging to the EIA consisting of *Happy Rest and Mzonjanifacies*have been recorded close to the Proposed Extended MRA. Happy Rest and Mzonjani pottery form part of two traditions (Kalundu and Urewe) that represent the spread of mixed farmers into southern Africa during the Early Iron Age (refer to Figure 12). This find is important as it provides evidence for early interaction between these groups. Later, by the 8th and 9th centuries, the two merged to form a new facies, *Doornkop*.

Middle Iron Age: No sites dating to this period are on record close to the Proposed Extended MRA.

Late Iron Age ("LIA"): For the area in question the history and archaeology of the Sotho Tswana are of interest. The ceramic sequence for the Sotho Tswana is referred to as Moloko and consists of different facies with origins in either the Icon facies or a different branch associated with Nguni speakers. Several sites belonging to the Madikwe and Olifantspoortfacies (from Icon) have been recorded close to the project area. These sites date to between AD 1500 and 1700 and predate stone walling ascribed to Sotho-Tswana speakers. Sotho Tswana stonewalled sites with Uitkomst pottery have been found close to the Proposed Extended MRA and date to the seventeenth to nineteenth centuries. Stone walled sites belonging to the LIA have also been identified next to the Proposed Extended MRA but so far have not been linked to a cultural group. LIA peoples were attracted to the area because of the relatively fertile soils around the hills and valleys, and because of the iron ore and red ochre. Mining techniques associated with the ancient mine workings are the same as those found in the Rooiberg area some 30km from Thabazimbi (Huffman 2006). Three groups are found in the Rooiberg area, specifically Madikwe, Melora and Rooiberg groups. Strategraphically, the relationship between Madikwe and Rooiberg is evident where the Madikwe site 20/85 lies underneath the Rooiberg site 11/85, suggesting that Rooiberg is the more recent (Mason 1986). Ceramic evidence suggests then that at one time Sotho-Tswana people were mining at Rooiberg. The ceramic evidence from the Rhino Andalusite Mine shows that the Sotho-Tswana people living there were directly related to the miners at Rooiberg: both belonged to the Western Sotho-Tswana cluster. Therefore, the relationship between the ochre mine and Madikwe settlements is great. Associated with the Madikwe settlements, in addition to the ochre mine is the several maize grindstones found.

Trade connections for ochre and tin have a bearing on the presence of maize. Trade networks spanned a wide area, up to the Zimbabwe culture area in the north, and as far as Maputo in the east before the arrival of the Dutch (Friede & Steel 1976). Maize came to Maputo sometime after the early 16th Century, through Portuguese trade with the New World. The grindstones found at the site CB14 in the Rhino Andalusite Mine indicate that maize was grown in the Thabazimbi area during the 17th Century (Huffman 2006). If one accepts the grindstone as diagnostic, then maize was cultivated some 150 years earlier than in Kwazulu-Natal.

Mitigation in the area by the National Cultural History Museum was conducted in 2004 on the Farm Elandsfontein 386 KQ, Amandelbult Mine. This included the survey and mapping of Sites in and around the Madeleine Robinson Nature Reserve of the Amandelbult Mine as part of the proposed extension of the mines operations

into the area. From the survey, several stone walled sites conforming to the Central Cattle Pattern (CCP) were identified along the base and between the saddle of the hills. Sites contained central kraals, smaller livestock enclosures, lower grindstones and ceramic scatters. These Sites form part of a larger settlement complex dating to the LIA. Unfortunately, at the time of the mitigation, insufficient data resulted in the absence of identifying the cultural facies of the people who occupied the settlements. Evidence for Iron Age activity will most likely be concentrated along water courses and rocky outcrops marked by ceramic clusters or dry-stone walling.

6.4.2 Land Use and Environmental Features

6.4.2.1 Description of the current land uses

A desktop assessment of the land use within and around the Extended MRA illustrates a conservation area and cultivated land on the northern and far southern side of the Extended MRA respectively. The remainder of the Extended MRA is situated within unspecified land. The land cover of the Extended MRA is dominated by thicket and bushland vegetation, with a portion of the land covered by cultivated land (ENPAT, 2001). The aerial imagery indicates that the cultivated boundary has expanded along the R510 since the data survey. The remainder of the Extended MRA is currently used for grazing purposes.

A desktop assessment of the land use within and around the Extended MRA illustrates a conservation area on the northern side and cultivated land on the far southern side of the Proposed Extended MRA. The remaining extent of the Extended MRA is situated within unspecified land. The land cover of the Proposed Extended MRA is dominated by thicket and bushland vegetation with a portion of the land covered by cultivated land (ENPAT, 2001).

Land Capability and Land Use: The soil and land types identified in the Proposed Extended MRA can be classified into four (4) different land capability classes as summarised in Table 15. The majority of the Proposed Extended MRA has arable land capability (82.6%) and only 1.3% has grazing land capability. The areas where mining has already taken place and housing constructed has industrial land capability (13.9% of the Proposed Extended MRA). Land with wetland land capability is associated with the Rensburg soil form and is situated around the river (2.1% of the Proposed Extended MRA).

Table 15: Summary of Land Capability Classes within the Proposed Extended MRA

SUMMARY OF LAND CAPABILITY CLASSES IDENTIFIED FOR THE PROPOSED EXTENDED MRA		
LAND CAPABILITY CLASS	**AREA (ha)**	**% OF STUDY AREA (%)**
Grazing land capability	106.4	1.3
Industrial land capability	1102.7	13.9
Wetland land capability	169.3	2.1
Arable land capability	6534.8	82.6
TOTALS	7913.2	100.0

6.4.2.2 Description of specific environmental features and infrastructure on the site

The study area where the shaft complex (including service infrastructure) is proposed is approximately 15 hectares in extent and the majority of the study area is already disturbed by previous activities. Temporary infrastructure was established on site for drilling purposes as part of the specialist studies. Currently, the site falls into a natural area, but not within any biodiversity conservation areas when overlain onto the Limpopo Province Conservation Plan. The site is also not situated within any threatened ecosystems. However, the site is occurring within an Important Bird Area (IBA) i.e. the Northern Turf Thornveld IBA (Refer to Figure 13). A biodiversity impact assessment will be conducted as part of the EIA phase to assess whether there are any onsite sensitivities.

6.4.2.3 Environmental and current land use map

(Show all environmental, and current land use features)

Refer to Figure 13 below for an illustration of the current land use map showing environmental features of the site and surrounding area.

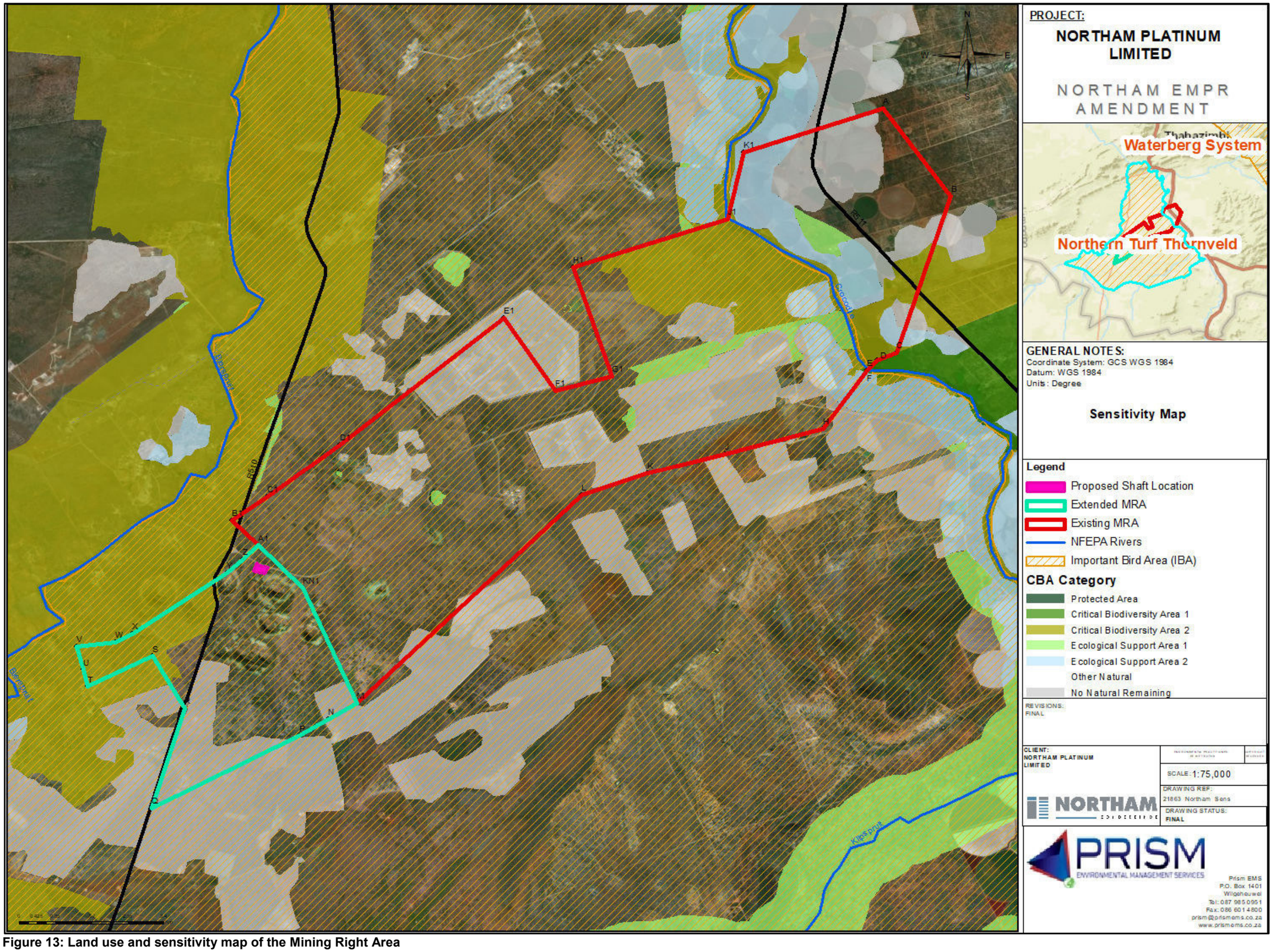


Figure 13: Land use and sensitivity map of the Mining Right Area

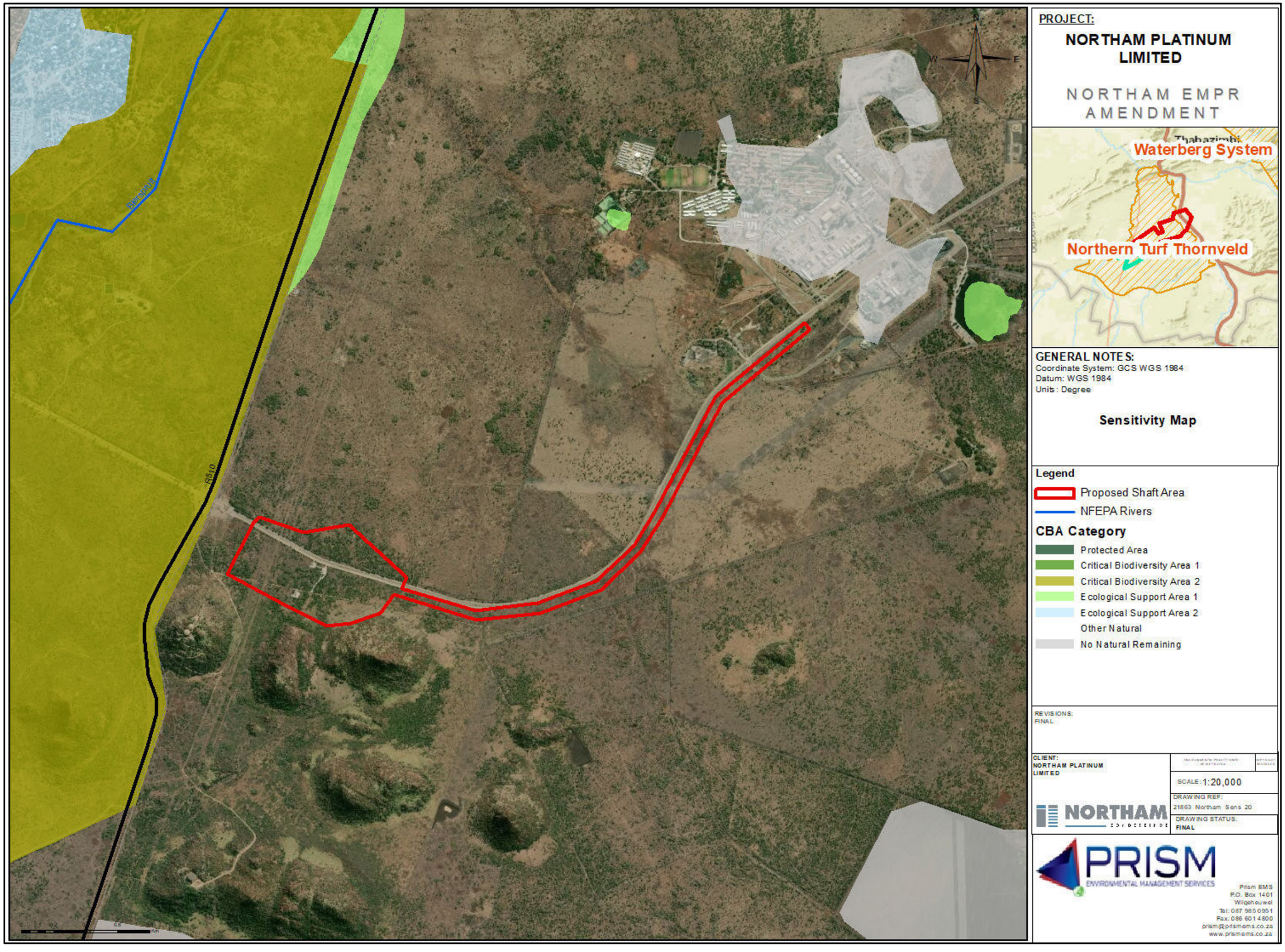


Figure 14: Land use and sensitivity map of the study site

6.5 Impacts identified

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability and duration of the impacts.)

Refer to Table 23.

6.6 Methodology used in determining the significance of environmental impacts

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

The standard methodology used in the preliminary environmental impact assessment to determine the significance rating of the potential impacts are outlined in this section.

6.6.1 Significance

The **significance** of an impact is defined as the combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The nature and type of impact may be direct or indirect and may also be positive or negative, refer to Table 16 for the specific definitions.

Table 16: Nature and type of impact

	Nature and Type of Impact:	
IMPACT	**Direct**	Impacts that are caused directly by the activity and generally occur at the same time and place as the activity
	Indirect	Indirect or induced changes that may occur because of the activity. These include all impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place as a result of the activity
	Cumulative	Those impacts associated with the activity which add to, or interact synergistically with existing impacts of past or existing activities, and include direct or indirect impacts which accumulate over time and space
	Positive	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will benefit significantly, and includes neutral impacts (those that are not considered to be negative)
	Negative	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will be comprised

Table 17 presents the defined criteria used to determine the **consequence** of the impact occurring which incorporates the extent, duration and intensity (severity) of the impact.

Table 17: Consequence of the Impact occurring

CONSEQUENCE		
	Extent of Impact:	
	Site	Impact is limited to the site and immediate surroundings, within the study site boundary or property (immobile impacts)
	Neighbouring	Impact extends across the site boundary to adjacent properties (mobile impacts)
	Local	Impact occurs within a 5km radius of the site
	Regional	Impact occurs within a provincial boundary
	National	Impact occurs across one or more provincial boundaries
	Duration of Impact:	
	Incidental	The impact will cease almost immediately (within weeks) if the activity is stopped, or may occur during isolated or sporadic incidences
	Short-term	The impact is limited to the construction phase, or the impact will cease within 1 - 2 years if the activity is stopped
	Medium-term	The impact will cease within 5 years if the activity is stopped
	Long-term	The impact will cease after the operational life of the activity, either by natural processes or by human intervention
	Permanent	Where mitigation either by natural process or by human intervention will not occur in such a way or in such a time span that the impact can be considered transient
	Intensity or Severity of Impact:	
	Low	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are not affected
	Low-Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are modified insignificantly
	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are altered
	Medium-High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes are severely altered
	High	Impacts affect the environment in such a way that natural, cultural and / or social functions and processes will permanently cease

The probability of the impact occurring is the likelihood of the impacts actually occurring and is determined based on the classification provided in Table 18.

Table 18: Probability and confidence of impact prediction

PROBABILITY	**Probability of Potential Impact Occurrence:**	
	Improbable	The possibility of the impact materialising is very low either because of design or historic experience
	Possible	The possibility of the impact materialising is low either because of design or historic experience
	Likely	There is a possibility that the impact will occur
	Highly Likely	There is a distinct possibility that the impact will occur
	Definite	The impact will occur regardless of any prevention measures

The **significance** of the impact is determined by considering the consequence and probability without taking into account any mitigation or management measures and is then ranked according to the ratings listed in Table 19. The level of confidence associated with the impact prediction is also considered as low, medium or high and is described in Table 20.

Table 19: Significance rating of the impact

SIGNIFICANCE	**Significance Ratings:**	
	Low	Neither environmental nor social and cultural receptors will be adversely affected by the impact. Management measures are usually not provided for low impacts
	Low-Medium	Management measures are usually encouraged to ensure that the impacts remain of Low-Medium significance. Management measures may be proposed to ensure that the significance ranking remains low-medium
	Medium	Natural, cultural and/or social functions and processes are altered by the activities, and management measures must be provided to reduce the significance rating
	Medium-High	Natural, cultural and/or social functions and processes are altered significantly by the activities, although management measures may still be feasible
	High	Natural, cultural, and/or social functions and processes are adversely affected by the activities. The precautionary approach will be adopted for all high significant impacts and all possible measures must be taken to reduce the impact

Table 20: Level of confidence of the impact prediction

CONFIDENCE	**Level of Confidence in the Impact Prediction:**	
	Low	Less than 40% sure of impact prediction due to gaps in specialist knowledge and/or availability of information
	Medium	Between 40 and 70% sure of impact prediction due to limited specialist knowledge and/or availability of information
	High	Greater than 70% sure of impact prediction due to outcome of specialist knowledge and/or availability of information

Once significance rating has been determined for each impact, management and mitigation measures must be determined for all impacts that have a significance ranking of Medium and higher in order to attempt to reduce the level of significance that the impact may reflect.

The EIA Regulations, 2014 specifically require a description is provided of the degree to which these impacts:

- can be reversed;
- may cause irreplaceable loss of resources; and
- can be avoided, managed or mitigated.

Based on the proposed mitigation measures the EAP will determine a mitigation efficiency (Table 21) whereby the initial significance is re-evaluated and ranked again to effect a significance that incorporates the mitigation based on its effectiveness. The overall significance is then re-ranked, and a final significance rating is determined.

Table 21: Mitigation efficiency

	Mitigation Efficiency	
MITIGATION EFFICIENCY	**None**	Not applicable
	Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact. Positive impacts will remain the same
	Low	Where the significance rating reduces by one level, after mitigation
	Medium	Where the significance rating reduces by two levels, after mitigation
	High	Where the significance rating reduces by three levels, after mitigation
	Very High	Where the significance rating reduces by more than three levels, after mitigation

The reversibility is directly proportional the “Loss of Resource” where no loss of resource is experienced, the impact is completely reversible; where a substantial “Loss of resource” is experienced there is a medium degree of reversibility; and an irreversible impact relates to a complete loss of resources, i.e. irreplaceable (Table 22).

Table 22: Degree of reversibility and loss of resources

DEGREE REVERSABILITY & LOSS OF RESOURCES	**Loss of Resources:**	
	No Loss	No loss of social, cultural and/or ecological resource(s) are experienced. Positive impacts will not experience resource loss
	Partial	The activity results in an insignificant or partial loss of social, cultural and/or ecological resource(s)
	Substantial	The activity results in a significant loss of social, cultural and/or ecological resource(s)
	Irreplaceable	The activity results in the complete and irreplaceable social, cultural and/or ecological loss of resource(s)
	Reversibility:	
	Irreversible	Impacts on natural, cultural and/or social functions and processes are irreversible to the pre-impacted state in such a way that the application of resources will not cause any degree of reversibility
	Medium Degree	Impacts on natural, cultural and/or social functions and processes are partially reversible to the pre-impacted state if less than 50% resources are applied
	High Degree	Impacts on natural, cultural and/or social functions and processes are partially reversible to the pre-impacted state if more than 50% resources are applied
	Reversible	Impacts on natural, cultural and/or social functions and processes are fully reversible to the pre-impacted state if adequate resources are applied

6.6.2 Cumulative Impacts

It is important to assess the natural environment using a systems approach that will consider the cumulative impact of various actions. Cumulative impact refers to the impact on the environment, which results from the incremental impact of the actions when added to other past, present and reasonably foreseeable future actions regardless of what agencies or persons undertake such actions. Cumulative impacts can result from individually minor, but collectively significant actions or activities taking place over a period. Cumulative effects can take place frequently and over a period that the effects cannot be assimilated by the environment.

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

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

This section aims to provide a discussion of the advantages and disadvantages (if any) of the initial site layout compared with the alternative layout options developed to accommodate concerns raised by affected parties.

To date, no concerns have been raised by any interested or affected parties. However, this report is referred to as the Draft Scoping Report (DSR) and contains details of the consultation process followed and is intended for circulation to the I&APs. After completion of the consultation phase including all comments, issues or concerns and potential impacts will be discussed therein (in the Final Scoping Report (FSR)) for submission to the

Department of Mineral Resources. This section must be updated after the public participation phase has been fully implemented.

6.8 The possible mitigation measures that could be applied and the level of risk

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

No comments have been received by Interested and Affected Parties to date. A preliminary impact assessment was conducted and is summarised in Table 23 and attached to Appendix 6.

Table 23: Summary of preliminary impact assessment and mitigation measures

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
CONSTRUCTION PHASE											
Establishment of Construction Camp and installation and operation of construction support services including chemical toilets and water tanks and generation of power.	**AIR QUALITY**	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Low*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low*	*High*	*Low*	*No Loss*	*Reversible*
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOIL	Direct	Soil alteration including compaction, contamination and pollution and erosion.	Layout 1	Yes	Negative	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	WATER	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement and spillage of sewage from the chemical toilets, may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and wastewater pipelines and stormwater management infrastructure.	**AIR QUALITY**	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*High*	*Low*	*No Loss*	*Reversible*
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
	TOPSOIL	Direct	Loss of topsoil and erosion	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
	SOIL	Direct	Soil alteration including contamination and compaction	Layout 1	No	Negative	*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
	LAND CAPABILITY	Direct	Loss of land capability	Layout 1	Yes	Negative	*Low-Medium*	*None*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*None*	*Low-Medium*	*Minimal*	*High Degree*
	WATER	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Loss of habitat	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
		Direct	Loss of fauna	Layout 1	Yes	Negative	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
		Direct	Loss of flora	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
		Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
		Indirect	Degradation of ecological systems	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
		Direct	Disruption of natural corridors	Layout 1	No	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	HERITAGE	Direct	Potential loss of cultural heritage	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
Generation and disposal domestic waste, construction and hazardous waste	**SERVICES**	Direct	Additional burden on existing landfill.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
	SOIL, WATER	Direct	Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Low*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low*	*High*	*Low*	*No Loss*	*Reversible*
	BIODIVERSITY	Direct	Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	Layout 1	No	Negative	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*High*	*Low*	*Minimal*	*High Degree*
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	**AIR QUALITY**	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*High*	*Low*	*No Loss*	*Reversible*
	NOISE	Indirect	Noise generation by increased traffic on the roads and construction vehicles.	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
	SOIL	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. Stockpiling of construction and excavated materials	**HEALTH AND SAFETY**	Direct	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	NATURAL RESOURCES	Direct	Increased fuel consumption	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Low*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low*	*High*	*Low*	*No Loss*	*Reversible*
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO_2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	TOPOGRAPHY	Direct	Temporary alteration of topography	Layout 1	Yes	Negative	*Low*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low*	*Low*	*Low*	*No Loss*	*Reversible*
	SOIL	Direct	Stockpiling of materials may cause soil compaction.	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
	HYDROLOGY	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	Yes	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*High*	*Low*	*No Loss*	*Reversible*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
Raise bore drilling and drill rig and sinking of shafts and vent raises.	**TOPOGRAPHY**	Direct	Temporary alteration of topography caused by drill rig.	Layout 1	Yes	Negative	*Low-Medium*	*None*	*Low-Medium*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*None*	*Low-Medium*	*No Loss*	*Reversible*
	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	GROUNDWATER	Direct	Groundwater pollution	Layout 1	Yes	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
Civil works including establishment of infrastructure on site including the pollution control dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, waste water pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing.	**AIR QUALITY**	Direct	Emissions from vehicles and machinery (CO_2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Low*	*Low*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOIL AND WATER	Direct	Contamination of soil and surface and ground water through cement mixing and spillages of hydrocarbons.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
Energy, water, raw materials and fuel consumption	**NATURAL RESOURCES**	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp. Rehabilitation of construction camp and other construction areas, including along the raw water and wastewater pipelines and access and haul roads.	**SOILS**	Direct	Soil erosion, compaction and contamination, as well as loss of topsoil.	Layout 1	Yes	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	SOILS	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavations to be backfilled.	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	SOILS AND WATER	Direct	Contamination of surface and ground water through spillages of hydrocarbons and wastewater.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment.	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
Creation of employment opportunities throughout the construction phase.	**SOCIO-ECONOMIC**	Direct	Decreased unemployment in the area and economic multiplier effects may improve the socio-economic circumstances of the local community.	Layout 1	Yes	Positive	*Medium-High*	*Very High*	*High*	*No Loss*	*Reversible*
				Layout 2			*Medium-High*	*Very High*	*High*	*No Loss*	*Reversible*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
OPERATIONAL PHASE											
Mining: Raise bore drilling and raise bore drill rig	**NOISE**	Direct	Noise impact	Layout 1	Yes	Negative	*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Low*	*Low*	*No Loss*	*Reversible*
	TOPOGRAPHY/ VISUAL	Direct	Temporary alteration of topography caused by drill rig causing visual impact.	Layout 1	Yes	Negative	*Low-Medium*	*None*	*Low-Medium*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*None*	*Low-Medium*	*No Loss*	*Reversible*
	SOILS	Direct	Soil alteration through soil erosion and compaction on the surface, as well as contamination through spillages of hydrocarbons.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Surface and groundwater pollution through spillages of hydrocarbons.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*No Loss*	*Reversible*
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.	**AIR QUALITY**	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO_2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	NOISE	Indirect	Noise generation by increased traffic on the surrounding roads.	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*No Loss*	*Reversible*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*No Loss*	*Reversible*
	NOISE	Direct	Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOILS	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
	HYDROLOGY	Direct	Impact of changes to water quality through spillages of materials from trucks, such as ore, sediments, diesel and oils may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Increase in fauna mortalities on the roads.	Layout 1	No	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	TRAFFIC	Direct	Increased traffic on adjacent roads and access issues.	Layout 1	Yes	Negative	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
	NATURAL RESOURCES	Direct	Increased fuel consumption.	Layout 1	Yes	Negative	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
Dewatering of underground mine	**GEOLOGY**	Direct	Geotechnical impacts such as ground settlements which may cause damage to surface infrastructure in the drawdown zone.	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Contamination of groundwater.	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Impacts on groundwater dependent surface water features such as wetlands and rivers.	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	SERVICES	Direct	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
Operation of conveyor belts	**NOISE**	Direct	Noise impact	Layout 1	Yes	Negative	*Low*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low*	*Medium*	*Low*	*No Loss*	*Reversible*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Medium*	*Very Low*	*Medium*	*No Loss*	*Reversible*
				Layout 2			*Medium*	*Very Low*	*Medium*	*No Loss*	*Reversible*

ACTIVITY	ASPECTS	IMPACTS					SIGNIFICANCE (WOM)	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Significance			LOSS RESOURCE	REVERSABILITY
Exhausting of mine ventilation air	**AIR QUALITY**	Direct	Alteration of air quality	Layout 1	Yes	Negative	*Low*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*Medium*	*Low*	*Minimal*	*High Degree*
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw water pipelines, wastewater pipelines, access and haul roads.	**SOILS**	Direct	Soil erosion, compaction and contamination.	Layout 1	No	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Surface and groundwater pollution through spillages.	Layout 1	No	Negative	*Low*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*High*	*Low*	*Minimal*	*High Degree*
Energy, fuel, water consumption and depletion of minerals	**NATURAL RESOURCES**	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, minerals and fuel.	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
Creation of new employment opportunities and sustaining existing employment at the mine.	**SOCIO-ECONOMIC**	Direct	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	Layout 1	Yes	Positive	*High*	*Very High*	*High*	*No Loss*	*Reversible*
				Layout 2			*High*	*Very High*	*High*	*No Loss*	*Reversible*
Operation of the shaft complex	**SOCIO-ECONOMIC**	Indirect	Decline/increase in property value	Layout 1	Yes	Negative	*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Low-Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOCIO-ECONOMIC	Indirect	Loss of Sense of Place	Layout 1	Yes	Negative	*Low-Medium*	*Very Low*	*Low-Medium*	*Partial*	*Medium Degree*
				Layout 2			*Low-Medium*	*Very Low*	*Low-Medium*	*Partial*	*Medium Degree*

6.9 The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties.)

Please refer to Figure 4 and Appendix 4.

6.10 Motivation where no alternative sites were considered

The location to establish the shaft complex has been chosen by considering the following factors:

- Favourable underlying geological conditions;
- Location close to the western extension of the Zondereinde Mine where access is required;
- Location close to existing roads and services and the existing Zondereinde mine complex; and
- Environmental conditions on the study area.

The above factors will be investigated in detail during the EIA phase.

6.11 Statement motivating the preferred site

(Provide a statement motivation the final site layout that is proposed.)

The current layout of the shaft complex (Figure 4 and Appendix 4) has been chosen by considering the following factors:

- Favourable underlying geological conditions;
- Topography of the area (koppies to the south of the study area;
- Location of existing roads and services;
- Environmental conditions on and around the study area.

The above factors will be investigated in detail during the EIA phase and informed by various specialist and technical studies as listed in the Plan of Study for EIA (Section 7), after which the layout will be confirmed and finalised.

7 PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

Refer to Section 6.1 for a full description and preliminary assessment of the alternatives to be considered during the EIA phase.

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

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)

Environmental aspects linked to the assessment of the receiving environment are discussed in Table 24. Information on how the impact will be assessed during the EIA phase and/or mitigated is also provided.

Table 24: Potential issues to be assessed during the EIA Phase

Environmental Aspect	Potential Issues / Impacts - Construction	Potential Issues / Impacts - Operation	Studies Required and Mitigation Measures	Actions / Activities
Local Climate	No adverse impacts are envisioned.	No adverse impacts are envisioned.	N/A	N/A
Topography	• Minor changes to topography • Possible erosion	No adverse impacts are envisioned.	• Detailed EMPr	• Earthworks
Geology and Soils	• Erosion of exposed soil • Erosion of stockpiled material (stone, sand and gravel) • Contamination to soil during the mixing of cement • Poor storm water management during construction.	No adverse impacts are envisioned	• In-depth Geotechnical Study. • Detailed EMPr	• Earthworks • Stockpiling • Raise bore drilling • General construction activities • Temporary and permanent services.
Land Use	• Change in land use;	• Change in land use	• Mining right for this area have been approved.	• Establishment and operation of shaft complex.
Agricultural Potential	No impacts are envisioned.	No adverse impacts are envisioned.	N/A	N/A
Existing Services	• Potential disturbance to existing infrastructure during construction.	No adverse impacts are envisioned.	• Services report; • Wayleaves.	• Construction of the road/re-alignment of the road.
Availability of Services	No adverse impacts are envisioned.	• Services required for the proposed development.	• Services report; • Wayleaves; • Reuse of water to decrease water requirements.	• Provision of services to the development.
Roads	• Increased construction related traffic;	• Increase in traffic and impact on surrounding road network.	• Dust control measures; • Traffic and access control measures;	• Transport of materials and personnel.

Environmental Aspect	Potential Issues / Impacts - Construction	Potential Issues / Impacts - Operation	Studies Required and Mitigation Measures	Actions / Activities
	• Decreased visibility along roads due to poor dust management.		• Detailed EMPr.	• Heavy construction and mining vehicles driving on gravel roads.
Air Quality	• Generation of dust through clearance of vegetation and construction activities.	• Mining vehicles driving on gravel roads.	• Dust control measures; • Detailed EMPr.	• Clearance of vegetation; • Heavy construction and mining vehicles driving on gravel roads.
Noise	• Increased noise pollution due to construction activities.	No adverse impacts are envisioned.	• Noise mitigation measures; • Detailed EMPr.	• General construction activities; • Earthworks with machinery; • Drilling.
Socio-Economic Environment	• Increased employment opportunities (positive); • Indirect injection of cash in the community due to investment (positive); • Increased economic opportunities in the area (positive); • Potential issues regarding security in the area due to construction workers in the area. • Health and safety risks to construction workers and visitors.	• Increased employment opportunities (positive); • Increased economic opportunities in the area (positive); • Health and safety risks to workers and visitors.	N/A	• Use of local labour force; • Health and safety risks from all work activities.
Biodiversity	• Disturbance of natural ecosystems, making	• Disturbance of birds and fauna in the area.	• Biodiversity Impact Assessment;	• Clearance of vegetation;

Environmental Aspect	Potential Issues / Impacts - Construction	Potential Issues / Impacts - Operation	Studies Required and Mitigation Measures	Actions / Activities
	them vulnerable to invasion of alien species; • Negative impact due to dust.		• Aquatic Assessment; • Detailed EMPr.	• Noise generation by construction activities; • Hunting, trapping or killing of animals; • General construction activities; • Re-alignment of road and installation of services; • Dust generation.
Surface Water	• Increased storm water resulting from clearance of vegetation and construction of hard surfaces. • Potential impact on surface water features due to installation of services.	• Increased storm water. • Potential ongoing impact on surface water features.	• Aquatic Assessment; • Detailed EMPr.	• Installation of services crossings surface water features.
Ground Water	• Impact on deep aquifer	• Impact on deep aquifer	• Geohydrological Impact Assessment	• Pumping, water abstraction and raise bore drilling.
Archaeology and Cultural Heritage	• Potential impacts to heritage resources.	No adverse impacts are envisioned.	• Heritage Impact Assessment	• Establishment of construction camp and shaft complex.

7.3 Description of aspects to be assessed by specialists

According to Münster (2005), a 'trigger' is "a particular characteristic of either the receiving environment or the proposed project which indicates that there is likely to be an issue and/or potentially significant impact associated with that proposed development that may require specialist input".

Further, the 2014 EIA Regulations define a specialist as: "A person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies."

The specialist studies 'initially triggered' by the findings of the Scoping process include the following:

- Biodiversity Impact Assessment;
- Aquatic Impact Assessment; and
- Geohydrological Impact Assessment; and
- Phase 1 Heritage Impact Assessment.

The *Guideline for determining the scope of specialist involvement in EIA processes* (Münster, 2005) was used in compiling the general Terms of Reference for the specialist studies together with the *Guideline for involving biodiversity specialists in EIA processes* (Brownlie, 2005) and the *Gauteng Department of Agriculture and Rural Development (GDARD) Requirements for Biodiversity Specialists.* In line with these guidelines, specialists will be required to do the following:

- Address all triggers for the specialist studies identified by the Scoping Report;
- Address issues raised by IAPs, as contained in the Comments and Response Report;
- Meet the requirements of the relevant environmental authorities;
- Identify and assess all potentially significant impacts (direct, indirect and cumulative) and suggest suitable mitigation measures;
- Assess alternatives (including the No-Go option) and identify the Best Practicable Environmental Option (BPEO) for the proposed development; and
- All specialist reports must adhere to Appendix 6 of the 2014 EIA Regulations.

In addition to the above-mentioned environmental specialist studies, the following technical studies will also be undertaken and will inform the EIA:

- Services report for sewage, water and stormwater;
- Electrical Report; and
- In-depth Geotechnical Assessment.

Table 25 provides an overview of the environmental aspects that will be assessed by specialists.

Table 25: Summary of environmental aspects to be assessed by specialists

Environmental Aspects	To be assessed by Specialist	Specialist Study
Geology and Soils	Yes	In-depth Geotechnical Study
Existing Services	Yes	Services Report and Electrical Report
Availability of Services	Yes	Services Report and Electrical Report
Biodiversity	Yes	Biodiversity Impact Assessment
Surface Water	Yes	Aquatic Impact Assessment
Ground Water	Yes	Geohydrological Impact Assessment
Archaeology and Cultural Heritage	Yes	Heritage Impact Assessment

7.4 Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

Refer to Section 6.6 for the methodology to assess environmental aspects and the complete Section 6 for a full description of the proposed method of assessing alternatives.

7.5 The proposed method of assessing duration and significance

The significance is defined as the combination of the **consequence** of the impact occurring and the **probability** that the impact will occur. The nature and type of impact may be direct or indirect and may also be positive or negative. The defined criteria used to determine the **consequence** of the impact occurring which incorporates the following:

- extent,
- duration and
- intensity (severity) of the impact.

The **probability** of the impact occurring is the likelihood of the impacts actually occurring. The **significance** of the impact is determined by considering the consequence and probability without taking into account any mitigation or management measures and is then ranked according to the ratings ranging from Low to High. Once significance rating has been determined for each impact, management and mitigation measures must be determined for all impacts that have a significance ranking of Medium and higher in order to attempt to reduce the level of significance that the impact may reflect.

The EIA Regulations, 2014 specifically require a description is provided of the degree to which these impacts:

- can be reversed;
- may cause irreplaceable loss of resources; and
- can be avoided, managed or mitigated.

Based on the proposed mitigation measures the EAP will determined a mitigation efficiency whereby the initial significance is re-evaluated and ranked again to affect a significance that incorporates the mitigation based on its effectiveness. The overall significance is then re-ranked, and a final significance rating is determined.

Also refer to Section 6.6.

7.6 The stages at which the competent authority will be consulted

The competent authority is the Limpopo Branch of the DMR. The DMR must be consulted during the following phases:

- Pre-application Phase (undertaken 5th February 2019);
- Application and Scoping Phase (June – August 2019);
- Impact Assessment Phase (September – November 2019).

7.7 Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

7.7.2 Steps to be taken to notify interested and affected parties

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h) (ii) herein.)

Potential Interested and Affected Parties (I&AP's) are notified through several mechanisms these include:

- Site Notices;
- Local Newspaper advertisement;
- Written Notifications to key stakeholders such as organs of state and landowners/occupiers and adjacent landowners;
- Liaison with Registered I&APs (via email).

7.7.3 Details of the engagement process to be followed

(Describe the process to be undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings and records of such consultation will be required in the EIA at a later stage.)

Upon acceptance of the scoping report by DMR, the applicant/EAP will proceed and continue with the tasks contained in the plan of study.

Subsequently an impact assessment report will be compiled and made available to all registered interested and affected parties and relevant organs of state for a period of 30 days. This comment period is planned for approximately **September 2019 – October 2019.**

Please note that public meetings will only be held if the level of interest in the project is justified. If there is only interest by a small group of I&AP's it may be beneficial to meet one on one, or to discuss via telephone.

7.7.4 Description of the information to be provided to Interested and Affected Parties

(Information to be provided must include the initial 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.)

All registered Interested and Affected Parties and relevant organs of state will be provided with a 30-day review period and accessibility to the environmental impact assessment report for the 30 days. This comment period is planned for approximately **September 2019 – October 2019.** The Environmental Impact Assessment Report will be compiled and will contain all the information as is required by Appendix of the EIA Regulations, 2014 [as amended], including *inter alia*: a detailed site plan; environmental sensitivities; specialist and technical reports; detailed environmental impact assessment and Environmental Management Programme.

7.8 Description of the tasks that will be undertaken during the environmental impact assessment process

Application Phase. The following has been attended to:

- Pre-application meeting with DMR;
- Identification of potential I&AP's; and
- Application submission.

Scoping Phase (this report). The following has been attended to:

- Stakeholder notification;
- Identification of potential impacts;
- Identification of knowledge gaps and/or specialist studies;
- Compilation of Scoping Report and Plan of Study;
- Circulate draft Scoping Report for Comment (30 days); **CURRENTLY**
- Comments and Response Report; and
- Submission of final Scoping Report for approval.

Impact Assessment Phase:

- Undertake specialist studies;
- Assessment of Environmental Impacts;
- Compilation of EIA Report;
- Circulate draft EIA Report for Comment (30 days);
- Comments and Response Report;
- Submission of final EIA Report for Record of Decision (Authorisation); and
- Notification of I&AP's of outcome of the decision.

The next steps in the EIA phase which will be undertaken upon completion of the scoping phase (i.e. after the submission and acceptance of this Scoping Report by DMR. During the EIA phase, specialist studies will be conducted to inform the impact assessment. Concerns raised by I&AP's pertaining to the proposed development and their potential impacts on the physical, biological aspects of the proposed site will also be assessed at an appropriate level of detail.

The findings, recommendations and statements compiled by the specialists will be integrated with the other environmental aspects and compiled into an EIA Report, and provided to the relevant organs of state and registered I&AP's for review and comment for a minimum period of 30 days. This is planned for the June/July 2019 period. All comments received from any authority, I&AP and specialist will be considered and incorporated in the EIA Report for final submission DMR for an evaluation and assessment in order to provide a decision on whether to grant or refuse the environmental authorisation.

7.9 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

Table 26: Mitigation Measures and Potential for Residual Risk

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
CONSTRUCTION PHASE			
Establishment of Construction Camp and installation and operation of construction support services, including chemical toilets and water tanks as well as generation of power.	Dust emissions altering air quality and visibility on nearby roads.	Control through dust control measures including: • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	*Low*
	Emissions from vehicles and machinery (CO^2, NOx, SOx, VOC's etc.).	Control through mitigation measures including: • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible;	*Low-Medium*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	
	Generation of noise through construction vehicles and machinery, causing a nuisance to fauna and surrounding land uses.	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	Soil alteration including compaction, contamination and erosion.	Control and stop through mitigation measures including: • Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. • To reduce the loss of material by erosion, disturbance must be kept to a minimum. • If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. • Where possible, natural vegetation should be retained to reduce the risk of erosion. • Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil.	
	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement and spillage of sewage from the chemical toilets, may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	• Control measures to control erosion and sedimentation including: • Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required; • To reduce the loss of material by erosion, causing sedimentation, disturbance must be kept to a minimum; • If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area; • Where possible, natural vegetation should be retained to reduce the risk of erosion; • Should erosion occur due to negligence on the part of the Contractor to apply the above measures, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		by the Contractor or a nominated clean up organisation at the expenses of the Contractor; • Proper Stormwater management must be implemented; • Run-off containing high sedimentation loads must not be released into natural or municipal drainage systems; • Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment.; • Silt fences must be fit for purpose, effective and regularly maintained.	
	Visual impact	Control measures to reduce visual impact including: • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and wastewater pipelines, powerlines and stormwater management infrastructure.	Dust emissions altering air quality and visibility on nearby roads.	Control through dust control measures including: • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	*Low*
	Emissions from vehicles and machinery (CO^2, NOx, SOx, VOC's etc.).	Control through mitigation measures including: • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and	*Low-Medium*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		comply with legislation in terms of allowable emissions.	
	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	*Low*
	Loss of topsoil and erosion.	Avoid through control measures including: • During clearing of vegetation, topsoil and subsoil must be stripped separately from each other and must be stored separately from spoil material for use in the rehabilitation phase.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• Topsoil should be protected from wind and rain, as well as contamination from diesel, concrete or wastewater. Topsoil stockpiles should be checked on a monthly basis to ensure that this is the case. • Topsoil should be used in landscaping and rehabilitation where possible.	
	Soil alteration including contamination and compaction.	Control and stop through mitigation measures including: • Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required. • To reduce the loss of material by erosion, disturbance must be kept to a minimum. • If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area. • Where possible, natural vegetation should be retained to reduce the risk of erosion. • Should erosion occur due to negligence on the part of the Contractor, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor. • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil.	
	Loss of land capability.	None	*Low-Medium*
	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	• Control measures to control erosion and sedimentation including: • Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required; • To reduce the loss of material by erosion, causing sedimentation, disturbance must be kept to a minimum; • If clearing of slopes occur within the rainy season, earth berms must be created along the up-slope side of the construction area; • Where possible, natural vegetation should be retained to reduce the risk of erosion;	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• Should erosion occur due to negligence on the part of the Contractor to apply the above measures, the Contractor will be responsible for reinstatement of the eroded area to its former state at his own expense. Any surface water pollution occurring as a result of this negligence will be cleaned up by the Contractor or a nominated clean up organisation at the expenses of the Contractor; • Proper Stormwater management must be implemented; • Run-off containing high sedimentation loads must not be released into natural or municipal drainage systems; • Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment.; • Silt fences must be fit for purpose, effective and regularly maintained.	
	Loss of habitat	Avoid and reduce through control measures: • Proper management of site clearing: o Restrict site clearing activities to construction area /domain.	*Low-Medium*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		○ Clearing of vegetation to be conducted in a phased manner (where possible). • The natural areas surrounding the Project area should be declared 'no-go' area's during the construction and operational phases and all efforts must be made to prevent access to these areas from construction workers, machinery and the general public; • All laydown, storage areas etc should be restricted to within the Project area and all access roads must be kept within this area or from existing access roads. • A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians). • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	Loss of fauna	Avoid and reduce through control measures: • Comply with the requirements of the National Environmental Management: Biodiversity Act (No. 10 of 2004), Natal Nature Conservation Ordinance 15 of 1974 and Animal Protection Act (No. 71 of 1962); • All domesticated animals are forbidden within the entire Project area (especially feral cats); • The use of “migratory friendly” property borders, such as palisade fencing or wire fencing with large gaps, should be considered along the pipeline, as this will allow for the ongoing survival of most species presently inhabiting the property. This will allow for the free movement of small mobile organisms (such as rodents). • If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action; • Environmental awareness training should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes;	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• No poaching or killing of animals to be allowed whatsoever; • No wilful harm to any animals, unless a direct threat is posed to a worker's health or safety; • Animals residing within the designated area shall not be unnecessarily disturbed; • Before construction starts, construction workers must be educated with regards to littering and poaching; • No trapping or snaring of wild animals if any. Nesting sites should not be disturbed; • If the development is approved, construction contractors, sub-contractors and operators must ensure that no fauna taxa are unduly disturbed, trapped, hunted or killed; • All workers will undergo environmental awareness training to address potential human and wildlife interaction and the permissible reactions to this interaction; • Environmental awareness training should include this aspect.	
	Loss of flora	Avoid and reduce through control measures: • Proper management of site clearing: ○ Restrict site clearing activities to construction area /domain.	*Low-Medium*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		○ Clearing of vegetation to be conducted in a phased manner (where possible). • The natural areas surrounding the Project area should be declared 'no-go' area's during the construction and operational phases and all efforts must be made to prevent access to these areas from construction workers, machinery and the general public; • All laydown, storage areas etc should be restricted to within the Project area and all access roads must be kept within this area or from existing access roads. • A qualified environmental control officer must be on site when construction begins to identify species that will be directly disturbed and to relocate fauna/flora that is found during construction (including all reptiles and amphibians). • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	Spreading of alien vegetation	Avoid through control measures including: • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.	*Low*
	Degradation of ecological systems	See above	*Low*
	Disruption of natural corridors	Avoid through control measures including: • The use of “migratory friendly” property borders, such as palisade fencing or wire fencing with large gaps, should be considered along the pipeline, as this will allow for the ongoing survival of most species presently inhabiting the property. This will allow for the free movement of small mobile organisms (such as rodents).	*Low-Medium*
	Visual impact	Control measures to reduce visual impact including: • Suitable screening to be put in place during construction to minimise visual impacts.	*Low*
	Potential loss of cultural heritage.	• All recommendations of the Heritage Specialist to be included in the EMPR and implemented	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
Generation and disposal of domestic waste, construction and hazardous waste.	Additional burden on existing landfill.	• Waste minimisation strategies to be included in the EIA/EMPR and implemented.	*Low*
	Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.	Control and stop through mitigation measures including: • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil.	*Low*
	Visual impact.	Control measures to reduce visual impact including: • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed.	*Low*
	Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	Control measures to reduce visual impact including: • No littering to be allowed; • Waste management strategies to be included in the EIA/EMPR and implemented; • Good housekeeping practices to be followed.	*Low*
Loading/off-loading and transportation of construction	Dust emissions altering air quality and visibility on nearby roads.	Control through dust control measures including:	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
materials, machinery, equipment and construction workers.		• A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	
	Noise generation by increased traffic on the roads and construction vehicles.	Control through noise control measures including: • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • Road users should adhere to speed limits; • Construction vehicles to be serviced at appropriate intervals to reduce unnecessary noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	Control and stop through mitigation measures including: • Construction vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Construction vehicles to keep to the designated roads; • Construction vehicles carrying materials to be appropriately covered as to reduce loss of materials.	*Low*
	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Control and stop through mitigation measures including: • Construction vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Construction vehicles to keep to the designated roads; • Construction vehicles carrying materials to be appropriately covered as to reduce loss of materials.	*Low*
	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	Control through mitigation measures including: • Enforce speed limits; • Penalise or fines for reckless driving.	*Low*
	Increased fuel consumption.	Reduce unnecessary trips through efficient planning.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
• Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. • Stockpiling of construction and excavated materials	Dust emissions altering air quality and visibility on nearby roads.	Control through dust control measures including: • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	*Low*
	Emissions from vehicles and machinery (CO^2, NOx, SOx, VOC's etc.).	Control through mitigation measures including: • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		comply with legislation in terms of allowable emissions.	
	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised	*Low*
	Temporary alteration of topography.	None	*Low*
	Stockpiling of materials may cause soil compaction.	Control and stop through mitigation measures including: • Stockpiling only to be done on designated approved areas.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	Impact of changes to water quality through materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Control measures to control erosion, contamination and sedimentation including: • Instability and erosion of steep slopes must be stabilised immediately. Re-vegetation in consultation with landscape architect and ECO should be done if required; • To reduce the loss of material by erosion, causing sedimentation, disturbance must be kept to a minimum; • Proper Stormwater management must be implemented; • Run-off containing high sedimentation loads must not be released into natural or municipal drainage systems; • Silt fences must be used to stabilise the site, reduce erosion and silt entering the natural environment. No unchecked silt may enter the natural environment.; • Silt fences must be fit for purpose, effective and regularly maintained.	*Low*
	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	Prevent through: • Complying with legislation and best practice health and safety standards.	*Low*
	Visual impact	Control measures to reduce visual impact including:	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed.	
Raise bore drilling and drill rig and sinking of shafts and vent raises.	Temporary alteration of topography caused by drill rig.	None	*Low-Medium*
	Noise impact	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, drilling and mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	*Low*
	Health and safety impacts	Prevent through:	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• Complying with legislation and best practice health and safety standards.	
	Groundwater pollution	Control through: • Operation of the raise bore drilling by suitably qualified persons and according to manufacturer's specifications.	*Low*
• Civil works including establishment of infrastructure on site including the pollution control dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, wastewater pipeline, electrical substation and powerlines. • Construction of buildings and structures including offices, ablution/change	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Control through mitigation measures including: • All construction vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
house, waste storage area and stores, including cement mixing.	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Control through noise control measures including: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Construction activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	*Low*
	Contamination of soil and surface and ground water through cement mixing and spillages of hydrocarbons.	Control and stop through mitigation measures including: • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil. • Appropriate installation and maintenance of temporary and permanent ablution facilities sanitation infrastructure.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• No cement mixing may occur on open ground. • Drip trays to be used under stationary vehicles.	
	Visual impact	Control measures to reduce visual impact including: • Suitable screening to be put in place during construction to minimise visual impacts; • No littering to be allowed; • Good housekeeping practices to be followed.	*Low*
Energy, water, raw materials and fuel consumption.	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	Control through minimisation strategies: • Reduce consumption of water by reusing water where possible; • Water and energy minimisation strategies to be included in the EIA/EMPR and implemented.	*Low*
• Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp.	Soil erosion, compaction and contamination, as well as loss of topsoil.	Prevent and control through appropriate rehabilitation techniques recommended by biodiversity specialists.	*Low*
	Spreading of alien vegetation	Avoid through control measures including: • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
• Rehabilitation of construction camp and other construction areas, including along the raw water and wastewater pipelines and access and haul roads.		events. This will also reduce the likelihood of encroachment by alien invasive plant species.	
	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavations to be backfilled.	Prevent through: • Complying with legislation and best practice health and safety standards.	*Low*
	Contamination of surface and ground water through spillages of hydrocarbons and wastewater.	Prevent through control measures: • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil; • Drip-trays to be used underneath stationary vehicles and machinery.	*Low*
	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment.	Prevent and control through appropriate rehabilitation techniques and monitoring recommended by biodiversity specialists.	*Low*
Creation of employment opportunities throughout the construction phase.	Decreased unemployment in the area and economic multiplier effects can improve the socio-economic circumstances of the local community.	Use of local labour force.	***High (+)***

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
OPERATIONAL PHASE			
Mining: Raise bore drilling and raise bore drill rig	Noise impact	Control through: • The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, drilling and mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	*Low*
	Temporary alteration of topography caused by drill rig causing visual impact.	None	
	Soil alteration through soil erosion and compaction on the surface, as well as	Control and stop through mitigation measures including:	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	contamination through spillages of hydrocarbons.	• To reduce the loss of material by erosion, disturbance must be kept to a minimum. • Waste, including solid and liquid waste and ablution facilities must be appropriately managed to prevent contamination of soil. • Spillages of hydrocarbons to be prevented.	
	Surface and groundwater pollution through spillages of hydrocarbons.	Control through: • Operation of the raise bore drilling by suitably qualified persons and according to manufacturer's specifications.	*Low*
	Health and safety impacts	Prevent through: • Complying with legislation and best practice health and safety standards.	*Low*
Loading / off-loading and transportation / hauling of overburden and ore and transportation of construction workers and other traffic.	Dust emissions altering air quality and visibility on nearby roads.	Control through dust control measures including: • A speed limit of 20km/h must be maintained on all dirt roads; • Dust suppression measures by means of either water or biodegradable chemical agent will be implemented during the construction phase to minimise dust generated by construction activities. Recycled water to be used, instead of potable water, to save water.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.)	Control through mitigation measures including: • All vehicles and machinery will be maintained such as to operate efficiently. Idling times of vehicles and machinery to be minimised; • In terms of transportation of workers and materials, collective transportation arrangements should be made to reduce individual car journeys where possible; • All vehicles used during the project should be properly maintained and in good working order; • All vehicles and other machinery should comply with road worthy requirements and comply with legislation in terms of allowable emissions.	*Low-Medium*
	Noise generation by increased traffic on the surrounding roads.	Control through noise control measures including: • Where possible, mining activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • Road users should adhere to speed limits; • Mining vehicles to be serviced at appropriate intervals to reduce unnecessary noise;	*Low-Medium*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	
	Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	See above	*Low*
	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.	Control and stop through mitigation measures including: • Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Mining vehicles to keep to the designated roads; • Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials.	*Low*
	Impact of changes to water quality through spillages of materials from trucks, such as ore, sediments, diesel and oils may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Control and stop through mitigation measures including: • Construction vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Construction vehicles to keep to the designated roads;	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		Construction vehicles carrying materials to be appropriately covered as to reduce loss of materials.	
	Increase in fauna mortalities on the roads.	Control through mitigation measures including: • Enforce speed limits; • Penalise or fines for reckless driving.	*Low*
	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed limits and reckless driving.	Control through mitigation measures including: • Enforce speed limits; • Penalise or fines for reckless driving.	*Low*
	Increased traffic on adjacent roads and access issues.	Reduce unnecessary trips through efficient planning.	*Low*
	Increased fuel consumption	Reduce unnecessary vehicle trips through efficient planning.	*Low-Medium*
Dewatering of underground mine	Geotechnical impacts such as ground settlements which may cause damage to surface infrastructure in the drawdown zone.	Prevent or control through: • Monitoring groundwater levels.	*Low*
	Contamination of groundwater	Prevent or control through: • Monitoring groundwater quality.	*Low*
	Impacts on groundwater dependent surface water features such as wetlands and rivers.	Prevent or control through: • Monitoring groundwater quality and levels.	*Low*
	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	Prevent or control through: • Monitoring groundwater quality and levels; • If required, compensation strategies to be designed and implemented.	*Low*
Operation of conveyor belts	Noise impact	Control through:	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
		• The provisions of SANS 10103:2008 will apply to all areas within audible distance of residents or adjacent landowners; • Conveyor belts, if any, which will be used must comply with the manufacturer's specifications on acceptable noise levels; • Where possible, operation activities should be limited to daytime only; • Noise monitoring should be undertaken as spot checks; • When required noise mufflers should be utilised to reduced noise; • It is important to keep an open channel of communication between all stakeholders and keep record of any concerns raised.	
	Visual impact	None	*Medium*
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw	Soil erosion, compaction and contamination.	Control and stop through mitigation measures including: • Mining vehicles to be serviced at appropriate intervals to reduce potential for leaking of hydrocarbons; • Mining vehicles to keep to the designated roads;	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
water pipelines, wastewater pipelines, access and haul roads.		• Mining vehicles carrying materials to be appropriately covered as to reduce loss of materials; • Spill procedures to be approved and implemented and included in the EIA/EMPR.	
	Surface and groundwater pollution through spillages.	• Spill procedures to be approved and implemented and included in the EIA/EMPR.	*Low*
	Spreading of alien vegetation	Avoid through control measures including: • Alien invasive species control methods to be included in the EIA/EMPr and implemented; • Recommendations by Biodiversity specialist to be included in the EIA/EMPR and implemented.	*Low*
Energy, fuel, water consumption and depletion of minerals	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, minerals and fuel.	Control through minimisation strategies: • Reduce consumption of water by reusing water where possible; • Water and energy minimisation strategies to be included in the EIA/EMPR and implemented.	*Low*

ACTIVITY whether listed or not listed *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, loading, hauling and transport, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)*	**POTENTIAL IMPACT** *(E.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc.)*	**MITIGATION TYPE** (*modify, remedy, control, or stop through e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc.)* *(E.g. modify through alternative method; control through noise control, control through management and monitoring through rehabilitation.)*	**POTENTIAL FOR RESIDUAL RISK**
Creation of new employment opportunities and sustaining existing employment at the mine.	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	Use of local labour.	***High (+)***
Operation of the Shaft Complex	Decline/increase in property value	None	*Low*
	Loss of Sense of Place	None	*Low-Medium*

8 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

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

8.1 Impact on the socio-economic conditions of any directly affected person

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein.)

The main socio-economic conditions that the proposed project will have on the area includes:

- due to extending the life of mine made possible by the access provided by the shaft complex to the extended MRA – existing jobs directly relating to the underground mining will be maintained (positive) and new jobs will be created; and
- the same risks pertaining to health and safety aspects exist (negative).

The socio-economic impacts of the shaft complex relate to ensuring the continuation of present employees' employment, as the LoM will be maintained and the shaft complex will create new employment opportunities during the construction phase and the operational phase.

This will also ensure the continued socio-economic benefits of Zondereinde Mine to the employee's dependants and the existing and new procurement benefits, resulting in economic multiplier effects to the local and surrounding communities.

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

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

Not applicable. The proposed activity, the extension of mining area (i.e. mineral reserve) will provide access to the already approved mining right area, therefore, no increase in the rate of production.

9 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

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

Not applicable, please refer to Section 6.1 for a description of alternatives.

10 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I **Monica Niehof** 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.

Signature of the EAP

DATE: 2019-07-09

11 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I **Monica Niehof** 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.

Signature of the EAP

DATE: 2019-07-09

-END-

APPENDIX 1 – EAP QUALIFICATIONS

UNISA

UNIVERSITY OF SOUTH AFRICA

We certify that

MONICA CORNELIA NIEHOF

having complied with the requirements of the Higher Education Act and the Institutional Statute, was admitted to the degree of

BACHELOR OF SCIENCE HONOURS

in Environmental Management

at a congregation of the University on 23 April 2018

Vice Chancellor

Executive Dean

University Registrar

19810237147099G05701

UN596028ISA

UNIVERSITY
OF
JOHANNESBURG

Die Raad en Senaat van die
UNIVERSITEIT VAN JOHANNESBURG
verklaar hiermee dat die graad

The Council and the Senate of the
UNIVERSITY OF JOHANNESBURG
hereby certify that the degree

MAGISTER ARTIUM

(Voltooi in ooreenstemming met die kurrikulum van die voormalige Randse Afrikaanse Universiteit)
(Completed in accordance with the curriculum of the former Rand Afrikaans University)

met studierigting with field of study

Omgewingsbestuur
Environmental Management

met al die regte en voorregte daaraan verbonde kragtens die Statuut van die Universiteit toegeken is aan

with all its associated rights and privileges in accordance with the Statute of the University has been awarded to

DE WET BOTHA

by geleentheid van 'n kongregasie van die Universiteit

at a congregation of the University

Visekanselier/Vice-Chancellor

Registrateur: Akademie/Registrar: Academic

29 SEPTEMBER/SEPTEMBER 2006
Johannesburg
ID 7706205069086

I certify that this document is a true reproduction/ copy of the original which was examined by me and that, from my observations, the original has not been altered in any matter.
Signature:
Rank: Maj 2077685-2
Date: 30/11/16

UNIVERSITY OF JOHANNESBURG
UNIVERSITEIT VAN JOHANNESBURG

13813

Die Raad en Senaat van die
RANDSE AFRIKAANSE UNIVERSITEIT
verklaar hiermee dat die graad

BACCALAUREUS ARTIUM CUM HONORIBUS

met studierigting

Geografie en Omgewingsbestuur

met al die regte en voorregte daaraan verbonde
kragtens die Statuut van die Universiteit
toegeken is aan

DE WET BOTHA

by geleentheid van 'n kongregasie van die Universiteit.

I certify that this document is a true reproduction/ copy of the original which was examined by me and that, from my observations, the original has not been altered in any matter.
Signature: .....
Rank: .....
Date: 30/11/16

Rektor

Viserektor (Akademie)

11 APRIL 2002
Johannesburg
ID 7706205069086

Die Raad en Senaat van die
RANDSE AFRIKAANSE UNIVERSITEIT
verklaar hiermee dat die

NAGRAADSE HOËR ONDERWYSDIPLOMA

met al die regte en voorregte daaraan verbonde
op 'n kongregasie van die Universiteit
toegeken is aan

DE WET BOTHA

I certify that this document is a true reproduction/ copy of the original which was examined by me and that, from my observations, the original has not been altered in any matter.
Signature: .....
Rank: .....
Date: .....

kragtens die Statuut van die Universiteit.

Rektor

Registrateur (Akademie)

19-MAART-2001
Johannesburg
ID 7706205069086

DIENS DEUR KENNIS

Die Raad en Senaat van die RANDSE AFRIKAANSE UNIVERSITEIT verklaar hiermee dat die graad

BACCALAUREUS ARTIUM

met studierigting

Geesteswetenskappe

met al die regte en voorregte daaraan verbonde
op 'n kongregasie van die Universiteit
toegeken is aan

DE WET BOTHA

kragtens die Statuut van die Universiteit.

I certify that this document is a true reproduction/ copy of the original which was examined by me and that, from my observations, the original has not been altered in any matter.
Signature:
Rank: Dkj 8607685842
Date: 30/11/16

Rektor

Registrateur (Akademie)

19-MAART-2001
Johannesburg
ID 7706205069086

SACNASP

South African Council for Natural Scientific Professions

herewith certifies that

De Wet Botha

Registration Number: 119979

is registered as a

Professional Natural Scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Environmental Science

Effective **19 February 2019** Expires **31 March 2020**

Chairperson

Chief Executive Officer

Scan this code to view online version of this certificate

APPENDIX 2 – EAP INFORMATION

Appendix 2 (1) – EAP Company Profile

PRISM

ENVIRONMENTAL MANAGEMENT SERVICES

COMPANY PROFILE

10 YEARS OF SUSTAINABLE GROWTH

2015

Environmental Consultants

Environmental Auditors

Aquatic &Wetland Specialists

Ecological Specialists

Air Quality Specialists

License Application Facilitators

Mining Consultants

Environmental Legislation Consultants

Company Overview

Prism Environmental Management Services is a multi-disciplinary Environmental Management consulting firm. With a vision encompassing a holistic understanding of integrated environmental management in partnership with sustainability, the company prides itself on excellent service and value-added solutions to a range of clients. Established in 2005, the company has grown from strength to strength, expanding to two offices with a team of professionals with a diverse range of specialities. Prism EMS is a verified Level 2 Contributor to B-BBEE.

With exceptional field-expertise, command and execution of the relevant legislative requirements and report quality, the company is recognised by clients, fellow consultants, and various Local and Provincial Authorities as a prominent service provider in our field of consulting.

Our Vision, Mission and Commitment

OUR VISION

Sustainability through Environmental Management Excellence.

OUR MISSION

Prism Environmental Management Services is a specialist environmental services provider, assuring excellence in environmental resource assessment and management. We stand in partnership with our clients, our employees, the community and the environment. Our ambition is to conserve resources, preserve natural habitats and prevent significant environmental impacts, by means of sustainable utilisation of our precious natural resources.

OUR COMMITMENT

The management and staff of Prism Environmental Management Services are committed to:

- Continued improvement of our customer relationships, ensuring customer satisfaction and superior service levels
- Providing professional and purposeful services at all times
- Following appropriate procedures to ensure the correct management and ongoing building of a sustainable environment
- Ongoing development of our staff to meet the challenges of our market
- Utilising experienced, well trained and technically competent staff
- To be dynamic in all dealings with our customers, colleagues and the environment
- Providing multi-faceted services to our clients through our variety of specialist disciplines; and
    - Embracing honesty, trust, teamwork, diversity and relationships that are beneficial to all involved.

Experience

The team at Prism EMS has extensive experience in Integrated Environmental Management (IEM) having completed numerous Basic Assessment Reports, Environmental Scoping Reports, Environmental Impact Assessments (EIA's) and Environmental Management Plans (EMP's) in terms of the National Environmental Management Act, 1998 and the National Environmental Management: Waste Act, 2008 as well as a wide range of specialist studies for a range of authorisation applications. Prism EMS is also involved in assisting various town planners and prominent developers with EIA applications, EMP's, Open Space Management Plans, Riverine- and Wetland Assessments and Delineations, Riverine and Wetland Management Plans, Ecological Studies, Air Quality Impact Assessments and other specialist studies. The consultancy also facilitates Water Use License Applications (WULAs).

With global emphasis placed on aquatic resources and the conservation thereof, it important to know that Prism EMS are specialists in the field of assessment, delineation, management and conservation of aquatic resources. Our highly qualified team has extensive knowledge of aquatic fauna and flora and have completed numerous wetland- and riverine assessments and delineations. Members of our team are acknowledged as leaders in the field of wetland assessment and delineation by peers and authorities alike. Both Prism EMS as a company, and De Wet Botha personally, are registered members of the SA Wetland Society.

Auditing and on-site monitoring also form part of the range of services the consultancy offers – be it environmental control officers (ECOs) during the construction phase of developments, environmental monitors (EMs) for the project engineering team on sites, or environmental officers (EOs) for contractors. The common goal aimed at, and achieved within these roles, is the overseeing, implementation and compliance with the Environmental Authorisation (EA) and EMP.

Consultants in our team have in-depth experience in the environmental component of the mining industry, regulated by the Mineral and Petroleum Resources Development Act, 2002 and with strong emphasis on the National Water Act, 1998, and National Environmental Management Act, 1998. Services offered to the mining industry include, but are not limited to, Closure Plans, Rehabilitation Fund Calculation, Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Management Implementation, Performance Assessments, Water Use License Applications, Bio-diversity Assessments and various Specialist Assessments as part of EMPr amendments and new mining activities.

Prism EMS has also expanded its services to encompass the Air Quality field. The consultancy and its associates are able to conduct Air Quality Impact Studies, Air Emissions modelling and also facilitate Air Emissions Licensing (AEL).

To summarise, Prism EMS is an accomplished consultancy, confident that we can successfully fulfil client requirements, from project planning to completion. The multi-faceted character of the company is evident from the range of disciplines abridged below.

Scope of Services

ENVIRONMENTAL IMPACT MANAGEMENT

- Environmental Impact Assessments (EIAs)
- Basic Assessment processes & Reports (BARs)
- Environmental Management Plans (EMPs)
- Site-specific EMPs
- Water Use License Applications (WULAs)
- Waste License Applications
- Air Emissions Licenses

ENVIRONMENTAL PLANNING

- Environmental Management Systems (conforming to ISO 14001)
- Environmental Site Selections and Planning at Pre-Feasibility Phase
- Environmental Procedures and Environmental Specifications

ENVIRONMENTAL AUDITING & MONITORING

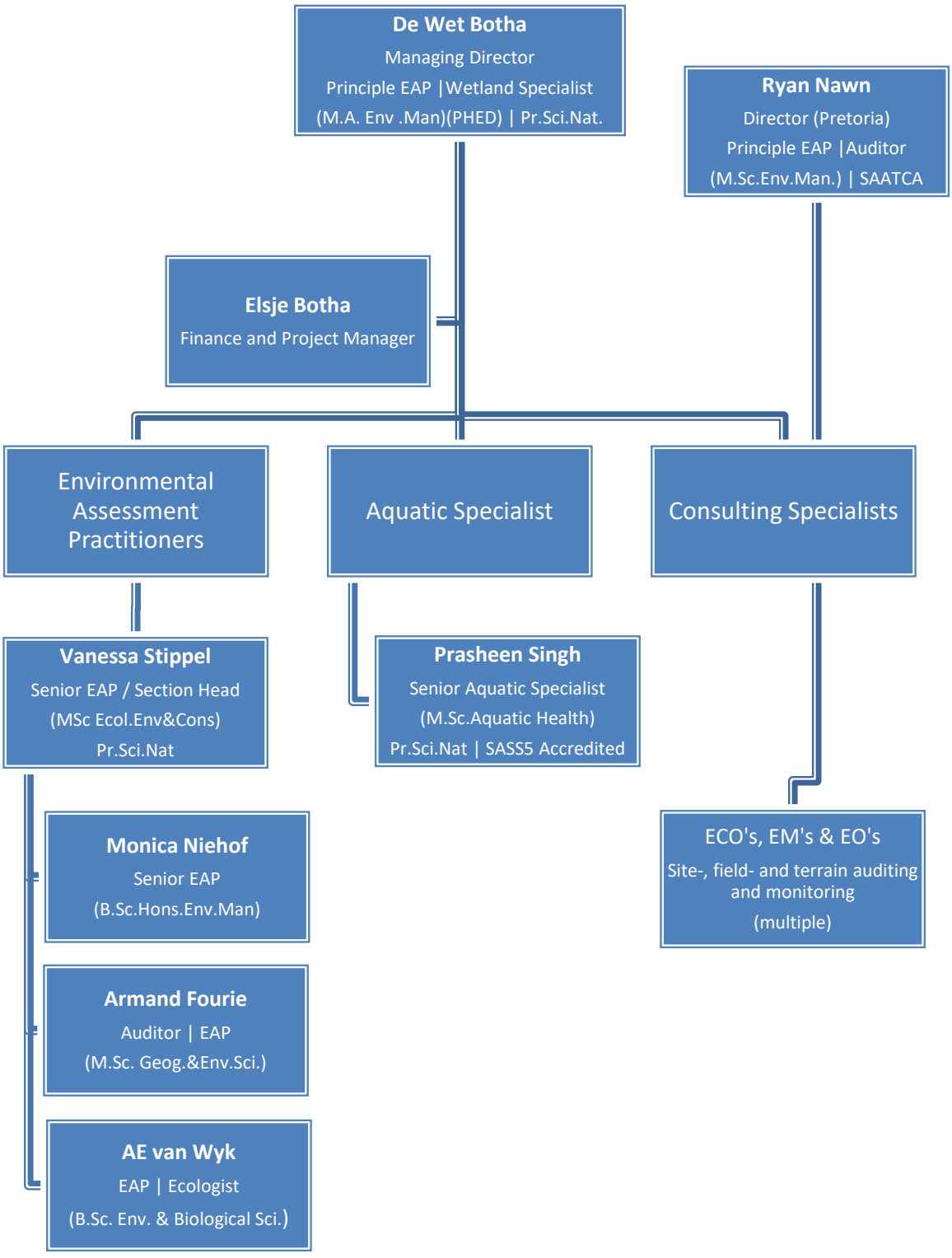
- ISO 14001 Environmental Management Systems
- Environmental Authorisations (and previous RoDs)
- Environmental Management Plans and Programmes for construction projects and mining
- Water Use Licenses
- Waste Licenses
- Green Building developments (conforming to MANUAL-6 & MANUAL-7 of the GBCSA requirements for Green Building)
- All levels of Environmental Monitoring & Control for construction projects representing Clients as:
  - Environmental Auditors
  - Environmental Officers
  - Environmental Monitors
  - Independent Environmental Control Officers (ECO)

Specialist Solutions

The list of specialist services we offer and facilitate includes, *inter alia*, the following:

- Ecological Habitat Assessments
- Aquatic Health Assessments (including SASS5)
- Wetland and Riparian Habitat assessments and delineation
- Rehabilitation plans and mitigatory strategy
- Aquatic and Ecological Monitoring Plans
- Bio-monitoring
- Biodiversity action plans
- Grassland rehabilitation
- Ridge Studies
- Air Quality Impact Assessments
- Geographic Information System (GIS) mapping
- Sensitivity mapping
- Legislation and process guidance
- Policy Development
- Open Space Management Plan (OSMP)
- Public Participation Processes
- EIA Review
- Specialist Auditing
- In terms of Mining Activities we facilitate:
  - Prospecting Right Applications
  - Prospecting Environmental Management Plans
  - Mining Right Applications
  - Closure Applications
  - Closure Cost Calculations
  - Annual Performance Audits (against relevant permits and licenses)

Company Organogram



Contact Us

Johannesburg:	Pretoria:
Tel No: 087 985 0951	Tel No: 012 342 2974
Fax No: 086 601 4800	Fax No: 086 552 1590
E-mail: prism@prismems.co.za	E-mail: prismpretoria@prismems.co.za
Unit 17 Coldstream Office Park	89 Burns Street
Coldstream Street	Colbyn
Little Falls	Pretoria

Visit our website www.prismems.co.za

or find us on Social Media:

LEVEL 2 CONTRIBUTOR TO B-BBEE

PRISM

ENVIRONMENTAL MANAGEMENT SERVICES

Appendix 2 (2) – CV OF EAP

Curriculum Vitae: Ms M Niehof

Name	:	**NIEHOF MONICA CORNELIA**
Date of Birth	:	13 February 1979
Profession/Specialisation	:	Senior Environmental Assessment Practitioner
Nationality	:	South African
Years' experience	:	11

Key Experience

Monica Niehof has 11 years' working experience in the environmental field and 17 years' work experience overall in a variety of fields including the tourism industry. Key experience in the environmental field include Environmental Impact Assessments, Water Use License (WUL) Applications, Waste Management License (WML) Applications, Air Emissions License (AEL) Applications, Environmental Management Programmes, Public Participation Processes, Environmental Authorisation, AEL and WML Auditing, Environmental Control and Monitoring for a variety of development projects including, residential, retail, mixed-use, commercial, infrastructure and mining projects.

Key Qualifications

University of South Africa
BSc. Honours Environmental Management

Tshwane University of Technology
National Diploma Tourism Management

Supplementary Training

- **IWRM, the NWA, and Water Use Authorisations, focusing on WULAs and IWWMPs (2018)**
  Carin Bosman Sustainable Solutions
- **Environmental Legal Training (2017)**
  MacRobert Attorneys, Pretoria
- **Environmental Legal Training (2016)**
  Imbewu Sustainability Legal Specialists, Pretoria
- **Innovative design and management of Tailings and Heap Leach Pads (2015)**
  Ian Hammond, Johannesburg
- **Mining and resources legislation (2013)**
  Imbewu Sustainability Legal Specialists, Johannesburg

Employment Record

January 2018 – To date	**PRISM EMS** Senior Environmental Assessment Practitioner
February 2014 – January 2018	**Environmental Assurance (Pty) Ltd** Environmental Consultant and Auditor
November 2009 – January 2014	**Torbiouse Solutions cc** Environmental Assessment Practitioner
March 2007 – October 2009	**Bokamoso Environmental Consultants** Environmental Consultant

Experience Record (Key Projects)

Environmental Authorisation Process (BA, EIA, WL, WULA/GA):

- Northam Platinum Limited Zondereinde Division – EIA Process and WUL Amendment: 2019 - current
- Peach Tree X 26 – BA and General Authorisation for residential township – 2018 – current
- Wilfordon X8-11 WULA for mixed-use township – 2018 – current
- Kengies X40 – Part 1 Amendment Application, WUL Amendment Application and EMPr: 2019
- Coega Tank Farm – EIA and AEL for proposed tank farm in Coega IDZ – 2018
- Vaal River City Link Road stream crossing GA – 2018
- Luipaartsvlei X9 – EIA for mixed-use development – 2018
- Kusile – BA for filling station and truck stop – 2018
- Greengate X 68 and Greengate X 70 BAs for residential townships – 2018;
- Eastern Platinum Limited: WULAs and WML for Crocodile River Platinum Mine: 2016-2017
- Eurasion Resources Group: EIA / EMPR and WULA for Mamatwan Proposed Manganese Mine: 2014-2015
- Yoctolux Investments (Pty) Ltd: EIA for Yoctolux Proposed Opencast Coal Mine: 2014
- Makoya Supply Chain Holdings (Pty) Ltd: EIA, AEL and WULA for Blinkpan Coal Siding: 2014-2015
- South African Coal Mine Holdings Ltd: EIA for treatment plant at Umlabu Coal Mine: 2014
- Infrasors Holdings Ltd EIA and WULA for Meepo Clay and Sand Mine: 2014
- Samancor Chrome Limited: Western Chrome Mines: EIA, EA amendment and WULA for Elandsdrift Proposed Opencast Chrome Mine: 2014-2016
- Samancor Chrome Limited: Western Chrome Mines: WML and WULA for Millsell/Waterkloof Mine Tailings Storage Facility and Waste Rock Dump Expansion: 2016-2017
- Samancor Chrome Limited: Western Chrome Mines: EA amendment for Millsell/Waterkloof Mine Expansion of Underground Mining: 2016-2017
- Samancor Chrome Limited: Eastern Chrome Mines: Proposed Opencast Chrome Mine: WULAs for Doornbosch, Lannex and Steelpoort Mines: 2017
- Coal of Africa Limited: IWWMP and RSIP updates for Mooiplaats Colliery: 2016 and 2017
- Geosciences (Pty) Ltd: Desktop Environmental Feasibility Study for Vygenhoek Proposed Water Bottling Plant: 2016
- Sabrix: AEL Audits for Boekenhoutkloof and Zandfontein plants: 2017
- Klei Minerale (Pty) Ltd (Sabrix): BA for Boekenhoutkloof Prospecting: 2017-2018
- Brikor: WML, EIA and WULA for the proposed Grootfontein Coal and Clay Mine: 2017-2018
- Aurecon: BA and WULA for the decommissioning of the Mogalakwena Municipality Masodi and Sekgakgapeng Oxidation Ponds: 2017
- Aurecon: WULA for the Mogalakwena Waste Water Treatment Plant: 2017
- Tubatse Chrome (Pty) Ltd: BA and Amendment of the AEL for the Tubatse Chrome Pellitising and Sintering Plant: 2017-2018
- Samancor Chrome Limited: EIA, WULA and WML for Mareesburg Chrome Mine: 2017-2018
- Kemin Industries South Africa (Pty) Ltd: AEL Amendment for Chemical Plant: 2017-2018
- Cell C (Pty) Ltd: Several BAs and Listing Enquiries for telecommunication masts: 2009-2014
- MTN (Pty) Ltd: Several BAs and Listing Enquiries for telecommunication masts: 2009-2014
- Vodacom (Pty) Ltd: Several Bas and Listing Enquiries for telecommunication masts: 2009-2014
- Eaton Towers (Pty) Ltd: Several BAs and Listing Enquiries for telecommunication masts: 2010-2014
- American Tower Corporation South Africa: Several Listing Enquiries for telecommunication masts: 2010-2014
- Hennie Burger: Scoping and EMP for Cashan X12 residential development: 2007
- Chieftain Group Ltd: EIA and EMP for Celtic Farm Estate (Rietvlei Farm Estate): 2007
- Kwezi V3 Engineers: WULA for the upgrading of the Colesberg WWTW: 2008
- Billion Group (Pty) Ltd: DFA scoping andBNEMA EIA for Forest Hill City retail development: 2009
- Noordvaal Developments: BA for the Hartebeesthoek 251 residential development: 2008
- Heartland Properties: EIA for the K113 route determination and construction of the K113 provincial road: 2009
- Cradle Gate: DFA Scoping and EIA for the Mogale X5 Mixed used development: 2008
- Cradle Gate: EIA for Nooitgedacht X9 residential township: 2009

- M&T Developments: EIA for Monavoni X31 residential township: 2008-2009
- M&T Developments: BA for Olympus AH 84 residential development: 2008
- M&T Developments: BA for the Pierre van Ryneveld reservoir: 2008
- Brodsky Investments: EIA for the R81 Provincial road upgrade, Polokwane: 2009
- Local Municipality: BA for the Siyabuswa water augmentation scheme – water supply pipeline in Siyabuswa, Moutse District: 2007-2008
- Dolphin Whisperer 10: BA and EIA for Valley View Phase 1 and Phase 2 residential townships in Emalahleni: 2008-2009
- Century Property Developments: EIA for Waterfall Valley residential township in Midrand: 2009

Section 24G Applications:

Miss Niehof has concluded on section 24G rectification applications in respect of illegal activities that has commenced prior to authorisation under the NEMA and are currently working on three S24G rectification applications.

A short non-descriptive list is provided due to the legal nature of the applications.

- 62 Austin Road – Current
- Grace Trinity School for Girls – Current
- St Declan's School for Boys - Current
- Cell C (Pty) Ltd: Telecommunication Mast: 2013
- USN, Vaal de Soleh: Benjoh Fishing Resort: 2008

Mining/Prospecting Applications, EMPLans and Amendments:

- Eastern Platinum Limited: Environmental Report for Mining Right Renewal for Crocodile River Platinum Mine: 2017
- Eurasion Resources Group: EIA / EMPR for Mamatwan Proposed Manganese Mine: 2014-2015
- Pewstar Investments (Pty) Ltd: EMP for proposed expansion of Vygenhoek sand mine: 2016

EIA/EMP Amendments (Section 102 MPRDA):

- Sky Sands Limited (Group Five): EIA/EMPR Amendment for Proposed expansion of Sky Sands sand mine: 2016

Professional Affiliations

- International Association Impact Assessment (IAIA): 2016-2017.

Curriculum vitae: Mr D Botha

Name	:	**BOTHA, DE WET**
Date of Birth	:	20 June 1977
Profession/Specialisation	:	Principle Environmental Scientist & Biodiversity Specialist
Nationality	:	South African
Years' experience	:	16

Key Experience

Mr Botha has extensive experience in conducting a broad range of applications related to authorisation from the various authorities managing Environmental Legislation in South Africa. Mr Botha has completed numerous EIA's and Basic Assessment Report applications. He has conducted EIA reviews and has acted in a specialist advisory role to other consultants/applicants. Management plans compiled include Environmental Management Plans, Open Space EMPs, Wetland EMP's and Waste Management Plans.

The practitioner has extensive and specialised experience in wetland and aquatic assessment and delineation, as well as applications for Water Use Licenses.

Additional to this, Mr Botha also has experience in Visual Assessments, Specialist Faunal and Floral Surveys, Grassland Rehabilitation and Baseline Agricultural Potential Studies. Mr Botha is an experienced Environmental Control Officer and –Auditor. GIS data and spatial modelling is included in Mr Botha's range of capabilities, along with GIS sensitivity mapping and Project Management.

As a specialist interest, Mr Botha has been involved with research and studying the habitat area of the Juliana's Golden Mole, a Red List threatened species, in association with the University of Pretoria.

Education & Key qualifications

MAGISTER ARTIUM (M.A. Environmental Management)
University of Johannesburg *(2005-2006)*

- Thesis: *Establishing Guidelines for Environmental Management Plans for Golf Course Developments in Gauteng Province.*
- Syndicate research: *Baseline Environmental Assessment investigating the flow of Mercury through the system at the University of Johannesburg in Mercury containing Lighting as a by- product.*
- The biosphere & environmental studies.
- Environmental analysis, management skills & perspectives.

DIPLOMA: REMOTE SENSING AND IMAGE PROCESSING
Rand Afrikaans University (2001)

DIPLOMA: GEOGRAPHIC INFORMATION SYSTEMS (GIS)
Rand Afrikaans University (2001)

BACHELOR OF ARTS (HONOURS) (BA. (Hons) Geography and Environmental Management)
Rand Afrikaans University (2001)
Modules completed:

- Geomorphology
- Energy Technology
- Remote Sensing and Satellite Imagery
- Geographic Information Systems
- Philosophy and Methodology of Geography

POST GRADUATE HIGHER EDUCATIONAL DIPLOMA (PHED).
Rand Afrikaans University (1999-2000)

BACHELOR OF ARTS (BA. Geography and Environmental Management)
Rand Afrikaans University (1996-2000)

Supplementary Qualifications

- Hydropedology and Wetland Functioning – (Water Business Academy / Terra Soil Science) (2018)
- General Water Use Authorisations Workshop (IMBEWU Sustainability Legal Specialists) (2017)
- Understanding the Basics of Wetland Ecosystems (Gauteng Wetland Forum) (2017)
- Wetland Plant Taxonomy (Water Research Commission) (2017)
- Financial Provision Regulations and Mine Closure Requirements (IMBEWU Sustainability Legal Specialists) (2016).
- SASS5 Aquatic Biomonitoring Training Course (DWA, Ground Truth) (2014)
- Tools for Wetland Assessments (Rhodes University) (2011) (Cum Laude) - Certified
- Short Course in Soil Classification and Wetland Delineation (Terra Soil Science) (2008)
- Wetland and Riparian Delineation Course (DWAF Accredited) (2008)
- Practical Field Training – Golden Mole Field Surveys (Pretoria of University; Dr. S. Maree) (2007)
- Lead auditors course (Environmental) ISO 14000 (University of Johannesburg) (2006)
- Geographical Information Systems (GIS) (Run by Geographical Information Management Systems (GIMS) - Introduction to Arcview GIS (2000)
- Geographical Information Systems (GIS) (Run by Geographical Information Management Systems (GIMS) – Introduction and Advance ArcInfo (2000)
- Geographical Information Systems (GIS) Introduction to MapInfo (2000)
- Geographical Information Systems (GIS) Advance and Specialist Map-Info (2000)

Employment record

August 2005 – Present	Prism EMS, Managing Director, Principle EAP, Wetland Specialist
August 2007 – Present	Greenline Environmental, Director, Principle EAP & Wetland Specialist
April 2004 – July 2005	Holgate and Associates, Environmental Scientist
January 2003 – February 2004	North Westminster Community College (UK), HOD Humanities Dept.
January 2002 – December 2002	Kelmscott Secondary School, (UK), HOD Geography
January 2001 – December 2001	Hoërskool Vryburger, Germiston, Teacher (Geography)
August 1999 – December 2000	The Knowledge Factory (Primedia), GIS Specialist/Product Owner

Experience record (Key Projects)

Environmental Legal Experience (more detail available on request)
Mr Botha has concluded on several section 24G rectification applications in respect of illegal activities that has commenced prior to authorisation under the NEMA. Several other legal notice response and applications were also dealt with over the past few years. Same include coastal protection notices etc.

A short non-descriptive list is provided due to the legal nature of the applications.

- 62 Austin Road - Current
- Grace Trinity School for Girls - Current
- St Declans School for Boys – Current
- 7x Wilderness NEM ICM - Current

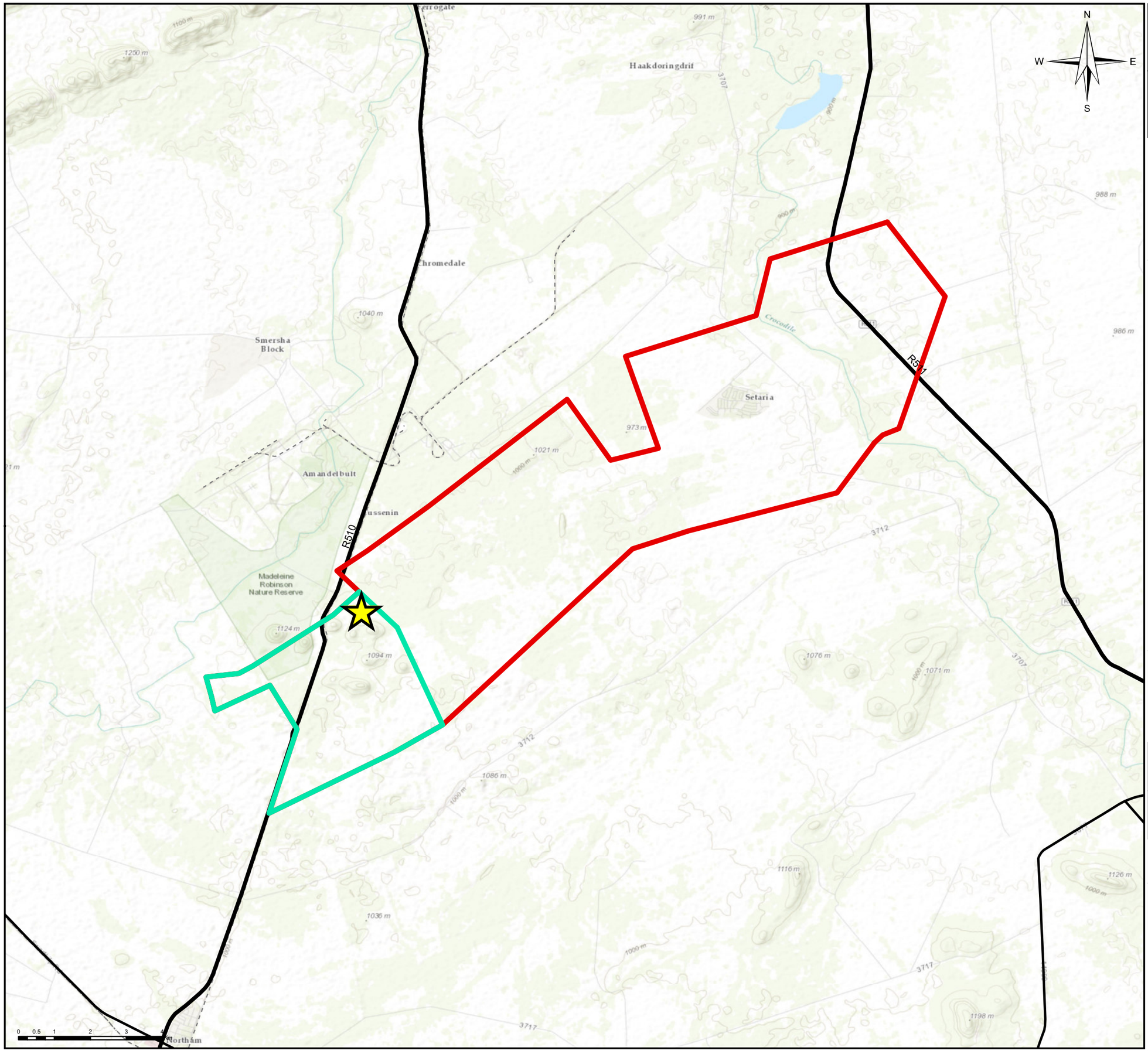
- Halewood International
- Plot 59 Bredell AH
- Plot 1 Marister AH
- Plot 2 Marister AH
- Plot 3 Marister AH
- Avlon School
- Cycle Park
- Sunninghill School
- 210 Kimbult
- Portion 53 Rietvlei 101
- BP Wiggel
- AG Die Casting
- Matt Cast Supplies
- CCP & Bi Metals
- Vikings Foundry
- JC Impellers
- Quantus Foundry
- Tantalite Resources
- Wilgeheuwel Ext 26
- Consol Clayville

Professional affiliations

- South African Council for Natural Scientific Professions (SACNASP) registered Scientist (Pr.Sci.Nat. | 119979)
- Founder Member of Environmental Assessment Practitioners Association of South Africa (EAPASA)
- Member of the International Association for Impact Assessors (IAIAsa) (1653)
- Member of the Gauteng Wetland Forum
- Member of South African Wetland Society

APPENDIX 3 – LOCALITY MAP

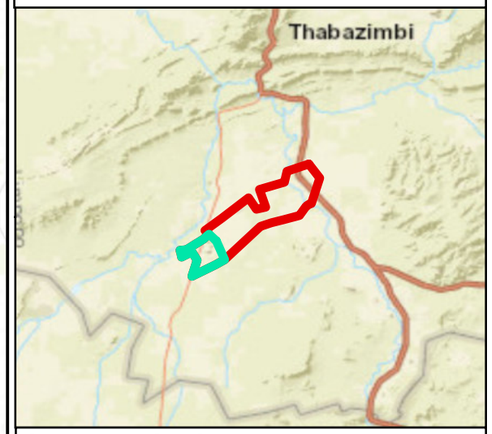
Appendix 3 (1) – Locality Map



PROJECT:

NORTHAM PLATINUM LIMITED

21863
Northam Zondereinde
3 Shaft



GENERAL NOTES:
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Locality Map

Legend

- Proposed Shaft Location
- Zondereinde Western Extension MRA
- Zondereinde MRA

REVISIONS:
FINAL

CLIENT:
NORTHAM PLATINUM LIMITED

ENVIRONMENTAL PRACTITIONER: DE WET BOTHA

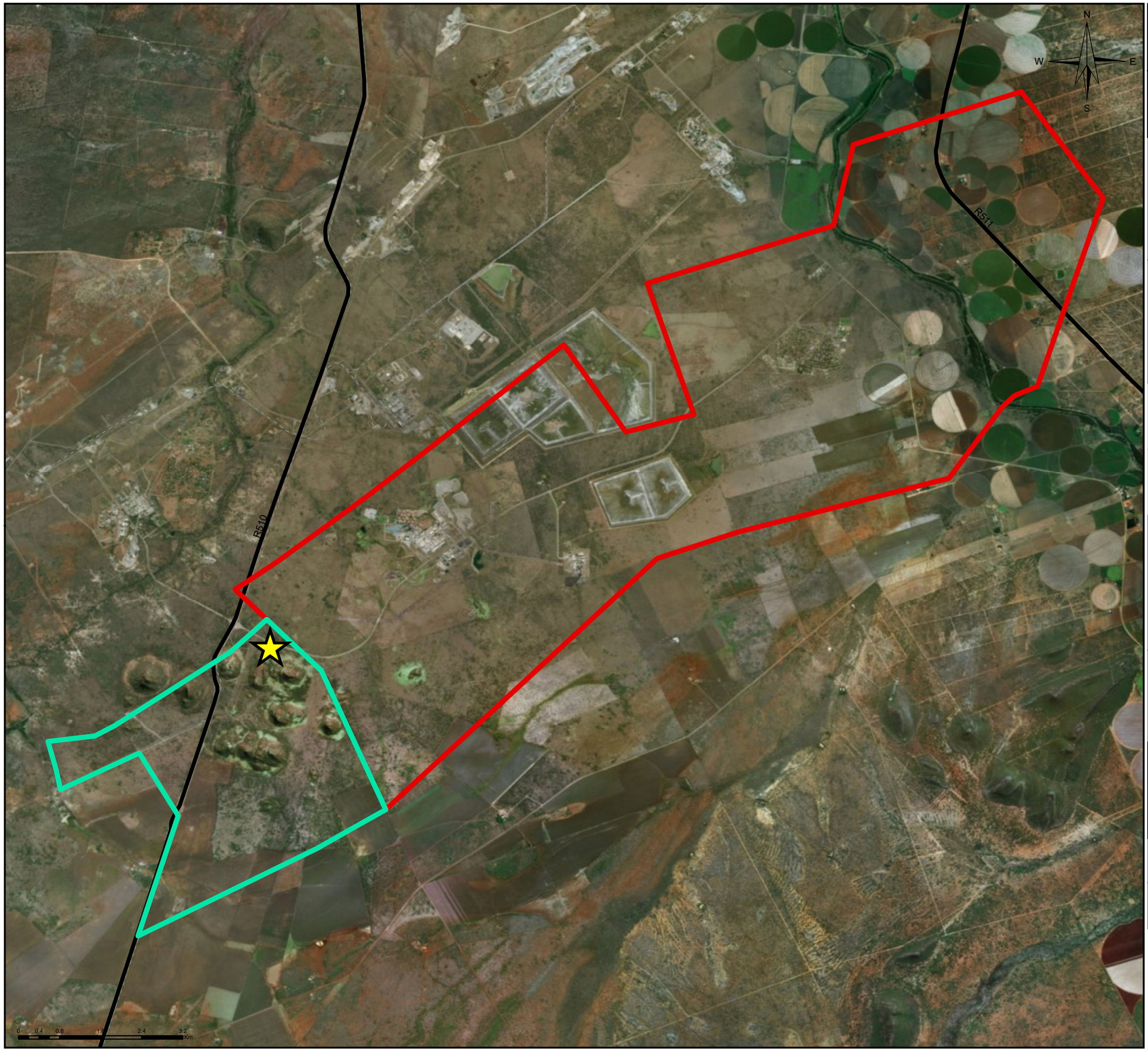
SCALE: 1:100,000

DRAWING REF:
21863_Northam_Locality_MRA

DRAWING STATUS:
FINAL

PRISM ENVIRONMENTAL MANAGEMENT SERVICES
Prism EMS
P.O. Box 1401
Wilgeheuwel
Tel: 087 985 0951
Fax: 086 601 4800
prism@prismems.co.za
www.prismems.co.za

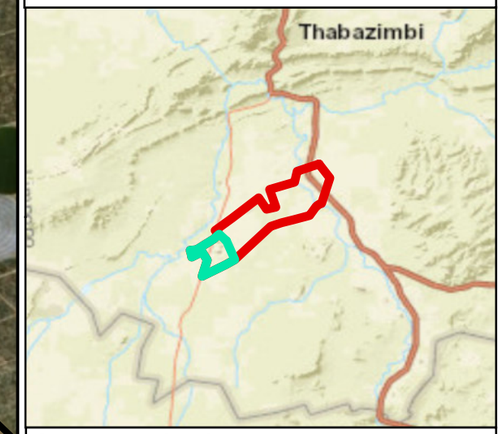
Appendix 3 (2) – Aerial Photograph



PROJECT:

NORTHAM PLATINUM LIMITED

21863
Northam Zondereinde
3 Shaft



GENERAL NOTES:
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Aerial Map

Legend

Proposed Shaft Location

Zondereinde Western Extension MRA

Zondereinde MRA

REVISIONS:
FINAL

CLIENT:
NORTHAM PLATINUM LIMITED

ENVIRONMENTAL PRACTITIONER: DE WET BOTHA

SCALE: 1:70,000

DRAWING REF:
21863_Northam_Aerial_MRA

DRAWING STATUS:
FINAL

PRISM
ENVIRONMENTAL MANAGEMENT SERVICES

Prism EMS
P.O. Box 1401
Wilgeheuwel
Tel: 087 985 0951
Fax: 086 601 4800
prism@prismems.co.za
www.prismems.co.za

APPENDIX 4 – SITE LAYOUT PLANS

Appendix 4 (1) – 3 Shaft Proposed Layout

ZONDEREINDE WESTERN BLOCK SHAFT – LAYOUT

SCALE 1:1000

ISSUED FOR APPROVAL

DRAWING NO.	DESCRIPTION

REFERENCE DRAWINGS

DRAWING NO.	DESCRIPTION

REFERENCE DRAWINGS

REV.	BY	DATE	REVISIONS	CHK.	DATE	S.L.	DATE
B	PR	01.06.19	SERVITUDES ADDED & ESKOM YARD ADJUSTED TO SUIT				
A	PR	20.05.19	ISSUED FOR APPROVAL				

DRA PROJECTS			DRAWING OFFICE		
APPROVAL	SIGNATURE	DATE	D.O. MANAGER		
PROJECT MANAGER			SECTION LEADER		
PROJECT ENGINEER			DRAWN	PR	
PROJECT ENGINEER			CHECKED		
DISCIPLINE ENGINEER			PR. ENG. / PR. TECH.		
DISCIPLINE ENGINEER			NAME:		
DISCIPLINE ENGINEER			REG. NUMBER:		
DESIGN ENGINEER			SIGNATURE:		

DRA Minerals Park
Number 3 Inyanga Close
Sunninghill / 2157
Telephone +27 11 202 8600
PO Box 350 / Rivonia 2128
South Africa
DRAglobal.com
DRA PROJECTS SA (PTY) LTD

TITLE: ZONDEREINDE WESTERN BLOCK SHAFT
ZONDEREINDE

OVERALL SITE
SITE LAYOUT

A0	PROJECT DWG No.	SHEET	REVISION	SCALE
	00000 IH – 00000 –00010	1 of 1	B	1:1000 U.O.S.

Appendix 4 (2) – Existing Overall Mine Layout

-	DESCRIPTION	00.00.00	INI.
REV.	REVISION DESCRIPTION	DATE	INITIALS

CLIENT:

ZONDEREINDE MINE
IWWMP

AISP

SPECIALIST CONSULTING CIVIL ENGINEERS

AfriCan*Innovative*
Solutions and Projects cc.
120 WILLEM BOTHA AVE., WIERDA PARK, CENTURION, SOUTH AFRICA.
TEL: +27 (0) 87 351 8330. FAX: +27 (0) 12 653 1375
E-MAIL:innovative@worldonline.co.za

PROJECT:

NORTHAM PLATINUM
ZONDEREINDE DIVISION

DRAWING TITLE:

STORM WATER -
CLEAN AND DIRTY WATER
INFRASTRUCTURE

DRAWN BY	DESIGNED BY	CHECKED BY	DATE 00.00.00
SCALE		SHEET SIZE	A1
DRAWING No.			REV.

AfriCan*Innovative*
Solutions and Projects cc.

APPENDIX 5 – PROOF OF PUBLIC PARTICIPATION

Appendix 5 (1) – I&AP Register & Database

Prism Ref: 21863

Association							BID Send	Method of delivery	Date of delivery	Registered		
Property Name	Title	Name	Surname	Capacity, Categorically	Organisation/ Affiliation	Capacity				Yes/No	Registration Type	Date
Organs of State and Authorities												
	Ms	Nozi	Molpheno	Commenting Authority	Waterbeg District Municipality	Environmental Officer	Yes	Email	08/07/2019	Yes	Automatic	
	Ms	Nomfundo	Mthethwa		Thabazimbi Local Municipality	Environmental Officer	Yes	Email	01/07/2019	Yes	Automatic	
	Mr	Thlhagala	Ngoasheng		Limpopo Department of Economic Development, Environment and Tourism	Environmental Officer: Waterberg District	Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
				Service Providers	Eskom		Yes	Email	01/07/2019	No		
					Roads Agency Limpopo (RAL)		Yes	Email	01/07/2019	No		
					South African National Roads Agency Limitied (SANRAL)		Yes	Email	01/07/2019	No		
				Competent Authority - Heritage	South African Heritage Resources Agency		Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
	Mr	Donald	Lithole		Limpopo Heritage Resource Authority		Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
	Mr	Thivhulawi	Kolani	Competent Authority - NEMA	Department of Mineral Resources: Limpopo Region	Sub-Directorate: Mine Environmental Management	Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
	Ms	Emily	Munyai		Department of Mineral Resources	Mineral Regulation	Yes	Email	01/07/2019	Yes	Automatic	01/07/2019

Association							BID Send	Method of delivery	Date of delivery	Registered		
Property Name	Title	Name	Surname	Capacity, Categorically	Organisation/ Affiliation	Capacity				Yes/No	Registration Type	Date
	Mr	Fumani Kevin	Khoza	Competent Authority - NWA	Department of Water and Sanitation		Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
	Ms	Mashudu	Mmbadi				Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
	Mr	Tele	Maphoto		Department of rural and Land Reform		Yes	Email	01/07/2019	No		
Ward Councillors												
				Ward 5			Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
				Ward 6			Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
				Ward 8			Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
							Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
							Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
				Ward 11			Yes	Email	01/07/2019	Yes	Automatic	01/07/2019
Land owner and Adjacent Land Owners												
The Remaining Extent of the Farm Zondereinde 384 KQ and The Remaining Extent of the Farm Elandsfontein 386 KQ	Ms	Sonwabiso	Ndaki	Landowner	Northam Platinum Ltd.	Environmental Officer	Yes	Email	01/07/2019	Yes	Requested	01/07/2019

Association							BID Send	Method of delivery	Date of delivery	Registered		
Property Name	Title	Name	Surname	Capacity, Categorically	Organisation/ Affiliation	Capacity				Yes/No	Registration Type	Date
Portion 2 of the Farm Kopje Alleen 422 KQ and The Remaining Extent of the Farm Kopje Alleen KQ	Mr	Leon	Fourie	Adjacent Landowners	Waldi Inv (Pty) Ltd		Yes	SMS	01/07/2019	No		
Portion 2 of the Farm Goevernements Plaats 417 KQ		P	Smit		Smit Familie Trust		Yes	SMS	01/07/2019	No		
The Remaining Extent of Portion 1 of the Farm Goevernements Plaats 417 KQ and The Remaining Extent of Portion 7 of Farm Goevernements Plaats 417 KQ	Mr	Willem	van Schalkwyk				Yes	SMS	01/07/2019	No		
The Remaining Extent of Portion 6 of Farm Kaalvlakte 416	Mr	Carel	Eloff				Yes	SMS	01/07/2019	No		
The Remaining Extent of the Farm Modergat 389 KQ and Portion 1 of the Farm Vlakpoort 388 KQ					Cronimet Chrome Prop Pty Ltd		Yes	Email	01/07/2019	No		
Portion 4 of the Farm Vlakpoort 388 KQ					Afarak South Africa (Pty) Ltd		Yes	Email	01/07/2019	No		
Portion 1 of Farm Schildpadnest 385 KQ		Letsetja	Sema		Anglo Platinum		Yes	Email	01/07/2019	No		
General I&APs												
Registered I&APs												

Appendix 5 (2) – Proof of Newspaper Notice

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA), 1998 (ACT NO. 107 OF 1998) [AS AMENDED] AND HERITAGE IMPACT ASSESSMENT AS REQUIRED BY SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (NHRA), 1999 (ACT NO. 25 OF 1999), AND THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998) [AS AMENDED] (NWA) FOR THE PROPOSED NORTHAM ZONDEREINDE 3 SHAFT = AND ASSOCIATED INFRASTRUCTURE AT NORTHAM ZONDEREINDE MINE

Mining Right Reference Number: LP30/5/1/2/2/37MR

PRISM Reference Number: 21863_Northam Zondereinde 3 Shaft

Notice is hereby given of a public participation process for the following proposed development:

Applicant: Northam Platinum Limited. **Location:** a part of the remainder of the farm Elandsfontein 386 KQ and the remainder of the Farm Zondereinde 384 KQ, Thabazimbi Local Municipality, Limpopo Province at the following coordinates: 24° 50'53.81" S, 27° 18'40.86" E. **Competent Authority:** Department of Mineral Resources: Limpopo Region. **Proposed development**: Northam Zondereinde plans to develop 3 Shaft with associated infrastructure on their existing Mining Right area. The shaft will provide access for the Zondereinde Western Extension. **Listed Activities:** In terms of NEMA and the Environmental Impact Assessment (EIA) Regulations, 2014 [as amended] the following listed activities are triggered under **Listing Notice 1** (GN R 983 of 2014 [as amended]): **Activity 12, 19, 27** & **28** and under **Listing Notice 2** (GN R 984 of 2014 [as amended]): **Activity 6, 12 & 17**. In terms of **Section 38(8)** of the **National Heritage Resources Act, (NHRA) 1999 (Act No. 25 of 1999)**, a Heritage Impact Assessment will also be undertaken. In terms of **the National Water Act, 1998 (Act No. 36 of 1998) [as amended]**: the required application for Section 21 water uses will be undertaken.

Prism EMS has been appointed as the independent Environmental Assessment Practitioner responsible for undertaking the Scoping and EIA and associated public participation process for environmental authorisation.

Register: You are invited to register as an Interested and Affected Party by providing your name, contact information and interest in the matter to the Consultant below. **Review of the DSR:** The Draft Scoping Report will be available for review from **10 July 2019** to **11 August 2019**. To obtain an electronic copy of the report or provide written comments, contact Monica Niehof at Tel: 087 985 0951 Fax: 086 601 4800 E-mail: monica@prismems.co.za. **Start Date of Notification Period:** 01 July 2019.

NOTICE OF APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA), 1998 (ACT NO. 107 OF 1998) [AS AMENDED] AND HERITAGE IMPACT ASSESSMENT AS REQUIRED BY SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT (NHRA), 1999 (ACT NO. 25 OF 1999), AND THE NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998) [AS AMENDED] (NWA) FOR THE PROPOSED NORTHAM ZONDEREINDE 3 SHAFT AND ASSOCIATED INFRASTRUCTURE AT NORTHAM ZONDEREINDE MINE.

Mining Right Reference Number: LP30/5/1/2/2/37MR

PRISM Reference Number: 21863_Northam Zondereinde 3 Shaft.

Notice is hereby given of a public participation process for the following proposed development:

Applicant: Northam Platinum Limited. **Location:** a part of the remainder of the farm Elandsfontein 386 KQ and the remainder of the Farm Zondereinde 384 KQ, Thabazimbi Local Municipality, Limpopo Province at the following coordinates: 24° 50'53.81" S, 27° 18'40.86" E. **Competent Authority:** Department of Mineral Resources: Limpopo Region. **Proposed development:** Northam Zondereinde plans to develop 3 Shaft with associated infrastructure on their existing Mining Right area. The shaft will provide access for the Zondereinde Western Extension. **Listed Activities:** In terms of NEMA and the Environmental Impact Assessment (EIA) Regulations, 2014 [as amended] the following listed activities are triggered under **Listing Notice 1** (GN R 983 of 2014 [as amended]): **Activity 12, 19, 27 & 28** and under **Listing Notice 2** (GN R 984 of 2014 [as amended]): **Activity 6, 12 & 17.** In terms of **Section 38(8)** of the **National Heritage Resources Act, (NHRA) 1999 (Act No. 25 of 1999)**, a Heritage Impact Assessment will also be undertaken. In terms of the **National Water Act, 1998 (Act No. 36 of 1998) [as amended]**: the required application for Section 21 water uses will be undertaken.

Prism EMS has been appointed as the independent Environmental Assessment Practitioner responsible for undertaking the Scoping and EIA and associated public participation process for environmental authorisation.

Register: You are invited to register as an Interested and Affected Party by providing your name, contact information and interest in the matter to the Consultant below. **Review of the DSR:** The Draft Scoping Report will be available for review from **10 July 2019** to **11 August 2019**. To obtain an electronic copy of the report or provide written comments, contact Monica Niehof at **Tel:** 087 985 0951 **Fax:** 086 601 4800.

E-mail: monica@prismems.co.za. **Start Date of Notification Period**: 01 July 2019.

LOCAL AUTHORITY NOTICE
THABAZIMBI LOCAL MUNICIPALITY
NOTICE OF APPLICATION FOR ESTABLISHMENT OF A TOWNSHIP

The Thabazimbi Local Municipality hereby gives notice in terms of Section 16(4) of the Thabazimbi Land Use Management By-Law, 2015, read together with the relevant provisions of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) and Regulations as promulgated, that an application to establish the township referred to in the Annexure hereto, has been received.

Particulars of the application will lie open for inspection during normal office hours at the office of the Municipal Manager, Thabazimbi Municipality, 7 Rietbok Street, Thabazimbi, for a period of 28 days from 28 June 2019.

Objections to or representations in respect of the application must be lodged with or made in writing to the Municipal Manager, Thabazimbi Municipality, at the above address or at Private Bag X530, Thabazimbi, 0380 within a period of 28 days from 28 June 2019.

ANNEXURE

Name of township: Thabazimbi Extension 71.
Full name of the applicant: Plan Wize Town and Regional Planners on behalf of the registered owner.
Number of erven in proposed township:
"Business 1" 2 - 3 erven
"Existing Public Roads":
Description of the land:
Portion 153 of the farm Doornhoek, 318-KQ, Limpopo Province
Situation of proposed township:
The development area is situated at the junction between the National Route Road P16-2 to Lephalale and Road D1485 running through the Thabazimbi town towards Marakele National Park, Hoopdal and Rooiberg.

TSATSI GEORGE RAMAGAGA, MUNICIPAL MANAGER, THABAZIMBI MUNICIPALITY, PRIVATE BAG X530, THABAZIMBI, 0380

PLAASLIKE BESTUURSKENNISGEWING
THABAZIMBI PLAASLIKE MUNISIPALITEIT
KENNISGEWING VAN AANSOEK OM STIGTING VAN DORP

Die Thabazimbi Plaaslike Munisipaliteit gee hiermee ingevolge Artikel 16(4) van die Thabazimbi Bywet op Grondgebruikbestuur, 2015, saamgelees met die relevante bepalings van die Wet op Ruimtelike Beplanning en Grondgebruikbestuur, 2013 (Wet 16 van 2013) (SPLUMA) en Regulasies soos gepromulgeer, kennis dat 'n aansoek om die dorp in die Bylae hierby genoem, te stig deur hom ontvang is.

Besonderhede van die aansoek lê ter insae gedurende gewone kantoorure by die kantoor van die Munisipale Bestuurder, Thabazimbi Munisipaliteit, 7 Rietbokstraat, Thabazimbi vir 'n tydperk van 28 dae vanaf 28 Junie 2019.

Besware teen of vertoë ten opsigte van die aansoek moet binne 'n tydperk van 28 dae vanaf 28 Junie 2019 skriftelik by of tot die Munisipale Bestuurder, Thabazimbi Munisipaliteit, by bovermelde adres of by Privaat Sak X530, Thabazimbi, 0380 ingedien of gerig word.

BYLAE

Naam van dorp: Thabazimbi Uitbreiding 71.
Volle naam van aansoeker: Plan Wize Stads en Streekbeplanners namens die geregistreerde eienaar.
Aantal erwe in voorgestelde dorp:
"Besigheid 1" 2 - 3 erwe
"Bestaande Openbare Paaie"
Beskrywing van grond:
Gedeelte 153 van die plaas Doornhoek, 318-KQ, Limpopo Provinsie
Ligging van voorgestelde dorp:
Die ontwikkelingsarea is geleë by die aansluiting van die Nasionale Roete Pad P16-2 na Lephalale en Pad D1485 wat deur die Thabazimbi dorp strek na Marakele Nasionale Park, Hoopdal en Rooiberg.

TSATSI GEORGE RAMAGAGA, MUNISIPALE BESTUURDER, THABAZIMBI MUNISIPALITEIT, PRIVAATSAK X530, THABAZIMBI, 0380

Local Authority Notice
Thabazimbi Land Use Scheme, 2014
Amendment Scheme 040
Notice of Draft Scheme Thabazimbi Municipality

The Thabazimbi Municipality hereby gives notice in terms of Section 16(1) of the Thabazimbi Land Use Management By-Law, 2015, read together with the relevant provisions of the Spatial Planning and Land Use Management Act, 2013 (Act 16 of 2013) and Regulations as promulgated that a Draft Town Planning Scheme, to be known as Thabazimbi Amendment Scheme 040, has been prepared by it.

This Scheme is an amendment of the Thabazimbi Land Use Scheme, 2014 and contains the following proposal:

The Rezoning of a part of the Remaining Extent of Erf 174, Thabazimbi (±3100m² in extent) to be permanently closed, from "Public Open Space" to "Residential 3".

Particulars of the application will lie for inspection during normal office hours at the office of the Municipal Manager, Thabazimbi Municipality, 7 Rietbok Street, Thabazimbi for a period of 30 days from 28 June 2019.

Objections to or representation in respect of the applications must be lodged with or made in writing to the Municipal Manager, Thabazimbi Municipality, at the above address or at Private Bag X530, Thabazimbi, 0380 within a period of 30 days from 28 June 2019.

Tsatsi George Ramagaga, Municipal Manager, Thabazimbi Municipality, Private Bag X530, Thabazimbi, 0380

Address of authorised agent: Plan Wize Town and Regional Planners, P.O. Box 2445, Thabazimbi, 0380, Tel: 082 449 7626 [Ref. No. T0601]

Plaaslike Bestuurskennisgewing
Thabazimbi Grondgebruikskema, 2014
Wysigingskema 040
Kennisgewing van Ontwerpskema Thabazimbi Munisipaliteit

Die Thabazimbi Munisipaliteit gee hiermee ingevolge Artikel 16(1) van die Thabazimbi Grondgebruikbestuur Verordening, 2015 saamgelees met die relevante bepalings van die Wet op Ruimtelike Beplanning en Grondgebruikbestuur, 2013 (Wet 16 van 2013) (SPLUMA) en Regulasies soos gepromulgeer kennis dat 'n Ontwerp Dorpsbeplanningskema, wat bekend sal staan as Thabazimbi Wysigingskema 040, deur hom opgestel is.

Hierdie skema is 'n wysiging van die Thabazimbi Grondgebruikskema, 2014, en bevat die volgende voorstel:

Die hersonering van 'n deel van die Resterende Gedeelte van Erf 174 Thabazimbi (±3100m² groot) wat permanent gesluit staan te word vanaf "Openbare Oopruimte" na "Residensieel 3".

Besonderhede van die aansoek lê ter insae gedurende gewone kantoorure by die kantoor van die Munisipale Bestuurder, Thabazimbi Munisipaliteit, 7 Rietbokstraat, Thabazimbi vir 'n tydperk van 30 dae vanaf 28 Junie 2019.

Besware teen of vertoë ten opsigte van die aansoek moet binne 'n tydperk van 30 dae vanaf 28 Junie 2019 skriftelik by of tot die Munisipale Bestuurder, Thabazimbi Munisipaliteit, by bovermelde adres of by Privaat Sak X530, Thabazimbi, 0380 ingedien of gerig word.

Tsatsi George Ramagaga, Munisipale Bestuurder, Thabazimbi Munisipaliteit, Privaatsak X530, Thabazimbi, 0380

Adres van gemagtigde agent: Plan Wize Stads- en Streekbeplanners, Posbus 2445, Thabazimbi, 0380, Tel: 0824497626 [Verw. No. T0601]

THABAZIMBI MUNICIPALITY
PROPOSED PERMANENT CLOSURE OF A PUBLIC OPEN SPACE (PARK ERF) AND ALIENATION OF A PART (±3100m²) OF THE REMAINING EXTENT OF ERF 174 THABAZIMBI

Notice is hereby given in terms of Section 68 of the Local Government Ordinance, 1939 (Ord. 17/1939) (as amended) that the Thabazimbi Municipality proposes to permanently close a Public Open Space (Park Erf) of a part (±3100m² in extent) of the Remaining Extent of Erf 174 Thabazimbi and in terms of Section 79(18)(b) of the Local Government Ordinance, 1939 (Ord. 17/1939) (as amended) that the Thabazimbi Municipality resolved to alienate a part (±3100m² in extent) of the Remaining Extent of Erf 174 Thabazimbi, subject to certain conditions.

A plan indicating the park portion, to be closed permanently, will lie for inspection during normal office hours at the office of the Municipal Manager, Thabazimbi Municipal Offices, 7 Rietbok Street, Thabazimbi, for a period of 30 days as from 28 June 2019.

Any person who wishes to object to the proposed permanent park closure or alienation or wishes to submit a claim for compensation, must lodge such objection or claim in writing with the Municipal Manager, Thabazimbi Municipal Offices, 7 Rietbok Street, or address it to Private Bag X530, Thabazimbi, 0380 on or before 26 July 2019.

Tsatsi George Ramagaga, Municipal Manager, Thabazimbi Municipality, Private Bag X530, Thabazimbi, 0380

THABAZIMBI MUNISIPALITEIT
VOORGESTELDE PERMANENTE SLUITING VAN 'N OPENBARE OOP RUIMTE (PARKERF) EN VERVREEMDING VAN 'N DEEL (±3100m²) VAN DIE RESTERENDE GEDEELTE VAN ERF 174, THABAZIMBI

Kennis geskied hiermee ingevolge Artikel 68 van die Ordonnansie op Plaaslike Bestuur, 1939 (Ord 17/1939) (soos gewysig), dat die Thabazimbi Munisipaliteit van voorneme is om 'n deel (±3100m² groot) van die Resterende Gedeelte van Erf 174 Thabazimbi, permanent te sluit en ingevolge Artikel 79(18)(b) van die Ordonnansie op Plaaslike Bestuur, 1939 (Ord 17/1939) (soos gewysig), dat die Thabazimbi Munisipaliteit besluit het om 'n deel (±3100m² groot) van die Resterende Gedeelte van Erf 174 Thabazimbi te vervreem, onderworpe aan sekere voorwaardes.

'n Sketsplan wat die betrokke parkgedeelte, wat permanent gesluit staan te word, aantoon sal gedurende gewone kantoorure ter insae lê in die kantoor van die Munisipale Bestuurder, Thabazimbi Munisipale Kantore, Rietbokstraat 7, Thabazimbi vir 'n tydperk van 30 dae vanaf 28 Junie 2019.

Enige persoon wat beswaar wil aanteken teen die voorgenome permanente parksluiting of vervreemding of 'n eis vir vergoeding wil indien, moet sodanige beswaar skriftelik inhandig by die kantoor van die Munisipale Bestuurder, Thabazimbi Munisipale Kantore, Rietbokstraat 7 of dit aan Privaatsak X530, Thabazimbi, 0380 rig voor of op 26 Julie 2019.

Tsatsi George Ramagaga, Munisipale Bestuurder, Thabazimbi Munisipaliteit, Privaatsak X530, Thabazimbi, 0380

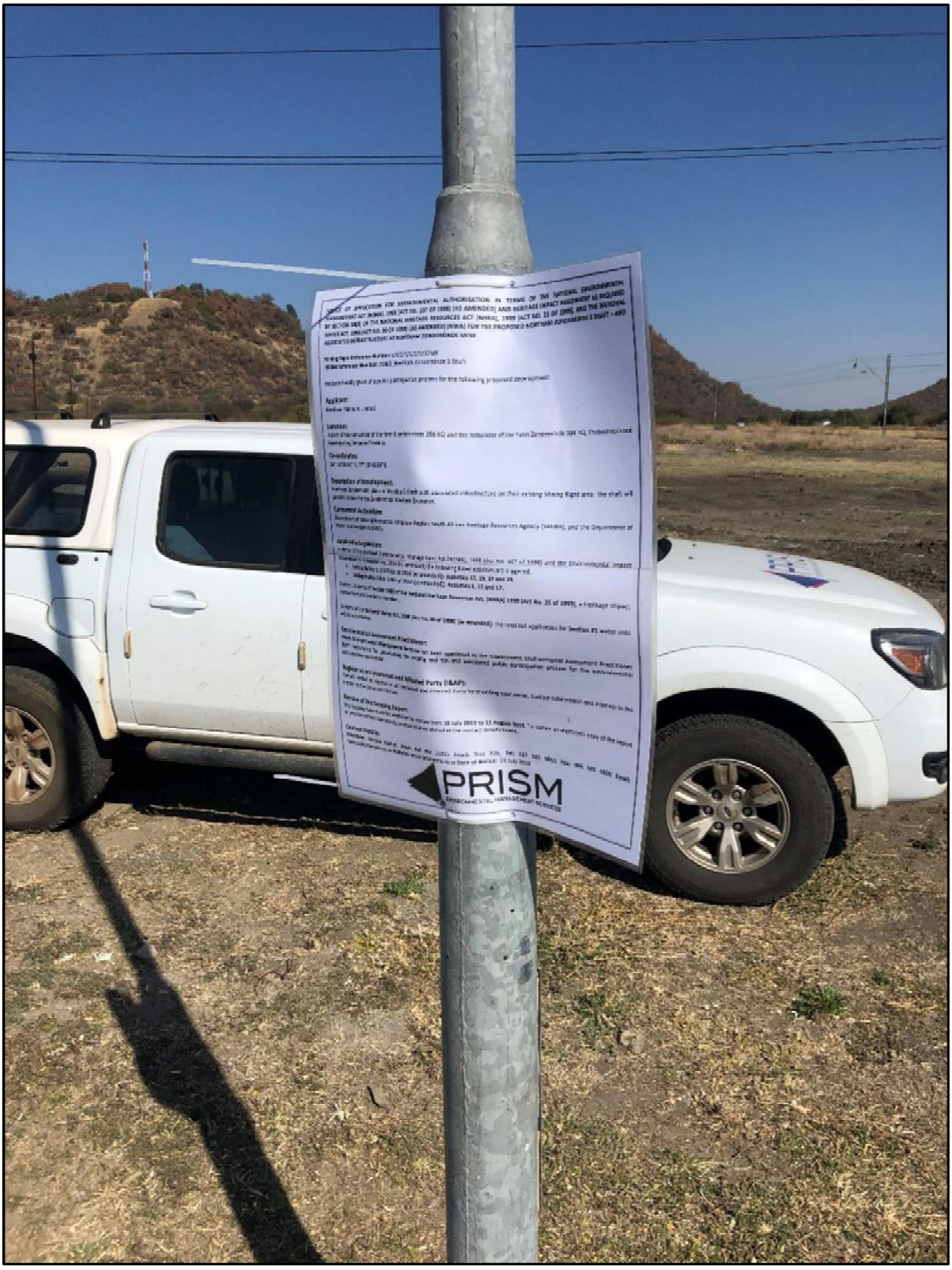
Appendix 5 (3) – Proof of Site Notices

APPENDIX 5.3 - PROOF OF SITE NOTICES

Position of Site Notices

Site Notice 1: Photograph taken of site notice 1 along the road at the site boundary

Site Notice 1: Photograph taken of site notice 1 along the road at the site boundary



Site Notice 2: Photograph taken of site notice 2 at the intersection with the R510 and the unnamed road towards the site

Site Notice 2: Photograph taken of site notice 2 at the intersection with the R510 and the unnamed road towards the site

Appendix 5 (4) – Proof of Written Notices

Will be submitted with the final scoping report

Appendix 5 (5) – Proof of Delivery of Draft Scoping Report

Will be submitted with the final scoping report

Appendix 5 (6) – Communication to and from Interested and Affected Parties

Will be submitted with the final scoping report

Appendix 5 (7) – Comments and Responses Report

No comments received to date

APPENDIX 6 – PRELIMINARY IMPACT ASSESSMENT

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
CONSTRUCTION PHASE																
Establishment of Construction Camp and installation and operation of construction support services including chemical toilets and water tanks and generation of power.	**AIR QUALITY**	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Likely*	*Low*	*High*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Short-term*	*Medium*	*Likely*	*Low*	*High*	*High*	*Low*	*No Loss*	*Reversible*
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	*Local*	*Medium-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Medium-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOIL	Direct	Soil alteration including compaction, contamination and pollution and erosion.	Layout 1	Yes	Negative	*Neighbouring*	*Medium-term*	*Medium-High*	*Definite*	*Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Medium-High*	*Definite*	*Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	WATER	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement and spillage of sewage from the chemical toilets, may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Regional*	*Short-term*	*Medium*	*Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Short-term*	*Medium*	*Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*Medium*	*Low*	*Low*	*No Loss*	*Reversible*
	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*No Loss*	*Reversible*
		Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	*Local*	*Medium-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Medium-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
	TOPSOIL	Direct	Loss of topsoil and erosion	Layout 1	Yes	Negative	*Neighbouring*	*Permanent*	*Medium-High*	*Likely*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Permanent*	*Medium-High*	*Likely*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	SOIL	Direct	Soil alteration including contamination and compaction	Layout 1	No	Negative	*Neighbouring*	*Medium-term*	*Low*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Low*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
	LAND CAPABILITY	Direct	Loss of land capability	Layout 1	Yes	Negative	*Site*	*Long-term*	*Low-Medium*	*Definite*	*Low-Medium*	*High*	*None*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Long-term*	*Low-Medium*	*Definite*	*Low-Medium*	*High*	*None*	*Low-Medium*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
Site clearing, removal of vegetation and topsoil (and stockpiling of topsoil) of the site footprint and for service infrastructure including access and haul roads, raw water and waste water pipelines and stormwater management infrastructure.	WATER	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Regional*	*Short-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Short-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Loss of habitat	Layout 1	Yes	Negative	*Site*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
		Direct	Loss of fauna	Layout 1	Yes	Negative	*Neighbouring*	*Permanent*	*Medium*	*Definite*	*Medium*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Permanent*	*Medium*	*Definite*	*Medium*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
		Direct	Loss of flora	Layout 1	Yes	Negative	*Site*	*Permanent*	*Medium*	*Definite*	*Medium*	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Permanent*	*Medium*	*Definite*	*Medium*	*Medium*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
		Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	*Neighbouring*	*Medium-term*	*Medium*	*Highly Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Medium*	*Highly Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
		Indirect	Degradation of ecological systems	Layout 1	Yes	Negative	*Regional*	*Long-term*	*Medium-High*	*Likely*	*Low-Medium*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Long-term*	*Medium-High*	*Likely*	*Low-Medium*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
		Direct	Disruption of natural corridors	Layout 1	No	Negative	*Neighbouring*	*Long-term*	*Medium-High*	*Highly Likely*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Long-term*	*Medium-High*	*Highly Likely*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
	HERITAGE	Direct	Potential loss of cultural heritage	Layout 1	Yes	Negative	*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
Generation and disposal domestic waste, construction and hazardous waste	SERVICES	Direct	Additional burden on existing landfill.	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
	SOIL, WATER	Direct	Potential pollution of soil, surface and groundwater due to indiscriminate disposal of waste.	Layout 1	No	Negative	*Local*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Medium*	*Likely*	*Low*	*Medium*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Medium*	*Likely*	*Low*	*Medium*	*High*	*Low*	*No Loss*	*Reversible*
	BIODIVERSITY	Direct	Mortalities of fauna caused by ingestion of plastic and potentially toxic materials, or they may suffocate on plastic, if waste is not disposed of correctly. They can also become stuck in waste and may die of hunger and or dehydration as a result.	Layout 1	No	Negative	*Regional*	*Permanent*	*High*	*Likely*	*Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Permanent*	*High*	*Likely*	*Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
Loading/off-loading and transportation of construction materials, machinery, equipment and construction workers.	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*No Loss*	*Reversible*
	NOISE	Indirect	Noise generation by increased traffic on the roads and construction vehicles.	Layout 1	Yes	Negative	*Local*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*Medium*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*Medium*	*Low*	*Low*	*No Loss*	*Reversible*
	SOIL	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained construction vehicles; and spillages of construction materials etc.	Layout 1	Yes	Negative	*Neighbouring*	*Medium-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and construction vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	*Local*	*Permanent*	*High*	*Likely*	*Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Permanent*	*High*	*Likely*	*Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	NATURAL RESOURCES	Direct	Increased fuel consumption	Layout 1	Yes	Negative	*National*	*Short-term*	*Medium*	*Likely*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*National*	*Short-term*	*Medium*	*Likely*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
Earthworks – excavations for establishment of site infrastructure, buildings, headgear, shaft box cut, installation of services and construction of access and haul roads. Stockpiling of construction and excavated materials	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Medium*	*Likely*	*Low*	*High*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Medium*	*Likely*	*Low*	*High*	*High*	*Low*	*No Loss*	*Reversible*
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO_2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	*Neighbouring*	*Medium-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
	TOPOGRAPHY	Direct	Temporary alteration of topography	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Low-Medium*	*Definite*	*Low*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Low-Medium*	*Definite*	*Low*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
	SOIL	Direct	Stockpiling of materials may cause soil compaction.	Layout 1	Yes	Negative	*Site*	*Short-term*	*Medium-High*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Site*	*Short-term*	*Medium-High*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
	HYDROLOGY	Direct	Impact of changes to water quality through construction materials such as sediments, diesel, oils and cement may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	Yes	Negative	*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
Raise bore drilling and drill rig and sinking of shafts and vent raises.	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors to the site when falling into excavation.	Layout 1	No	Negative	*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*No Loss*	*Reversible*
	TOPOGRAPHY	Direct	Temporary alteration of topography caused by drill rig.	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*None*	*Low-Medium*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*None*	*Low-Medium*	*No Loss*	*Reversible*
	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	*Local*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	GROUNDWATER	Direct	Groundwater pollution	Layout 1	Yes	Negative	*Local*	*Medium-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Medium-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
Civil works including establishment of infrastructure on site including the pollution control dam, shaft headgear, conveyor belts and services infrastructure including permanent stormwater management infrastructure, raw water pipeline, waste water pipeline, electrical substation and powerlines. Construction of buildings and structures including offices, ablution/change house, waste storage area and stores, including cement mixing.	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO2, NOx, SOx, VOC's etc.).	Layout 1	Yes	Negative	*Neighbouring*	*Medium-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Low*	*Low*	*Minimal*	*High Degree*
	NOISE	Direct	Generation of noise through construction vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Incidental*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOIL AND WATER	Direct	Contamination of soil and surface and ground water through cement mixing and spillages of hydrocarbons.	Layout 1	No	Negative	*Regional*	*Short-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Short-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Neighbouring*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
Energy, water, raw materials and fuel consumption	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, raw materials and fuel.	Layout 1	Yes	Negative	*National*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*National*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
Demolition and /or removal of temporary construction infrastructure including stormwater drainage structures (e.g. diversion berms), chemical toilets and construction camp.	SOILS	Direct	Soil erosion, compaction and contamination, as well as loss of topsoil.	Layout 1	Yes	Negative	*Neighbouring*	*Medium-term*	*Medium*	*Likely*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Medium-term*	*Medium*	*Likely*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	SOILS	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	*Local*	*Medium-term*	*Medium*	*Likely*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Medium-term*	*Medium*	*Likely*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Health and safety impacts e.g. accidents causing injury to workers or visitors	Layout 1	No	Negative	*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
Rehabilitation of construction camp and other construction areas, including along the raw water and waste water pipelines and access and haul roads.	HEALTH AND SAFETY	Direct	to the site when falling into excavations to be backfilled.	Layout 2	No	Negative	*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	SOILS AND WATER	Direct	Contamination of surface and ground water through spillages of hydrocarbons and waste water.	Layout 1	No	Negative	*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Failure of re-vegetation efforts due to insufficient seeding and monitoring of vegetation establishment.	Layout 1	Yes	Negative	*Site*	*Medium-term*	*Medium-High*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Medium-term*	*Medium-High*	*Highly Likely*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
Creation of employment opportunities throughout the construction phase.	**SOCIO-ECONOMIC**	Direct	Decreased unemployment in the area and economic multiplier effects may improve the socio-economic circumstances of the local community.	Layout 1	Yes	Positive	*Regional*	*Short-term*	*High*	*Definite*	*Medium-High*	*High*	*Very High*	*High*	*No Loss*	*Reversible*
				Layout 2			*Regional*	*Short-term*	*High*	*Definite*	*Medium-High*	*High*	*Very High*	*High*	*No Loss*	*Reversible*
OPERATIONAL PHASE																
Mining: Raise bore drilling and raise bore drill rig	**NOISE**	Direct	Noise impact	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Short-term*	*Medium*	*Highly Likely*	*Low-Medium*	*High*	*Low*	*Low*	*No Loss*	*Reversible*
	TOPOGRAPHY/ VISUAL	Direct	Temporary alteration of topography caused by drill rig causing visual impact.	Layout 1	Yes	Negative	*Local*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*None*	*Low-Medium*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Short-term*	*Medium*	*Definite*	*Low-Medium*	*High*	*None*	*Low-Medium*	*No Loss*	*Reversible*
	SOILS	Direct	Soil alteration through soil erosion and compaction on the surface, as well as contamination through spillages of hydrocarbons.	Layout 1	No	Negative	*Site*	*Short-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Short-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Surface and groundwater pollution through spillages of hydrocarbons.	Layout 1	No	Negative	*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Health and safety impacts	Layout 1	No	Negative	*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	AIR QUALITY	Direct	Dust emissions altering air quality and visibility on nearby roads.	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium-High*	*Highly Likely*	*Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Long-term*	*Medium-High*	*Highly Likely*	*Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
	AIR QUALITY	Direct	Emissions from vehicles and machinery (CO_2, NOx, SOx, VOC's etc.)	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
	NOISE	Indirect	Noise generation by increased traffic on the surrounding roads.	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*No Loss*	*Reversible*
	NOISE	Direct	Generation of noise through heavy vehicles and equipment, causing a nuisance to fauna and surrounding land uses.	Layout 1	Yes	Negative	*Neighbouring*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Long-term*	*Medium*	*Definite*	*Medium*	*High*	*Medium*	*Low*	*No Loss*	*Reversible*
Loading / off-loading and transportation / hauling of overburden and ore	**SOILS**	Direct	Soil alteration including compaction, contamination and soil erosion through spillages of oil and fuel etc. on gravel roads from poorly maintained heavy vehicles; and spillages of construction materials etc.	Layout 1	No	Negative	*Neighbouring*	*Long-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Neighbouring*	*Long-term*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
and transportation of construction workers and other traffic.	HYDROLOGY	Direct	Impact of changes to water quality through spillages of materials from trucks, such as ore, sediments, diesel and oils may pose a threat to the instream and adjacent vegetated areas, if by chance it is dispersed via surface run-off or allowed to permeate groundwater.	Layout 1	No	Negative	*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Incidental*	*Medium*	*Possible*	*Low*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Increase in fauna mortalities on the roads.	Layout 1	No	Negative	*Local*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
	HEALTH AND SAFETY	Direct	Potential for accidents due to increased traffic and heavy vehicles not keeping to traffic rules and speed limits and reckless driving.	Layout 1	No	Negative	*Local*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Permanent*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	TRAFFIC	Direct	Increased traffic on adjacent roads and access issues.	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Highly Likely*	*Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Long-term*	*Medium*	*Highly Likely*	*Medium*	*High*	*Medium*	*Low*	*Minimal*	*High Degree*
	NATURAL RESOURCES	Direct	Increased fuel consumption.	Layout 1	Yes	Negative	*National*	*Medium-term*	*Low*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
				Layout 2			*National*	*Medium-term*	*Low*	*Definite*	*Medium*	*High*	*Low*	*Low-Medium*	*Minimal*	*High Degree*
Dewatering of underground mine	GEOLOGY	Direct	Geotechnical impacts such as ground settlements which may cause damage to surface infrastructure in the drawdown zone.	Layout 1	No	Negative	*Regional*	*Long-term*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Long-term*	*High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Contamination of groundwater.	Layout 1	Yes	Negative	*Regional*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*High*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Impacts on groundwater dependent surface water features such as wetlands and rivers.	Layout 1	Yes	Negative	*Regional*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	SERVICES	Direct	Decrease in water availability to persons dependent on ground water such as farmers and local communities.	Layout 1	Yes	Negative	*Regional*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Long-term*	*Medium-High*	*Possible*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
Operation of conveyor belts	NOISE	Direct	Noise impact	Layout 1	Yes	Negative	*Neighbouring*	*Long-term*	*Medium*	*Possible*	*Low*	*Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Neighbouring*	*Long-term*	*Medium*	*Possible*	*Low*	*Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	VISUAL	Direct	Visual impact	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Definite*	*Medium*	*Medium*	*Very Low*	*Medium*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Long-term*	*Medium*	*Definite*	*Medium*	*Medium*	*Very Low*	*Medium*	*No Loss*	*Reversible*
Exhausting of mine ventilation air	AIR QUALITY	Direct	Alteration of air quality	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Possible*	*Low*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Long-term*	*Medium*	*Possible*	*Low*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
Operation and maintenance of the support services infrastructure on the shaft complex including substation, pollution control dam and stormwater management infrastructure, powerlines, raw water pipelines, waste water pipelines, access and haul roads.	SOILS	Direct	Soil erosion, compaction and contamination.	Layout 1	No	Negative	*Site*	*Long-term*	*Medium*	*Highly Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Site*	*Long-term*	*Medium*	*Highly Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	HYDROLOGY	Direct	Surface and groundwater pollution through spillages.	Layout 1	No	Negative	*Regional*	*Incidental*	*Medium-High*	*Possible*	*Low*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Regional*	*Incidental*	*Medium-High*	*Possible*	*Low*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
	BIODIVERSITY	Direct	Spreading of alien vegetation	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
				Layout 2			*Local*	*Long-term*	*Medium*	*Likely*	*Low-Medium*	*Medium*	*High*	*Low*	*Minimal*	*High Degree*
Energy, fuel, water consumption and depletion of minerals	NATURAL RESOURCES	Direct	Unsustainable use of natural resources may deplete and / or decrease the availability of water, power, minerals and fuel.	Layout 1	Yes	Negative	*National*	*Permanent*	*Medium-High*	*Possible*	*Low-Medium*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*
				Layout 2			*National*	*Permanent*	*Medium-High*	*Possible*	*Low-Medium*	*Medium*	*Medium*	*Low*	*Minimal*	*High Degree*

ACTIVITY	ASPECTS	IMPACTS					CONSEQUENCE			PROBABILITY	SIGNIFICANCE (WOM)	CONFIDENCE	MITIGATION EFFICIENCY	SIGNIFICANCE (WM)	DEGREE	
		TYPE	DESCRIPTION	ALTERNATIVE	CUMULATIVE	NATURE	Extent (A)	Duration (B)	Intensity (C)	Probability (P)	Significance (A + B + C) X P				LOSS RESOURCE	REVERSABILITY
Creation of new employment opportunities and sustaining existing employment at the mine.	**SOCIO-ECONOMIC**	Direct	Decreased unemployment in the area and economic multiplier effects will improve the socio-economic circumstances of the local community and wider region.	Layout 1	Yes	Positive	*Regional*	*Long-term*	*High*	*Definite*	*High*	*Medium*	*Very High*	*High*	*No Loss*	*Reversible*
				Layout 2			*Regional*	*Long-term*	*High*	*Definite*	*High*	*Medium*	*Very High*	*High*	*No Loss*	*Reversible*
Operation of the shaft complex	**SOCIO-ECONOMIC**	Indirect	Decline/increase in property value	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium-High*	*Likely*	*Low-Medium*	*Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
				Layout 2			*Local*	*Long-term*	*Medium-High*	*Likely*	*Low-Medium*	*Medium*	*Medium*	*Low*	*No Loss*	*Reversible*
	SOCIO-ECONOMIC	Indirect	Loss of Sense of Place	Layout 1	Yes	Negative	*Local*	*Long-term*	*Medium*	*Likely*	*Low-Medium*	*Medium*	*Very Low*	*Low-Medium*	*Partial*	*Medium Degree*
				Layout 2			*Local*	*Long-term*	*Medium*	*Likely*	*Low-Medium*	*Medium*	*Very Low*	*Low-Medium*	*Partial*	*Medium Degree*