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FINAL SCOPING REPORT FOR THE UNDERGROUND EXPANSION PROJECT AT EAST AND WEST MINES FOR THARISA MINERALS

DMRE REFERENCE NUMBER: REF NO.: NW30/5/1/1/3/2/1/00358 (SEC 00330 MR) EM
MANYABE CONSULTANCY (PTY) LTD PROJECT CODE: 202308

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Date: 13 November 2024

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DOCUMENT HISTORY – MANYABE CONSULTANCY

Revision	Date	Compiled By	Comments
01	13 March 2024	Mpho Manyabe	Initial draft for commenting by the client
02	13 November 2024	Mpho Manyabe	Final for submission to the DMRE

APPROVAL FOR RELEASE

Name	Title	Signed
Ms. Mpho Manyabe	Manyabe Consultancy: Managing Director and Lead EAP	

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DECLARATION BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

I **Mpho Manyabe**, declare that -

- I act as the independent Environmental Assessment Practitioner (EAP) in this application for the proposed **Underground Expansion Project** at East and West mines.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting Environmental Impact Assessments (EIAs), including knowledge of the relevant Acts, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations and all other applicable legislation, policies and guidelines.
- undertake to disclose to the applicant and the competent authority (CA) all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the CA; and the objectivity of any report, plan or document to be prepared by myself for submission to the CA.
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to Interested and Affected Parties (I&APs) and the public at large and that participation by I&APs is facilitated in such a manner that all I&APs, state department and CA will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application.
- I will ensure that the comments of all I&APs are considered and recorded in reports that are submitted to the CA in respect of the application, provided that comments that are made by I&APs in respect of a final report that will be submitted to the CA may be attached to the report without further amendment to the report.
- I will keep a register of all I&APs that participated in a public participation process (PPP); and all the particulars furnished by me in this form are true and correct.
- I will perform all other obligations as expected from an EAP in terms of the Regulations.

Signature of the EAP

Date: 13 November 2024

EAP Company: Manyabe Consultancy (Pty) Ltd

EXECUTIVE SUMMARY

PROJECT INTRODUCTION AND BACKGROUND

Tharisa Minerals (Pty) Ltd (Tharisa) operates an opencast mining operation that produces chrome and platinum group metals (PGM) concentrate.

Tharisa holds existing environmental authorisations (EAs) and licenses under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), the National Environmental Management: Waste Act, 2008 (Act. 59 of 2008) (NEMWA) and the National Water Act, 1998 (Act. No 36 of 1998) (NWA) for the mining of the East, West and Far West open pits.

Tharisa Mine has been in operation since November 2009 having an initial Mining Right 49/2009 (MR) effective 19 September 2008, issued on 13 August 2009 by the then the Department of Minerals and Energy (DME). Tharisa subsequently applied for an amendment of the MR with the Reference Number: NW/30/5/1/2/2/358 MR, stamped 28 July 2011. This MR was however only registered in 2016.

Tharisa is now proposing to expand the mining operation into the underground working to extend its life of mine (LoM) by approximately 100 years, with underground mining taking place at approximately 100 – 800m below ground level. The project is referred to as the **Underground Expansion Project**. It is proposed that the expansion into the underground workings will increase production by an additional 5 000 tons per day thereby reducing the amount of ore required to be imported. The proposed expansion will occur within the approved MR footprint. The ore extracted will be taken to the existing processing plant for further processing before being sold to a third party.

Tharisa has the potential to extract approximately 15 000 to 18 000 tons of ore per day. At present, the mine extracts approximately 11 800 tons of ore per day and imports 3 500 tons from other mining operations due to Tharisa's inability to access the ore body through opencast mining methods.

Manyabe Consultancy (MC) has been appointed by Tharisa as an independent Environmental Assessment Practitioner (EAP), to undertake a Section 102 amendment application in terms of the MPRDA to amend the Environmental Management Programme (EMPr); to undertake an Environmental Impact Assessment (EIA) to obtain an EA in terms of the NEMA; and to obtain a Waste Management License (WML) in terms of the NEMWA.

The competent authority (CA) for the above-mentioned applications is the North West Department of Mineral Resources and Energy (DMRE).

A Water Use License Application (WULA) process is concurrently being undertaken, for the various activities that will occur within the mine, as various activities are listed as water uses under Section 21 of the NWA.

Currently, the West and East pits are being mined via conventional open pit truck and shovel methods up to a defined economic limit, and will then transition to underground, from the highwall. The pits will be accessed via the West and East declines.

The most effective environmental process [Scoping and Environmental Impact Reporting (S&EIR)] has thus been proposed taking cognisance of schedule constrains as well as to ensure the correct environmental legal process is followed.

Tharisa holds the following approvals:

Approval	Reference	Licence Type	Approval Date
Mining EMPRs			
Environmental Impact Assessment and Environmental Management Programme for a Proposed Platinum Group Metals Mine, Metago Project Number: T014-01, June 2008	DMRE Reference Number: (NW) 30/5/1/2/3/2/1/358EM	Mining Right (MR)	19 September 2008
	DACE Reference Number: NWP/EIA/159/2007	EA	23 October 2009

Approval	Reference	Licence Type	Approval Date
Amendment of the EA, 23 October 2009 to incorporate additional listed activities previously excluded: Transmission and distribution of above ground electricity (120KV or more)	DACE Reference Number: NWP/EIA/159/2007	EA and EMPR Amendment	30 August 2011
Environmental impact assessment and management programme report for changes to the pit, tailings dam and waste rock facilities; a chrome sand drying plant and other operational and surface infrastructure changes, SLR December 2014	DMRE Reference Number: (NW) 30/5/1/2/3/2/1/358EM	EA and EMPR Amendment and Waste Management Licence (WML)	24 June 2015
	DEDECT Reference Number: NWP/EIA/50/2011	EA	29 April 2015
Amendment of an EA for Increase Storage Capacity of Tailings Facility and Waste Rock Dump and Increase the authorised Fuel Storage Capacity in respect of Farm Rooikopies JQ 297, Elandsdrift JQ 467 And Kafferskraal JQ 342, within the Magisterial District of Bojanala, North West Province, Green Gold October 2020	DMRE Reference Number: NW 30/5/1/2/3/2/1/358EM	EA and EMPR Amendment and WML	3 August 2021
Tharisa Additional Waste Rock Storage Environmental Impact Assessment and Environmental Management Programme, SLR 2023 • The expansion of the existing and approved Far West WRD 1 by a footprint of 109 ha. The expanded area will be referred to as the West Above Ground (OG) WRD. Portions of the West OG WRD will be located on backfilled areas of the West Pit; and • The establishment of a waste rock dump (referred to as the East OG WRD) on backfilled portions of the East Pit. The proposed East OG WRD will cover an area of approximately 72 ha.	DMRE: NW 30/5/1/2/3/2/1/358EM	EA and EMPR Amendment and WML	31 May 2023
Tharisa Mine Amendment IWUL (supersedes the 2020 IWUL)	Licence No. 03/A21K/ABCGIJ/1468	IWUL	17 September 2024
Supporting Infrastructure			
EA for the diversion of an existing 275kV powerline and associated infrastructure	Department of Environmental Affairs (DEA) RoD Reference Number: 14/12/16/3/3/3/408	EA	15 November 2012
Amendment of an EA to upgrade the existing Waste Water Treatment Plant at the Tharisa Mine	DMRE: NW 30/5/1/2/3/2/1/358EM	EA and EMPR	14 August 2020
Rectification of an unlawful commencement of a listed activity for the storage of dangerous goods of more than 80m^3 but les then 500m^3	DMRE: NW 30/5/1/2/3/2/1/358EM	EA and EMPR	10 August 2021

OVERVIEW OF THE EXISTING OPERATIONS AND PROPOSED PROJECT INFRASTRUCTURE

A. EXISTING OPERATIONS

Mining at Tharisa Mine is undertaken using conventional open pit truck and shovel methods. The two (2) mining sections (East and West) are separated by a tributary of the Sterkstroom River and the D1325 (Marikana Road). The waste rock from the open pit areas is stockpiled at various WRDs and TSFs. Some in-pit dumping of waste rock has taken place at East Mine.

The existing mining infrastructure includes the following:

- West WRD (64.89 ha);
- Far-West WRD (32.90 ha);

- Far-West Pit (48.03 ha);
- West Pit (39.47 ha);
- Central WRD /Eastern WRD 1 (76.3 ha);
- Eastern WRD (63.23 ha);
- East Pit (211.43 ha);
- Run of Mine (RoM) pad (15.84 ha);
- Concentrator plant (Genesis and Voyager) (28.43 ha);
- Vulcan plant (3.29 ha);
- TSF1 Phase 1 & 2 (115.99 ha); and
- TSF 2 Phase 1 & 2 (101.91 ha).
- Haul roads;
- Various product stockpiles;
- Topsoil stockpiles;
- Stormwater dam;
- Pollution Control Dam (PCD);
- Hernic quarry (stormwater dam);
- Sewage Treatment Plant (STP); and
- Supporting Infrastructure such as:
  - Offices;
  - Workshops;
  - Change houses; and
  - Access control facilities.

A network of roads exists within the mine. A 275 kV powerline and associated Eskom servitude cross through the eastern part of the mining area in a north-south direction. Smaller rural power and telephone lines currently service the residential areas within the western and eastern sections of the project area. Infrastructure (pipes and canals) associated with the Buffelspoort Irrigation Board traverses various sections of the project area in a south-north direction.

The ore body at Tharisa Mine is made up of Middle Group (MG)1, MG2, MG3, MG4 and MG4a. The primary focus of the underground mine will be on extracting the MG1, MG2 and MG4, which are positioned around 12 to 20 m apart, separated by waste and inter-burden. The extraction strategy involves targeting multiple reefs, necessitating the use of superimposed pillars in some sections and off set pillars in others. The design will encompass mining from the base of the crown pillar down to a depth of approximately 800 meters below surface. It is estimated that the **Underground Expansion Project** will be able to generate approximately 5.76 million tons per annum (Mtpa) of RoM ore.

B. PROPOSED PROJECT INFRASTRUCTURE

It is proposed that the following infrastructure will need to be constructed to support the underground operation:

A. UNDERGROUND MINING METHOD

An assessment was undertaken to determine the most effective and efficient mining method to extract the ore body. The following methods were considered:

- Hybrid mining method;
- Mechanised bord and pillar mining; and
- Conventional methods.

The recommended mining method selected to extract the MG2 and MG4 reef horizon would be the mechanised bord and pillar mining, while the hybrid mining method will be utilised to extract the MG1 reef horizon.

B. DECLINE SHAFT

It is proposed that access to the underground mining blocks (East and West) will be through a 5- barrel (6m x 5m) decline system developed from the highwall position of the Tharisa West and East pits on the MG2 reef horizon. The decline aims to permit the conveying of ore out of the mine (via conveyor belts underground), provides access for machines from surface to underground workshops or workplaces, permit access to the underground workings for mining personnel and provide ventilation to the underground operations.

Based on the joints and geotechnical inputs within the mine, declines must advance east and later turn towards the west. The declines will start below and intersect MG2 as early as possible but outside the crown pillar position. The decline will be constructed with a slightly upwards slope initially to limit water inflow into the underground workings from the pit. The main conveyor belt will be installed on the MG2 reef horizon with all ore from MG4 being placed on the conveyor belt through ore passes. Five (5) declines are planned, all targeting the MG2 reef horizon with access to MG4 via breakaway inclines and then mining of the MG4 reef horizon via three (3) declines.

C. BOX CUT DESIGN

The West and East underground box cuts will be constructed in a similar way and will include the following:

- West and East ramp entrance;
- 5-barrel decline;
- North wall; and
- South wall.

D. MINING PROCESSING

The ore extracted from the underground (East and West) will be transferred to the concentrator complex for further processing via product conveyor belts. The concentrator complex has already been approved as part of the 2008 EMPr.

The concentrator complex caters for two (2) streams, namely PGMs and Chrome, to accommodate the different characteristics of the MG ore seams that are mined. Tharisa's two independent processing plants are designed to treat five (5) MG Chromitite Layers of the Bushveld Complex, namely MG1, 2, 3, 4a and 4b. The plants have a similar process flow that includes crushing and grinding, primary removal of chrome concentrate by spirals, followed by PGM flotation from the chrome tails and a second spiral recovery of chrome from the PGM tails. The tails from these plants are processed further in the fine-chrome recovery plant (Vulcan), before deposition of final tails to the TSFs.

The target production figures for the plants are approximately 15 000 tonnes of PGM concentrate per month; and approximately 125 000 tonnes of chrome concentrate per month.

The PGM concentrate is transported to the surrounding smelters in the region. The chrome concentrate is taken by trucks to the Marikana Railway Siding where it is transported by rail to Richards Bay.

E. UNDERGROUND INFRASTRUCTURE AND SERVICES

Two (2) separate support underground infrastructure areas will be constructed to service the West and the East shafts. The following infrastructure will be expected to be constructed underground:

- Substations and mini substations;
- Air compressors to move air within the underground compartments;
- Electrical cables to transfer power underground;
- Refuge chambers;
- Drop raises;
- Control and Instrumentation (C&I) network;
- Underground water storage dams (emergency and transfer dams);

- Underground conveyor belts and chairlifts;
- Ablution facilities;
- Workshops;
- Waste storage facilities;
- Process and potable water underground pipelines; and
- Underground roads.

F. SURFACE INFRASTRUCTURE AND SERVICES

Two (2) separate support surface infrastructure areas will be constructed to service the West and East underground areas. Although a central infrastructure area may be feasible, due to the location of the mine and associated health and safety risks presented by the Marikana Road which divides the mine into East and West, a decision was made to have 2 separate infrastructure areas designed to support the underground workings (East and West).

The opencast mining area will continue to be operational while the underground workings are being constructed and transitioned to underground mining. Therefore the opencast workshop and surface infrastructure will remain and be operated separately from the underground support surface infrastructure.

The following new infrastructure will be established at the West underground support surface infrastructure area:

- Two surface PCDs and silt traps;
- Grey water storage tanks;
- Workshops, storage areas and wash bay;
- Hydrocarbon fuel storage area (2 above ground storage tanks each measuring 30m^3);
- Laydown areas;
- Trackless mobile machinery parking area;
- Mine store and Capital yard;
- STP and balancing tank;
- Stormwater management infrastructure with associated pumps;
- RoM stockpile area;
- Surface conveyor belts;
- Supplementary Infrastructure:
    - Offices, change house, ablutions, and lamp room to cater for 600 to 800 personnel;
    - Vehicle parking area (approximately 372 parking spaces) with solar panels attached to the roof;
    - Access roads and bridge;
    - Processing water reticulation system;
    - Guard house and security fencing;
    - Substation and power supply and backup generators [5 megavolt-amperes (MVA), 11kV/525V and 20MVA, 88/11Kv]; and
    - Potable water storage supply tanks.

The East underground support surface infrastructure will be established to the south eastern corner of the East Pit. The following new infrastructure will be established at the East underground support surface infrastructure area:

- Two surface PCDs and silt traps;
- Grey water storage tanks;
- Workshops, storage areas and wash bay;
- Hydrocarbon fuel storage area (2 above ground storage tanks each measuring 30m^3);
- Laydown areas;
- Trackless mobile machinery parking area;
- Mine store and Capital yard;
- STP and balancing tank;

- Stormwater management infrastructure with associated pumps;
- RoM stockpile area;
- Surface conveyor belts;
- Supplementary Infrastructure:
  - Offices, change house, ablutions and lamp room to cater for 600 to 800 personnel;
  - Vehicle parking area (approximately 372 parking spaces) with solar panels attached to the roof;
  - Processing water reticulation system;
  - Guard house and security fencing;
  - Substation and power supply and backup generators (5MVA, 11kV/525V and 20MVA, 88/11kV); and
  - Potable water storage supply tanks.

G. EXISTING INFRASTRUCTURE TO BE UTILISED

The following infrastructure that is already existing as part of the opencast mine will be utilised to support the underground mining operation:

- Haul roads;
- RoM stockpiles;
- Concentrator complex (all associated infrastructure);
- Topsoil stockpiles; and
- WRDs and TSFs.

H. VENTILATION SHAFTS

Ventilation Shafts will be constructed at strategic locations on the surface to provide ventilation to the West and East underground mine. The ventilation shafts will include upcast and downcast shafts for each underground workings (West and East). These ventilation shafts will be constructed as and when required as the mine expands. The support infrastructure required for the ventilation shaft will include the following:

- Substation and powerlines;
- Access roads; and
- Diesel and hydraulic oil storage areas.

I. ACCESS ROADS

Roads will be constructed around the shafts to provide direct access to the shaft and ventilation shaft areas as well as to access areas within the shaft footprint (internal roads). The West Shaft will have two main access areas, one on the east and one on the western side which will be access controlled. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The East Shaft will be accessed via the existing main entrance to the mine.

J. ELECTRICITY

A short- and long-term solution has been proposed to address the electrical requirements of the mine. The short-term solution which will meet the underground power requirements for approximately four (4) years includes expanding the existing substation and installing underground cables to provide electricity to the underground mine, as well as the construction of 2 new 5MVA, 11kV/525V substations which will feed East and West underground operations.

The long-term solution that is proposed will need to be constructed in 2027. This option will cater to both the West and East underground mining operations. The long-term solution will include the construction and operation of a new 20MVA, 88/11kV substation and associated powerlines.

K. WATER MANAGEMENT

Water at the mine is sourced from local ground water via abstraction from a wellfield developed by the mine and from the western irrigation canal of the Buffelspoort dam irrigation system. Tharisa has also secured an allocation from Rand Water through an agreement with Samancor. In terms of the agreement, the total maximum quota to be supplied is 2,666,000 kilolitres per month.

A network of pipelines transports potable water and recycled/ process water within the mine site. All pipelines are either below the surface or raised 50 cm above ground. Infrastructure (pipes and canals) associated with the Buffelspoort Irrigation Board traverses various sections of the project area in a South-North direction.

New High-Density Polyethylene (HDPE) pipelines will be laid to support the underground operations. The mine will be required to pump water out of the mine to ensure a safe underground working environment. The water pumped out of the underground will be sorted in the proposed PCDs located at the East or West surface infrastructure. This water, which is considered dirty, will be reused within the mining process specifically for washing of vehicles, mining equipment usage, underground drilling, washing of the faces within the underground mine and dust suppression on surface and underground. The remining water will be reused into the concentrator complex and other processing facilities.

Stormwater management infrastructure will be constructed around the mining areas to ensure separation of clean and dirty water as well as to maximise clean water runoff away from the mining areas.

I. Surface Pollution Control Dams and Silt Traps

Two (2) PCDs will be constructed at both East and West shafts to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs will each be lined with a concrete liner and have double silt traps to collect all silt which will be regularly cleaned out during the dry season. The PCDs are named as follows with associated design parameters:

West Shaft

- PCD A
  - Volume: 36 100m^3
  - Dimensions: 95m (Length) X 95m (Width) X 4m (depth)
- PCD B
  - Volume: 5 550m^3
  - Dimensions: 37 m (Length) X 50 (Width) X 3 m (depth)

East Shaft

- PCD C
  - Volume: 36 100m^3
  - Dimensions: 95m (Length) X 95m (Width) X 4m (depth)
- PCD D
  - Volume: 5 550m^3
  - Dimensions: 37 m (Length) X 50 (Width) X 3 m (depth)

Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification.

II. Underground Water Storage Dams

Two (2) emergency underground water dams will be constructed at East and West shafts to ensure the underground workings remain safe and free of water. Transfer dams will be constructed in areas where dust suppression and mining activities will occur. The water will be pumped between surface and underground dams to ensure water is managed effectively and reused. The transfer and emergency dams will change as the mine progresses underground and more area is available to store water which was previously mined.

III. Sewage Treatment Plant

A STP will be constructed at both East and West surface infrastructure areas. The STP at each location will be able to treat 300 – 400 m^3/day of domestic sewage. It is anticipated that the effluent qualities will have Chemical Oxygen Demand (COD) of 600 mg/L, Total Kjeldahl Nitrogen (TKN) of 65 mg/L, and Total Phosphate of 10 mg/L. The proposed STPs will aim to treat the sewage with discharge limits complying with the standards/ guidelines as set out by the DWS.

L. WASTE MANAGEMENT

A waste storage area will be constructed at both the East and West underground support surface infrastructure areas. The waste will be handled, separated, stored, and disposed of at an appropriate accredited facility.

The following waste types are anticipated to be generated at the operation:

- General waste (domestic waste; paper; plastic; cardboard; tins; and glass).
- Hazardous Waste (hydrocarbon waste; chemical waste; and light bulbs i.e. containing mercury).

As part of the proposed mining operation, the following waste-related facilities will be constructed to manage the various waste streams:

- Hazardous waste storage area for the safe and compliant temporary storage of various hazardous waste materials;
- General waste storage area for temporary storage of sorted material before disposal;
- Waste tyre storage area for the short- to medium-term storage of used tyres;
- Material Recovery Facility (MRF) for sorting and separate storage of recyclable materials;
- Oil traps and oil storage tanks for oil interception or recovery, and temporary storage of used oil;
- Salvage yard or scrap yard for temporary storage of scrap metal and reusable mechanical parts; and
- STPs to treat black water produced on site.

Hazardous waste will be removed offsite by a hazardous waste contractor. A safe disposal certificate for the removal of hazardous waste will be retained as proof of safe disposal.

M. EMPLOYMENT AND RECRUITMENT

It is anticipated that the labour requirements below will be needed for the proposed underground mine. The labour will be sourced from both the existing open-cast labour force as well as from external labour forces (local, provincial, and national expertise, if required).

Phase	Total labour	Management	UG Mining labour	UG Equipment Labour	Engineering	Services
Construction Phase	**510**	10	200	50	150	100
Operational Phase	**830**	20	300	100	350	60
Decommissioning Phase	**510**	10	200	50	150	100

N. SURFACE AGREEMENTS

The majority of the surface rights required for Tharisa's operations have been purchased. Where surface rights have not been purchased, appropriate lease agreements have been negotiated.

SCOPING AND ENVIRONMENTAL IMPACT REPORTING PROCESS

EIA is a planning and decision-making tool that is used to identify the environmental consequences of a proposed project before the development takes place. The purpose of the EIA is to describe the potential consequences of the proposed **Underground Expansion Project** in environmental, economic, and social terms. Public issues and concerns must therefore be identified timeously so that these can be recorded and

responded to in the EIA. All comments received in writing will be included in the submission to the CA for consideration.

The NEMA EIA Regulations, 2014, as amended, define two (2) broad processes for an EIA, namely: Basic Assessment (BA) and S&EIR. A BA is required for projects with less significant impacts or impacts that can easily be mitigated. S&EIR is applicable to all projects likely to have significant environmental impacts due to their nature or extent, activities associated with potentially high levels of environmental degradation, or activities for which the impacts cannot be easily predicted. The proposed project entails the undertaking of the S&EIR in terms of the NEMA EIA Regulations 2014, as amended and the NEMWA.

The S&EIR process consists of two phases, as follows:

The first phase is a Scoping Study (current phase), which identifies potential issues requiring more detailed investigation by undertaking specialist studies. A complete list of specialist studies and the issues that must be addressed have been detailed in the Plan of Study for EIA in this Final Scoping Report, which is being made available for public and authority review.

The second phase will be the Impact Assessment Phase during which detailed investigations of the issues identified during the Scoping Study will be undertaken.

This Final Scoping Report has been compiled in terms of Appendix 2 of the NEMA EIA Regulations of 2014, as amended, as well as the requirements of the Scoping Report template issued by the DMRE. All comments received during the review of the Draft Scoping Report have been incorporated into this Final Scoping Report for submission to the DMRE, for decision making.

Before Tharisa can commence with the proposed **Underground Expansion Project**, an amendment to the EMPr, and an integrated EA and WML application need to be undertaken in terms of the following national legislation:

- The NEMA, for the listed activities stipulated in the NEMA EIA Regulations of 2014, as amended;
- The MPRDA, for the amendment of the EMPr in accordance with Section 102 of the MPRDA; and
- The NEMWA, for waste management activities stipulated in GNR. 921, promulgated under NEMWA.

The approvals in terms of the NEMA, NEMWA and MPRDA are being applied for to the North West DMRE.

The S&EIR process is being undertaken as per the following legislation:

Integrated EA and WML Application

The proposed project entails the undertaking of the EIA – S&EIR in terms of the EIA Regulations 2014, as amended; promulgated in terms of the NEMA as listed in GNR. 983, 984 and 985, as amended. These activities are identified as actions that may not commence without an EA granted from the relevant CAs.

As per the NEMWA List of Waste Management Activities, (GNR. 921 of 29 November 2013), the project will trigger Category “B” and “C” activities.

For Category “B” activities, a person who wishes to commence, undertake, or conduct an activity listed under the Category, must conduct a S&EIR process, as stipulated in the EIA regulations 2014, as amended, under section 24(5) of the NEMA as part of a WML application.

For Category “C” activities, a person who wishes to commence, undertake or conduct a waste management activity must comply with relevant requirements or standards determined by the Minister i.e. Norms and Standards for Storage of Waste, 2013.

A WML is being applied for, as the project triggers Category “B” activities. For activities which will be triggered as stipulated in Category “C”, a certificate will be sought from the DMRE.

Section 102 amendment application

Section 102 of the MPRDA states that "*a reconnaissance permission, prospecting right, mining right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right and production right work programme; mining work programme, EMPr, and Environmental Management Plan (EMP) may not be amended or varied (including by extension of the area covered by it or by the addition of minerals or a share or shares or seams, mineralised bodies, or strata, which are not at the time the subject thereof) without the written consent of the Minister*".

It must be noted that Activity 21D has been included in Listing Notice 1 on the NEMA EIA Regulations, of 2014, as amended, which requires that a **BA** be undertaken as part of a MR amendment process in terms of section 102 of the MPRDA. Due to the NEMA and NEMWA listed activities, which require a S&EIR process to be followed, Section 102 amendment is also following the S&EIR process. Section 102 is being applied for to incorporate the proposed underground mining activities.

The proposed project requires that a Section 102 Application process be undertaken to incorporate underground mining methods and associated infrastructure into the EMPr. It should be noted that the ore body to be mined as part of the approved MR does not change, and only the mining method is changing.

Applications for Integrated EA and Section 102 Amendment were submitted to the DMRE on 09 February 2024. Acknowledgements of receipt and approval of the Section 102 and EA Amendment applications by the DMRE were received on 21 and 25 October 2024, respectively.

The Draft Scoping Report has been finalised, and the Final Scoping Report is being submitted to the DMRE for approval with comments and feedback received from Interested and Affected Parties (I&APs) and authorities.

PROJECT ALTERNATIVES

In terms of Appendix 2 of the NEMA EIA Regulations 2014, as amended, all environmental reports must contain a description of any feasible and reasonable alternatives that have been identified, including a description and comparative assessment of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the community, that may be affected by the activity.

Every S&EIR process must therefore identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If no alternatives exist, proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the proposal/ preferred option and the no-go option exist must be provided.

The following alternatives have been considered, and will be further investigated during the Impact Assessment Phase:

The property on which or location where it is proposed to undertake the activity

To minimise the extent of the project disturbance, the project footprint (surface infrastructure) will be located on previously disturbed areas. No alternatives have been investigated in terms of location of the proposed **Underground Expansion Project**. As indicated above, Tharisa currently holds the MR to the areas under investigation.

The type of activity to be undertaken

Tharisa has the potential to extract approximately 15 000 to 18 000 tons of ore per day. At present, the mine extracts approximately 11 800 tons of ore per day and imports 3 500 tons from other mining operations due to Tharisa's inability to access the ore body through opencast mining methods. The ore is taken to a processing plant for further processing before being sold to a third party.

Tharisa publicly declared a mineral reserve of 107.2Mt in December 2022. The declared mineral reserve consists of 88.2Mt delivered from open pit operations and 19Mt from underground operations. The open pit mineral reserves are updated annually, and the underground Minerals were updated through a Prefeasibility Study that was undertaken in 2020. The East Pit is planned to be completed by 2037 and the West/Far West pits by 2040, after which each will transition to underground operations. However, due to numerous factors as highlighted below, the **Underground Expansion Project** has been fast-tracked:

- Inability to relocate communities out of the opencast mining area as well as lack of space to construct new WRDs;
- Additional costs required to purchase land for the construction of the additional WRDs as well as further environmental impacts;
- Due to the geometry of the ore body, increased waste stripping is required to access the ore which will require increased WRD space as well as increase fleet requirements;
- Increase diesel costs and hauling distances between the opencast pits and the processing plant; and
- Requirement to reduce Green House Gas (GHG) in line with the Paris Agreement.

Due to the shortfalls anticipated from the open pit mining areas, it is anticipated that the underground mining for West would need to start operating by 2025 and East by 2030. The introduction of underground mining will extend the LoM until 2125.

The benefits of the **Underground Expansion Project** are listed below:

- Improved 4E grades due to a more selective mining cut;
- Increased production thereby reducing the amount of ore required to be imported;
- Improved overall profitability of the mine;
- Reduction in surface WRDs, and associated property purchases;
- Option to dump waste on top of the unmined West Pit area;
- Reduction in East Pit mining rate, with associated waste stripping and equipment fleet;
- The relocation of the community will no longer be required for mine development however relocation as a result of other mining infrastructure such as the Lapologang TSF will be required but will be limited in extent;
- Creation of employment, increased spending ability feeding back to the Provincial economy, economic empowerment; and
- Negate incremental cost challenges towards end of the LoM.

The technology to be used in the activity

a) Mining Methods Alternatives

Based on the MG cut selection, the most appropriate mining method was selected having considered the following:

- Ore dips.
- Mining heights envisaged.
- Mining cost.
- Ventilation requirements.
- Practicality.
- Safety.
- Level of mechanisation possible.

The following mining methods were considered:

- **Hybrid mining**
- **Mechanised – Bord & Pillar**
- Mechanized – XLP

- Conventional mining
- Long Hole Stope Drilling
- Conventional – Up dip/ Down dip

The recommended mining method selected to extract the MG2 and MG4 reef horizon would be the **mechanised bord and pillar mining** while the **hybrid mining method** will be utilised to extract the MG1 reef horizon.

b) Electricity Supply Alternatives

The underground operations shall be accessed from two (2) box cuts, located on either side of the Marikana Road, approximately 2 km north of the existing Tharisa 11 kV Main Consumer Substation.

The forecast load of the Tharisa underground mining operations is expected to be in the range of 10 to 20 MVA. This load is expected to grow from an initial 5 to 8 MVA in the early years, and to level out to the 10 to 20 MVA level over time.

The following three (3) bulk electricity supply options have been considered:

- Extending an 11 kV underground cable network from the existing Tharisa 11 kV Main Consumer Substation to the Box cut area. Option A entails using 11kV underground cables for the complete route.
- Extending an 11 kV underground cable network from the existing Tharisa 11 kV Main Consumer Substation to the Box cut area. Option B entails using 11kV underground cables combined with a section of overhead lines for the route.
- Constructing a new 88/11 kV substation in close proximity to the Box cut area.

The operational aspects of the activity

The following alternatives were identified with regards to the options for the transportation of product from underground to surface, then to processing plants:

- Haul truck;
- Overland conveyor; and
- Railway.

The option of not implementing the activity

The option of the project not proceeding would mean that the environmental and social status would remain the same as current. This implies that both negative and positive impacts would not take place. As such, negative impacts on biodiversity, water resources, air quality land use, etc. would not transpire, but also that the positive impacts such as economic development, employment creation, skills development, and poverty alleviation would not occur.

If the project was not to proceed, the expected revenue, economic activity, skills development, job opportunities, and the continued upliftment of the surrounding communities as a whole would not be realised. Furthermore, the mineral reserves in the project area would remain unmined. The benefits of the **Underground Expansion Project** will be lost, and the current impacts, especially on the surrounding communities will continue.

The above alternatives will further be assessed in the Impact Assessment Phase.

BASELINE ENVIRONMENT

An overview of the baseline biophysical and socio-economic environment of the proposed **Underground Expansion Project** at East and West mines is given below. This information was obtained from the existing data presented in the approved environmental reports and specialist studies reports which were undertaken

previously, for similar activities at Tharisa Mine. The data will be updated based on the specialist studies which are currently being undertaken for the proposed project.

Environmental Aspect	Description
Geology	The Bushveld Igneous Complex (BIC), a massive intrusive body, has undergone erosion and tilting, and now emerges along the apparent boundary of a large basin measuring nearly 350km across. The BIC is comprised of eastern and western lobes, with a northern and far western extension. Additionally, a buried limb, known as the Bethal Limb, exists based on borehole intersections. All five limbs were formed approximately 2,000 million years ago. The eastern and western limbs exhibit striking similarities. This extensive complex originated when vast amounts of molten rock (magma) from the Earth's mantle ascended to the surface through vertical cracks and conduits in the crust. Upon reaching the surface, it differentiated, cooled, and solidified, resulting in a vast layered igneous body with a predominance of Chromite, thus forming the rare rock type known as Chromitite. Chromite deposits in the BIC are found as stratified layers of massive chromitite. These significant chromitite layers are located in the lower section of the BIC known as the Critical Zone. They are categorised into three groups based on their proximity to each other. The Lower Group (LG) consists of seven chromitite layers, the MG has four main chromitite layers, and the Upper Group (UG) contains two chromitite layers (some sources also mention a third layer - UG3). The naming convention assigns ascending numbers to the layers within each group, starting from the bottom layer (e.g., LG1, LG2, and so on, up to UG2 at the top). This naming convention reflects the concept that the lowermost layers are considered the oldest. The Merensky Reef, situated at some distance above the UG2 chromitite layer, is the uppermost layer of economic interest in the Critical Zone. However, the Merensky Reef is mainly composed of Pyroxenite with only a few thin chromite stringers near its base. The individual chromitite layers can vary in width from a few centimeters to over 2 meters in localised areas, but they generally range around 1 meter in thickness, seldom exceeding 2 meters. As a general trend, the average chrome content and Cr/Fe ratio of the layers decrease as the sequence progresses upward, while the PGMs content increases. The chromitite layers in the MG exhibit intermediate concentrations of both chrome and Platinum Group Elements (PGE) mineralisation, but there is a general decrease in grain size from the lowermost to the uppermost layers. Traditionally, chrome production primarily focused on exploiting the layers of the Lower Group, while PGE production typically targeted the uppermost Merensky Reef and the underlying UG2 Chromitite layer from the Upper Group. From an economic perspective, the chrome and PGE concentrations in the MG Chromitite layers are considered marginal on an individual basis.
Topography, Vegetation and Land Use	Tharisa Mine is situated on slightly undulating plains and located to the east and west of the perennial Sterkstroom River. Small sections of original vegetation remain intact on the site, although most of the site represents old, cultivated land. The major land uses of the project area as classified by the Environmental Potential Atlas of South Africa (2000) are mining and vacant/unspecified land (AGES, 2023b). Tharisa Mine is situated within the Savanna biome which is the largest biome in Southern Africa. The Savanna Biome is characterised by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). Tharisa's operations, land use in the area was a mixture of farming, residential, mining, small business, and general community activities. Similar land uses still take place adjacent to the mine infrastructure and activity areas (Metago, 2008; SLR, 2014). Mining activities occur to the North and immediate West and East of Tharisa Mine. Amongst the mining activities is open land mostly owned by mining companies and the community of Marikana (GLYA, 2023). Immediately West of the mining area, in the MR footprint, is the Lapologang community. The predominant land cover types in the area are listed below: • Mine: Extraction pits and quarries; • Mine: Surface infrastructure; • Mine: Tailings and resource dumps; and • Commercial Annual crops rainfed/ dryland. As a result of this, the area may be described as significantly transformed by mining.
Climate	Tharisa Mine falls within the Highveld Climatic Zone (semi-tropical region) which is characterised by moderately warm temperatures, with mild dry winters and hot summers. The Buffelspoort weather station (Station No. 0511 855 W) is the closest station to Tharisa. The rainy season typically occurs in summer during October to March, with afternoon thundershowers occurring often from August to March (GCS, 2022).

Environmental Aspect	Description
	The area experiences hot temperatures during summer, with a maximum of 36.4°C for October. Winter temperatures are relatively low especially in May to July. The average annual precipitation in the region ranges from 873 mm and 939 mm (Airshed Planning Professionals, 2023a). Rainfall is generally in the form of thunderstorms. These can be of high intensity with lightening and strong gusty south-westerly winds. The frequency of hail is also high with approximately 4-7 hailstorms per season (GCS, 2022). Rainfall conditions are highly variable, and droughts and floods do occur. The annual Wind roses comprise 16 spokes which represent the directions from which winds blew during the period. The average wind speed at the project site is 3.29 m/s and calm conditions (<0.5 m/s) occurred for some 1.2% of the time. Wind speed capable of causing wind erosion i.e., ≥5.4 m/s occurred for about 8.8% of the time. This equates to about 32 days in a year. The prevailing winds are from the northeast (10.2%) and east (9.4%), east northeast (9.3%) respectively. Secondary contributions are from the southeast (9.2%) and east-southeast (9.1%).
Wetlands	There are channelled and Unchannelled Valley Bottom wetlands which have been identified within the study area, and have been grouped as follows: • North-western wetlands; • North-eastern wetlands; • South-eastern wetlands; • South-western wetland and artificial wetland; and • Sterkstroom River.
Surface Water	Tharisa Mine is located in the Crocodile (West) and Marico Water Management Area (WMA) and is located mainly in the Quaternary Catchment Area (QCA) A21K. The Crocodile River is a major tributary of the Limpopo River (Drainage Region A) which discharges into the Indian Ocean (Mozambique). The Pienaars, Apies, Moretele, Jukskei, Hennops, Magalies and Elands rivers are all major tributaries of the Crocodile River which make up the A20 tertiary hydrological catchment with its 39 quaternary catchments (GCS, 2022). The main river upstream of the project site is the Sterkstroom River, which is a source of water for the Buffelspoort Dam. The water quality of the Sterkstroom River (a tributary of the Crocodile River) must be continuously monitored to assess the impacts of the mine on water quality. This river originates in the headwaters of the A21K quaternary catchment, which then flows through the Buffelspoort Dam (approximately 5.8 km upstream) and then traverses the mine and continues towards the Crocodile River. The Sterkstroom River has an ecological category of class C (DWS, 2014). Class C means the river system is moderately modified and a loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged (Kleynhans, Louw, & Graham, 2008).
Groundwater	Groundwater enters the mine as direct recharge from rainfall or as seepage from the TSFs or WRDs. According to the Groundwater Resources Association (GRA) II datasets, the average recharge for the entire catchment is about 28 mm/a, or about 0.000077 m/d (SLR, 2014). Due to mine dewatering, the local groundwater flow directions in the deeper fractured aquifer are generally re-directed towards the mine. The general groundwater flow direction is from south to north, or southeast to northwest. Groundwater within the mining area is neutral (pH~7.8) and non-saline [average Total Dissolved Solids (TDS) of 340 mg/l]. The average sulphate concentration is ~38.9 mg/l and the average nitrate as N concentration is ~5.8 mg/l.
Terrestrial Ecology (Flora and Fauna)	The mine falls within the Marikana Thornveld which is an important vegetation type that requires careful consideration when developing mining projects. Based on the North West Biodiversity Sector Plan (NWBSP), the project area occurs within a Terrestrial Critical Biodiversity Area (CBA)2 and is earmarked as Ecological Support Area (ESA)1 and ESA2 classifications. This suggests that patches of provincially Endangered and/or Vulnerable ecosystems, or endemic vegetation types, are present and any further modification should be limited to existing irreversibly modified or heavily degraded areas. Also, the ESAs suggest the presence of important habitats or supporting movement corridors within the region. The project area includes a terrestrial CBA and a critically endangered river (the Sterkstroom) defined by the North-West Province 2009 biodiversity assessment, and a High Biodiversity area in terms of the recently published Mining Biodiversity Guidelines. It is important to note that these national guidelines and assessments were published after the mine was approved in 2008. The area has been transformed by agricultural and mining activities (both on the project sites and in the surrounding areas), yet aquatic and terrestrial habitat, although limited, does still exist within the project area which is suitable for fauna and flora species, including some Red Data and protected species.

Environmental Aspect	Description
Soil and Land Capability	The dominant soils at Tharisa Mine are neutral to slightly alkaline (pH of 5.2 to 7.3), which is within accepted range for good nutrient mobility. These soils tend to be saline in character. Due to the generally high clay content of the soils, the cation exchange capacity (CEC) of the soils is moderate to high. Majority of the soils within the Tharisa Mining Right Area (MRA) have moderate erodibility. These soils are not that prone to erosion, but compaction and contamination of these soils require assessment and mitigation.
Air Quality	Existing sources of emissions in the region and the characterisation of existing ambient pollution concentration is fundamental to the assessment of cumulative air impacts. A change in ambient air quality can result in a range of impacts which in turn may cause a disturbance and/or health impacts to nearby receptors. The main pollutant of concern in the region is particulate matter [total suspended particles (TSP)]; PM_{10} and $PM_{2.5}$) resulting from vehicle entrainment on the roads (paved and unpaved surfaces), mining and smelter activities, farming activities and windblown dust from exposed surfaces, mine waste dumps and TSFs. Gaseous pollutants such as sulphur dioxide (SO_2), nitrogen dioxide (NO_x), carbon monoxide (CO), and carbon dioxide (CO_2) would result from vehicles, mining equipment, and processing emissions. A dust fall network is in place comprised of 15 single dust buckets located at and around Tharisa Mine, and passive sampling is conducted at three locations to determine background SO_2 and NO_2 concentrations.
Noise	Tharisa Mine is located in an area where the character of ambient noise is already affected by industrialisation and economic activity, which over time, has resulted in an increase in road traffic noise and noise generated by intensive mining activities by surrounding mines. Road traffic emanates specifically from the N4 and various secondary roads, such as the Marikana Road that runs between the East and West mining areas at Tharisa Mine. The N4 has a wide noise footprint, affecting people living within a zone of approximately 1.2 km either side of the road, while noise generated by surrounding mining activities affects communities, farmers and other third parties in the immediate surrounds. These land use types and associated activities represent perennial sources of noise in the area, such as industrial and traffic noise. Noise emissions from these anthropogenic elements (activities mentioned above) and noise emissions from natural elements such as insects, birds, weather events etc. contribute to the existing soundscape (acoustic baseline environment) of the area.
Visual Aesthetic	The visual character of an area is determined by considering landscape character, scenic quality, sensitivity of the visual resource, sense of place and visual receptors. Mine-related infrastructure and activities has the potential to alter the visual aspects in a project area and surrounding area. The project area is largely disturbed and is characterised by Tharisa's mining-related infrastructure and activities as well as private farming and community related activities. Natural elements within the MR area exist, including various scattered patches of natural habitat and the Sterkstroom River, separating the East and West mining areas.
Heritage/ Archaeology and Palaeontology	The most important heritage resources discovered in the area were stone-walled settlements, graveyards, a historical village and homestead, mining heritage remains, isolated and randomly scattered stone tools, historical houses and outdated and discarded agricultural implements. Graveyards located within the mining area have since been relocated with all associated consultations and permits. There are several churches within the MRA. These churches include the African Faith Mission (AFM), Uniting Reform Church (URC), New Earth Apostolic Church (NEAC) Ts'enolo Apostolic Church (TAC) and many other apostolic churches whose members assemble at various venues including private homes, schools and/or hired venues. Heritage resources of high significance have been identified within the MRA. Tharisa obtained a permit in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), for the exhumation and relocation of graves to be disturbed by the mining of the east pit. Although no paleontological resources are expected within the MRA, these resources are protected by national legislation and must be reported to the South African Heritage Resources Agency (SAHRA) should they be identified on-site.
Socio-Economic Environment	The mining sector is a big contributor to the economy of South Africa as well as the region. The Rustenburg area has a large concentration of mining activities, with the mining sector creating the biggest job opportunities. The proposed project to be implemented has many positive benefits and spinoffs both during the construction and operational phases. The benefits and positive impacts have a countrywide reach.

POTENTIAL IMPACTS

A number of potential impacts have been identified which will be considered further in the process as required.

CONSTRUCTION PHASES
• Sedimentation of the Sterkstroom River from site clearing. • Loss of soil resources and land capability due to site clearing and grubbing of the footprint areas associated with the construction of the underground infrastructure. • Soil erosion, soil compaction, and loss of topsoil. • Benefits resulting from employment programmes and income opportunities created by the mine. • Benefits resulting from local supply chain and procurement. • Loss of natural vegetation and habitat. • Dust generation. • Possible impacts to groundwater from seepage. • Reduced recharge of groundwater due to increased run-off. • Pollution of the Sterkstroom River from hydrocarbon spills from construction machinery. • Destruction of wetlands. • Introduction of Alien Invasive Plant species (AIPs) resulting in further alteration of the natural vegetation profiles of freshwater resources. • Alteration of the natural topography of the area, changing its baseline sense of place. • Noise impacts from construction machinery and vehicles. • Loss of heritage/ cultural and paleontological resources.
OPERATIONAL PHASE
• Sedimentation of watercourses due to operational activities. • Soil erosion, dust generation, soil compaction, and loss of topsoil. • Possible impacts to groundwater from seepage and spillages such as hydrocarbons. • Reduced groundwater quantity as a result of dewatering for underground mining. • Risk of subsidence. • Air pollution through dust generation and gaseous emissions. • Creation of Jobs. • Noise disturbance from operational and maintenance activities.
CLOSURE/ REHABILITATION.
• Pollution to surface water from hydrocarbon spillage from rehabilitation equipment. • Contamination of surface water resources by Acid Mine Drainage (AMD). • Compaction of soil, soils erosion and contamination of soil resources from heavy vehicles. • Potential for establishment of alien invasive vegetation. • Noise disturbance from decommissioning machinery and vehicles (however not expected to impact any receptors). • Increase in dust fallout. • Loss of employment and enterprise development opportunities. • Risk of subsidence. • Groundwater Contamination.

Specialist baseline and impact assessments will be conducted for these potential impacts.

SPECIALIST STUDIES

The following specialists' studies will be undertaken, for the various environmental aspects:

- Closure and Rehabilitation Plans;
- Social Impact Assessment;
- Community Health Assessment;
- Climate Change Assessment;
- Blasting and Vibration Assessment;
- Air Quality Impact assessment;
- Ground Water Impact Assessment;
- Noise Impact Assessment;
- Heritage Impact Assessment and Paleontological Studies;
- Terrestrial Ecology Assessment;
- Aquatic Ecology & Wetlands Assessment; and

- Surface Water Impact Assessment.

The specialists will assess the impacts (including cumulative effects) of the proposed activity/aspect in relation to the construction, operational, closure and decommissioning phases. The reports will detail appropriate and implementable measures to avoid, mitigate and manage the potential impacts that have been identified.

PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) is being undertaken in terms of Chapter 6, Regulation 41 of the EIA 2014 Regulations, as amended, for the proposed project triggering listed activities under the NEMA, NEMWA and the MPRDA. MC on behalf of Tharisa took into account all relevant guidelines applicable to the PPP as contemplated in section 24J of the NEMA. Notices were given to all potential I&APs to participate in the project, as follows:

Announcement of the project and the Draft Scoping Report availability

The objectives of PPP during the scoping phase are to provide sufficient and accessible information to I&APs in an objective manner to enable them to raise comments, issues of concern and suggestions for enhanced benefits. I&APs also have an opportunity to provide input into the terms of reference (ToR) for the specialist studies, and to contribute relevant local and traditional knowledge to the S&EIR process.

The project was announced to the public on **Friday, 09 February 2024**, by means of the placement of a newspaper advertisement and site notices. Background Information Documents (BIDs) were distributed to I&APs to create awareness of the proposed project. The report was subjected to a PPP of at least 30 days and this Final Scoping Report reflects the incorporation of comments received, including comments from the competent and commenting authorities.

The following processes were undertaken to announce the project and the availability of the Draft Scoping Report:

- An I&AP database was compiled and is being maintained, and includes all I&APs in respect of the application in accordance with Regulation 42.
- Letters were sent to all I&APs, written in any of the manners provided for in section 47D of the NEMA, announcing the project and the availability of the Draft Scoping Report, containing project information, a locality map to the municipal councillor, community members, the local and district municipality, state departments and all other stakeholders as required by the CA, including adjacent communities' members.
- Affected parties who could not be reached via mail, fax or e-mail of the proposed project, were visited for delivery of the letters. The letters attached sheets which allowed I&APs to register and/ or/ comment on the Draft Scoping Report.
- Four (4) site notice boards were fixed at places conspicuous to and accessible by the public at the boundary of the site where the activity to which the application relates. Site notices were written in English and Setswana.
- One (1) advertisement (translated into both English and Setswana) was placed in the Rustenburg Herald Local newspaper.
- The Draft Scoping Report was also made available on the MC website (https://manyabeconsultancy.com/stakeholder-engagement/); and at the Marikana Public Library.
- SMS notifications of the availability of the Draft Scoping Report for public comment were distributed.
- Two (2) focus group meetings were hosted with the surrounding community members, to discuss the Draft Scoping Report and the project, as follows.

Venue	Date	Times
Mmaditlhokwa Village: **Open Space**	10 February 2024	10:00 - 12:00
Lapologang Village: **Sports Ground**	10 February 2024	14:00 - 16:00

- The proceedings of the public meetings, as well as all comments submitted have been captured in a Comments and Responses Report (CRR) which has been attached to this Final Scoping Report for submission to the DMRE for decision-making.
- Telephonic consultation was undertaken with I&APs to obtain comments about the Draft Scoping Report; and to share information about the Project and to obtain comments about the Draft Scoping Report.

All comments and representations received from I&APs have been considered and recorded in the CRR. All I&APs who have participated in the PPP have been thanked, and their comments acknowledged.

The Draft Scoping Report was available for public comment from **Friday, 09 February 2024** to **Monday, 11 March 2024**.

Announcement of the Submission of the Final Scoping Report to the Competent Authority

- The Draft Scoping Report has been updated based on the comments and inputs received during the review and commenting period of the Draft Scoping Report.
- The Final Scoping Report is being submitted to the DMRE for decision-making. All registered I&APs are being notified of the Final Scoping Report submission, and that it is available on the MC website for review and comment.
- Any additional comments received will be incorporated into the Draft EIA and EMPr Report. All additional comments will also be captured in the “live, continuously updated” CRR for the project.

The Final Scoping Report is being made available for public comment from **Wednesday, 13 November 2024** to **Friday, 13 December 2024**.

CONCLUSION

This report serves to detail the outcome of the scoping assessment requirements for the proposed **Underground Expansion Project**. Various alternatives have been identified, with a couple being carried through for investigation in the Impact Assessment Phase of the S&EIR process, due to the need for specialist assessment and input. Further investigations are required to fully characterise the receiving environment as well as to investigate the potential negative and positive impacts associated with the proposed project. The Draft Scoping Report was subjected to PPP for review by all identified I&APs. All comments received during the review of the Draft Scoping Report have been incorporated into this Final Scoping Report (this report) for submission to the DMRE for approval.

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AERMOD	Atmospheric Dispersion Modelling System
AFM	African Faith Mission
AIPs	Alien Invasive Plant species
AMD	Acid Mine Drainage
BA	Basic Assessment
BATNEEC	Best Available Techniques Not Entailing Excessive Cost
BBBEE	Broad Based Black Economic Empowerment
BDM	Bojanala Platinum District Municipality
BIC	Bushveld Igneous Complex
BIDs	Background Information Documents
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
CEC	Cation Exchange Capacity
CO	Carbon Monoxide
COD	Chemical Oxygen Demand

CO_2	Carbon Dioxide
CRR	Comments and Responses Report
CV	Curriculum Vitae
C&I	Control and Instrumentation
DACE	Department of Agriculture, Conservation and Environment
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEDECT	Department of Economic Development, Environment, Conservation and Tourism
DFFE	Department of Forestry, Fisheries and the Environment
DME	Department of Minerals and Energy
DMRE	Department of Mineral Resources and Energy
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
ESAs	Ecological Support Areas
$FeCr_2O_4$	Chromium Oxide
FeO	Iron Oxide
GDARDE	Gauteng Department of Agriculture, Rural Development and Environment
GDP	Gross Domestic Product
GHG	Green House Gas
GNR	Government Notice Regulation
GRA	Groundwater Resources Association
Ha	Hectares
HDA	Historically Disadvantaged
HDPE	High-Density Polyethylene
HIA	Heritage Impact Assessment
HOA	Home Owner Association
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPAP	The Industrial Policy Action Plan
IUCN	Union for Conservation of Nature
IWWMP	Integrated Water and Waste Management Plan
IWUL	Integrated Water Use Licence
IWULA	Integrated Water Use Licence Application
I&APs	Interested and Affected Parties
K	Potassium
LED	Local Economic Development
LG	Lower Group
LHRP	Labour and Human Resources Plan
LoM	Life of Mine
MC	Manyabe Consultancy (Pty) Ltd
MEC	Member of the Executive Committee
MG	Middle Group
MHSA	Mine Health Safety Act, 1996 (Act No. 29 of 1996)
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right
MRA	Mining Right Area
MRF	Material Recovery Facility
Mtpa	million tons per annum
MVA	megavolt-amperes
NAAQSs	South African National Ambient Air Quality Standards
NDP	National Development Plan
NDR	Dustfall Regulation
NEAC	New Earth Apostolic Church
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMAQA	National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004)
NEMPAA	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

NEMWA	National Environmental Management: Waste Act, 2008 (Act. 59 of 2008)
NFA	National Forestry Act, 1998 (Act No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NGO	Non-Government Organisation
NGP	National Growth Path
NHRA	National Heritage Resources Act, 1999 (Act. No 25 of 1999)
NO_X	Nitrogen oxides
NPI	Australian National Pollutant Inventory
NSSD	National Strategy for Sustainable Development
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NWBSP	North West Biodiversity Sector Plan
P	Phosphoros
PCD	Pollution Control Dam
PGE	Platinum Group Elements
PGM	Platinum Group Metals
PPE	Personal Protective Equipment
PPP	Public Participation Process
QCA	Quaternary Catchment Area
READ	Rural, Environment and Agricultural Development
RoD	Record of Decision
RoM	Run of Mine
SCC	Species of Conservation Concern
SACNASP	South African Council for Natural Scientific Professions
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SANS	South African National Standards
SDF	Spatial Development Framework
SLP	Social and Labour Plan
SME	Small and Medium Enterprise
SPL	Sound pressure level
SO_2	Sulphur dioxide
Stats SA	Statistics South Africa
STP	Sewage Treatment Plant
SWMP	Stormwater Management Plan
S&EIR	Scoping and Environmental Impact Reporting
TAC	Ts'enolo Apostolic Church
TBC	To be confirmed
TDS	Total Dissolved Solids
Tharisa	Tharisa Minerals (Pty) Ltd
TKN	Total Kjeldahl Nitrogen
ToRs	Terms of Reference
TSF	Tailings Storage Facility
TUT	Tshwane University of Technology
UG	Upper Group
UNISA	University of Southern Africa
URC	Uniting Reform Church
US EPA	United States Environmental Protection Agency
WHO	World Health Organisation
WMA	Water Management Area
WML	Waste Management License
WRD	Waste Rock Dump
WRF	Weather Research and Forecasting
WUL	Water Use License
WULA	Water Use License Application
WWTP	Waste Water Treatment Plant
Zn	Zinc

ABOUT THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Manyabe Consultancy (MC) is a 100% black female owned entity which offers sustainable development solutions to both public and private sectors, including parastatals. The company was founded in 2014 by the Managing Director, Mpho Manyabe. MC seeks to maintain its strategic position in the Environmental Management Services sector by providing service of excellence to its clients. This is achieved by providing: a professional and efficient service; the highest possible level of customer care; the highest ethical and moral principles in our actions, words and thoughts; and the highest possible level of integrity.

The objective of MC is to create an environment in which enthusiastic, highly skilled and motivated professionals seek professional opinions for contribution to the environmental, social and economic development in South Africa. MC currently has a turnover of less than R10 million rand and is a Level 1 contributor with 135% Broad Based Black Economic Empowerment (BBBEE) procurement.

Managing Director: Mpho Manyabe

MANYABE CONSULTANCY

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Mpho Manyabe: BSc Honours in Environmental Management, University of South Africa (UNISA), 2016; National Diploma Environmental Sciences, Tshwane University of Technology (TUT), 2008

Mpho Manyabe currently holds a BSc Honours Degree in Environmental Management from the University of South Africa (UNISA); and National Diploma in Environmental Sciences, from Tshwane University of Technology (TUT), 2008. She has seventeen (17) years of work experience in the field of Environmental Management from different consulting companies.

She was previously nominated to be in the Gauteng Department of Agriculture, Rural Development and Environment (GDARDE) Environmental Impact Assessment (EIA) EAP committee which was launched on 31 March 2015 comprising of EAPs and GDARDE officials to provide quarterly reports to the Executive Authority (Member of the Executive Committee (MEC)) on issues identified as blockages to the improved efficiencies the department seeks to achieve.

She was also a member of the Academic Advisory Committee for the Environmental Science programme in the Department of Environmental, Water and Earth Sciences in the Faculty of Science at the TUT, to serve for a period of three (3) years, where she assisted with preparation and provision of relevant, high quality teaching and learning content for students. She was identified based on her expertise in the field of Environmental Sciences/ Management to make a positive contribution to what TUT was offering students in terms of course content and on how to better run programs to the benefit of students. She is registered with South African Council for Natural Scientific Professions (SACNASP) as a Certificated Natural Scientist, and she is also a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

She is the Lead EAP on the project.

Please refer to Appendix 4 for the EAPs Curriculum Vitae (CV).

SECTION 1: PROJECT INTRODUCTION AND BACKGROUND

Tharisa Minerals (Pty) Ltd (Tharisa) operates an opencast mining operation that produces chrome and platinum group metals (PGM) concentrate. The mine is located on Farms K/Kraal 342 JQ, Rooikoppies 297 JQ and Elandsdrift 467 JQ, south of Marikana in the North West Province (refer to Figure 1).

Tharisa holds existing environmental authorisations (EAs) and licenses under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), the National Environmental Management: Waste Act, 2008 (Act. 59 of 2008) (NEMWA) and the National Water Act, 1998 (Act. No 36 of 1998) (NWA) for the mining of the East, West and Far West open pits.

Tharisa Mine has been in operation since November 2009 having an initial Mining Right 49/2009 (MR) effective 19 September 2008, issued on 13 August 2009 by the then the Department of Minerals and Energy (DME). Tharisa subsequently applied for an amendment of the MR with the Reference Number: NW/30/5/1/2/2/358 MR, stamped 28 July 2011. This MR was however only registered in 2016.

Tharisa is now proposing to expand the mining operation into the underground working to extend its life of mine (LoM) by approximately 100 years, with underground mining taking place at approximately 100 – 800m below ground level. The project is referred to as the **Underground Expansion Project**. It is proposed that the expansion into the underground workings will increase production by an additional 5 000 tons per day thereby reducing the amount of ore required to be imported. The proposed expansion will occur within the approved MR footprint. The ore extracted will be taken to the existing processing plant for further processing before being sold to a third party.

Tharisa has the potential to extract approximately 15 000 to 18 000 tons of ore per day. At present, the mine extracts approximately 11 800 tons of ore per day and imports 3 500 tons from other mining operations due to Tharisa's inability to access the ore body through opencast mining methods.

Manyabe Consultancy (MC) has been appointed by Tharisa as an independent Environmental Assessment Practitioner (EAP), to undertake a Section 102 amendment application in terms of the MPRDA to amend the Environmental Management Programme (EMPr); to undertake Environmental Impact Assessment (EIA) to obtain an EA in terms of the NEMA; and to obtain a Waste Management License (WML) in terms of the NEMWA.

The competent authority (CA) for the above-mentioned applications is the North West Department of Mineral Resources and Energy (DMRE).

A Water Use License Application (WULA) process is concurrently being undertaken, for the various activities that will occur within the mine, as various activities are listed as water uses under Section 21 of the NWA.

Currently, the West and East pits are being mined via conventional open pit truck and shovel methods up to a defined economic limit, and will then transition to underground, from the highwall. The pits will be accessed via the West and East declines.

1-1 DETAILS AND EXPERTISE OF THE APPOINTED EAP

Below are the details of the appointed independent EAP. For the expertise of the EAP, please refer to Appendix 4 for a CV.

EAP Name	Tel	Email	Qualifications
Mpho Manyabe	011 863 1079	mpho@manyabeconsultancy.com	BSc Honours in Environmental Management, UNISA, 2016. National Diploma Environmental Sciences, TUT, 2008 SACNASP Registered Scientist: Reg No. 117719

EAP Name	Tel	Email	Qualifications
			EAPASA Registered EAP: Reg No. 2019/700

1-2 THARISA DETAILS

Contact Person	Mr. Tebogo Matsimela
Designation	Group ESG Manager
Email Address:	tmatsimela@tharisa.com
Telephone Number:	+2714 572 0700
Tharisa Mine Physical Address	Portion 84, Farm 342-JQ, Marikana, 0284, South Africa

1-3 PURPOSE OF THE FINAL SCOPING REPORT

This Final Scoping Report has been compiled in terms of Appendix 2 of the NEMA Environmental Impact Assessment (EIA) Regulations of 2014, as amended, as well as the requirements of the Scoping Report template issued by the DMRE. All comments received during the review of the Draft Scoping Report have been incorporated into this Final Scoping Report for submission to the DMRE, for decision making.

A summary of the requirements of a scoping report including cross-references to sections in this report where these requirements have been addressed is provided in Table 1.

Table 1: Content of the Final Scoping Report as per Appendix 2, Government Notice Regulation (GNR.) 982, as Amended

Content of the Final Scoping Report	Section of this Final Scoping Report Complying to the Regulations
(a) Details of – (i) The EAP who prepared the report and (ii) The expertise of the EAP, including a CV.	Section 1.1, Appendix 4; and page xv and xxiv
(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 (iii) Where the required information in terms of (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	Section 2
(c) A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	Figure 1 & Appendix 1
(d) A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered (ii) A description of the activities to be undertaken, including associated structures and infrastructure.	Section 2
(e) 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.	Section 3
(f) A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	Section 4
(g) A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including -	Section 6
(i) details of the alternatives considered.	Section 6
(ii) details of the Public Participation Process (PPP) undertaken in terms of Regulation 41 of the Regulations, including copes of the supporting documents and inputs.	Section 7 and Section 16
(iii) a summary of the issues raised by Interested and Affected Parties (I&APs), and an indication of the manner in which the issues were incorporated, or the reasons for not including them.	Section 7, Section 16 and Appendix 3
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 8 and Section 11
(v) the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts,	Section 9

Content of the Final Scoping Report	Section of this Final Scoping Report Complying to the Regulations
including the degree to which these impacts – (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated.	
(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	Section 10
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.	Section 11
(viii) the possible mitigation measures that could be applied and level of residual risk.	Section 12. Section 15.7 and Table 52
(ix) the outcome of the selection matrix.	Section 12
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for no considering such.	Section 13
(xi) a concluding statement indicating the preferred alternatives, including preferred locations of the activity.	Section 14
(h) a plan of study for undertaking the environmental impact assessment process to be undertaken, including –	Section 15
(i) A description of the alternatives to be considered and assessed within the preferred site.	Section 15
(ii) A description of the aspects to be assessed as part of the environmental impact assessment process.	Section 15
(iii) Aspects to be assessed by specialists.	Section 15
(iv) A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists.	Section 15
(v) A description of the proposed method assessing duration significance.	Section 15
(vi) An indication of the stages at which the CA will be consulted.	Section 15
(vii) Particulars of the PPP that will be conducted during the environmental impact assessment process.	Section 16
(viii) A description of the tasks that will be undertaken as part of the environmental impact assessment process.	Section 16
(ix) Identify suitable 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.	Section 17
(i) An undertaking under oath or affirmation by the EAP in relation to – (i) The correctness of the information provided in the report (ii) The inclusion of comments and inputs from stakeholders, I&APs (iii) Any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by interested or affected parties.	Section 20
(j) An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and I&APs on the plan of study for undertaking the environmental impact assessment.	Section 20
(k) Where applicable, any specific information required by the CA.	Section 18
(l) Any other matter required in terms of section 24(4)(a) and (b) of the Act.	Section 19

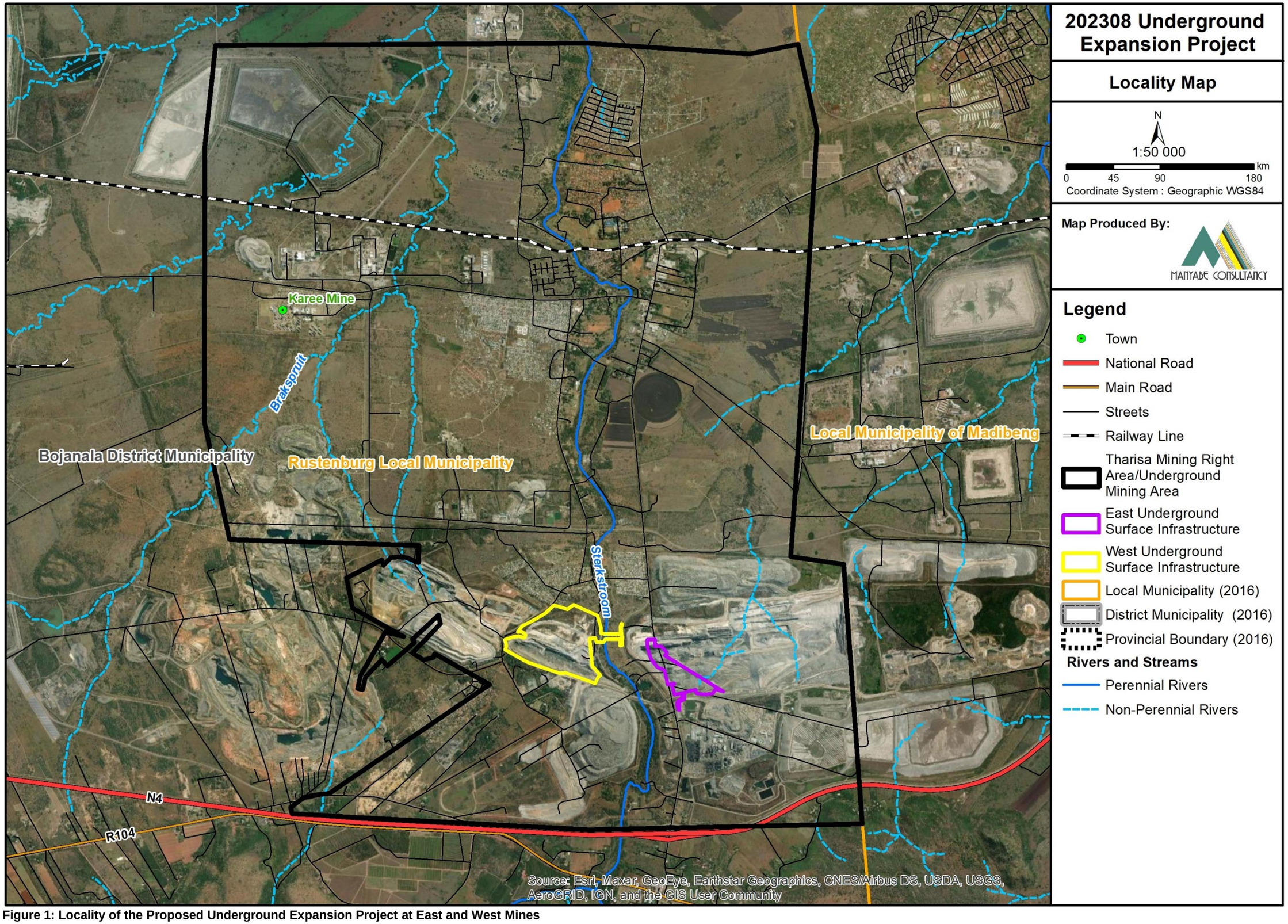


Figure 1: Locality of the Proposed Underground Expansion Project at East and West Mines

SECTION 2: DESCRIPTION OF THE SCOPE OF THE ACTIVITY

The proposed project activities are listed in Table 2 below. Table 3 details all the activities in terms of the EIA Regulations, 2014 (as amended) in accordance with the NEMA which are applicable to the proposed project. The proposed area to be mined, including the infrastructure layout plan is provided in Appendix 1.

Table 2: Summary of Project Activities

Phase of the Project	Activity

Construction Phase	• Site clearance for the establishment of the following infrastructure:
	  ○ Laydown areas
	  ○ Portals
	  ○ Topsoil and overburden stockpiles
	  ○ Infrastructure areas
	  ○ Roads (Internal roads, berms, surfaced parking areas and haul roads)
	• Surface infrastructure establishment of the following infrastructure:
	  ○ Mine offices
	  ○ Change houses
	  ○ Ablution facilities
	  ○ Lamp rooms
	  ○ Substations and backup generators
	  ○ All workshops, stores and capital yards
	  ○ Overburden and product stockpiles (RoM)
	  ○ Guard house and security fencing
	  ○ Access and service roads (with bridge)
	  ○ Overland conveyor belts
	  ○ Machinery parking area
	  ○ Hydrocarbon storage tanks
	  ○ Ventilation and incline shaft per mining area
	• Blasting and excavation activities for the establishment of portals and shafts
	• Water related infrastructure establishment of the following infrastructure:
	  ○ Potable water storage supply tanks
	  ○ Process water reticulation infrastructure
	  ○ Pollution Control Dams (PCDs) and silt traps
	  ○ Wash bays
	  ○ River crossings
	  ○ Stormwater pipelines.
	  ○ Stormwater channels
	  ○ Sewage Treatment Plant (STPs) and balancing tanks
	  ○ Boreholes
	  ○ Grey water storage tanks
	• Waste management facilities establishment (general, hazardous, tyre storage and sorting, recycling/ recovery facilities)
	• Underground infrastructure establishment of the following infrastructure:
	  ○ Underground Water Storage Dams
	  ○ Substations and mini substations
	  ○ Air compressors
	  ○ Electrical cables
	  ○ Refuge chambers
	  ○ Drop raises
	  ○ Control and Instrumentation (C&I) network
	  ○ Water storage dams (emergency and transfer dams)
	  ○ Conveyor belts and chairlifts
	  ○ Ablution facilities
	  ○ Workshops
	  ○ Waste storage facilities
	  ○ Process and potable water pipelines
	  ○ Underground roads

Operational Phase	• Underground mining of the mineral resources (including blasting) • Operation and maintenance of the supporting surface infrastructure. • Transportation of the mineral • Refuelling of machinery within the mining area (for machinery that cannot be moved easily).

Phase of the Project	Activity
	• Handling of general and hazardous waste
Closure and Rehabilitation Phase	• Removal of all Surface Infrastructure. • Maintenance and Monitoring which will be undertaken in accordance with the approved EMPr for the **Underground Expansion Project**, as follows: o Specialist Reports which are currently being compiled will need to structure the framework for maintenance and monitoring. Maintenance and monitoring will include some of the following key activities: o Fertilisation of rehabilitated areas o Surface water quality monitoring o Groundwater quality monitoring o Fauna and flora monitoring o Alien and invasive plant species (AIPs) monitoring and control o General maintenance, including rehabilitation of cracks and subsidence o Annual environmental performance assessment report development o Environmental closure report development o Annual environmental aspect reporting o Final closure application development and motivation

Table 3: Listed Activities to be undertaken for the proposed project

Name of Activity (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or m^2)	Listed Activity Mark with an X where applicable or affected.	Applicable Listing Notice Listing Notice 1 (GNR.983); Listing Notice 2 (GNR.984) and Listing Notice 3 (GNR.985), as amende by: Listing Notice 1(GNR.327); Listing Notice 2 (GNR.325) and Listing Notice 3 (GNR.324)	Waste Management Authorisation (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
Triggered activities listed under GNR.327 (Listing Notice 1)				
Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification. Stormwater management infrastructure will be constructed around the mining areas to ensure separation of clean and dirty water as well as to maximise clean water runoff away from the mining areas. The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	To be confirmed (TBC)	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 9	N/A
New High-Density Polyethylene (HDPE) pipelines will be laid to support the underground operations. The mine will be required to pump water out of the mine to ensure a safe underground working environment. The water pumped out of the underground will be sorted in the proposed PCDs located at the East or West surface infrastructure. This water, which is considered dirty, will be reused within the mining process specifically for washing of vehicles, mining equipment usage, underground drilling, washing of the faces within the underground mine and dust suppression on surface and underground. The remining water will be reused into the concentrator complex and other processing facilities. The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, wastewater, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	TBC	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 10	N/A
A short- and long-term solution has been proposed to address the electrical requirements of the mine. The short-term solution which will meet the underground power requirements for approximately 4 years includes expanding the existing substation and installing underground cables to provide electricity to the underground mine, as well as the construction of 2 new 5 megavolt-amperes (MVA), 11kV/ 525V substations which will feed East and West underground operations. The long-term solution that is proposed will need to be constructed in 2027. This option will cater to both the West and East underground mining operations. The long-term solution will include the construction and operation of a new 20MVA, 88/11kV substation and associated powerlines. The development of facilities or infrastructure for the transmission and distribution of electricity-(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more, excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is- (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	0.26 ha	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 11	N/A
The proposed construction of underground water storage dams (emergency and transfer dams). 2 emergency underground water dams will be constructed at East and West shaft to ensure the underground workings remain safe and free of water. Transfer dams will be constructed in areas where dust suppression and mining activities will occur. The water will be pumped between surface and underground dams to ensure water is managed effectively and reused. The transfer and emergency dams will change as the mine progresses underground and more area is available to store water which was previously mined. **2 PCDs will be constructed at East and West shaft (in total x4) to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs are named as follows with associated design parameters:** **West Shaft: PCD A = Volume: 36 100m^3** **PCD B = Volume: 5 550m^3** **East Shaft: PCD C = Volume: 36 100m^3** **PCD D = Volume: 5 550m^3** **Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification.** The development of dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) within a watercourse.	x4 PCDs = 0.8 ha ≈ 8000m^2	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 12	A WML Application is required and is being applied for under the NEMWA.

Name of Activity (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or m^2)	Listed Activity Mark with an X where applicable or affected.	Applicable Listing Notice Listing Notice 1 (GNR.983); Listing Notice 2 (GNR.984) and Listing Notice 3 (GNR.985), as amende by: Listing Notice 1(GNR.327); Listing Notice 2 (GNR.325) and Listing Notice 3 (GNR.324)	Waste Management Authorisation (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
Triggered activities listed under GNR.327 (Listing Notice 1)				
The proposed construction of underground water storage dams (emergency and transfer dams). 2 emergency underground water dams will be constructed at East and West shaft to ensure the underground workings remain safe and free of water. Transfer dams will be constructed in areas where dust suppression and mining activities will occur. The water will be pumped between surface and underground dams to ensure water is managed effectively and reused. The transfer and emergency dams will change as the mine progresses underground and more area is available to store water which was previously mined. 2 PCDs will be constructed at East and West shaft (in total x4) to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs are named as follows with associated design parameters: **West Shaft:** PCD A = Volume: 36 100m^3 PCD B = Volume: 5 550m^3 **East Shaft:** PCD C = Volume: 36 100m^3 PCD D = Volume: 5 550m^3 The total combined capacity for the PCDs = 83 300m^3. Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification. The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50,000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.	The total combined capacity for the PCDs = 83 300m^3. x4 PCDs = 0.8 ha ≈ 8000m^2	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 13	A WML Application is required and is being applied for under the NEMWA. Triggered activities listed under GNR.921 [Category B (4)] are Activities 7 and 10
Hydrocarbon fuel storage areas (2 above ground storage tanks each = 30m^3) separately, at East and West mines. The total combined capacity = 120m^3. The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	0.0604 Ha ≈ 604 m^2	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 14	N/A
This activity will be applicable, as the activity will be undertaken within a 500m buffer of identified wetlands. Roads will be constructed around the shafts to provide direct access to the shaft and ventilation shaft areas as well as to access areas within the shaft footprint (internal roads). The West Shaft will have two main access areas, one on the east and one on the western side which will be access controlled. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The East Shaft will be accessed via the existing main entrance to the mine. The proposed access roads and associated bridge will trigger this listed activity. The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	**East Pit Area**: 185 704 m^2 i.e. 18.6 Ha. **West Pit Area**: 631 045 m^2 = 63.1 Ha.	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 19	N/A
The proposed project requires an amendment of the approved EMPr by way of lodging a Section 102 application. Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014, required for such amendment.	5 515. 5316 Ha	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 21D	N/A
Construction of haul roads and access roads. Roads will be constructed around the shafts to provide direct access to the shaft and ventilation shaft areas as well as to access areas within the shaft footprint (internal roads). The West Shaft will have two main access areas, one on the east and one on the western side which will be access controlled. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The East Shaft will be accessed via the existing main entrance to the mine. The proposed access roads and associated bridge will trigger this listed activity. The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of Activity 5 in Government Notice 387 of 2006 or Activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road- (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter.	TBC	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 24	N/A
A STP will be constructed at both East and West surface infrastructure areas (2 in total, constructed separately East and West). The STP at each location will be able to treat 300 – 400 m^3/day of domestic sewage i.e. 600 – 800 m^3/day in total. This activity is being applied for as it is expected that these volumes will be exceeded.	38.6 m^2 = 0,00386 Ha.	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 25	N/A

Name of Activity (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or m^2)	Listed Activity Mark with an X where applicable or affected.	Applicable Listing Notice Listing Notice 1 (GNR.983); Listing Notice 2 (GNR.984) and Listing Notice 3 (GNR.985), as amende by: Listing Notice 1(GNR.327); Listing Notice 2 (GNR.325) and Listing Notice 3 (GNR.324)	Waste Management Authorisation (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
Triggered activities listed under GNR.327 (Listing Notice 1)				
The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2,000 cubic metres but less than 15 000 cubic metres.				
The area falls within a Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). A Biodiversity Assessment is currently being undertaken on the proposed area. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The bridge footings have the potential to encroach the floodline and the riparian zone. A Hydrological Study (including floodline delineation) is currently underway. The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for - (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	**East Pit Area**: 185 704 m^2 i.e. 18.6 Ha. **West Pit Area**: 631 045 m^2 = 63.1 Ha.	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 27	N/A
The area falls within a CBAs and ESAs. A Biodiversity Assessment is currently being undertaken on the proposed area. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The bridge footings have the potential to encroach the floodline and the riparian zone. **Species of Conservation Concern (SCC) and Red Data/protected species could potentially occur in the area. Obtaining permits and translocating of these plants if encountered will be required.** Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA).	**East Pit Area**: 185 704 m^2 i.e. 18.6 Ha. **West Pit Area**: 631 045 m^2 = 63.1 Ha.	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 30	N/A
The proposed project is for the expansion of the current mining operation into the underground working to extend the mine's LoM by approximately 100 years, with underground mining taking place at approximately 100 – 800m below ground level. The project is referred to as the Underground Expansion Project (West and East). The proposed project requires an amendment of the approved EMPr by way of lodging a Section 102 application. The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding— (i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water or sewage where the capacity will be increased by less than 15 000 cubic metres per day; or (iii) the expansion is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will be increased by 50 cubic meters or less per day.	5 515. 5316 Ha	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 34	N/A
Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification. Stormwater management infrastructure will be constructed around the mining areas to ensure separation of clean and dirty water as well as to maximise clean water runoff away from the mining areas. The expansion of infrastructure for the bulk transportation of water or storm water where the existing infrastructure- (i) has an internal diameter of 0.36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to transportation of water or storm water within a road reserve or railway line reserve; or (bb) will occur within an urban area.	TBC	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 45	N/A
New HDPE pipelines will be laid to support the underground operations. The mine will be required to pump water out of the mine to ensure a safe underground working environment. The water pumped out of the underground will be sorted in the proposed PCDs located at the East or West surface infrastructure. This water, which is considered dirty, will be reused within the mining process specifically for washing of vehicles, mining equipment usage, underground drilling, washing of the faces within the underground mine and dust suppression on surface and underground. The remining water will be reused into the concentrator complex and other processing facilities. The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure- (i) has an internal diameter of 0.36 metres or more; or (ii) has a peak throughput of 120 litres per second or more; and (a) where the facility or infrastructure is expanded by more than 1 000 metres in length; or (b) where the throughput capacity of the facility or infrastructure will be increased by 10% or more; excluding where such expansion- (aa) relates to the bulk	TBC	X	Listing Notice 1 (GNR.983), as amended by Listing Notice 1 (GNR. 327) Activity 46	N/A

Name of Activity (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or m^2)	Listed Activity Mark with an X where applicable or affected.	Applicable Listing Notice Listing Notice 1 (GNR.983); Listing Notice 2 (GNR.984) and Listing Notice 3 (GNR.985), as amende by: Listing Notice 1(GNR.327); Listing Notice 2 (GNR.325) and Listing Notice 3 (GNR.324)	Waste Management Authorisation (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
Triggered activities listed under GNR.327 (Listing Notice 1)				
transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve or railway line reserve; or (bb) will occur within an urban area.				
Triggered activities listed under GNR.325 (Listing Notice 2)				
Hydrocarbon fuel storage areas (2 above ground storage tanks each = 30m^3) separately, at East and West mines. The total combined capacity = 120m^3. There is a possibility of increasing the storage facility which could potentially exceed 500m^3. This will be clarified during the EIA. The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	0.0604 Ha ≈ 604 m^2	X	Listing Notice 2 (GNR.984), as amended by Listing Notice 2 (GNR. 325) Activity 4	N/A
2 PCDs will be constructed at East and West shaft (in total x4) to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs are named as follows with associated design parameters: **West Shaft: PCD A = Volume: 36 100m^3** **PCD B = Volume: 5 550m^3** **East Shaft: PCD C = Volume: 36 100m^3** **PCD D = Volume: 5 550m^3** The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding-(i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2,000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.	5 515. 5316 Ha	X	Listing Notice 2 (GNR.984), as amended by Listing Notice 2 (GNR. 325) Activity 6	N/A
The clearance of indigenous vegetation of more than 20 ha. The area falls within a CBAs and ESAs. A Biodiversity Assessment is currently being undertaken on the proposed area. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The bridge footings have the potential to encroach the floodline and the riparian zone. A Hydrological Study (including floodline delineation) is currently underway. The area to be disturbed will be confirmed to determine the extent of the area characterised by indigenous vegetation. The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	**East Pit Area**: 185 704 m^2 i.e. 18.6 Ha. **West Pit Area**: 631 045 m^2 = 63.1 Ha.	X	Listing Notice 2 (GNR.984), as amended by Listing Notice 2 (GNR. 325) Activity 15	N/A
The proposed construction of underground water storage dams (emergency and transfer dams). 2 emergency underground water dams will be constructed at East and West shaft to ensure the underground workings remain safe and free of water. Transfer dams will be constructed in areas where dust suppression and mining activities will occur. The water will be pumped between surface and underground dams to ensure water is managed effectively and reused. The transfer and emergency dams will change as the mine progresses underground and more area is available to store water which was previously mined. 2 PCDs will be constructed at East and West shaft (in total x4) to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs are named as follows with associated design parameters: **West Shaft:** PCD A = Volume: 36 100m^3 PCD B = Volume: 5 550m^3 **East Shaft:** PCD C = Volume: 36 100m^3 PCD D = Volume: 5 550m^3 The total combined capacity for the PCDs = 83 300m^3. Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification. **The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the highwater mark of the dam covers an area of 10 hectares or more.**	The total combined capacity for the PCDs = 83 300m^3. x4 PCDs = 0.8 ha ≈ 8000m^2	X	Listing Notice 2 (GNR.984), as amended by Listing Notice 2 (GNR. 325) Activity 16	N/A

Name of Activity (E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc…etc…etc E.g. for mining,- excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	Aerial extent of the activity (Ha or m²)	Listed Activity Mark with an X where applicable or affected.	Applicable Listing Notice Listing Notice 1 (GNR.983); Listing Notice 2 (GNR.984) and Listing Notice 3 (GNR.985), as amende by: Listing Notice 1(GNR.327); Listing Notice 2 (GNR.325) and Listing Notice 3 (GNR.324)	Waste Management Authorisation (Indicate whether an authorisation is required in terms of the Waste Management Act). (Mark with an X)
Triggered activities listed under GNR.327 (Listing Notice 1)				
Triggered activities listed under GNR.324 (Listing Notice 3)				
Roads will be constructed around the shafts to provide direct access to the shaft and ventilation shaft areas as well as to access areas within the shaft footprint (internal roads). The West Shaft will have two main access areas, one on the east and one on the western side which will be access controlled. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The East Shaft will be accessed via the existing main entrance to the mine. The proposed access roads and associated bridge will trigger this listed activity. **The project is located within a CBA which will be affected by the proposed roads establishment.** The development of a road wider than 4 metres with a reserve less than 13.5 metres. (h) North West (ii) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the CA; (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the CA; (vi) Areas within 5 kilometres from protected areas identified in terms of the National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA) or from a biosphere reserve.	TBC	X	Listing Notice 3 (GNR.985), as amended by Listing Notice 3 (GNR. 324) Activity 4	N/A
The clearance of an area of 300 square metres or more of indigenous vegetation. The area falls within a CBAs and ESAs. A Biodiversity Assessment is currently being undertaken on the proposed area. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The bridge footings have the potential to encroach the floodline and the riparian zone. A Hydrological Study (including floodline delineation) is currently underway. The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (h) North West (iv) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the CA; (v) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the CA; or (vi) Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.	**East Pit Area**: 185 704 m² i.e. 18.6 Ha. **West Pit Area**: 631 045 m² = 63.1 Ha.	X	Listing Notice 3 (GNR.985), as amended by Listing Notice 3 (GNR. 324) Activity 12	N/A

2-1 DESCRIPTION OF THE PROPERTY

Farm Name (s)	The mining operation (opencast and proposed underground) is located on the Farms K/Kraal 342 JQ, Rooikoppies 297 JQ and Elandsdrift 467 JQ, approximately 95 kilometres (km) north-west of Johannesburg and 35 km east of Rustenburg, accessible via the R104 regional road just off the N4 toll road.
Affected Farm (s)	The approved MR properties incorporate the existing opencast mine, the proposed **Underground Expansion Project** and associated supporting infrastructure. The project is situated within the Rustenburg Local Municipality which forms part of the Bojanala Platinum District Municipality (BDM) in the North-West Province. Following are the approved MR properties which incorporate the existing opencast mine and proposed Underground Expansion Project. • Farm K/Kraal 342 JQ, Portion 2, 3, 5, 6, 7, 9, 10, 11, 12, 13, 15, 16, 19, 20, 22, 23, 25, 26, 27, 28, 29, 30, 33, 38, 39, 40, 41, 47, 48, 53, 74, 76, 83, 84, 90, 91, 96, 100, 101, 104, 105, 108, 109, 110, 111, 114, 116, 117, 118, 119, 120, 122, 123, 127, 132, 133, 135, 137, 138, 139, 140, 142, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 166, 175, 176, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 196, 205, 206, 207, 208, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 224, 225, 226, 227, 229, 230, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 250, 251, 256, 257, 259, 262, 265, 266, 276, 283, 285, 286, 289, 297, 298, 301, 303, 304, 305, 314, 317, 318, 319, 324, 329, 330, 331, 335, 336, 342, 344, 350, 352, 353, 354, 356, 357, 358, 361, 362 and 365. A Section 102 application was submitted to the DMRE to add the following farm portions: Portion 32, 209, 211, 253, 254, 255, 260, 261, 306 and 307. A decision has been taken to update the submitted Section 102 to remove all other portions, except for Portion 260, 261, 306 and 307 from the application. • Farm Rooikoppies 297 JQ, Portion 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 19, 20, 22, 23, 24, 26, 27, 28, 29, 30, 32, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 52, 53, 54, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 80, 81, 82, 83, 84, 85, 86, 87, 88, 95, 96, 97, 98, 99, 101, 102, 103, 104, 105, 106, 107, 108, 109, 111, 113, 114, 116, 117, 118, 120, 121, 122, 123, 124, 125, 126, 130, 134, 135, 136, 137, 138, 139, 141, 142, 143, 144, 145, 146, 147, 149, 150, 151, 152, 153, 154, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 173, 176, 177, 179, 182, 183, 184, 185, 189, 190, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 212, 213, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 276, 277, 278, 279, 280, 281, 282, 283, 292, 297, 307, 308, 312, 313, 314, 315, 316, 317, 318, 320, 322, 323, 326, 327, 328, 329, 330, 331, 332, 333, 335, 336, 337, 338, 339, 343, 344, 345, 347, 348, 349, 351, 354, 357, 358, 359, 360, 361, 362, 364, 365, 366, 367, 368, 369, 370, 371, 372, 387, 388, 399 and 400. The following are surface rights for the mine which include the proposed underground mine's associated infrastructure. It must be noted that no ore extraction will be undertaken on these properties. • Farm K/Kraal 342 JQ, Portion 368, 370 and 381. • Farm Elandsdrift 467 JQ, Portion 29, 64, 69, 89, 90, 91, 92, 93, 94, 111, 176 and 177. Refer to Figure 2 below for a map indicating directly and indirectly affected properties.
Application Area (Ha)	Currently, the West Pit measures approximately 39.47 ha, whereas the East Pit measures approximately 211.43 ha. For the proposed project, the following areas with associated infrastructure will be disturbed: **East Pit Area**:

	Surface and Underground Infrastructure will measure approximately 185 704 m^2 i.e. 18.6 hectares. **West Pit Area**: Surface and Underground Infrastructure will measure approximately 631 045 m^2 = 63.1 hectares. The proposed expansion will occur within the approved mining footprint, which measures approximately 5 515. 5316 Ha.	
Farm Owner	Tharisa Minerals (Pty) Ltd	
Province	North West	
District Municipality	Bojanala Platinum District Municipality	
Local Municipality	Rustenburg Local Municipality	
Distance and direction from nearest town (s)	Tharisa Mine is located approximately 4 km to the south of Marikana Town, in the North West Province	
Facility Co-ordinates	East Mine: Latitude: 25°43'58.75"S Longitude: 27°28'42.83"E	West Mine: Latitude: 25°44'4.52"S Longitude: 27°29'33.16"E

2-2 EXISTING PROJECT INFRASTRUCTURE

Mining at Tharisa Mine is undertaken using conventional open pit truck and shovel methods. The two (2) mining sections (East and West) are separated by a tributary of the Sterkstroom River and the D1325 (Marikana Road). The waste rock from the open pit areas is stockpiled at various Waste Rock Dumps (WRDs) and Tailing Storage facilities (TSFs). Some in-pit dumping of waste rock has taken place at East Mine.

The existing mining infrastructure includes the following:

- West WRD (64.89 ha);
- Far-West WRD (32.90 ha);
- Far-West Pit (48.03 ha);
- West Pit (39.47 ha);
- Central WRD /Eastern WRD 1 (76.3 ha);
- Eastern WRD (63.23 ha);
- East Pit (211.43 ha);
- Run of Mine (RoM) pad (15.84 ha);
- Concentrator plant (Genesis and Voyager) (28.43 ha);
- Vulcan plant (3.29 ha);
- TSF1 Phase 1 & 2 (115.99 ha); and
- TSF 2 Phase 1 & 2 (101.91 ha).
- Haul roads;
- Various product stockpiles;
- Topsoil stockpiles;
- Stormwater dam;
- PCD;
- Hernic quarry (stormwater dam);
- STP; and
- Supporting Infrastructure such as:
  - Offices;
  - Workshops;
  - Change houses; and
  - Access control facilities.

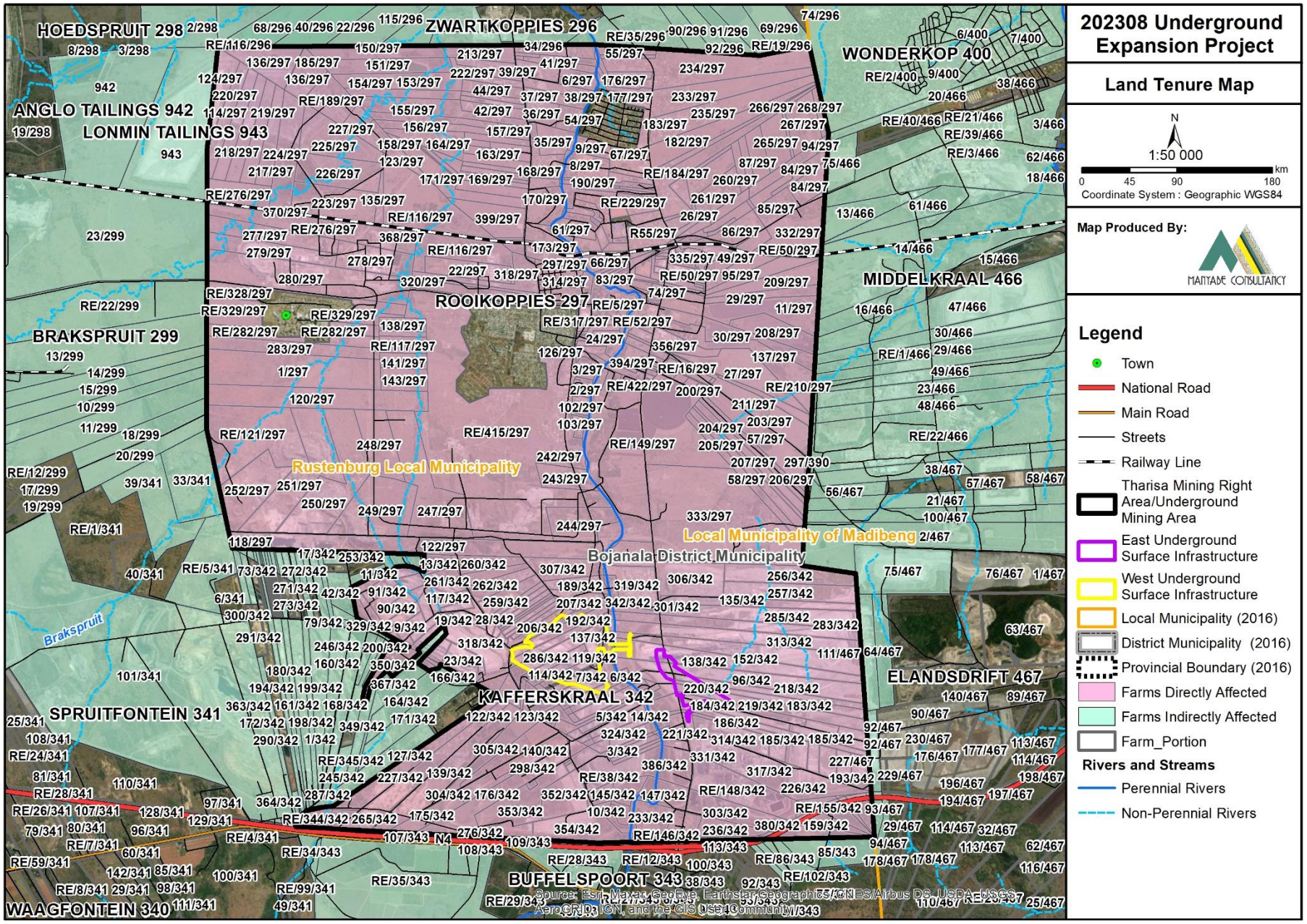


Figure 2: Land Tenure Map

A network of roads exists within the mine. A 275 kV powerline and associated Eskom servitude cross through the eastern part of the mining area in a north-south direction. Smaller rural power and telephone lines currently service the residential areas within the western and eastern sections of the project area. Infrastructure (pipes and canals) associated with the Buffelspoort Irrigation Board traverses various sections of the project area in a south-north direction.

The ore body at Tharisa Mine is made up of Middle Group (MG)1, MG2, MG3, MG4 and MG4a. The primary focus of the underground mine will be on extracting the MG1, MG2 and MG4, which are positioned around 12 to 20 m apart, separated by waste and inter-burden. The extraction strategy involves targeting multiple reefs, necessitating the use of superimposed pillars in some sections and off set pillars in others. The design will encompass mining from the base of the crown pillar down to a depth of approximately 800 meters below surface. It is estimated that the **Underground Expansion Project** will be able to generate approximately 5.76 million tons per annum (Mtpa) of RoM ore.

Currently, the West and East pits are being mined via conventional open pit truck and shovel methods up to a defined economic limit, and will then transition to underground, from the highwall. The pits will be accessed via the West and East declines.

The most effective environmental process [Scoping and Environmental Impact Reporting (S&EIR)] has thus been proposed taking cognisance of schedule constraints as well as ensuring the correct environmental legal process is followed.

Tharisa holds the following approvals:

Approval	Reference	Licence Type	Approval Date
Mining EMPRs			
Environmental Impact Assessment and Environmental Management Programme for a Proposed Platinum Group Metals Mine, Metago Project Number: T014-01, June 2008	DMRE Reference Number: (NW) 30/5/1/2/3/2/1/358EM	Mining Right (MR)	19 September 2008
	DACE Reference Number: NWP/EIA/159/2007	Environmental Authorisation (EA)	23 October 2009
Amendment of the EA, 23 October 2009 to incorporate additional listed activities previously excluded: Transmission and distribution of above ground electricity (120KV or more)	DACE Reference Number: NWP/EIA/159/2007	EA and EMPR Amendment	30 August 2011
Environmental impact assessment and management programme report for changes to the pit, tailings dam and waste rock facilities; a chrome sand drying plant and other operational and surface infrastructure changes, SLR December 2014	DMRE Reference Number: (NW) 30/5/1/2/3/2/1/358EM	EA and EMPR Amendment and Waste Management Licence (WML)	24 June 2015
	DEDECT Reference Number: NWP/EIA/50/2011	EA	29 April 2015
Amendment of an Environmental Authorisation for Increase Storage Capacity of Tailings Facility and Waste Rock Dump and Increase the authorised Fuel Storage Capacity in respect of Farm Rooikopies JQ 297, Elandsdrift JQ 467 And Kafferskraal JQ 342, within the Magisterial District of Bojanala, North West Province, Green Gold October 2020	DMRE Reference Number: NW 30/5/1/2/3/2/1/358EM	EA and EMPR Amendment and WML	3 August 2021
Tharisa Additional Waste Rock Storage Environmental Impact Assessment and Environmental Management Programme, SLR 2023 • The expansion of the existing and approved Far West WRD 1 by a footprint of 109 ha. The expanded area will be referred to as the West Above Ground (OG) WRD. Portions of the West OG WRD will be located on backfilled areas of the West Pit; and	DMRE: NW 30/5/1/2/3/2/1/358EM	EA and EMPR Amendment and WML	31 May 2023

Approval	Reference	Licence Type	Approval Date
• The establishment of a waste rock dump (referred to as the East OG WRD) on backfilled portions of the East Pit. The proposed East OG WRD will cover an area of approximately 72 ha.			
Tharisa Mine Amendment IWUL (supersedes the 2020 IWUL)	Licence No. 03/A21K/ABCGIJ/1468	IWUL	17 September 2024
Supporting Infrastructure			
EA for the diversion of an existing 275kV powerline and associated infrastructure	Department of Environmental Affairs (DEA) RoD Reference Number: 14/12/16/3/3/3/408	EA	15 November 2012
Amendment of an EA to upgrade the existing Waste Water Treatment Plant at the Tharisa Mine	DMRE: NW 30/5/1/2/3/2/1/358EM	EA and EMPR	14 August 2020
Rectification of an unlawful commencement of a listed activity for the storage of dangerous goods of more than 80m^3 but les then 500m^3	DMRE: NW 30/5/1/2/3/2/1/358EM	EA and EMPR	10 August 2021

2-3 PROPOSED PROJECT INFRASTRUCTURE

It is proposed that the following infrastructure will need to be constructed to support the underground operation:

2-3.1.1 Underground Mining Method

An assessment was undertaken to determine the most effective and efficient mining method to extract the ore body. The following methods were considered:

- Hybrid mining method;
- Mechanised bord and pillar mining; and
- Conventional methods.

The criteria utilised to determine the best mining method included an assessment of ore dips, mining heights envisaged, mining cost, ventilation requirements, practicality, safety; and level of mechanisation possible. The assessment identified that the recommended mining method selected to extract the MG2 and MG4 reef horizon would be mechanised bord and pillar mining while the hybrid mining method will be utilised to extract the MG1 reef horizon.

Bord and pillar mining is a mining method in which the mined material is extracted across a horizontal plane, creating horizontal arrays of bords and pillars. To do this, "bords" of ore are extracted while "pillars" of untouched material are left to support the roof. The technique is usually used for relatively flat-lying deposits, such as those that follow a particular stratum. Bord and pillar mining can be advantageous because it reduces the risk of surface subsidence compared to other underground mining techniques and can be mechanised. However, because significant portions of ore may have to be left behind, recovery and profits can be lower (refer to Figure 3).

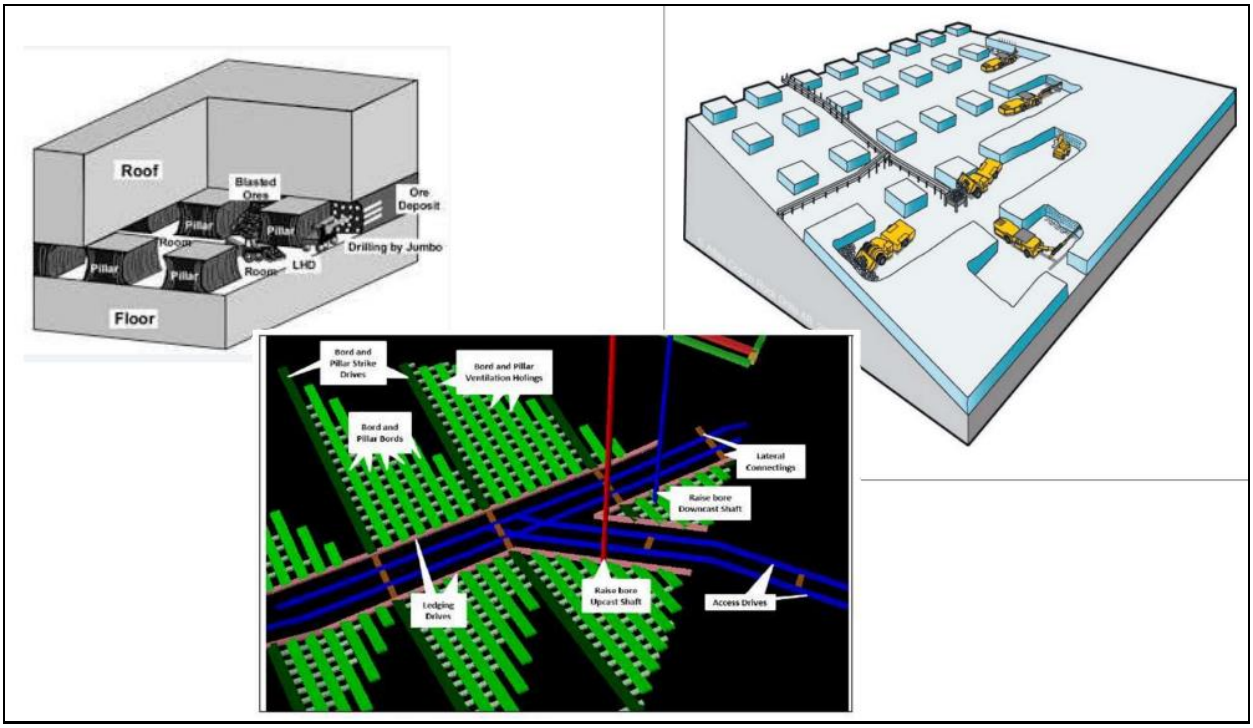


Figure 3: Mechanised Bord and Pillar Mining Method

The method is ideal for the envisaged production targets and stooping heights of the MG 2 and MG4 ore seams. A safety factor will depend on the depth and MG thickness. The safety factor will range around 1.5 for the LoM, approximately 100 years. Pillar widths will be wider depending on depth and mining height.

A crown pillar is a rock mass that is left above an underground mine to provide a barrier between the surface and the underground workings. It can be either a surface crown pillar, which is used when an underground mine is constructed directly below the surface, or a crown pillar between open Pit and underground, which is used when a deposit is exploited by both methods.

The main purpose of a crown pillar is to prevent subsidence of the surface land and inflow of water, soil, and rock into the mine. The design of a crown pillar depends on the rock mass characteristics, the mining method, and the safety requirements. The crown pillar thickness for the MG2 reef was calculated to be 27m while the crown pillar thickness for the MG4 reef was calculated to be 26m.

2-3.1.2 Decline Shaft

It is proposed that access to the underground mining blocks (East and West) will be through a 5- barrel (6m x 5m) decline system developed from the highwall position of the Tharisa West and East pits on the MG2 reef horizon as shown in Figure 4. The decline aims to permit the conveying of ore out of the mine (via conveyor belts underground), provides access for machines from surface to underground workshops or workplaces, permit access to the underground workings for mining personnel and provide ventilation to the underground operations.

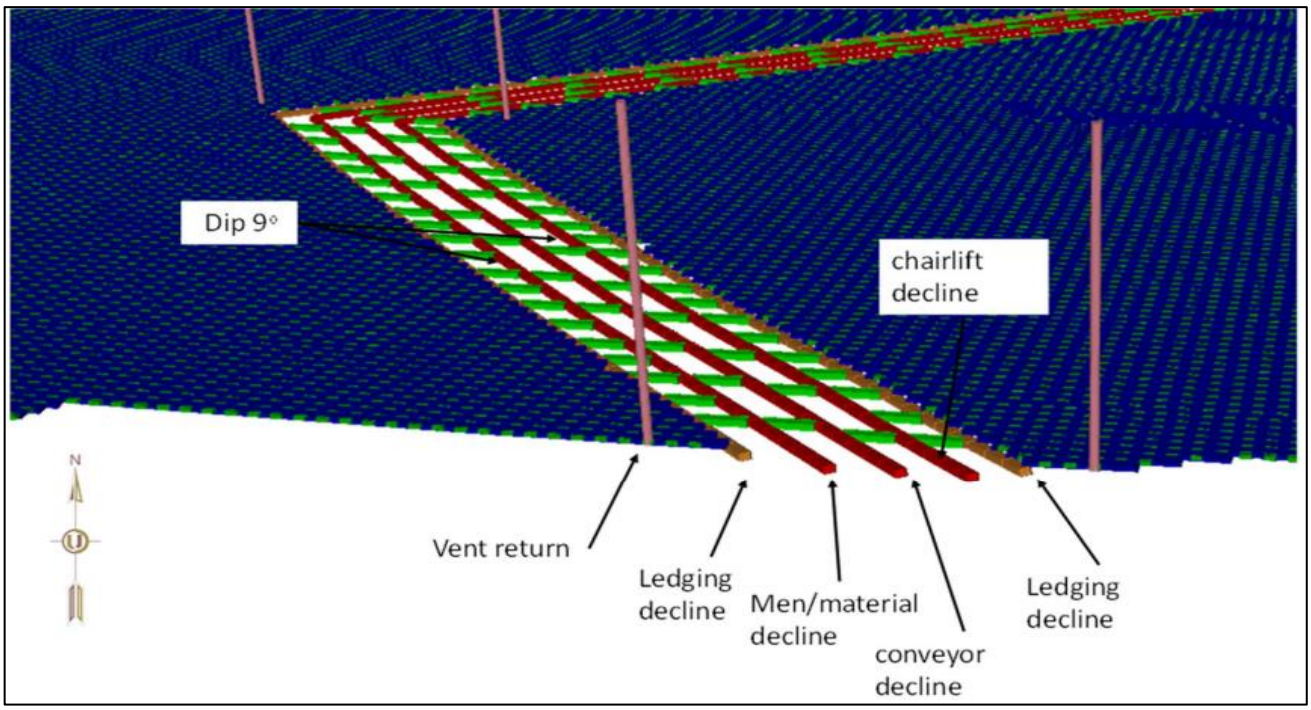


Figure 4: 5-Barrel (6m x 5m) Decline System

Based on the joints and geotechnical inputs within the mine, declines must advance east and later turn towards the west. The declines will start below and intersect MG2 as early as possible but outside the crown pillar position. The decline will be constructed with a slightly upwards slope initially to limit water inflow into the underground workings from the pit. The main conveyor belt will be installed on the MG2 reef horizon with all ore from MG4 being placed on the conveyor belt through ore passes. Five (5) declines are planned, all targeting the MG2 reef horizon with access to MG4 via breakaway inclines and then mining of the MG4 reef horizon via three (3) declines.

2-3.1.3 Box Cut Design

Tharisa underground boxcut layout has been provided in Figure 5. The West and East underground box cuts will be constructed in a similar way and will include the following:

- West and East ramp entrance;
- 5-barrel decline;
- North wall; and
- South wall.

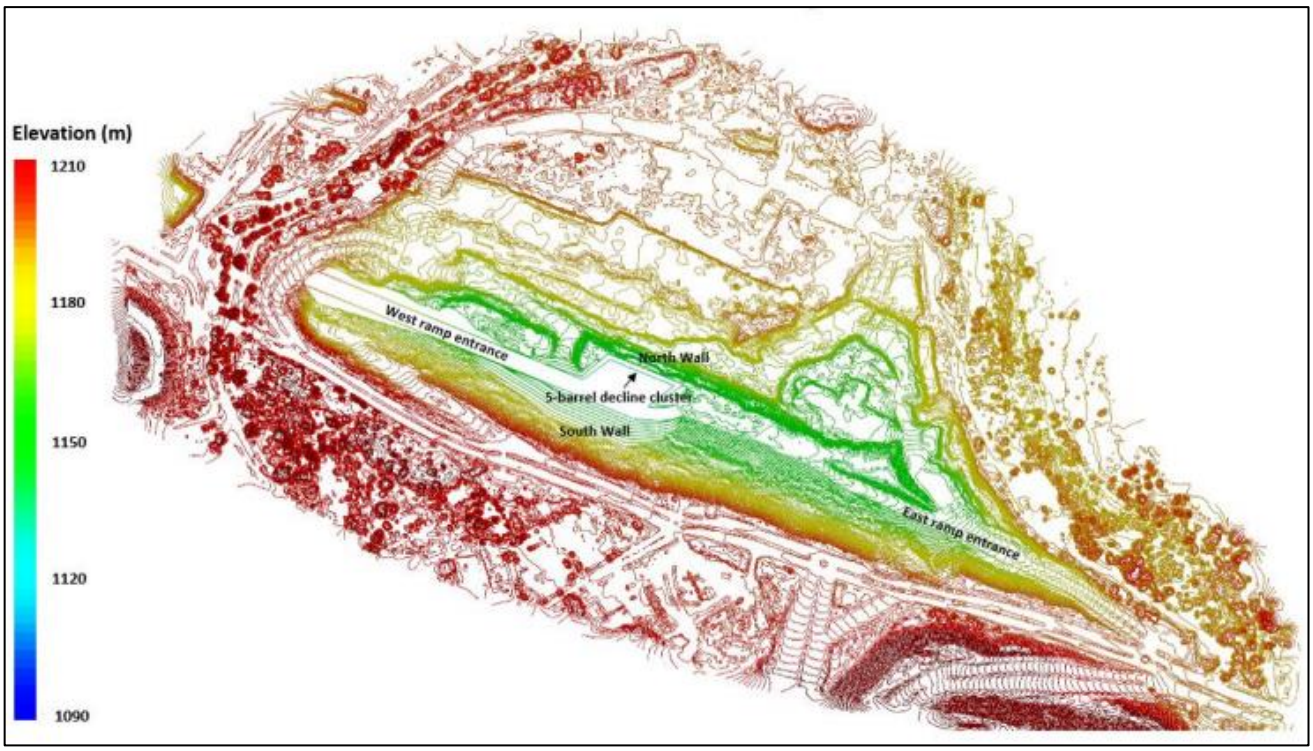


Figure 5: Underground Box Cut Layout

A cross-section of the northern wall where the decline will enter into the underground workings has been shown in Figure 6 (West underground boxcut) and Figure 7 (East underground boxcut)

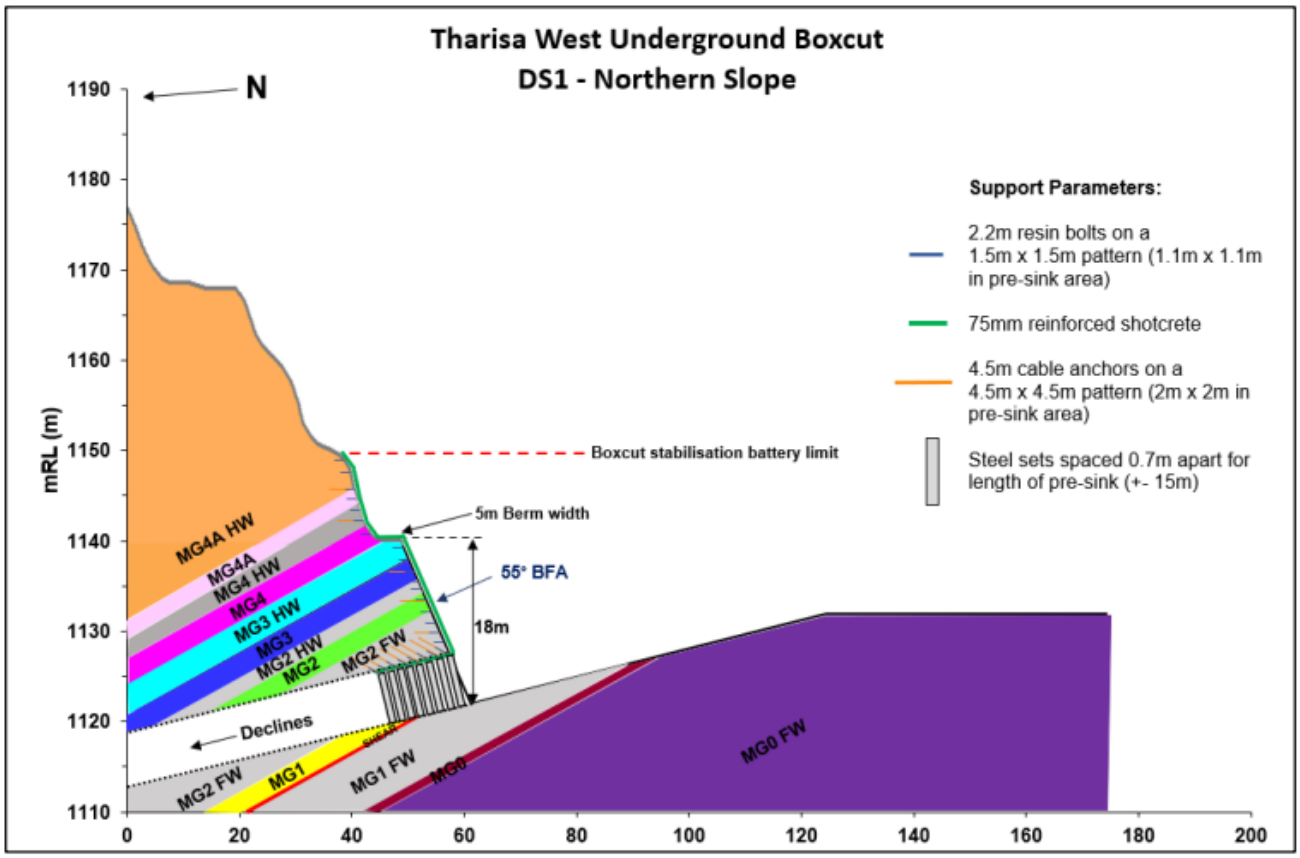


Figure 6: Northern Slope West Underground Boxcut

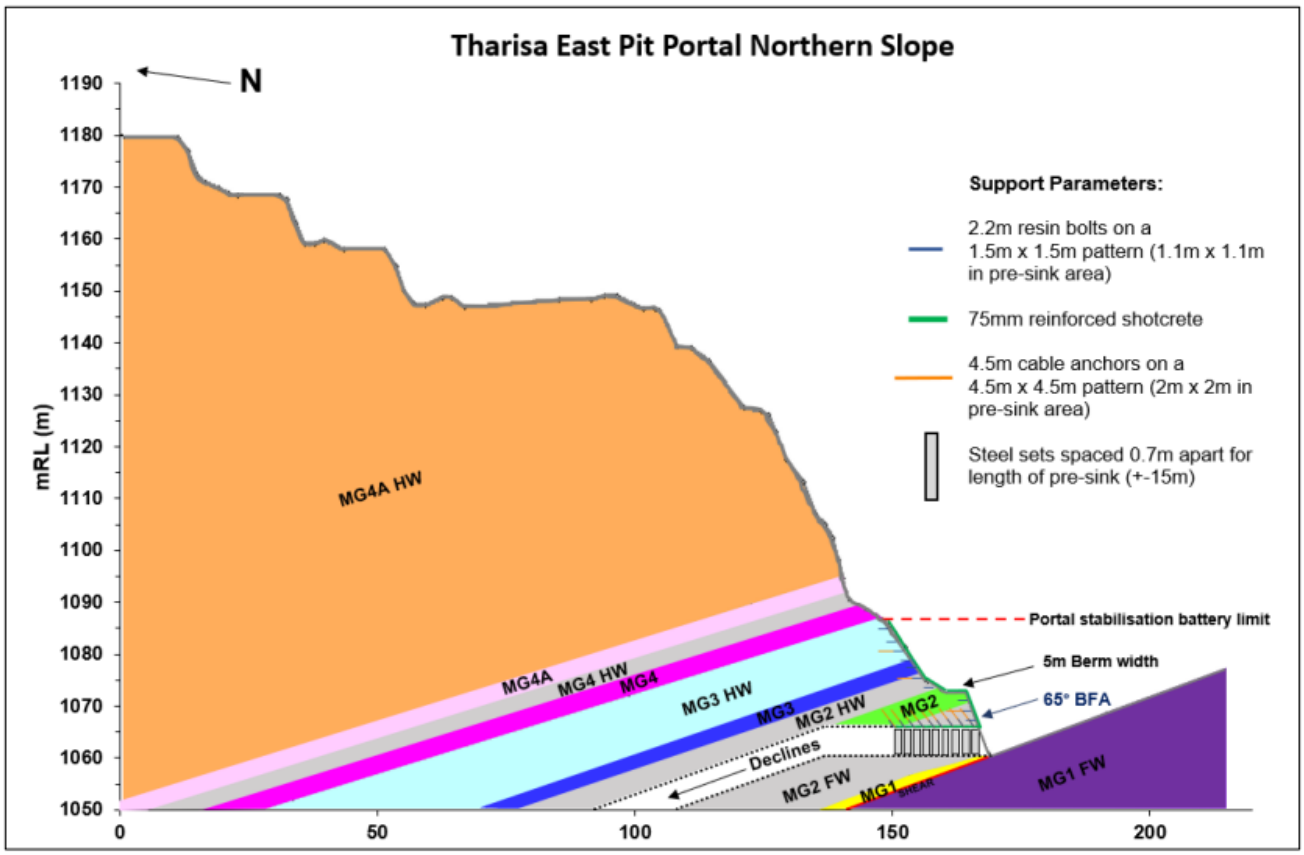


Figure 7: Northern Slope East Underground Boxcut

2-3.1.4 Mineral to be Mined

Tharisa wishes to mine PGMs and Chrome through underground mining methods.

Platinum Group Metals

PGMs describe the six (6) metal elements of platinum, palladium, rhodium, ruthenium, iridium, and osmium. However, osmium is typically not economically recoverable. These metals typically occur together with concentrations of nickel, copper, chrome, and gold. The major PGM deposits are found in the South African Bushveld Complex, the Great Dyke of Zimbabwe, and the palladium rich Russian deposits.

PGMs are vital industrial metals valued for their durability, resistance to corrosion and catalytic properties. The automotive industry is the world's largest consumer of PGMs, which are used in catalytic converters for vehicle exhaust systems. Other drivers of demand are jewellery, industrial uses, and investment.

The South African Bushveld Complex hosts the largest PGM deposits globally and is the major primary producer accordingly. Whilst South Africa accounts for global primary supply of some 70% of platinum, 36% of palladium and 82% of rhodium excluding secondary supplies. The supply statistics are according to Johnson Matthey, as seen in their PGM Market Report published in May 2023.

According to the Platinum Standard based on information from SFA Oxford Limited, primary platinum supply decreased by 11% from 2021 to 2022 to 5 500 koz. Therefore the expansion of this project will assist in providing supply to the market.

The South African PGM mining industry is well established, especially on the eastern and western limb of the Bushveld Complex. The Merensky mines are being depleted and the South African environment is dominated with Upper Group (UG2) mining. Expansion projects in the South African context include the ramping up of Sibanye-Stillwater's K4 shaft (ZAR3.9 billion development) and the Impala's Two Rivers Merensky expansion (ZAR10 billion), the expansion of Mogalakwena as well as Sedibelo's Triple Crown project.

There are two major projects that are in development on the northern limb of the Bushveld Complex, namely Ivanplats' Platreef project and PGMs Waterberg project, at steady state production they are estimated to bring approximately 1 000 kozpa of PGMs into the market.

Chrome

Chromium is the 14th most abundant metal in the lithosphere (the earth's crust and the uppermost mantle). Chromite or chrome ore is the commercial name for iron chromium oxide ($FeCr_2O_4$), a mineral containing chromium. Iron chrome oxide contains around 68% of chromium and 32% of iron oxide (FeO).

Major deposits have been identified in many locations worldwide; however, the main deposits in terms of estimated volumes are located on the African continent, primarily between South Africa and Zimbabwe.

According to the International Chromium Development Association, global chromite resources are estimated at over 12 000 Mt while chrome mineral reserves are estimated at around 470 Mt.

Global chrome ore and concentrates production in 2022 was 33.0 Mt. As it possesses the largest resources and reserves of chrome ore, South Africa is also the largest producer globally. South Africa's chrome ore and concentrate production reached 20.8 Mt in 2022, including 14.8 Mt of conventional chrome ore, and around 6.0 Mt of UG2 chrome concentrate.

Conventional chrome ore is extracted from Lower Group (LG) and MG Chromitite Layers while UG2 Chromitite Layers is a source of chromite and PGMs. The UG2 Chromitite Layers is mined by PGM producers to extract PGMs and the by-product of that extraction process is chrome ore concentrate. As a by-product and therefore accounted for at a lower cost, UG2 chrome concentrate is seen as a cost effective alternative to conventional chrome typically used by ferrochrome producers. UG2 is mainly exported to China where local ferrochrome producers use it in their furnaces as a blend to reduce raw materials costs.

The top chrome ore producers in South Africa are: Assmang Proprietary Limited, Glencore plc, Merafe Resources Limited, Samancor Chrome Limited and Tharisa.

South Africa exports approximately 90% of its production to China as chrome ore lump and concentrates. Chinese customs data does not distinguish conventional chrome ore from UG2 concentrate. In 2022, South Africa exported over 13.4 Mt of chrome ore.

Chrome ore demand is driven by ferrochrome demand as approximately 96% of the chrome ore is used for metallurgical purposes. Two percent of the demand comes from the chemical industry and the rest from refractory and foundry industries. Stainless steel is the largest consumer of ferrochrome and as such a change in the dynamics of the stainless steel industry impacts on the ferrochrome industry.

2-3.1.5 Mining Resource

The ore body at Tharisa Mine is made up of MG1, MG2, MG3, MG4 and MG4a. The mining resource location for the underground is shown in Figure 9. The primary focus of the underground mine will be on extracting the MG1 (Figure 10), MG2 (Figure 11) and MG4 (Figure 12), which are positioned around 12 to 20 m apart, separated by waste and inter-burden. The extraction strategy involves targeting multiple reefs, necessitating the use of superimposed pillars in some sections and off set pillars in others. The design will encompass mining from the base of the crown pillar down to a depth of approximately 800 meters below surface. The mining depths of the reef is shown in Figure 8. It is estimated that the Underground Expansion project will be able to generate approximately 5.76 Mtpa of RoM ore.

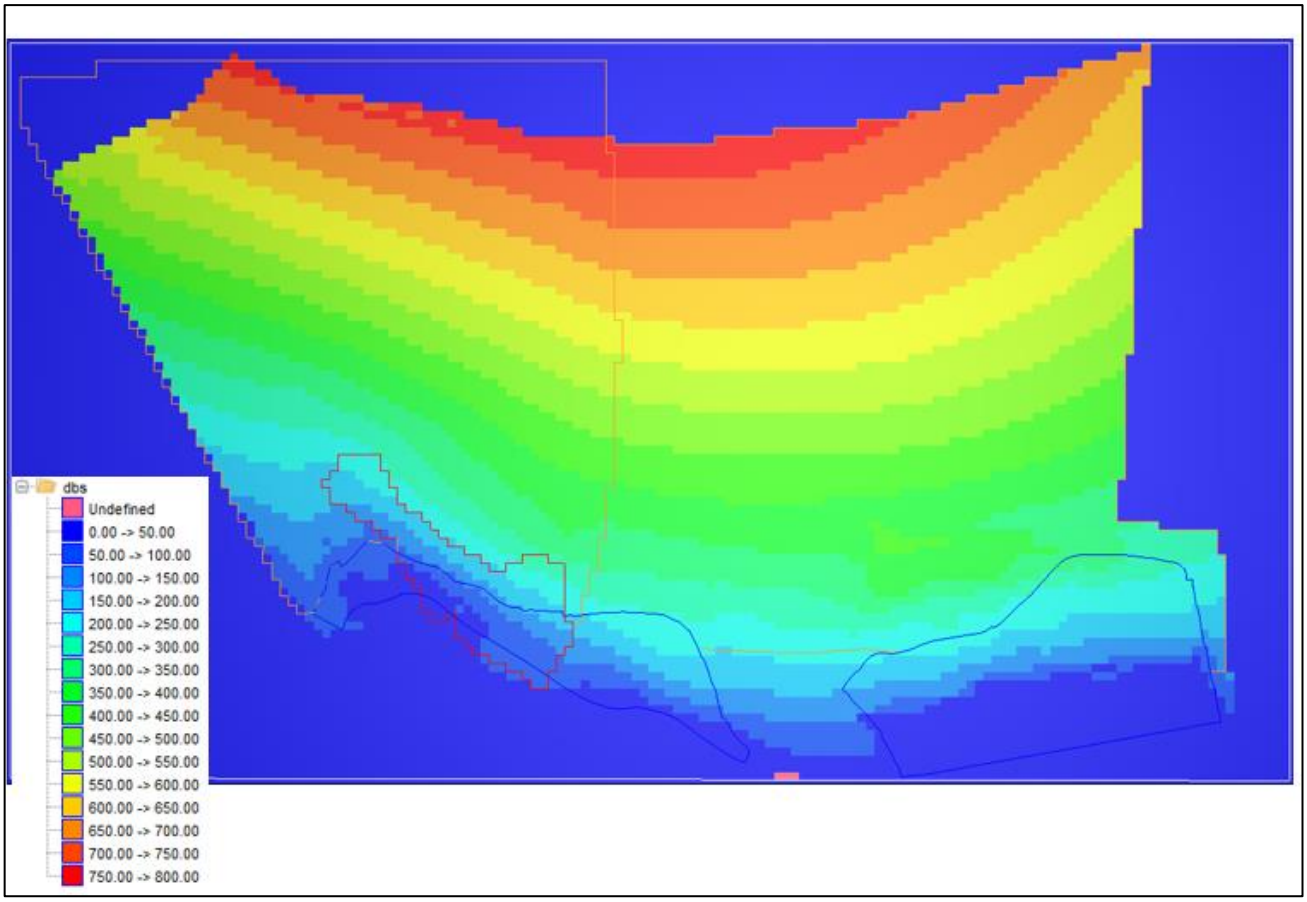


Figure 8: Depth of Mining

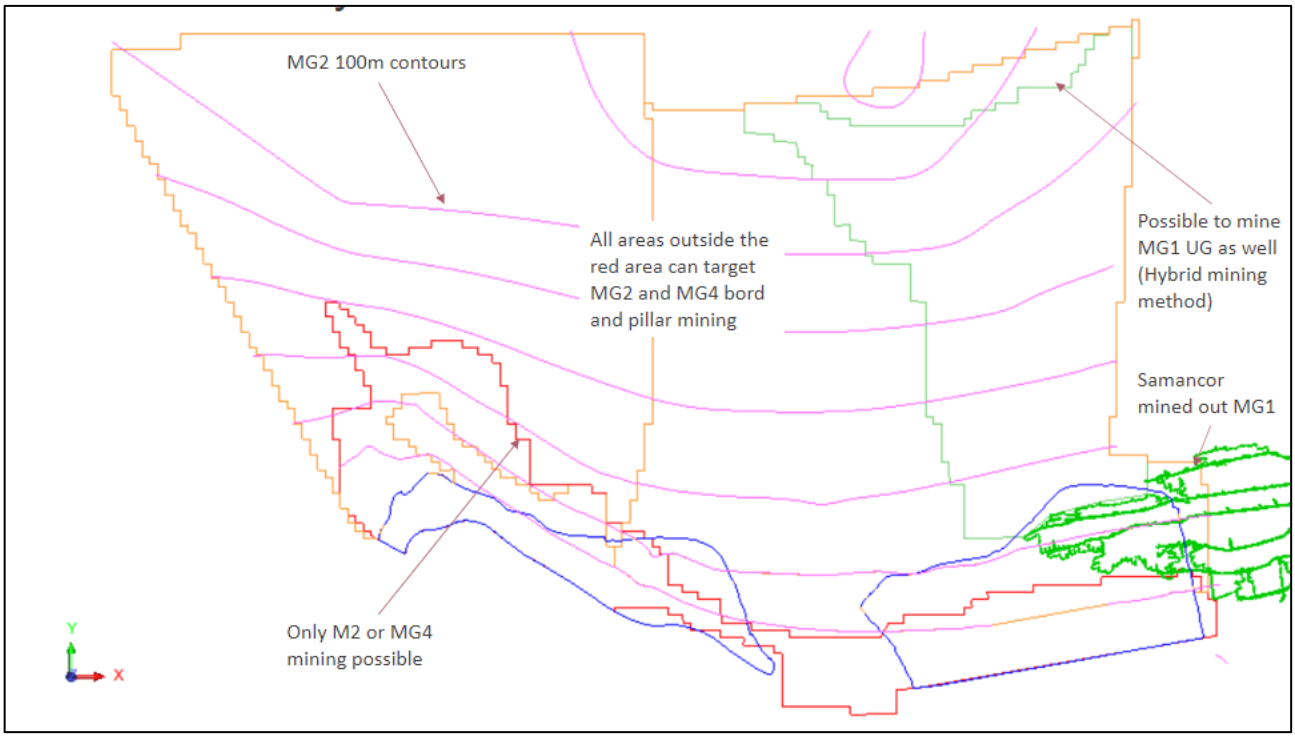


Figure 9: Mining Resource Location (West and East)

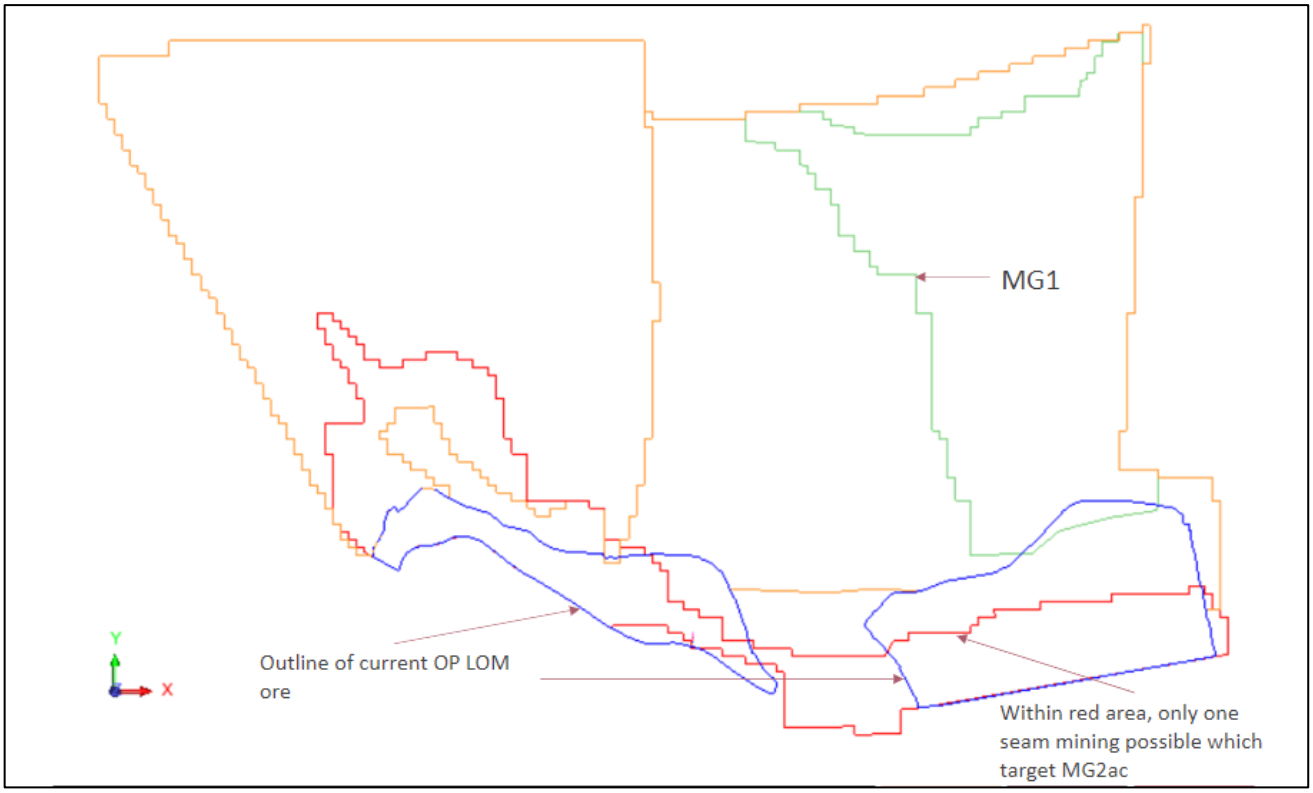


Figure 10: MG 1 Reef Horizon

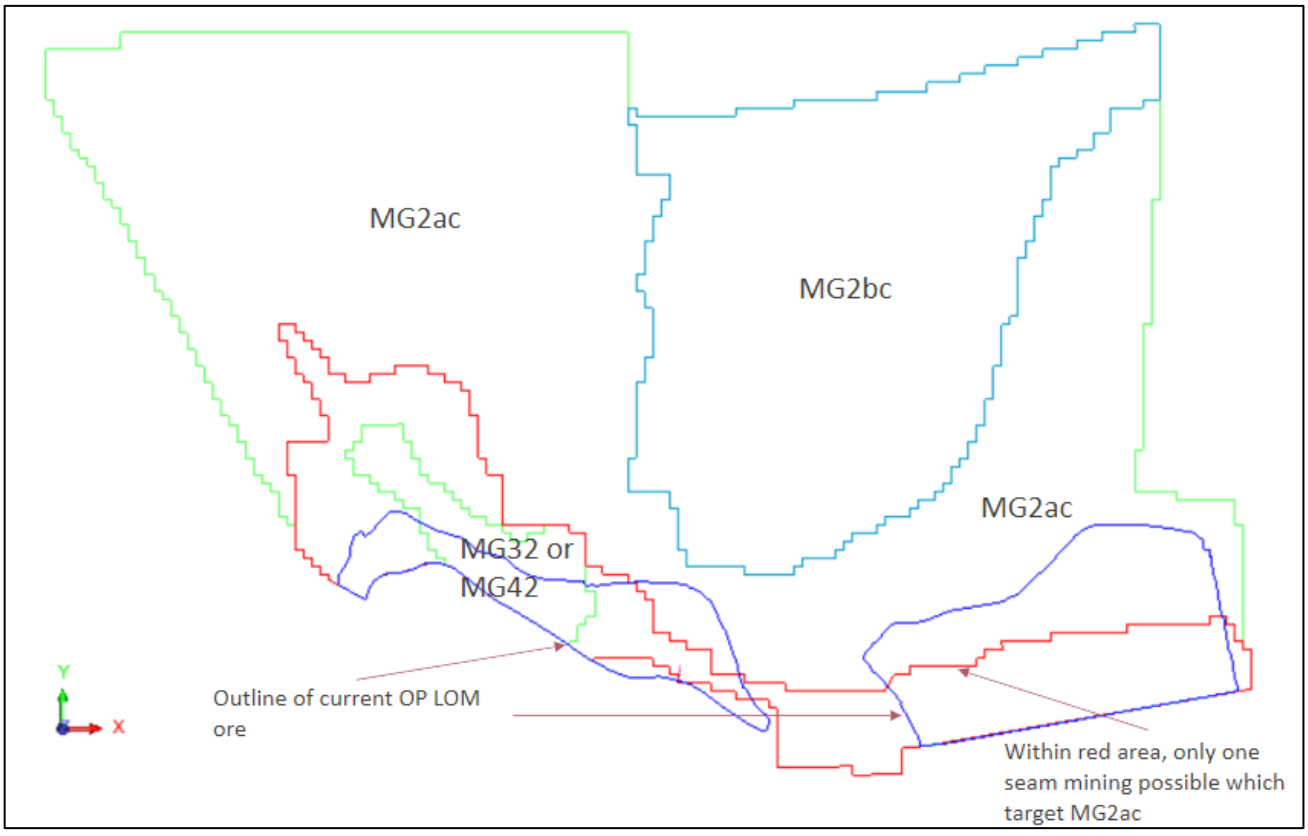


Figure 11: MG 2 Reef Horizon

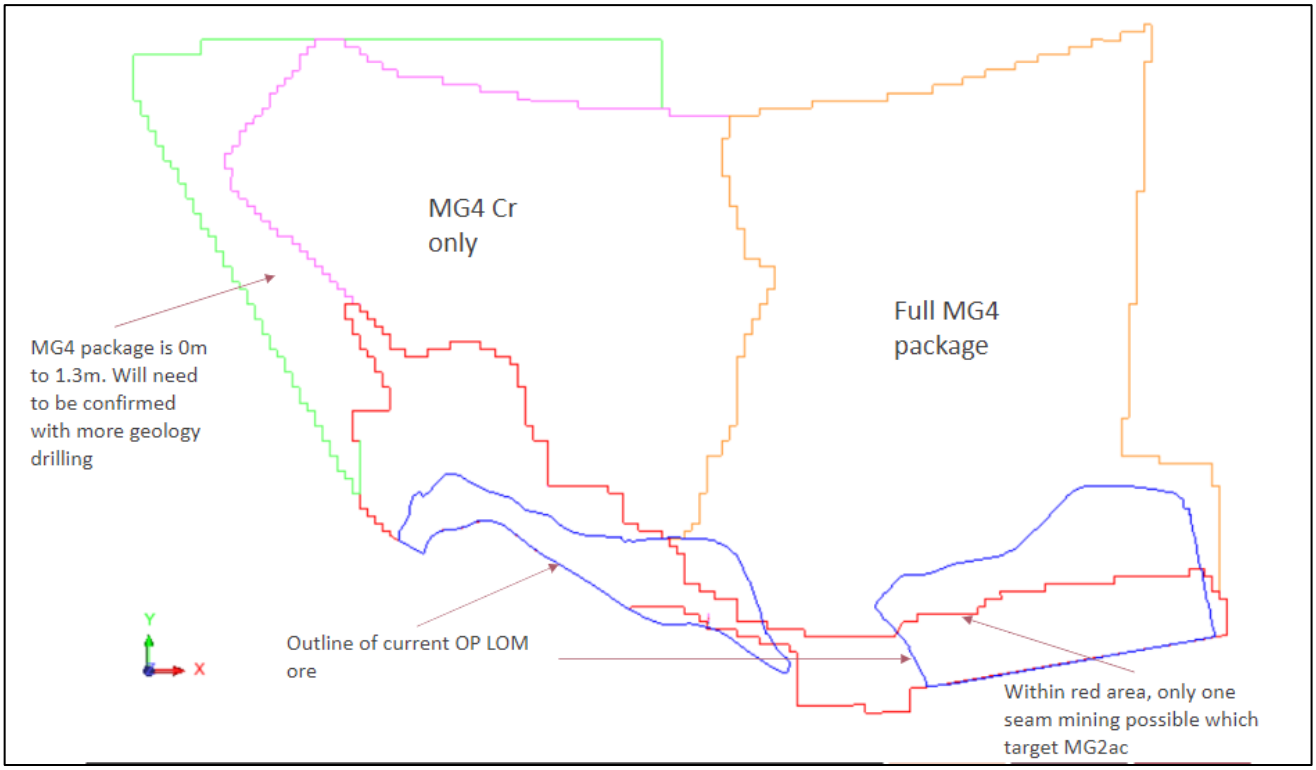


Figure 12: MG 4 Reef Horizon

2-3.1.6 Mining Processing

The concentrator complex caters for two (2) streams, namely PGMs and Chrome, to accommodate the different characteristics of the MG ore seams that are mined. Tharisa's two independent processing plants are designed to treat five (5) MG Chromitite Layers of the Bushveld Complex, namely MG1, 2, 3, 4a and 4b. The plants have a similar process flow that includes crushing and grinding, primary removal of chrome concentrate by spirals, followed by PGM flotation from the chrome tails and a second spiral recovery of chrome from the PGM tails. The tails from these plants are processed further in the fine-chrome recovery plant (Vulcan), before deposition of final tails to the TSFs. The target production figures for the plants are approximately 15 000 tonnes of PGM concentrate per month; and approximately 125 000 tonnes of chrome concentrate per month.

The target production figures for the plants are approximately 15 000 tonnes of PGM concentrate per month; and approximately 125 000 tonnes of chrome concentrate per month.

The PGM concentrate is transported to the surrounding smelters in the region. The chrome concentrate is taken by trucks to the Marikana Railway Siding where it is transported by rail to Richards Bay.

2-3.1.7 Underground Infrastructure and Services

Two (2) separate support underground infrastructure areas will be constructed to service the West and the East shafts. The following infrastructure will be expected to be constructed underground:

- Substations and mini substations;
- Air compressors to move air within the underground compartments;
- Electrical cables to transfer power underground;
- Refuge chambers;
- Drop raises;
- C&I network;
- Underground water storage dams (emergency and transfer dams);
- Underground conveyor belts and chairlifts;

- Ablution facilities;
- Workshops;
- Waste storage facilities;
- Process and potable water underground pipelines; and
- Underground roads.

2-3.1.8 Surface Infrastructure and Services

Two (2) separate support surface infrastructure areas will be constructed to service the West and East underground areas. Although a central infrastructure area may be feasible, due to the location of the mine and associated health and safety risks presented by the Marikana Road which divides the mine into East and West, a decision was made to have 2 separate infrastructure areas designed to support the underground workings (East and West).

The opencast mining area will continue to be operational while the underground workings are being constructed and transitioned to underground mining. Therefore the opencast workshop and surface infrastructure will remain and be operated separately from the underground support surface infrastructure.

The following new infrastructure will be established at the West underground support surface infrastructure area as shown in Figure 13:

- Two surface PCDs and silt traps;
- Grey water storage tanks;
- Workshops, storage areas and wash bay;
- Hydrocarbon fuel storage area (2 above ground storage tanks each measuring 30m^3);
- Laydown areas;
- Trackless mobile machinery parking area;
- Mine store and Capital yard;
- STP and balancing tank;
- Stormwater management infrastructure with associated pumps;
- RoM stockpile area;
- Surface conveyor belts;
- Supplementary Infrastructure:
    - Offices, change house, ablutions and lamp room to cater for 600 to 800 personnel;
    - Vehicle parking area (approximately 372 parking spaces) with solar panels attached to the roof;
    - Access roads and bridge;
    - Processing water reticulation system;
    - Guard house and security fencing;
    - Substation and power supply and backup generators (5 MVA), 11kV/525V and 20MVA, 88/11Kv]; and
    - Potable water storage supply tanks.

The East underground support surface infrastructure will be established to the south eastern corner of the East Pit. The following new infrastructure will be established at the East underground support surface infrastructure area as shown in Figure 14:

- Two surface PCDs and silt traps;
- Grey water storage tanks;
- Workshops, storage areas and wash bay;
- Hydrocarbon fuel storage area (2 above ground storage tanks each measuring 30m^3);
- Laydown areas;
- Trackless mobile machinery parking area;
- Mine store and Capital yard;

- STP and balancing tank;
- Stormwater management infrastructure with associated pumps;
- RoM stockpile area;
- Surface conveyor belts;
- Supplementary Infrastructure:
  - Offices, change house, ablutions and lamp room to cater for 600 to 800 personnel;
  - Vehicle parking area (approximately 372 parking spaces) with solar panels attached to the roof;
  - Processing water reticulation system;
  - Guard house and security fencing;
  - Substation and power supply and backup generators (5MVA, 11kV/525V and 20MVA, 88/11kV); and
  - Potable water storage supply tanks.

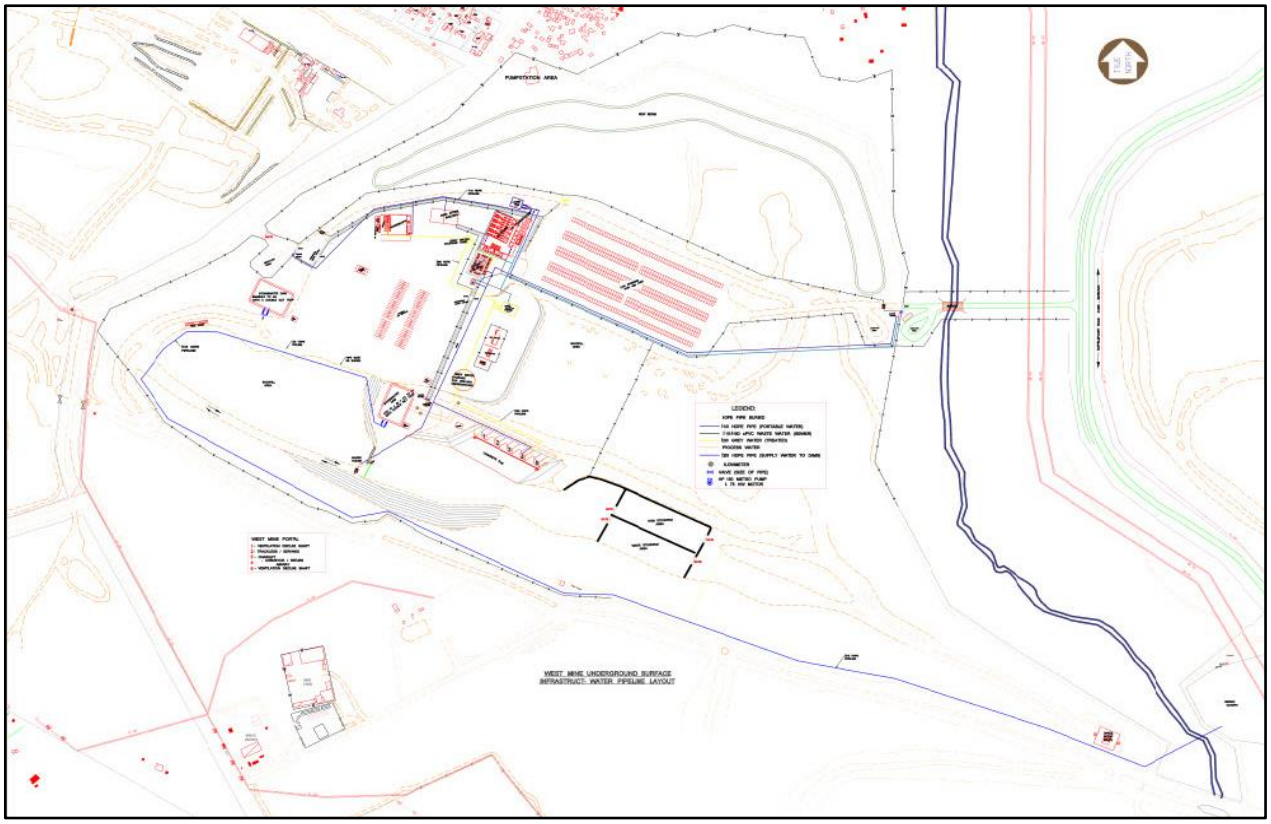


Figure 13: West Underground Surface Support Infrastructure Layout

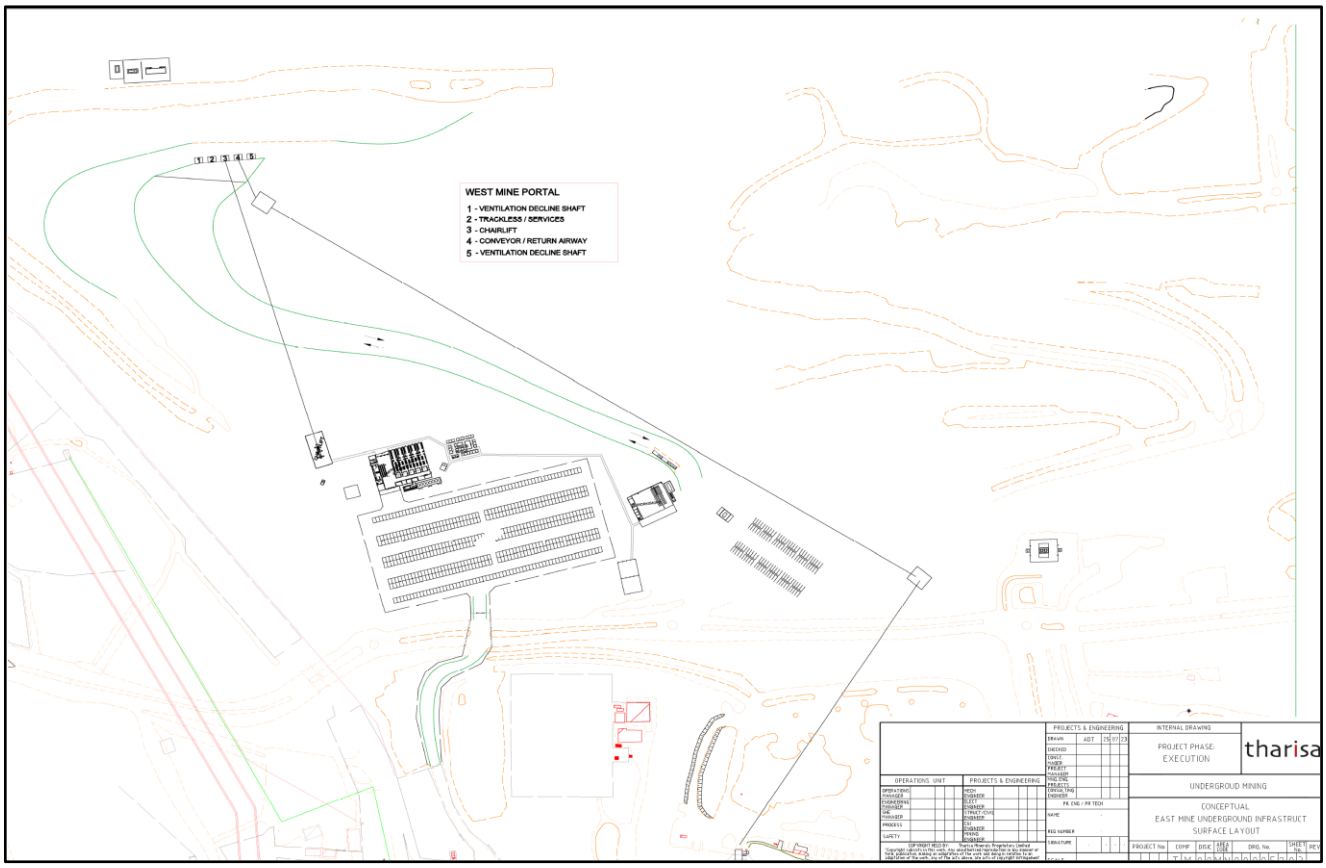


Figure 14: East Underground Surface Support Infrastructure Layout

2-3.1.9 Existing Infrastructure to be Utilised

The following infrastructure that is already existing as part of the opencast mine will be utilised to support the underground mining operation:

- Haul roads.
- RoM stockpiles.
- Concentrator complex (all associated infrastructure).
- Topsoil stockpiles.
- WRDs and TSFs.

2-3.1.10 Ventilation Shafts

Ventilation Shafts will be constructed at strategic locations on the surface to provide ventilation to the West and East underground mine. The ventilation shafts will include upcast and downcast shafts for each underground workings (West and East). These ventilation shafts will be constructed as and when required as the mine expands. The support infrastructure required for the ventilation shaft will include the following:

- Substation and powerlines;
- Access roads; and
- Diesel and hydraulic oil storage areas.

Illustrations of an upcast and downcast ventilation shaft has been provided in Figure 15.

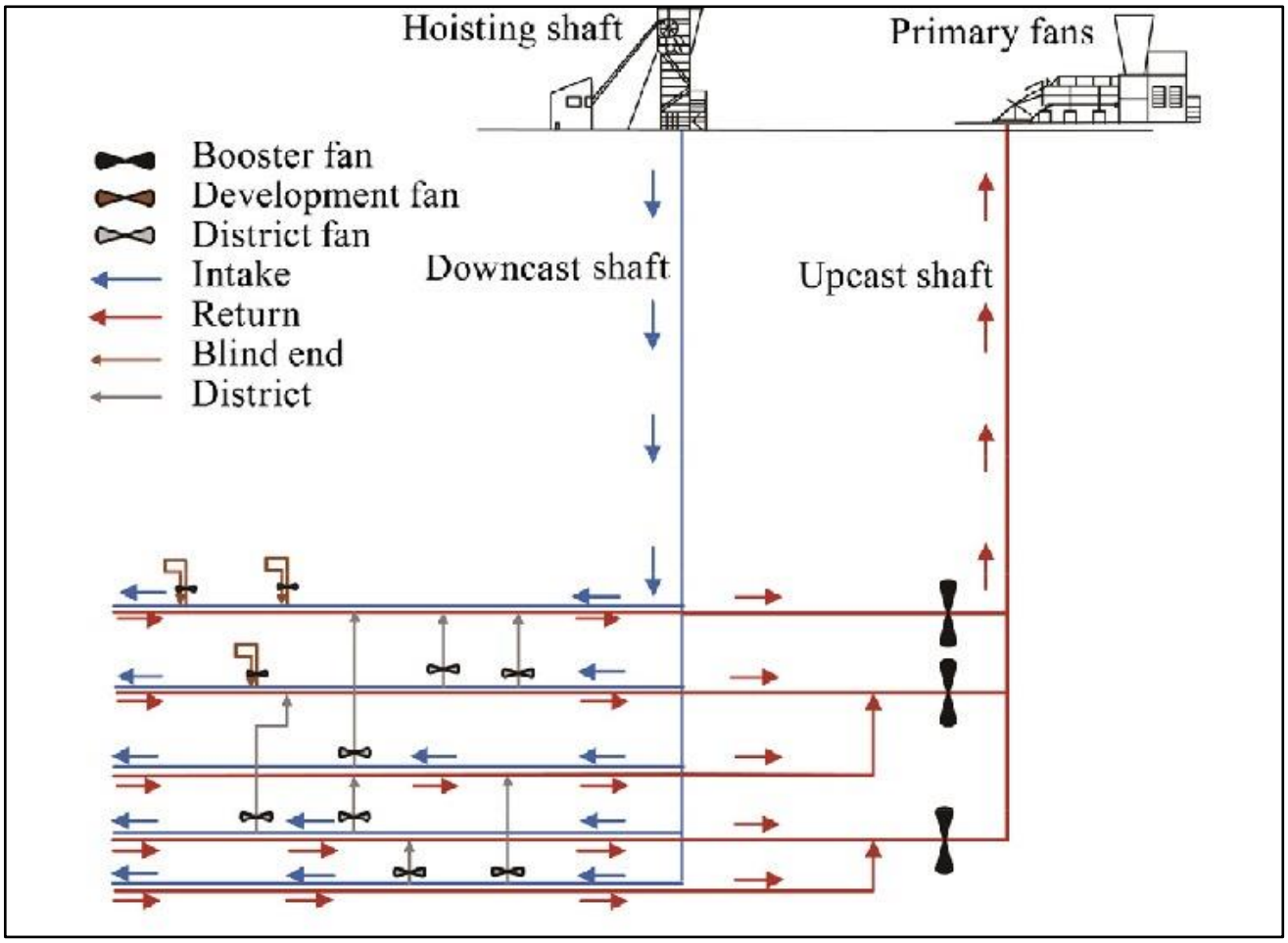


Figure 15: Ventilation Shaft Upcast and Downcast

A downcast shaft is a vertical or inclined tunnel that brings fresh air into a mine, while an upcast shaft is a vertical or inclined tunnel that expels stale or contaminated air from a mine. The downcast and upcast shafts are usually connected by horizontal or inclined passages that allow the air to circulate through the mine. The downcast or upcast ventilation shaft will have fans attached to pump air into or out of the mine. To reduce noise and visual pollution these fans will be installed below surface.

The difference between a downcast and an upcast shaft is important for the safety and efficiency of the mining operations, as it affects the quality of the air, the temperature, the pressure, and the risk of fire or explosions.

The proposed locations of the upcast and downcast ventilation shafts for East and West mines are presented in Figure 16.

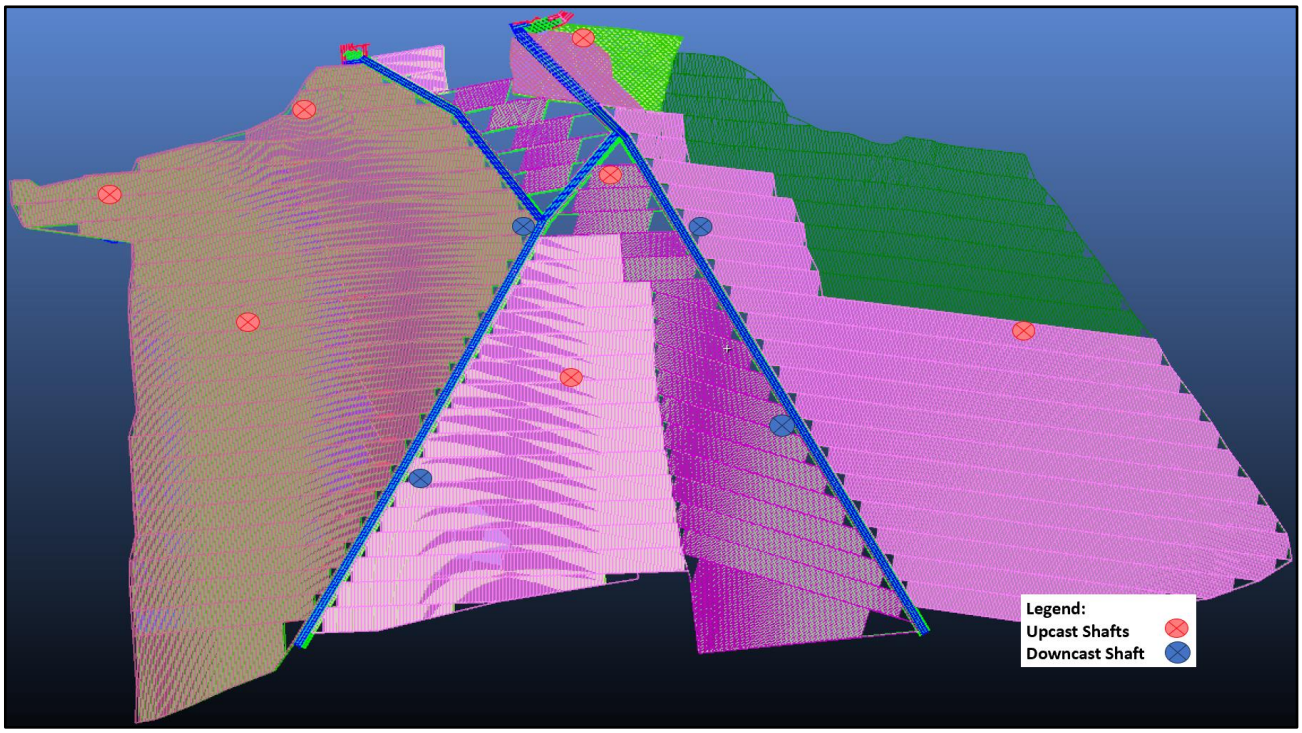


Figure 16: proposed Locations of Upcast and Downcast Ventilation Shafts

2-3.1.11 Access Roads

Roads will be constructed around the shafts to provide direct access to the shaft and ventilation shaft areas as well as to access areas within the shaft footprint (internal roads). The West Shaft will have two main access areas, one on the east and one on the western side which will be access controlled. The access road on the east will be accessed via a new bridge to be constructed over the Sterkstroom River which will join to the existing Marikana Road. The East Shaft will be accessed via the existing main entrance to the mine.

2-3.1.12 Electricity

A short- and long-term solution has been proposed to address the electrical requirements of the mine. The short-term solution which will meet the underground power requirements for approximately four (4) years includes expanding the existing substation and installing underground cables to provide electricity to the underground mine, as well as the construction of 2 new 5MVA, 11kV/525V substations which will feed East and West underground operations.

The long-term solution that is proposed will need to be constructed in 2027. This option will cater to both the West and East underground mining operations. The long-term solution will include the construction and operation of a new 20MVA, 88/11kV substation and associated powerlines.

2-3.1.13 Water Management

Water at the mine is sourced from local ground water via abstraction from a wellfield developed by the mine and from the western irrigation canal of the Buffelspoort dam irrigation system. Tharisa has also secured an allocation from Rand Water through an agreement with Samancor. In terms of the agreement, the total maximum quota to be supplied is 2,666,000 kilolitres per month.

A network of pipelines transports potable water and recycled/ process water within the mine site. All pipelines are either below the surface or raised 50cm above ground. Infrastructure (pipes and canals) associated with the Buffelspoort Irrigation Board traverses various sections of the project area in a South-North direction.

New HDPE pipelines will be laid to support the underground operations. The mine will be required to pump water out of the mine to ensure a safe underground working environment. The water pumped out of the underground will be sorted in the proposed PCDs located at the East or West surface infrastructure. This water, which is considered dirty, will be reused within the mining process specifically for washing of vehicles, mining equipment usage, underground drilling, washing of the faces within the underground mine and dust suppression on surface and underground. The remining water will be reused into the concentrator complex and other processing facilities.

Stormwater management infrastructure will be constructed around the mining areas to ensure separation of clean and dirty water as well as to maximise clean water runoff away from the mining areas.

2-3.1.14 Surface Pollution Control Dams and Silt Traps

Two (2) PCDs will be constructed at both East and West shafts to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs will each be lined with a concrete liner and have double silt traps to collect all silt which will be regularly cleaned out during the dry season. The PCDs are named as follows with associated design parameters:

West Shaft

- PCD A
  - Volume: 36 100m^3
  - Dimensions: 95m (Length) X 95m (Width) X 4m (depth)
- PCD B
  - Volume: 5 550m^3
  - Dimensions: 37 m (Length) X 50 (Width) X 3 m (depth)

East Shaft

- PCD C
  - Volume: 36 100m^3
  - Dimensions: 95m (Length) X 95m (Width) X 4m (depth)
- PCD D
  - Volume: 5 550m^3
  - Dimensions: 37 m (Length) X 50 (Width) X 3 m (depth)

Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification.

2-3.1.15 Underground Water Storage Dams

Two (2) emergency underground water dams will be constructed at East and West shafts to ensure the underground workings remain safe and free of water. Transfer dams will be constructed in areas where dust suppression and mining activities will occur. The water will be pumped between surface and underground dams to ensure water is managed effectively and reused. The transfer and emergency dams will change as the mine progresses underground and more area is available to store water which was previously mined.

2-3.1.16 Sewage Treatment Plant

A STP will be constructed at both East and West surface infrastructure areas. The STP at each location will be able to treat 300 – 400 m^3/day of domestic sewage. It is anticipated that the effluent qualities will have Chemical Oxygen Demand (COD) of 600 mg/L, Total Kjeldahl Nitrogen (TKN) of 65 mg/L, and Total Phosphate of 10 mg/L. The proposed STPs will aim to treat the sewage with discharge limits complying with the standards/ guidelines as set out by the DWS.

The raw domestic sewage will be fed through an upfront manual screen and into a concrete septic tank. The angled, manually raked screen will aim to prevent debris and trash from entering the plant. The screened sewage is transferred by a set of duty/standby submersible pumps to a trickle filter. The trickling filter is a technology in which the microbial community grows on synthetic media creating a biofilm. The trickle filter is constructed as a vented tower allowing the natural flow of air to provide the required oxygen for cell metabolism to break down the COD.

Additionally, nitrifying bacteria also grow on the biofilm. In the presence of low COD, these micro-organisms oxidise ammonia to nitrate, which is the first step in biological nitrogen removal. The biological treated wastewater is collected in a basin at the bottom of the trickle filter and transferred by a set of duty/standby clarifier feed pumps to a lamella clarifier where the sloughed biomass settles out and returns to the first chamber of the septic tank.

The overflow from the clarifier is disinfected by dosing calcium hypochlorite inline upfront of the chlorine contact tank. The septic tank needs to be desludged as required.

2-3.1.17 Waste Management

A waste storage area will be constructed at both the East and West underground support surface infrastructure areas. The waste will be handled, separated, stored, and disposed of at an appropriate accredited facility.

The following waste types are anticipated to be generated at the operation:

- General waste (domestic waste; paper; plastic; cardboard; tins; and glass).
- Hazardous Waste (hydrocarbon waste; chemical waste; and light bulbs i.e. containing mercury.

As part of the proposed mining operation, the following waste-related facilities will be constructed to manage the various waste streams:

- Hazardous waste storage area for the safe and compliant temporary storage of various hazardous waste materials;
- General waste storage area for temporary storage of sorted material before disposal;
- Waste tyre storage area for the short- to medium-term storage of used tyres;
- Material Recovery Facility (MRF) for sorting and separate storage of recyclable materials;
- Oil traps and oil storage tanks for oil interception or recovery, and temporary storage of used oil;
- Salvage yard or scrap yard for temporary storage of scrap metal and reusable mechanical parts; and
- STPs to treat black water produced on site.

Hazardous waste will be removed offsite by a hazardous waste contractor. A safe disposal certificate for the removal of hazardous waste will be retained as proof of safe disposal.

2-3.1.18 Employment and Recruitment

It is anticipated that the labour requirements below will be needed for the proposed underground mine. The labour will be sourced from both the existing open-cast labour force as well as from external labour forces (local, provincial, and national expertise, if required).

Table 4: Labour Requirements

Phase	Total labour	Management	UG Mining labour	UG Equipment Labour	Engineering	Services
Construction Phase	**510**	10	200	50	150	100
Operational Phase	**830**	20	300	100	350	60
Decommissioning Phase	**510**	10	200	50	150	100

2-3.1.19 Surface Agreements

The majority of the surface rights required for Tharisa's operations have been purchased. Where surface rights have not been purchased, appropriate lease agreements have been negotiated.

SECTION 3: POLICY AND LEGAL CONTEXT

The purpose of this section is to list legislation, principles and policies that may relate to the management of anticipated impacts resulting from the proposed **Underground Expansion Project** at East and West mines. The reason for this is to ensure that the DMRE have access to the rich picture in terms of legislation. Legislation principles and policies as listed hereunder are relatively detailed.

3-1 LEGISLATION, POLICIES AND GUIDELINES APPLICABLE TO THE PROPOSED PROJECT

Table 5 below lists the applicable legislation, policies and guidelines identified as relevant to the proposed **Underground Expansion Project** at East and West mines. In addition, a description of how the proposed activity complies with and responds to the legislation and policy context is given. This list is not exhaustive but rather presents the most applicable legislation relevant to the proposed **Underground Expansion Project** at East and West mines.

Table 5: Policy and Legislative Context of the Proposed Project

Applicable legislation and guidelines	Reference where applied	How does this development comply with and respond to the legislation and policy context	Authority
The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) (The Constitution).	• Throughout the Scoping Report.	Section 24 of the Constitution states that "*…everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that (c) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*" This protection encompasses preventing pollution and promoting conservation and environmentally sustainable development.	Government of the Republic of South Africa.
MPRDA.	• Section 3-3.	Tharisa has been in operation since November 2009 having an initial MR 49/2009 effective 19 September 2008, issued on 13 August 2009 by the then the DME (now referred to as the DMRE). Tharisa subsequently applied for an amendment of the MR with the Reference Number: NW/30/5/1/2/2/358 MR, stamped 28 July 2011. This MR was however only registered in 2016. The original EMPr was compiled by Metago in 2008 in terms of NEMA and the MPRDA. The following approvals have been granted under the MPRDA: • A MR (Reference No.: NW30/5/1/2/3/2/1/358) issued by the DMRE on 19 September 2008 and amended in July 2011; • An approved EMPr (Reference No.: NW 30/5/1/2/3/2/1/358EM) issued by the DMRE on 19 September 2008; • An addendum to the EIA and EMPr (Ref No.: NW/30/5/1/2/3/2/1/358EM) issued by the DMRE on 24 June 2015; • An addendum to the EIA and EMPr (Ref No.: NW/30/5/1/2/3/2/1/358EM) issued by the DMRE on 14 August 2020; and • An addendum to the EIA and EMPr (Ref No.: NW/30/5/1/2/3/2/1/358EM) issued by the DMRE on 08 August 2021. The proposed EMPr amendment is being undertaken under the MPRDA.	North West DMRE.
NEMA and the EIA Regulations 2014, as amended.	• Throughout the Scoping Report. • Section 2 of this report details the proposed project description, and the listed activities triggered; Table 3 detail the listed activities to be authorised according to NEMA. • Section 3-2.	Section 24 of the NEMA i.e. control of activities which may have a detrimental effect on the environment and Section 28 of the NEMA i.e. duty of care and remediation of environmental damage have been taken in consideration of. Tharisa has EAs authorised under NEMA. The following EAs have been granted under the NEMA: • An EA (Ref No.: NWP/EIA/159/2007) issued by the North West DEDECT on 23 October 2009; • An EA (Ref No.: 14/12/16/3/3/2/408) issued by the Department of Forestry, Fisheries and the Environment (DFFE) on 15 November 2012; • An EA (Ref No.: NWP/EIA/50/2011) issued by the North West DEDECT on 29 April 2015; • A Section 24G EA (Ref No.: NW/30/5/1/2/3/2/1/358EM) issued by the DMRE on 10 August 2021. The proposed **Underground Expansion Project** at East and West mines triggers activities listed in GNR. 983, 984 and 985, as amended, which require an EA from the DMRE. Activities listed in GNR 325 as amended require that a S&EIR be undertaken. **Triggered activities listed under GNR.327 (Listing Notice 1) are as follows:** Activities 9, 10, 11, 12, 13, 14, 19, 21D, 24, 25, 27, 30, 34, 45 and 46. **Triggered activities listed under GNR.325 (Listing Notice 2) are as follows:** Activities 4, 6, 15 and 16. **Triggered activity listed under GNR.324 (Listing Notice 3) is as follows:** Activities 4 and 12. The EA – WML application is being undertaken under the NEMA and the NEMWA.	
DFFE Integrated Environmental Management (IEM) Guideline Series, Guideline 5: Assessment of the EIA Regulations, 2012 (Government Gazette 805). IEM Guideline Series 11, published by the DFFE in 2004. Review in EIA IEM, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.	• Throughout the Scoping Report.	Environmental impacts will be generated primarily in the construction phase of this project with associated operational phase impacts. These will be assessed as part of the proposed project. A S&EIR is required for the proposed project as activities are triggered under GNR. 983, 984 and 985, as amended.	North West DMRE.
DFFE 2017, Public Participation guideline in terms of NEMA EIA Regulations.	• Throughout the Scoping Report.	PPP is a requirement of the S&EIR and is being conducted for the proposed project.	North West DMRE.
NWA.	• Throughout WULA – pertaining to water related aspects. As mentioned above, the proposed project requires that an Integrated Water Use License (IWUL) be applied for. A WULA is currently being undertaken in parallel with the EA – WML Application, and Section 102 EMPr amendment for the **Underground Expansion Project**. • Section 3-5.	The proposed **Underground Expansion Project** at East and West mines requires Section 21 (a), (b), (c), (e), (f), (g), (i), (j) IWULA, for the following water uses: Section 21 (a) - Taking water from a water resource: for the abstraction of water from boreholes and the underground workings. Section 21 (b) - Storing water: for the development of all dams for storage of water. Section 21 (c) - Impeding or diverting the flow of water in a watercourse and 21 (i) - Altering the bed, banks, course or characteristics of a watercourse: for the mining of areas within a watercourse, (wetland and river) their associated buffer zones and floodlines. Section 21 (e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1): for irrigation and dust suppression. Section 21 (f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit: for discharge of treated waste water from the STPs: discharge of excess underground water. Section 21 (g) - Disposing of waste in a manner which may detrimentally impact on a water resource: for the construction of the dams and dust suppression. Section 21(j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people: for the removal of water from the underground workings.	DWS.

Applicable legislation and guidelines	Reference where applied	How does this development comply with and respond to the legislation and policy context	Authority
		The triggering of these water uses will require a full Integrated Water Use Licence Application (IWULA) to be applied for. A WUL (Licence No. 03/A21K/ABCGIJ/1468) was issued by the DWS to Tharisa on 16 July 2012 for the following Section 21 water uses: Section 21 (a), (b), (c), (i), (g), (j). An amended IWUL to the issued WUL was issued by the DWS on 12 November 2020, for the same water uses, as originally applied for. Subsequently, a WUL was issued by the DWS to Tharisa on 17 September 2024, for the following Section 21 water uses: Section 21 (a), (b), (c), (f), (g), (i), (j). The licence supersedes the licence issued to the Tharisa on 12 November 2020.	
NEMWA.	• Throughout the Scoping Report. • Section 2 of this report details the proposed project description and the listed activities triggered. • Section 3-4.	The proposed **Underground Expansion Project** associated infrastructure (PCDs) triggers activities listed in under GNR.921 [Category B (4)] and requires a WML from the DMRE. According to GNR. 921 of the NEMWA, activities listed in GNR.921 (Category B) require that a S&EIR be undertaken. Triggered activities listed under GNR.921 [Category B (4)] are as follows: • Activities 7 and 10. The project will also trigger activities ;listed under Category "C" of GNR.921. Under this category, a WML is not required, but a certificate will be sought from the DMRE. It must however be noted that an integrated EA- WML application is being submitted for the approval by the DMRE. The EA – WML application is being undertaken under the NEMA and the NEMWA.	North West DMRE, through the Integrated application process.
National Environmental Management Air Quality Act, 2004 (Act No. 39 of 2004) (NEMAQA).	• SECTION 8:- Baseline Description.	Air quality management: Section 32 – Dust control; Section 34 – Noise control; and Section 35 – Control of offensive odours. No approvals are required from the district municipality for the proposed project.	DFFE.
National Forestry Act, 1998 (Act No. 84 of 1998) (NFA).	• SECTION 8:- Baseline Description.	The NFA protects against the cutting, disturbance, damage, destruction, or removal of protected trees. A Biodiversity Impact Assessment is currently being conducted as part of the S&EIR, which will identify protected trees, which may be affected by the proposed **Underground Expansion Project** at East and West mines. Should there be any protected trees that are affected by the project, Tharisa would have to apply for the required permit for the removal and/or relocation of the trees.	Department of Agriculture, Forestry and Fisheries (DAFF).
NEMBA.	• SECTION 8:- Baseline Description.	The NEMBA provides for the management and conservation of South Africa's biodiversity within the framework of NEMA, as well as the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources. The Act provides for listing of threatened or protected ecosystems, in one of four categories: critically endangered, endangered, vulnerable or protected. During the S&EIR process, biodiversity hotspots and bioregions will be investigated to determine the impacts that the project may have on the receiving environment. The management and control of alien invasive species on the impacted areas during all the phases of the project will be governed by the NEMBA. The NEMBA ensures that provision is made by the proponents to remove any alien species, which have been introduced to the site or are present on the site.	DFFE.
Mine Health Safety Act, 1996 (Act No. 29 of 1996) (MHSA).	• SECTION 8:- Baseline Description.	The MHSA aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa. The proposed project is located within a mining area and Tharisa will therefore need to ensure that employees, contractors, sub-contractors and visiting personnel, adhere to this Act and subsequent amendment regulations on site.	North West DMRE.
Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA).	• SECTION 8:- Baseline Description.	The act makes provision for the control measures for erosion; and control measures for alien and invasive plant species.	DAFF.
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).	• SECTION 8:- Baseline Description.	A Heritage Impact Assessment (HIA) screener and Exemption of Palaeontological Impact Assessment is currently being undertaken for the project, to identify whether there are any areas of historical importance or of palaeontological importance.	North West Heritage Resource Authority

3-2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998)

The NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

In 2014 on 8 December, new EIA Regulations came into effect and replaced the previous EIA Regulations of 18 June 2010. The Regulations are as follows:

- GNR. 982 provides for the methodology and format which needs to be considered when conducting a (BA) and S&EIR processes;
- GNR. 983 (Listing Notice 1) provides for activities which require a BA process to be followed;
- GNR. 984 (Listing Notice 2) provides for activities which require a S&EIR to be followed; and
- GNR. 985 (Listing Notice 3) also provides for activities which require a BA process to be followed.

The Minister of Environmental Affairs has again made amendments to the EIA Regulations, 2014, published under GNR. 982, GNR. 983, GNR. 984 and GNR. 985 of 4 December 2014, in terms of sections 24(5) and 44 of the NEMA through the promulgation of GNR. 324, GNR. 325, GNR. 326 and GNR. 327 of 07 April 2017.

The NEMA EIA Regulations define two broad processes for an EIA, namely: BA and S&EIR.

S&EIR is applicable to all projects likely to have significant environmental impacts due to their nature or extent, activities associated with potentially high levels of environmental degradation, or activities for which the impacts cannot be easily predicted.

BA is required for projects with less significant impacts or impacts that can easily be mitigated.

The proposed project will entail the undertaking of the EIA - S&EIR in terms of the EIA Regulations 2014, as amended; promulgated in terms of the NEMA as listed in GNR. 983, 984 and 985, as amended. These activities are identified as actions that may not commence without an EA granted from the relevant competent authorities, in this case, the DMRE.

3-2.1 Listed and specified activities for the proposed Underground Expansion Project at East and West mines

The listed activities associated with the proposed project in respect of NEMA are provided in Table 3 above. The design of the infrastructure that will trigger these listed activities is provided in Figure 17. Based on the nature and extent of the listed activities, MC on behalf of Tharisa will conduct an integrated application process.

Figure 17: Proposed Underground Expansion Project at East and West mines Design

3-3 MINERALS & PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002)

The MPRDA aims to "make provision for equitable access to, and sustainable development of, the nation's mineral and petroleum resources". This Act outlines the procedural requirements that need to be met to acquire mineral and petroleum rights in South Africa. The MPRDA governs the sustainable utilisation of South Africa's mineral resources.

Tharisa has been in operation since November 2009 having an initial MR 49/2009 effective 19 September 2008, issued on 13 August 2009 by the then the DME. Tharisa subsequently applied for an amendment of the MR with the Reference Number: NW/30/5/1/2/2/358 MR, stamped 28 July 2011. This MR was however only registered in 2016.

The proposed project requires that a Section 102 Application process be undertaken to incorporate underground mining methods and associated infrastructure into the EMPr. It should be noted that the ore body to be mined as part of the approved MR does not change, and only the mining method is changing.

In terms of Section 102 of the MPRDA, the application procedure to be followed concerning the EMPr amendment is a S&EIR process. Section 102 of the Act states that "*a reconnaissance permission, prospecting right, mining right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right and production right work programme; mining work programme, EMPr, and Environmental Management Plan (EMP) may not be amended or varied (including by extension of the area covered by it or by the addition of minerals or a share or shares or seams, mineralised bodies, or strata, which are not at the time the subject thereof) without the written consent of the Minister*".

It must be noted that Activity 21D has been included in Listing Notice 1 on the NEMA EIA Regulations, of 2014, as amended, which now requires that a **BA** must be undertaken as part of a MR amendment process in terms of section 102 of the MPRDA. Due to the NEMA and NEMWA listed activities, which require a S&EIR process to be followed, Section 102 amendment will also follow the S&EIR process.

3-4 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT 59 OF 2008)

NEMWA regulates waste management in South Africa and provides reasonable measures for pollution prevention resulting from waste activities.

The NEMWA defines Waste as (a) *any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or (b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered; (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered; (i) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or, (ii) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste*.

3-4.1 List of Waste Management Activities

The Acting Minister of the DFFE under section 19 (1) of the NEMWA, has published a List of Waste Management Activities which have, or are likely to have a detrimental effect on the environment in GNR. 921 of 29 November 2013.

The schedule has listed activities in three different categories, i.e. Category "A", Category "B" and Category "C".

For **Category "A"** activities, a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a BA process, as stipulated in the NEMA EIA Regulations under section 24 (5) of the NEMA as part of a waste license application.

For **Category "B"** activities, a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a NEMA S&EIR process, as stipulated in the EIA regulations under section 24(5) of the NEMA as part of a waste license application.

Regarding the development of the new PCDs, though Tharisa has sought legal opinion on the applicability of PCDs to the Act, and the conclusion was that no listed waste management activities that may be relevant to the construction and operation of the PCDs were identified. MC is of opinion that the WML must be applied for, given that silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification. This waste could be collected after 90 days. The PCDs will therefore serve as temporary storage facilities. It has not yet been established with respect to the frequency of desilting for ultimate disposal. The waste could be classified as "hazardous" due to the leaching potential.

The listed activities associated with the proposed project in respect of NEMWA are provided in Table 6 below.

Table 6: Triggered Activities Listed Under GNR.921 [Category B (4)]

Activity Number	Description
Activity 7	The disposal of any quantity of hazardous waste to land.
Reason: The report (Metago, 2008) states the following: "*Based on the tests results, none of the wastes are expected to be acid generating. The design of pollution abatement measures need only consider the leachability of the waste under natural pH conditions to mildly acidic conditions*". All of the waste streams were however classified as "hazardous" due to the leaching potential, with the leaching of aluminium under conditions of neutral pH likely. In the long term the different waste streams are likely to have similar pollution potential. Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification. Disposal of silt and sludge may be considered disposal of a hazardous waste.	
Activity 10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).
Reason: Construction of PCDs for storage of stormwater containing silt and sludge.	

For **Category "C",** a person who wishes to commence, undertake or conduct a waste management activity must comply with relevant requirements or standards determined by the Minister listed below:

a) Norms and Standards for Storage of Waste, 2013;
b) Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013; or
c) Standards for Scrapping or Recovery of Motor Vehicles, 2013.

Storage of waste

(1) The storage of general waste at a facility that has the capacity to store in excess of 100m^3 of general waste at any one time, excluding the storage of waste in lagoons or temporary storage of such waste.

(2) The storage of hazardous waste at a facility that has the capacity to store in excess of 80m^3 of hazardous waste at any one time, excluding the storage of hazardous waste in lagoons or temporary storage of such waste.

(3) The storage of waste tyres in a storage area exceeding 500m^2.

Schedule 3 of the Act includes the following definition:

"**Hazardous waste**" means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles.

For the **Underground Expansion Project,** the following activities trigger the need for a WML:

I. Surface Pollution Control Dams and Silt Traps

As mentioned above, two (2) PCDs will be constructed at both East and West shafts to collect all dirty water generated from the underground and dirty water runoff from surface. The PCDs will each be lined with a concrete liner and have double silt traps to collect all silt which will be regularly cleaned out during the dry season. Silt traps and sumps will be constructed within the shaft areas to collect stormwater and direct the water to the PCDs for reuse while silt and sludge will remain behind and removed offsite as waste according to the relevant waste classification.

II. Storage of waste activities

Two (2) separate waste storage areas will separately be constructed at both the East and West underground support surface infrastructure areas. A WML is being applied for, as the project triggers Category "B" activities. For activities which will be triggered as stipulated in Category "C", a certificate will be sought from the DMRE.

3-5 NATIONAL WATER ACT, 1998 (ACT. NO 36 OF 1998)

The NWA guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities, which may impact water resources through the categorisation of 'listed water uses' encompassing water extraction, flow attenuation within catchments, as well as the potential contamination of water resources.

The proposed **Underground Expansion Project** at East and West mines requires a Section 21 (a), (b), (c), (e), (f), (g), (i), (j) WULA, for the following water uses:

- Section 21 (a) - Taking water from a water resource: for the abstraction of water from boreholes and the underground workings;
- Section 21 (b) - Storing water: for the development of all dams for storage of water;
- Section 21 (c) - Impeding or diverting the flow of water in a watercourse and 21 (i) - Altering the bed, banks, course or characteristics of a watercourse: for the mining of areas within a watercourse, (wetland and river) their associated buffer zones and floodlines;
- Section 21 (e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1): for irrigation and dust suppression;

- Section 21 (f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit: for discharge of treated waste water from the STPs: discharge of excess underground water;
- Section 21 (g) - Disposing of waste in a manner which may detrimentally impact on a water resource: for the construction of the dams and dust suppression; and
- Section 21(j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people: for the removal of water from the underground workings.

The triggering of these water uses will require a new WULA to be applied for, for the proposed **Underground Expansion Project** and its associated infrastructure.

A WUL (Licence No. 03/A21K/ABCGIJ/1468) was issued by the DWS to Tharisa on 16 July 2012 for the following Section 21 water uses: Section 21 (a), (b), (c), (i), (g), (j). An amended IWUL to the issued WUL was issued by the DWS on 12 November 2020, for the same water uses, as originally applied for.

Subsequently, a WUL was issued by the DWS to Tharisa on 17 September 2024, for the following Section 21 water uses: Section 21 (a), (b), (c), (f), (g), (i), (j). The licence supersedes the licence issued to the Tharisa on 12 November 2020.

3-6 NATIONAL POLICY AND PLANNING FRAMEWORK

3-6.1 National Development Plan 2030

The National Development Plan (NDP) 2030 promotes an economy that will create more jobs, improving infrastructure, transition to low carbon economy, an inclusive and integrated rural economy, reversing the spatial effects of apartheid, improving the quality of education, training and innovation, quality health for all, social, protection, building safer communities and reforming the public sector.

The NDP 2030 provides the context for all growth in South Africa. The NDP provides a broad strategic framework, setting out an overarching approach to confronting poverty and inequality through the promotion of development, based on the six focused and interlinked priorities. One of the key priorities is “faster and more inclusive economic growth”. To transform the economy and create sustainable expansion for job creation, an average economic growth exceeding 5% per annum is required.

It is also acknowledged that environmental challenges are in conflict with some of these development initiatives. As such, it is emphasised that there is also a need to:

- Protect the natural environment.
- Enhance the resilience of people and the economy to climate change.
- Reduce carbon emissions in line with international commitments.
- Make significant strides toward becoming a zero-waste economy.
- Reduce greenhouse gas emissions and improve energy efficiency.

Government has set development goals aimed at reducing poverty, unemployment, and inequality. The mining sector is a big contributor to the economy of South Africa as well as the region. The proposed project to be implemented has many positive benefits and spinoffs during the construction, operational and closure phases. The benefits and positive impacts have a countrywide reach. The impacts of the positive benefits of the proposed project have long-term benefits starting from the lowest unit, which is the individual, graduating to households and/or family unit, to the local level up to the country level.

3-7 PROVINCIAL PLANS

3-7.1 North West Spatial Development Framework

The North West Spatial Development Framework (SDF) needs to be conducive for sustainable development and provides for the execution of specific objectives. Those applicable to the proposed **Underground Expansion project area** listed:

iii. Giving spatial effect to objectives set by National Government Policies on Sustainability to support the optimal integration of the aspects of social, economic, institutional, political, physical and engineering services. The objectives include:

a. The NDP 2030 which promotes an economy that will create more jobs, improving Infrastructure, transition to low carbon economy, an inclusive and integrated rural economy, reversing the spatial effects of apartheid ,improving the quality of education, training and innovation, quality health for all, social, protection, building safer communities and reforming the public sector.

b. The National Strategy for Sustainable Development (NSSD) promoting the integration between social demands, natural resource protection, sustainable use and economic development.

iv. Restructuring and eliminating the disparate spatial development patterns provided by apartheid planning.

v. Creating an enabling environment for sustainable employment and economic growth and infrastructure development, promoting the objectives of the National Growth Path (NGP), The Industrial Policy Action Plan (IPAP) and The National Infrastructure Plan.

x. The optimal utilisation of natural resources by the objectives of:

a) Protecting biodiversity from the development of mines, forestry, urban and rural development, agriculture set by the North West Biodiversity Sector Plan (NWBSP).

b) Enhancing the quantity and protecting the quality of water resources.

c) Utilising the mineral resources in a responsible way attending to the effect of it on the environment.

d) Protecting high and unique potential agriculture land and the reduction of available land due to the development of mines, urban and rural areas and forestry.

Five strategic objectives have been identified to provide a foundation for spatial development strategies in the North West. These objectives are outlined below:

- **Strategic Objective 1**: Focus development on regional spatial development initiatives, development corridors, development zones and nodes.
- **Strategic Objective 2**: Protect biodiversity, water and agricultural resources.
- **Strategic Objective 3**: Promote Infrastructure Investment.
- **Strategic Objective 4**: Support economic development and job creation guiding the spatial development pattern of North West.
- **Strategic Objective 5**: Balance urbanisation and the development of rural areas within North West.

To achieve high growth scenarios and strategic objectives above, seven (7) development mechanisms were identified. These include land use planning and management, settlement planning, economic development, infrastructure investment, human resources development, facilitative governance and industrialisation. These mechanisms will ensure that the province enjoys high growth by shifting from social needs-based policy to infrastructure and economic growth-based policies.

3-8 MUNICIPAL PLANS

3-8.1 Bojanala Platinum District Municipality Integrated Development Plan (2022 – 2027)

BDM is one of the four district municipalities in the North West Province. BDM is situated on the eastern part of the North West province, and it shares provincial boundaries with Limpopo, Mpumalanga and Gauteng

Provinces and a national boundary with Botswana in the northern side. Its geographic size is covers 18 333km², with a population of 1 657 148 (2016, Statistics SA) and this makes it the most populous of the four districts of the North West Province.

The main economic drivers of the district municipality are agriculture, tourism, manufacturing, mining and the service industry. BDM is located along the Merensky Reef, which account for the district municipality being the leader in the production of PGMs. As a result, mining is the biggest employer in the district. The tourism industry also plays a major role in the economy of the district due to the number of world class public and private game parks. Sun City in Moses Kotane is also one of the region's tourist attractions.

The N4 freeway also play a role in linking the district with major economic centres in Gauteng Province. Furthermore, The N4 freeway that traverses the boundaries of three local municipalities in BDM is unique as it spans the central section of the only coast-to-coast corridor in Africa. The east-west corridor runs from Maputo in the east to Walvis Bay, Namibia in the west and connects the capital cities of four countries of the Southern African Development Community (SADC), namely Maputo in Mozambique, Pretoria in South Africa, Gaborone in Botswana and Windhoek in Namibia.

A number of challenges affecting the local economic development key performance area in the district were identified as follows:

- Lack/poor tourism infrastructure development.
- Driving difficulties and poor visibility at major tourism activities within the district.
- No proactive measures to initiate activities that could attract or promote tourism.
- Poor Integrated tourism information management system.
- Widening gap between commercial and emerging farmers.
- Not transferring assets to the local municipality/traditional authority for purpose of maintenance and operation.
- Lack of support for farmers to do game farming.
- Poor tenure development support.
- Poor coordinate, monitoring and implementation of Social and Labour Plans (SLPs).
- No mineral beneficiation for enterprises.
- Lack of coordination job creation stats by private sector e.g. Mines, Retails, manufacturing, etc.

3-8.2 Rustenburg Local Municipality Integrated Development Plan (2022 – 2027)

The Rustenburg Local Municipality is a category B municipal council consisting of 45 wards. It occupies the central part of the BDM and houses the main offices of the district municipality. The major settlements of Rustenburg Local Municipality are the Rustenburg town, Phokeng, Tlhabane, Hartebeesfontein and Marikana.

The N4 freeway passes through the town of Rustenburg and also links the municipality with the main centres of Johannesburg and Tshwane metros. Rustenburg is home to large mining operations by companies such as Anglo Platinum, Impala Platinum, Glencore and Lonmin. Approximately 97% of the total platinum production occurs in Rustenburg, with the mining sector providing more than 50% of all formal employment.

The Rustenburg Local Municipality's Integrated Development Plan (IDP) identifies strategic focus areas it has identified as the cornerstones of a successful and thriving council within the developed Master Plan 2040, and which form the foundation of its Five-year IDP. The approved master plan has 5 goals which reads as follows:

- City of vibrant and diversified economy;
- City of identity;

- City of smart liveable homes;
- City of excellence in Education and sport; and
- City of sustainable resources management.

The IDP identifies agriculture, mining, manufacturing, utilities, trade, transport, finance, community and personal services, general government services and tourism as sectors that contributes to local economic development. Of relevance to the project is opportunities identified in terms of recycling and rehabilitations of mines which could contribute to the local economic development.

The Rustenburg area has a large concentration of mining activities, with the mining sector creating the biggest job opportunities.

3-9 OTHER ENVIRONMENTAL PLANNING AND MANAGEMENT GUIDELINES

A number of planning and management guidelines have been developed that need to be considered as part of the S&EIR process, including:

- DWS, 2010. Operational Guideline: Integrated Water and Waste Management Plan (IWWMP). Resource Protection and Waste;
- Department of Water Affairs and Forestry (DWAF), 2007. Best Practice Guideline A2: Water Management for Mine Residue Deposits;
- DWAF, 2007. Best Practice Guideline A4: Pollution control dams;
- DWAF, 2008. Best Practice Guideline A6: Water Management for Underground Mines;
- DWAF, 2006. Best Practice Guideline G1 Storm Water Management;
- DWAF, 2006. Best Practice Guideline G2: Water and Salt Balances;
- DWAF, 2006. Best Practice Guideline G3. Water Monitoring Systems;
- DWAF, 2008. Best Practice Guideline G4: Impact Prediction;
- DWAF, 2008. Best Practice Guideline H1: Integrated Mine Water Management;
- DWAF, 2006. Best Practice Guideline H3: Water Reuse and Reclamation;
- DEAT. 2002. IEM, Information series 2: Scoping. DEAT. 2002;
- DEAT. 2002. IEM, Information series 3: Stakeholder Engagement. DEAT. 2002;
- DEAT. 2002. IEM, Information series 4: Specialist Studies. DEAT. 2002;
- DEAT. 2002. IEM, Information series 12: EMPrs. DEAT. 2002;
- DFFE. 2012. Companion to the EIA Regulations 2010, IEM Guideline Series 7, DEA; and
- DFFE. 2017. Guideline on Need and Desirability, DEA, Pretoria, South Africa.

SECTION 4: NEED AND DESIRABILITY OF THE ACTIVITY

Tharisa has the potential to extract approximately 15 000 to 18 000 tons of ore per day. At present, the mine extracts approximately 11 800 tons of ore per day and imports 3 500 tons from other mining operations due to Tharisa's inability to access the ore body through opencast mining methods. The ore is taken to a processing plant for further processing before being sold to a third party.

Tharisa publicly declared a mineral reserve of 107.2Mt in December 2022. The declared mineral reserve consists of 88.2Mt delivered from open pit operations and 19Mt from underground operations. The open pit mineral reserves are updated annually, and the underground Minerals were updated through a Prefeasibility Study that was undertaken in 2020. The East Pit is planned to be completed by 2037 and the West/Far West pits by 2040, after which each will transition to underground operations. However, due to numerous factors as highlighted below, the **Underground Expansion Project** has been fast-tracked:

- Inability to relocate communities out of the opencast mining area as well as lack of space to construct new WRDs;
- Additional costs required to purchase land for the construction of the additional WRDs as well as further environmental impacts;
- Due to the geometry of the ore body, increased waste stripping is required to access the ore which will require increased WRD space as well as increase fleet requirements;
- Increase diesel costs and hauling distances between the opencast pits and the processing plant; and
- Requirement to reduce Green House Gas (GHG) in line with the Paris Agreement.

Due to the shortfalls anticipated from the open pit mining areas, it is anticipated that the underground mining for West would need to start operating by 2025 and East by 2030. The introduction of underground mining will extend the LoM until 2125.

The benefits of the **Underground Expansion Project** are listed below:

- Improved 4E grades due to a more selective mining cut;
- Increased production thereby reducing the amount of ore required to be imported;
- Improved overall profitability of the mine;
- Reduction in surface WRDs, and associated property purchases;
- Option to dump waste on top of the unmined West Pit area;
- Reduction in East Pit mining rate, with associated waste stripping and equipment fleet;
- The relocation of the community will no longer be required for mine development however relocation as a result of other mining infrastructure such as the Lapologang TSF will be required but will be limited in extent;
- Creation of employment, increased spending ability feeding back to the Provincial economy, economic empowerment; and
- Negate incremental cost challenges towards end of the LoM.

4-1 QUESTIONS TO BE ENGAGED WITH, WHEN CONSIDERING NEED AND DESIRABILITY

The Guideline on the assessment of Need and Desirability [Department of Environmental Affairs (DEA), 2017] includes a number of questions, the answers to which should be considered in the S&EIR process. Table 7 presents the needs and desirability analysis undertaken for the proposed project.

Table 7: Need and Desirability

Theme	No.	Question	Response
Securing ecological sustainable development and use of natural resource	1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	The entire area covered by the application will be completely transformed by the proposed mining activities (surface infrastructure). The vegetation and topsoil will be stripped. It must however be noted that the underground mining infrastructure/ activities will not impact on the ecological integrity of the area. Ony the supporting associated infrastructure will. The area to be disturbed is within the approved Mining Right Area (MRA) which would have been disturbed as part of the mining process.
	1.1	How were the following ecological integrity considerations taken into account?	
	1.1.1	Threatened Ecosystems	The proposed area does not fall within any original or remaining extents of a threatened ecosystem.
	1.1.2	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.	The West mine associated infrastructure will (access road and bridge) encroach on the Sterkstroom River. It must however be noted that no mining activities will be undertaken within the riparian zone/ 1:100m floodline. Wetlands have been identified within the MRA (see Section 8-4 and Figure 24). A WULA is being submitted to the DWS to obtain the required permission to establish the associated infrastructure which will support the proposed Underground Expansion Project.
	1.1.3	CBAs and ESAs	The project area occurs within a Terrestrial CBA2 and is earmarked as ESA1 and ESA2 classifications. This suggests that patches of provincially Endangered and/or Vulnerable ecosystems, or endemic vegetation types, are present and any further modification should be limited to existing irreversibly modified or heavily degraded areas. Also, the ESAs suggest the presence of important habitats or supporting movement corridors within the region. The project area includes a terrestrial CBA and a critically endangered river (the Sterkstroom) defined by the North-West Province 2009 biodiversity assessment, and a High Biodiversity area in terms of the recently published Mining Biodiversity Guidelines. It is important to note that these national guidelines and assessments were published after the mine was approved in 2008. The area has been transformed by agricultural and mining activities (both on the project sites and in the surrounding areas), yet aquatic and terrestrial habitat, although limited, does still exist within the project area which is suitable for fauna and flora species, including some Red Data and protected species.
	1.1.4	Conservation targets	These will be considered during the Impact Assessment Phase and responded to accordingly.
	1.1.5	Ecological drivers of the ecosystem	
	1.1.6	Environmental Management Framework	
	1.1.7	SDF	The North West SDF has been referenced for the compilation of this Scoping Report and will also be considered in the Impact Assessment Phase.
	1.1.8	Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)	A desktop survey of wetlands was carried out for the Scoping Phase which referenced National Freshwater Ecosystem Priority Areas (NFEPA) wetlands. No RAMSAR sites are present in the vicinity of the project area.

Theme	No.	Question	Response
	1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative 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?	The West mine associated infrastructure will (access road and bridge) encroach on the Sterkstroom River. It must however be noted that no mining activities will be undertaken within the riparian zone/ 1:100m floodline. Wetlands have been identified within the MRA. A WULA is being submitted to the DWS to obtain the required permission to establish the associated infrastructure which will support the proposed **Underground Expansion Project**. The vegetation and topsoil will be stripped. It must however be noted that the underground mining infrastructure/ activities will not impact on the ecological integrity of the area. Ony the supporting associated surface infrastructure will, to a certain extent. Especially at the proposed access roads and bridge area. The vast area to be disturbed is within the approved MRA. No consideration was given to alternative mining sites mainly due to the availability of the mineral within the area. MC's impact assessment methodology will be utilised to identify, determine and assess the potential impacts during the Impact Assessment Phase.
	1.3	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?	
	1.4	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 minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	A waste storage area will be constructed at both the East and West underground support surface infrastructure areas. The waste will be handled, separated, stored, and disposed of at an appropriate accredited facility. The following waste types are anticipated to be generated at the operation: • General waste (domestic waste; paper; plastic; cardboard; tins; and glass). • Hazardous Waste (hydrocarbon waste; chemical waste; and light bulbs i.e. containing mercury. As part of the proposed mining operation, the following waste-related facilities will be constructed to manage the various waste streams: • Hazardous waste storage area for the safe and compliant temporary storage of various hazardous waste materials; • General waste storage area for temporary storage of sorted material before disposal; • Waste tyre storage area for the short- to medium-term storage of used tyres; • MRF for sorting and separate storage of recyclable materials; • Oil traps and oil storage tanks for oil interception or recovery, and temporary storage of used oil; • Salvage yard or scrap yard for temporary storage of scrap metal and reusable mechanical parts; and

Theme	No.	Question	Response
			• STPs to treat black water produced on site. Hazardous waste will be removed offsite by a hazardous waste contractor. A safe disposal certificate for the removal of hazardous waste will be retained as proof of safe disposal.
	1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? 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?	The extent to which cultural heritage sites will/may be disturbed will be investigated in the Impact Assessment Phase.
	1.6	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?	The proposed Mining activities will essentially deplete a non-renewable natural resource within the MRA. Once the mineral is removed, it will be gone from the area forever. Preliminary impacts of the proposed project have been identified and mitigation measures aimed at avoiding, reducing and/ or managing the negative impacts as well as enhancing the positive impacts. Additional management measures will be recommended in the EMPr.
	1.7	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?	The proposed underground mining activities will deplete a non-renewable natural resource (PGM and Chrome). Once the minerals have been mined, it will be gone from this area forever. The ore extracted will be taken to the existing processing plant for further processing before being sold to a third party. Preliminary impacts of the proposed project have been identified and mitigation measures aimed at avoiding, reducing and / or managing the negative impacts as well as enhancing the positive impacts have been recommended.
	1.7.1	Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised 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)	PGMs are vital industrial metals valued for their durability, resistance to corrosion and catalytic properties. The automotive industry is the world's largest consumer of PGMs, which are used in catalytic converters for vehicle exhaust systems. Other drivers of demand are jewellery, industrial uses, and investment. According to the Platinum Standard based on information from SFA Oxford Limited, primary platinum supply decreased by 11% from 2021 to 2022 to 5 500 koz. Therefore the expansion of this project will assist in providing supply to the market. The top chrome ore producers in South Africa are: Assmang Proprietary Limited, Glencore plc, Merafe Resources Limited, Samancor Chrome Limited and Tharisa. South Africa exports approximately 90% of its production to China as chrome ore lump and concentrates. Chrome ore demand is driven by ferrochrome demand as approximately 96% of the chrome ore is used for metallurgical purposes.
	1.7.2	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?)	

Theme	No.	Question	Response
			The ore extracted will be taken to the existing processing plant for further processing before being sold to a third party. The social impacts as a result of mining proceeding will be assessed in the Impact Assessment Phase.
	1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The EIA will provide mitigation measures to reduce the overall impact of the mine in terms of scarce resource usage.
	1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts?	Sufficient information was gathered prior to the onset of this process to indicate that the potential mining of the mineral is feasible.
	1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Each specialist will investigate the impacts and present the gaps and /or limitations in knowledge in their respective reports. Gaps in knowledge are collated and expressly provided in the EIA and EMPr Report, which will be submitted to the DMRE for consideration.
	1.8.2	What is the level of risk associated with the limits of current knowledge?	
	1.8.3	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?	
	1.9	How will the ecological impacts, resulting from this development impact on people's environmental right in terms following:	This will be investigated and quantified by each specialist and presented in the Impact Assessment Phase.
	1.9.1	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?	
	1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
	1.10	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.)?	
	1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?	
	1.12	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?	Refer to SECTION 6: for details of the alternatives considered. This aspect will be further investigated during the Impact Assessment Phase.
	1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Cumulative impacts will be investigated and presented during the Impact Assessment Phase.
P r o	2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?	

Theme	No.	Question	Response
	2.1.1	The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,	The social baseline took the BDM, 5 years District IDP, 2022 – 2027 and the Rustenburg Local Municipality IDP (2022 – 2027) into consideration. The IDP presents issues and requests raised by residents within the municipality.
	2.1.2	Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	The labour will be sourced from both the existing open-cast labour force as well as from external labour forces (local, provincial, and national expertise, if required).
	2.1.3	Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and	
	2.1.4	Municipal Economic Development Strategy ["local economic development (LED) Strategy").	
	2.2	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?	The proposed project will result in employment opportunities. Tharisa is committed to the socio-economic upliftment of the host communities in which the mine operates. During FY2021/2022, 18 new small and medium enterprises (SMEs) were developed on the mine's enterprise initiatives. Seven (7) SMEs provided services by fixing 69 houses and two churches in Lapologang and Mmadithlokwa communities. These SMEs were able to register their companies and ensure compliance through the assistance of the enterprise development programme at Tharisa. Some SMEs are able to conduct business with other organisations following on from this this project initiative. Tharisa strives to minimise potential negative social impacts while promoting opportunities for the local communities in its areas of operation. Tharisa will continue its commitment to community initiatives through its SLP to address job creation, poverty alleviation, basic infrastructure, education and development needs.
	2.2.1	Will the development complement the local socio-economic initiatives (such as LED initiatives), or skills development programs?	
	2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	
	2.4	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 mine will offer transferable skills to employees throughout the LoM, to ensure that they have skills other than those required by the mine, to lessen the negative impact and foster continued livelihood.
	2.5	In terms of location, describe how the placement of the proposed development will	
	2.5.1	result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	The proposed project will result in the creation of job opportunities. The labour will be sourced from both the existing open-cast labour force as well as from external labour forces (local, provincial, and national expertise, if required).
	2.5.2	reduce the need for transport of people and goods	The PGM concentrate is transported to the surrounding smelters in the region. The chrome concentrate is taken by trucks to the Marikana Railway Siding where it is transported by rail to Richards Bay.
	2.5.3	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),	
	2.5.4	compliment other uses in the area,	Mining activities occur to the North and immediate West and East of Tharisa Mine. Amongst the mining activities is open land mostly owned by mining companies and the community of Marikana (GLYA, 2023). Immediately West of the mining area, in the MR footprint, is the Lapologang community. The predominant land cover types in the area are listed below: • Mine: Extraction pits and quarries;

Theme	No.	Question	Response
			• Mine: Surface infrastructure; • Mine: Tailings and resource dumps; and • Commercial Annual crops rainfed/ dryland. The proposed activity compliments other uses in the area.
	2.5.5	be in line with the planning for the area,	The LoM will be extended by approximately 100 years, and the Closure and Rehabilitation Report will consider end-land use in line with the LED Strategy.
	2.5.6	for urban related development, make use of underutilised land available with the urban edge,	Not applicable. The proposed mining project is outside an urban area.
	2.5.7	optimise the use of existing resources and infrastructure,	The following infrastructure that is already existing as part of the opencast mine will be utilised to support the underground mining operation: • Haul roads. • RoM stockpiles. • Concentrator complex (all associated infrastructure). • Topsoil stockpiles. • WRDs and TSFs.
	2.5.8	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 reflects the spatial reconstruction priorities of the settlement),	The project will entail the expansion of the existing substation and the installation of the underground cables to provide electricity to the underground mine, as well as the construction of 2 new 5MVA, 11kV/525V substations which will feed East and West underground operations, as a long term solution. . The long-term solution will include the construction and operation of a new 20MVA, 88/11kV substation and associated powerlines.
	2.5.9	discourage "urban sprawl" and contribute to compaction/densification,	The project area and surrounds are fairly rural and cannot therefore influence urban sprawl.
	2.5.10	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,	The community projects associated with the SLP prioritises Historically Disadvantaged (HDAs) South Africans as beneficiaries.
	2.5.11	encourage environmentally sustainable land development practices and processes,	Not applicable. This can only be considered during the investigation for the end land use, post closure.
	2.5.12	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 proposed expansion area is dependent on the location of the identified resource.
	2.5.13	the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),	The proposed project will allow the mine to contribute to the local, regional and national Gross Domestic Product (GDPs), and also to the local communities through job security, as well as other influences and community upliftment programmes.
	2.5.14	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	The impact to cultural heritage will be investigated during the Impact Assessment Phase.

Theme	No.	Question	Response
	2.5.15	in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	The proposed project will ensure job security, as well as programmes proposed in the mine's SLP.
	2.6	How were a risk-averse and cautious approach applied in terms of socio-economic impacts?	Social impacts will be investigated during the Impact Assessment Phase.
	2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Gaps in knowledge, uncertainties and assumptions will be determined during the Impact Assessment Phase and presented in the EIA and EMPr Report.
	2.6.2	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?	
	2.6.3	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?	
	2.7	How will the socio-economic impacts, resulting from this development impact on people's environmental right in terms following:	
	2.7.1	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 minimise, manage and remedy negative impacts?	A Social Impact Assessment will be conducted during the Impact Assessment Phase which will consider the extent and significance of the proposed impacts presented in this section.
	2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	
	2.8	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.)?	
	2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	
	2.10	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?	
	2.11	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?	
	2.12	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?	
	2.13	What measures were taken to:	
	2.13.1	ensure the participation of all interested and affected parties,	An I&AP database has been developed to identify and verify the directly and indirectly affected landowners or land occupiers as well as the potentially affected surrounding

Theme	No.	Question	Response
			communities. This database will be updated throughout the S&EIR process to ensure adequate consultation.
	2.13.2	provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	MC will maintain and update the I&AP database to ensure communication with all registered I&APs. Site notices will be erected in various locations around the site and in the nearest communities to announce the project. SMS notifications will be utilised to keep I&APs informed about the project.
	2.13.3	ensure participation by vulnerable and disadvantaged persons,	Refer to SECTION 7: of this Scoping Report, describing the PPP to be implemented for the proposed project. Two Focus Group Meetings are planned to be convened in the Scoping Phase of the Project. Efforts will be made at the meeting to ensure that all participants can participate in a language they are able to understand.
	2.13.4	promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	The consultation process seeks to inform affected communities of the positive and negative impacts associated with the proposed project and provide opportunity for any stakeholder to raise concerns which will be responded to both on record in the reports and through direct written response (where possible).
	2.13.5	ensure openness and transparency, and access to information in terms of the process,	MC is bound by legislation and regulations to share information pertaining to the project, to be transparent and impartial.
	2.13.6	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	All stakeholder needs will be accommodated as far as is reasonably possible.
	2.13.7	ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein was be promoted?	The EAP cannot force participation from specific demographics. Cultural norms will be respected and adhered to; however, no demographic can be excluded from public consultation and therefore all registered stakeholders and meeting attendees will be considered intrinsic to the public consultation process and outcomes.
	2.14	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)?	
	2.15	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 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	The applicant must produce a Health and Safety policy and best practice on site, compliant with the MHSA. Workers must be educated on a regular basis about the environmental and safety risks that may occur within their work environment. Also, adequate measures need to be taken to ensure that the appropriate personal protective equipment (PPE) is issued to workers based on the areas that they work and the requirements of their job.
	2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	

<table>
<tr><th>Theme</th><th>No.</th><th>Question</th><th>Response</th></tr>
<tr><td rowspan="11"></td><td>2.16.1</td><td>the number of temporary versus permanent jobs that will be created,</td><td rowspan="4">It is anticipated that the labour requirements below will be needed for the proposed underground mine. The labour will be sourced from both the existing open-cast labour force as well as from external labour forces (local, provincial, and national expertise, if required).

Labour Requirements
<table><tr><th>Phase</th><th>Total labour</th><th>Management</th><th>UG Mining labour</th><th>UG Equipment Labour</th><th>Engineering</th><th>Services</th></tr><tr><td>Construction</td><td>510</td><td>10</td><td>200</td><td>50</td><td>150</td><td>100</td></tr><tr><td>Operational</td><td>830</td><td>20</td><td>300</td><td>100</td><td>350</td><td>60</td></tr><tr><td>Decommissioning</td><td>510</td><td>10</td><td>200</td><td>50</td><td>150</td><td>100</td></tr></table></td></tr>
<tr><td>2.16.2</td><td>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),</td></tr>
<tr><td>2.16.3</td><td>the distance from where labourers will have to travel,</td></tr>
<tr><td>2.16.4</td><td>the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</td></tr>
<tr><td>2.16.5</td><td>the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</td><td>Though there are host communities living in the areas planned to be mined, agricultural jobs will not be affected as the project is for underground mining.</td></tr>
<tr><td>2.17</td><td colspan="2">What measures were taken to ensure:</td></tr>
<tr><td>2.17.1</td><td>that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</td><td>MC has identified the relevant government organisations which must be consulted throughout the S&EIR process. Furthermore, this application is in terms of the One Environmental System and MC shall endeavour to align the various procedures to reduce stakeholder fatigue.</td></tr>
<tr><td>2.17.2</td><td>that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</td><td>Not Applicable.</td></tr>
<tr><td>2.18</td><td>What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</td><td rowspan="3">As part of the S&EIR process, Financial Liability for the Applicant will be calculated to determine the cost of decommissioning and rehabilitating the mine site to an end-land use which is sustainable and in the best interest of both the surrounding communities and the environment.</td></tr>
<tr><td>2.19</td><td>Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</td></tr>
<tr><td>2.20</td><td>What measures were taken to ensure that he 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?</td></tr>
<tr><td>2.21</td><td>Considering the need to secure ecological integrity and a healthy bio-physical 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 socio-economic considerations?</td><td>Refer to SECTION 6: for the description of the process followed to reach the proposed preferred site. This aspect will be further investigated during the Impact Assessment Phase.</td></tr>
</table>

Theme	No.	Question	Response
	2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Cumulative impacts will be assessed during the Impact Assessment Phase and presented in the EIA and EMPr Report.

SECTION 5: PERIOD FOR WHICH EA IS REQUIRED

It is envisaged that the EA would have been granted in 2025 for the proposed **Underground Expansion Project** at East and West mines. Subsequent to the issuance of all approvals, construction activities will then commence.

SECTION 6: DESCRIPTION OF THE ALTERNATIVES CONSIDERED

In terms of Appendix 2 of the NEMA EIA Regulations 2014, as amended, all environmental reports must contain a description of any feasible and reasonable alternatives that have been identified, including a description and comparative assessment of the advantages and disadvantages that the proposed activity and alternatives will have on the environment and on the community, that may be affected by the activity.

Every S&EIR process must therefore identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If no alternatives exist, proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the proposal/ preferred option and the no-go option exist must be provided.

The EIA 2014 Regulations, as amended, define alternatives as the different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

- The property on which or location where it is proposed to undertake the activity;
- The type of activity to be undertaken;
- The design or layout of the activity;
- The technology to be used in the activity;
- The operational aspects of the activity; and
- The option of not implementing the activity.

Although a collection of alternatives may exist for the proposed project, only feasible alternatives have been considered in this application.

The following alternatives have been considered, and will be further investigated during the Impact Assessment Phase:

6-1 THE PROPERTY ON WHICH OR LOCATION WHERE IT IS PROPOSED TO UNDERTAKE THE ACTIVITY

To minimise the extent of the project disturbance, the project footprint (surface infrastructure) will be located on previously disturbed areas. No alternatives have been investigated in terms of location of the proposed **Underground Expansion Project**. As indicated above, Tharisa currently holds the MR to the areas under investigation.

6-2 THE TYPE OF ACTIVITY TO BE UNDERTAKEN (UNDERGROUND VERSUS OPENCAST MINING)

Refer to SECTION 4: above, for the need and desirability of the proposed Underground Expansion Project.

6-3 THE TECHNOLOGY TO BE USED IN THE ACTIVITY

6-3.1 Mining Methods Alternatives

Based on the MG cut selection, the most appropriate mining method was selected having considered the following:

- Ore dips.
- Mining heights envisaged.
- Mining cost.
- Ventilation requirements.
- Practicality.
- Safety.
- Level of mechanisation possible.

The following mining methods were considered:

- **Hybrid mining**
- **Mechanised – Bord & Pillar**
- Mechanized – XLP
- Conventional mining
- Long Hole Stope Drilling
- Conventional – Up dip/ Down dip

The recommended mining method selected to extract the MG2 and MG4 reef horizon would be the **mechanised bord and pillar mining** while the **hybrid mining method** will be utilised to extract the MG1 reef horizon.

6-3.2 Electricity Supply Alternatives

The underground operations shall be accessed from two (2) box cuts, located on either side of the Marikana Road, approximately 2 km north of the existing Tharisa 11 kV Main Consumer Substation.

The forecast load of the Tharisa underground mining operations is expected to be in the range of 10 to 20 MVA. This load is expected to grow from an initial 5 to 8 MVA in the early years, and to level out to the 10 to 20 MVA level over time.

The following three (3) bulk electricity supply options have been considered:

- Extending an 11 kV underground cable network from the existing Tharisa 11 kV Main Consumer Substation to the Box cut area. Option A entails using 11kV underground cables for the complete route.
- Extending an 11 kV underground cable network from the existing Tharisa 11 kV Main Consumer Substation to the Box cut area. Option B entails using 11kV underground cables combined with a section of overhead lines for the route.
- Constructing a new 88/11 kV substation in close proximity to the Box cut area.

6-4 THE OPERATIONAL ASPECTS OF THE ACTIVITY (TRANSPORT OPTIONS)

The following alternatives were identified with regards to the options for the transportation of product from underground to surface, then to processing plants:

- Haul truck;
- Overland conveyor; and
- Railway.

6-5 THE OPTION OF NOT IMPLEMENTING THE ACTIVITY.

The option of the project not proceeding would mean that the environmental and social status would remain the same as current. This implies that both negative and positive impacts would not take place. As such, negative impacts on biodiversity, water resources, air quality land use, etc. would not transpire, but also that

the positive impacts such as economic development, employment creation, skills development, and poverty alleviation would not occur.

If the project was not to proceed, the expected revenue, economic activity, skills development, job opportunities, and the continued upliftment of the surrounding communities as a whole would not be realised. Furthermore, the mineral reserves in the project area would remain unmined. The benefits of the **Underground Expansion Project** will be lost, and the current impacts, especially on the surrounding communities will continue.

The above alternatives will further be assessed in the Impact Assessment Phase.

SECTION 7: DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

The PPP will be undertaken in terms of Chapter 6, Regulation 41 of the EIA 2014 Regulations, as amended, for the proposed project triggering listed activities under the NEMA, NEMWA and the MPRDA. MC on behalf of Tharisa will take into account all relevant guidelines applicable to the PPP as contemplated in section 24J of the NEMA. Notices will be given to all potential I&APs to participate in the project, as follows:

7-1 LEGAL REQUIREMENTS OF THE PPP AS REQUIRED BY SECTION 41 OF THE NEMA

41 (1) This regulation only applies in instances where adherence to the provisions of this regulation is specifically required.

(2) The person conducting a PPP must take into account any relevant guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential I&APs of an application or the proposed application which is subjected to public participation by:

(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of (i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and (ii) any alternative site;

(b) giving written notice, in any of the manners provided for in section 47D of the Act, to (i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken; (iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area; (iv) the municipality which has jurisdiction in the area; (v) any organ of state having jurisdiction in respect of any aspect of the activity; and (vi) any other party as required by the CA;

(c) placing an advertisement in (i) one local newspaper; or (ii) any official that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;

(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official referred to in paragraph (c)(ii); and

(e) using reasonable alternative methods, as agreed to by the CA, in those instances where a person is desirous of but unable to participate in the process due to (i) illiteracy; (ii) disability; or (iii) any other disadvantage.

(3) A notice, notice board or advertisement referred to in subregulation (2) must (a) give details of the application or proposed application which is subjected to public participation; and (b) state (i) whether a BA or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.

(4) A notice board referred to in subregulation (2) must (a) be of a size of at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the CA.

7-2 ANNOUNCEMENT OF THE PROJECT AND THE DRAFT SCOPING REPORT AVAILABILITY

The objectives of PPP during the scoping phase are to provide sufficient and accessible information to I&APs in an objective manner to enable them to raise comments, issues of concern and suggestions for enhanced benefits. I&APs also have an opportunity to provide input into the terms of reference (ToR) for the specialist studies, and to contribute relevant local and traditional knowledge to the S&EIR process.

The project was announced to the public on **Friday, 09 February 2024**, by means of the placement of a newspaper advertisement and site notices. Background Information Documents (BIDs) were distributed to I&APs to create awareness of the proposed project. The report was subjected to a PPP of at least 30 days and this Final Scoping Report reflects the incorporation of comments received, including comments from the competent and commenting authorities.

The following processes were undertaken to announce the project and the availability of the Draft Scoping Report:

- An I&AP database was compiled and is being maintained, and includes all I&APs in respect of the application in accordance with Regulation 42.
- Letters were sent to all I&APs, written in any of the manners provided for in section 47D of the NEMA, announcing the project and the availability of the Draft Scoping Report, containing project information, a locality map to the municipal councillor, community members, the local and district municipality, state departments and all other stakeholders as required by the CA, including adjacent communities' members.
- Affected parties who could not be reached via mail, fax or e-mail of the proposed project, were visited for delivery of the letters. The letters attached sheets which allowed I&APs to register and/ or/ comment on the Draft Scoping Report.
- Four (4) site notice boards were fixed at places conspicuous to and accessible by the public at the boundary of the site where the activity to which the application relates. Site notices were written in English and Setswana.
- One (1) advertisement (translated into both English and Setswana) was placed in the Rustenburg Herald Local newspaper.
- The Draft Scoping Report was also made available on the MC website (https://manyabeconsultancy.com/stakeholder-engagement/); and at the Marikana Public Library.
- SMS notifications of the availability of the Draft Scoping Report for public comment were distributed.
- Two (2) focus group meetings were hosted with the surrounding community members, to discuss the Draft Scoping Report and the project, as follows.

Venue	Date	Times
Mmaditlhokwa Village: **Open Space**	10 February 2024	10:00 - 12:00
Lapologang Village: **Sports Ground**	10 February 2024	14:00 - 16:00

- The proceedings of the public meetings, as well as all comments submitted have been captured in a CRR which has been attached to this Final Scoping Report for submission to the DMRE for decision-making.
- Telephonic consultation was undertaken with I&APs to obtain comments about the Draft Scoping Report; and to share information about the Project and to obtain comments about the Draft Scoping Report.

All comments and representations received from I&APs have been considered and recorded in the Comments and Responses Report (CRR). All I&APs who have participated in the PPP have been thanked, and their comments acknowledged.

The Draft Scoping Report was available for public comment from **Friday, 09 February 2024** to **Monday, 11 March 2024**.

7-3 ANNOUNCEMENT OF THE SUBMISSION OF THE FINAL SCOPING REPORT TO THE COMPETENT AUTHORITY

- The Draft Scoping Report has been updated based on the comments and inputs received during the review and commenting period of the Draft Scoping Report.
- The Final Scoping Report is being submitted to the DMRE for decision-making. All registered I&APs are being notified of the Final Scoping Report submission, and that it is available on the MC website for review and comment.
- Any additional comments received will be incorporated into the Draft EIA and EMPr Report. All additional comments will also be captured in the "live, continuously updated" CRR for the project.

7-4 ANNOUNCEMENT OF DRAFT EIA AND EMPR REPORT AVAILABILITY

The objectives of PPP during the Impact Assessment Phase are to verify that I&APs issues have been considered in the Impact Assessment, and to comment on the findings of the S&EIR, including the potential negative and positive impacts and the proposed management measures.

MC will compile and announce the availability of Draft EIA and EMPr Report. The report will be subjected to PPP of at least 30 days and will reflect the incorporation of comments received, including any comments of the competent and commenting authorities.

The following processes will be undertaken to announce the Draft EIA and EMPr Report:

- Letters will be sent to all I&APs, written in any of the manners provided for in section 47D of the NEMA, announcing the availability of the Draft EIA and EMPr Report to the municipal councillor of the ward in which the site is situated and any organisation of ratepayers that represent the community in the area, the municipality which has jurisdiction in the area, any organ of state having jurisdiction in respect of any aspect of the activity; and any other party as required by the CA, including adjacent communities' members.
- SMS notifications of the availability of the Draft EIA and EMPr Report for public comment will be distributed.
- Four (4) focus group meetings will be held with the adjacent landowners within a 5km radius; community organisations, such as: rate payers associations, HOAs, interest groups, etc.; relevant state departments at local, district, provincial and national levels; ward councillor; NGOs/ various environmental protection agencies/ bodies; and any other party perceived as playing a role within the community/ study area, to discuss the Draft EIA and EMPr Report.
- Telephonic consultation will be undertaken with I&APs to obtain comments about the Draft EIA and EMPr Report.
- The Draft EIA and EMPr Report will be made available on the MC website (https://manyabeconsultancy.com/stakeholder-engagement/); and at the Marikana Public Library; and
- Subsequent to the 30 days' period, all comments and representations received from I&APs will be considered and recorded in the CRR. All I&APs who would have participated in the PPP will be thanked, and their comments acknowledged.

7-5 ANNOUNCEMENT OF THE SUBMISSION OF THE FINAL EIA AND EMPR TO THE COMPETENT AUTHORITY

- The Final EIA and EMPr Report will consider and address all comments raised by I&APs, as per the CRR.
- The Final EIA and EMPr Report will be submitted to the DMRE for review and consideration towards a decision.
- All registered I&APs will be notified of the submission and the availability of the Final EIA and EMPr Report on MC website for review and commenting, should they choose to do so.
- Any additional comments will be directed to DMRE and copied to MC.

7-6 ANNOUNCEMENT OF THE DECISION

MC will ensure that all registered I&APs are provided with access to the decision and the reasons for such decision. I&APs will be drawn to the fact that appeals may be lodged against the decision in terms of the National Appeals Regulations of 2014 (GNR. 993), if such appeals are available in the circumstances of the decision. The decision will be advertised through the following methods:

- Personalised letters to individuals and organisations on the stakeholder database; and
- Placement of a newspaper advert in the same local newspaper where the project and the availability of the Draft Scoping Report was announced, translated in both English and Setswana.

SECTION 8: SPECIFIC BASELINE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITE

An overview of the baseline biophysical and socio-economic environment of the proposed **Underground Expansion Project** at East and West mines is given below. This information was obtained from the existing data presented in the approved environmental reports and specialist studies reports which were undertaken previously, for similar activities at Tharisa Mine. The data will be updated based on the specialist studies which are currently being undertaken for the proposed project. The surface infrastructure and associated activities to be developed as part of the proposed project will be established in brownfield area within the current Tharisa MR property. The infrastructure and associated activities have been presented in Section 2. Sensitive environmental and socio-economic features associated with the proposed project will be confirmed during the specialist studies which are currently being undertaken as part of this S&EIR process.

8-1 GEOLOGY

The Bushveld Igneous Complex (BIC), a massive intrusive body, has undergone erosion and tilting, and now emerges along the apparent boundary of a large basin measuring nearly 350km across. The BIC is comprised of eastern and western lobes, with a northern and far western extension. Additionally, a buried limb, known as the Bethal Limb, exists based on borehole intersections. All five limbs were formed approximately 2,000 million years ago. The eastern and western limbs exhibit striking similarities. This extensive complex originated when vast amounts of molten rock (magma) from the Earth's mantle ascended to the surface through vertical cracks and conduits in the crust. Upon reaching the surface, it differentiated, cooled, and solidified, resulting in a vast layered igneous body with a predominance of Chromite, thus forming the rare rock type known as Chromitite.

Chromite deposits in the BIC are found as stratified layers of massive chromitite. These significant chromitite layers are located in the lower section of the BIC known as the Critical Zone. They are categorised into three groups based on their proximity to each other (Figure 18). The Lower Group (LG) consists of seven chromitite layers, the MG has four main chromitite layers, and the UG contains two chromitite layers (some sources also mention a third layer - UG3). The naming convention assigns ascending numbers to the layers within each group, starting from the bottom layer (e.g., LG1, LG2, and so on, up to UG2 at the top). This naming convention reflects the concept that the lowermost layers are considered the oldest.

The Merensky Reef, situated at some distance above the UG2 chromitite layer, is the uppermost layer of economic interest in the Critical Zone. However, the Merensky Reef is mainly composed of Pyroxenite with only a few thin chromite stringers near its base.

The individual chromitite layers can vary in width from a few centimeters to over 2 meters in localised areas, but they generally range around 1 meter in thickness, seldom exceeding 2 meters. As a general trend, the average chrome content and Cr/Fe ratio of the layers decrease as the sequence progresses upward, while the PGMs content increases. The chromitite layers in the MG exhibit intermediate concentrations of both chrome and Platinum Group Elements (PGE) mineralisation, but there is a general decrease in grain size from the lowermost to the uppermost layers.

Traditionally, chrome production primarily focused on exploiting the layers of the Lower Group, while PGE production typically targeted the uppermost Merensky Reef and the underlying UG2 Chromitite layer from the Upper Group. From an economic perspective, the chrome and PGE concentrations in the MG Chromitite layers are considered marginal on an individual basis.

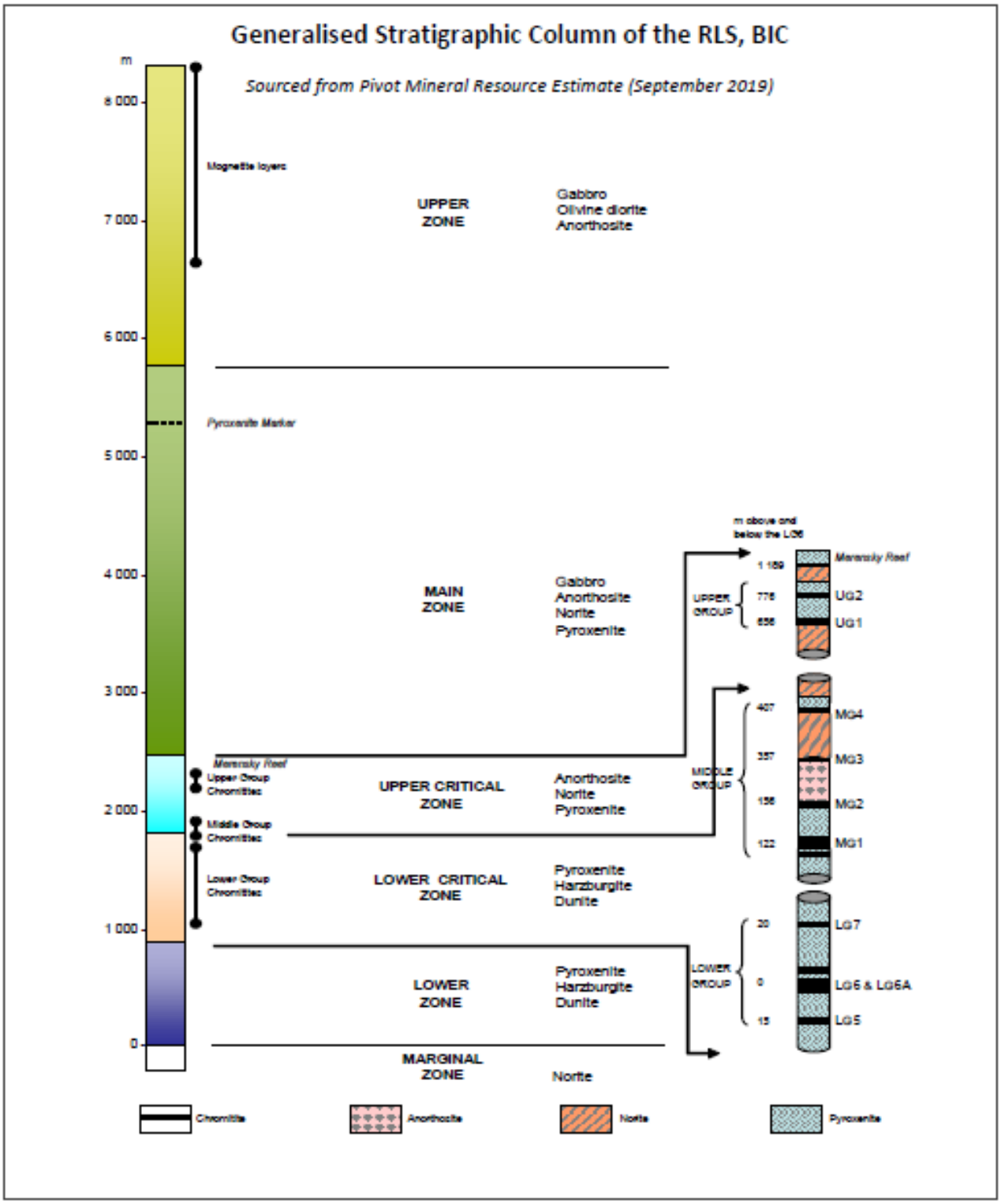


Figure 18: Stratigraphy of the Regional Geology

The open cast operations of Tharisa are located on Farm K/Kraal 342JQ where chromitite layers of the MG and UG1 (for which Tharisa holds the MRs) is outcropping on the property. The MR for these layers extends northward underground onto Rooikoppies 297JQ. Both properties are situated in the Marikana Section of the southwestern limb of the Bushveld Complex. The Marikana Section is separated from the Brits Section by Wolhuterskop in the east, and from the Rustenburg Section by the Spruitfontein “upfold” in the west. Tharisa Mine property is positioned on the western side of the Marikana Section, with its westernmost area falling within the Rustenburg Section.

8-2 TOPOGRAPHY, VEGETATION AND LANDUSE

8-2.1 Topography

Tharisa Mine is situated on slightly undulating plains and located to the east and west of the perennial Sterkstroom River (Figure 19). Small sections of original vegetation remain intact on the site, although most of the site represents old, cultivated land. The major land uses of the project area as classified by the Environmental Potential Atlas of South Africa (2000) are mining and vacant/unspecified land (AGES, 2023b).

8-2.2 Regional Vegetation

Tharisa Mine is situated within the Savanna biome which is the largest biome in Southern Africa. The Savanna Biome is characterised by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs).

The most recent classification of the area by Mucina and Rutherford (2006) shows that the mine is classified as Marikana Thornveld. The Marikana Thornveld vegetation type is considered Endangered. While the national conservation target for this vegetation type is 19%, less than 1% is statutorily conserved. This vegetation type has been transformed (48%), mainly by cultivation and urban or built-up areas. Most agricultural development of this area is in the western regions towards Rustenburg, while in the east industrial development is a greater threat. Alien invasive plants are localised in high densities, especially along drainage lines, in this vegetation type.

The Marikana Thornveld vegetation type is characterised by open Vachellia karroo woodland, valleys and slightly undulating plains and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitats protected from fire.

8-2.3 Land Use

Tharisa's operations, land use in the area was a mixture of farming, residential, mining, small business, and general community activities. Similar land uses still take place adjacent to the mine infrastructure and activity areas (Metago, 2008; SLR, 2014).

Mining activities occur to the North and immediate West and East of Tharisa Mine. Amongst the mining activities is open land mostly owned by mining companies and the community of Marikana (GLYA, 2023). Immediately West of the mining area, in the MR footprint, is the Lapologang community.

The predominant land cover types in the area are listed below:

- Mine: Extraction Pits and Quarries;
- Mine: Surface Infrastructure;
- Mine: Tailings and Resource Dumps; and
- Commercial Annual Crops rainfed/dryland.

As a result of this, the area may be described as significantly transformed by mining.

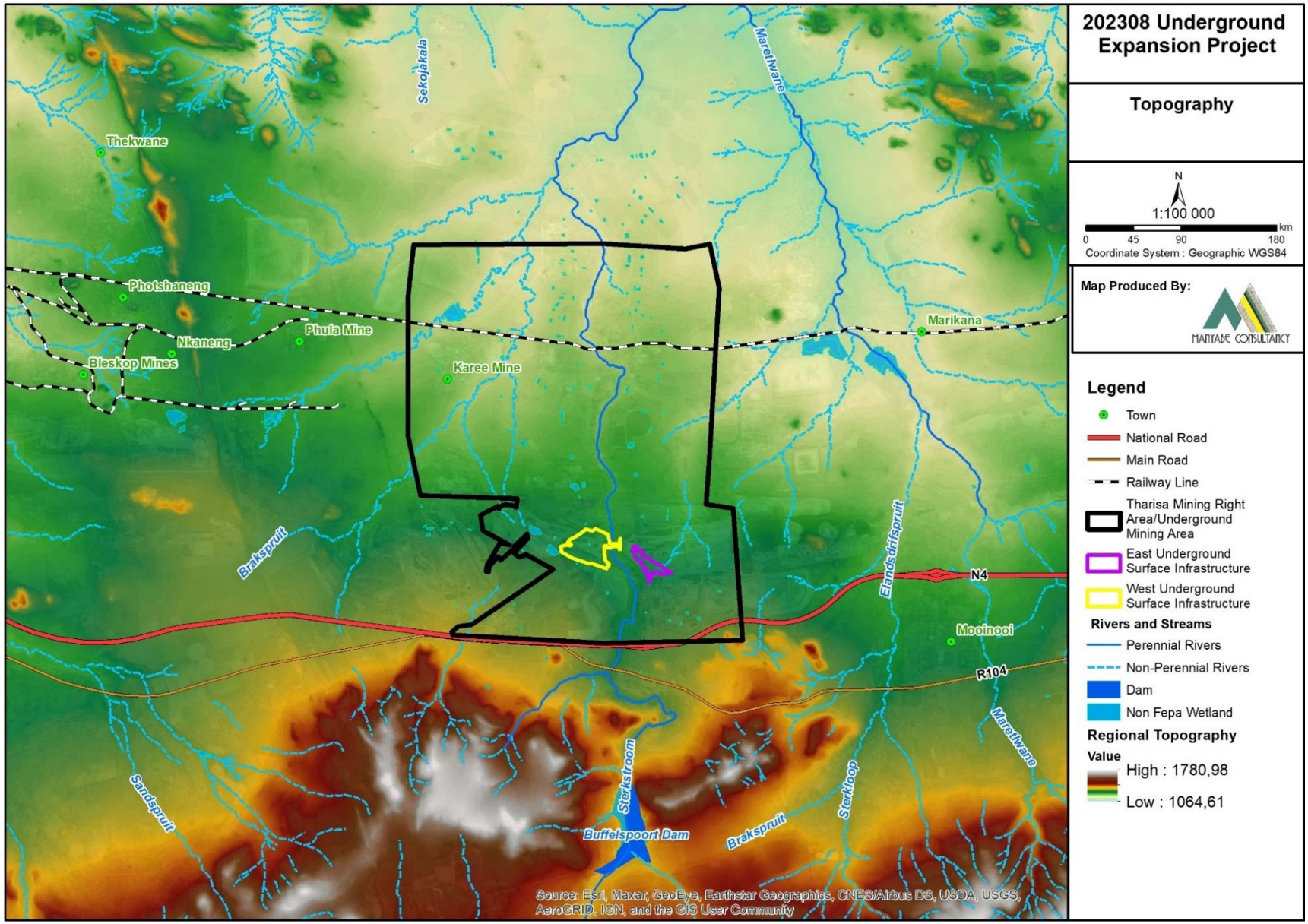


Figure 19: Topographical Map

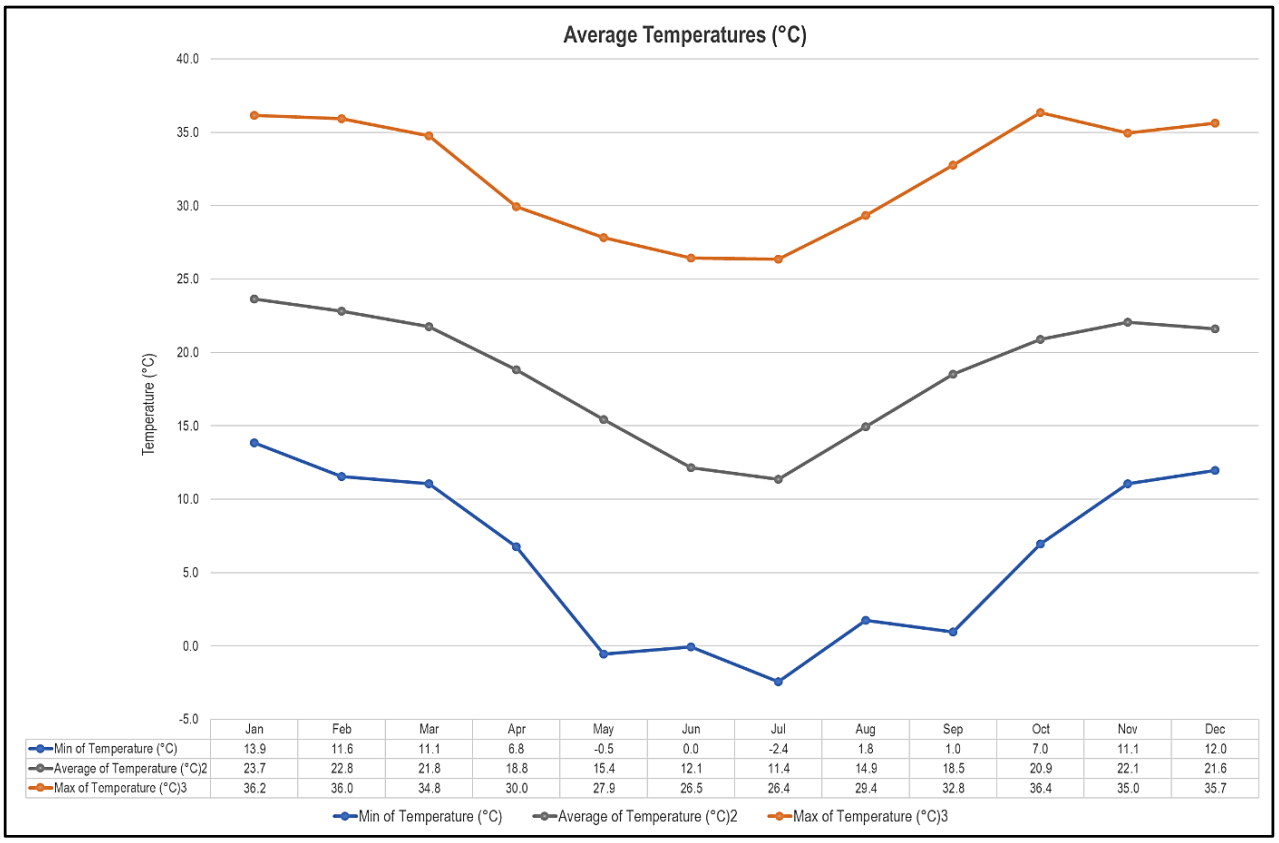
8-3 CLIMATE

8-3.1 Regional Climate

Tharisa Mine falls within the Highveld Climatic Zone (semi-tropical region) which is characterised by moderately warm temperatures, with mild dry winters and hot summers. The Buffelspoort weather station (Station No. 0511 855 W) is the closest station to Tharisa. The rainy season typically occurs in summer during October to March, with afternoon thundershowers occurring often from August to March (GCS, 2022).

8-3.2 Ambient Temperature

The area experiences hot temperatures during summer, with a maximum of 36.4°C for October. Winter temperatures are relatively low especially in May to July. The monthly temperature pattern is provided in Figure 20.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min of Temperature (°C)	13.9	11.6	11.1	6.8	-0.5	0.0	-2.4	1.8	1.0	7.0	11.1	12.0
Average of Temperature (°C)2	23.7	22.8	21.8	18.8	15.4	12.1	11.4	14.9	18.5	20.9	22.1	21.6
Max of Temperature (°C)3	36.2	36.0	34.8	30.0	27.9	26.5	26.4	29.4	32.8	36.4	35.0	35.7

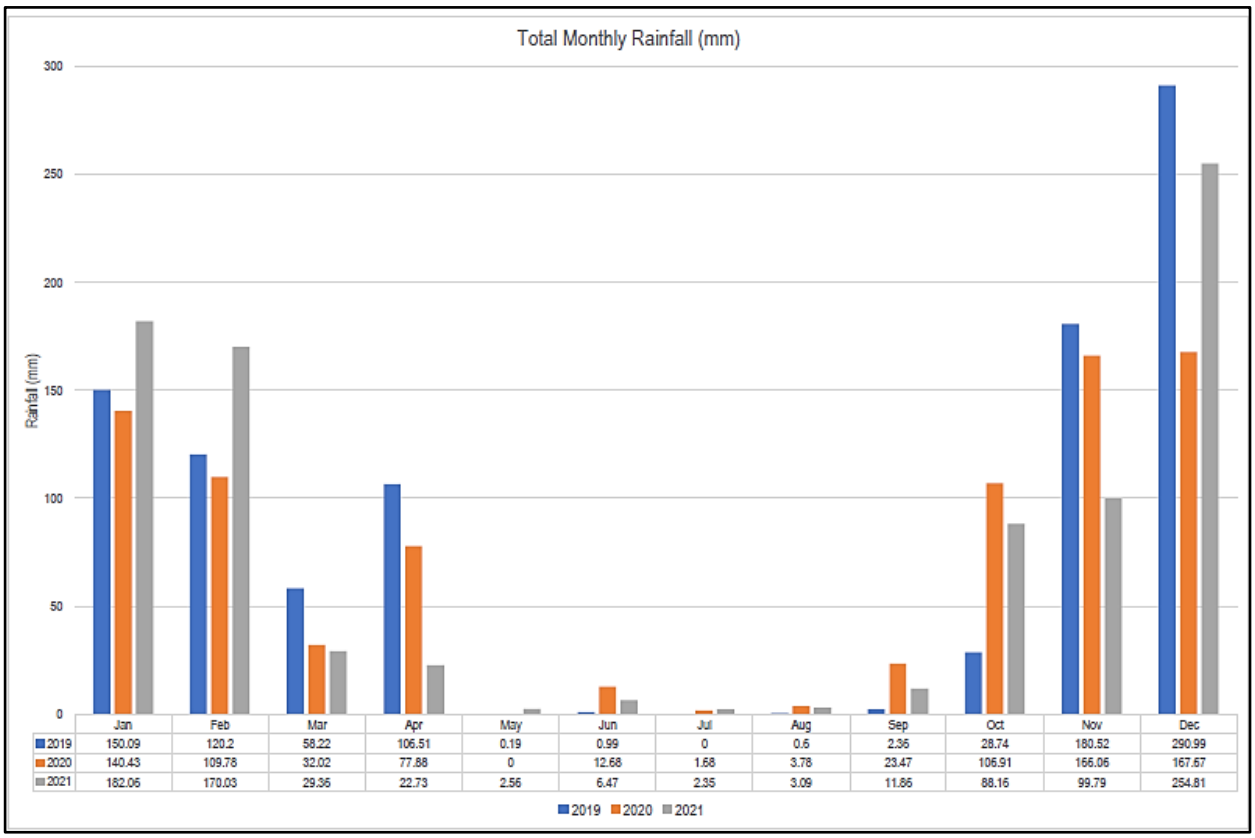
Figure 20: Minimum, Average and Maximum Temperatures Over the Project Area [Weather Research and Forecasting (WRF) Data; 2019 to 2021]

8-3.3 Rainfall and Elevation

The average annual precipitation in the region ranges from 873 mm and 939 mm (Airshed Planning Professionals, 2023a). Rainfall is generally in the form of thunderstorms. These can be of high intensity with lightening and strong gusty south-westerly winds. The frequency of hail is also high with approximately 4-7 hailstorms per season (GCS, 2022).

Precipitation is important to air pollution studies since it represents an effective removal mechanism for atmospheric pollutants and inhibits dust generation potentials. Monthly rainfall for the project site (based on WRF data for 2019 – 2021) is given in Figure 21. Months wherein the most rain occurred stretched from October to April (Airshed Planning Professionals, 2023a).

Relatively high levels of evaporation occur because of the elevated solar radiation levels experienced. The maximum evaporation rate occurs in December, with a mean rate of more than 7mm per day. Evaporation is greater than rainfall for all months of the year resulting in a marked moisture deficit in the region (GCS, 2022).



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	150.09	120.2	58.22	106.51	0.19	0.99	0	0.6	2.36	28.74	180.52	290.99
2020	140.43	109.78	32.02	77.88	0	12.68	1.68	3.78	23.47	106.91	166.06	167.67
2021	182.06	170.03	29.36	22.73	2.56	6.47	2.35	3.09	11.86	88.16	99.79	254.81

Figure 21: Monthly Precipitation over the Project Area (WRF Data; 2019 to 2021)

8-3.4 Wind Speed

The annual Wind roses comprise 16 spokes which represent the directions from which winds blew during a period of time. The average wind speed at the project site is 3.29 m/s and calm conditions (<0.5 m/s) occurred for some 1.2% of the time. Wind speed capable of causing wind erosion i.e., ≥5.4 m/s occurred for about 8.8% of the time (Figure 22). This equates to about 32 days in a year. The prevailing winds are from the northeast (10.2%) and east (9.4%), east northeast (9.3%) respectively. Secondary contributions are from the southeast (9.2%) and east-southeast (9.1%).

Hourly meteorological data was analysed and used to understand the prevailing wind patterns in the project area. Data was used to assess the wind speed and wind direction regime on site. The diurnal, seasonal and periodic wind roses for the project area are depicted in Figure 23 (diurnal and seasonal wind roses).

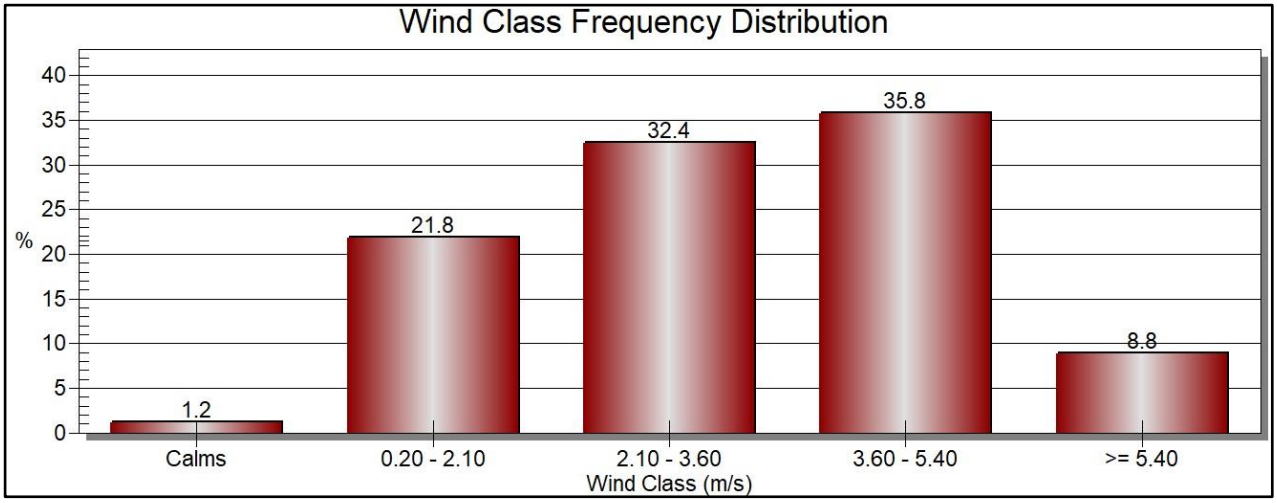


Figure 22: Wind Class Frequency Distribution

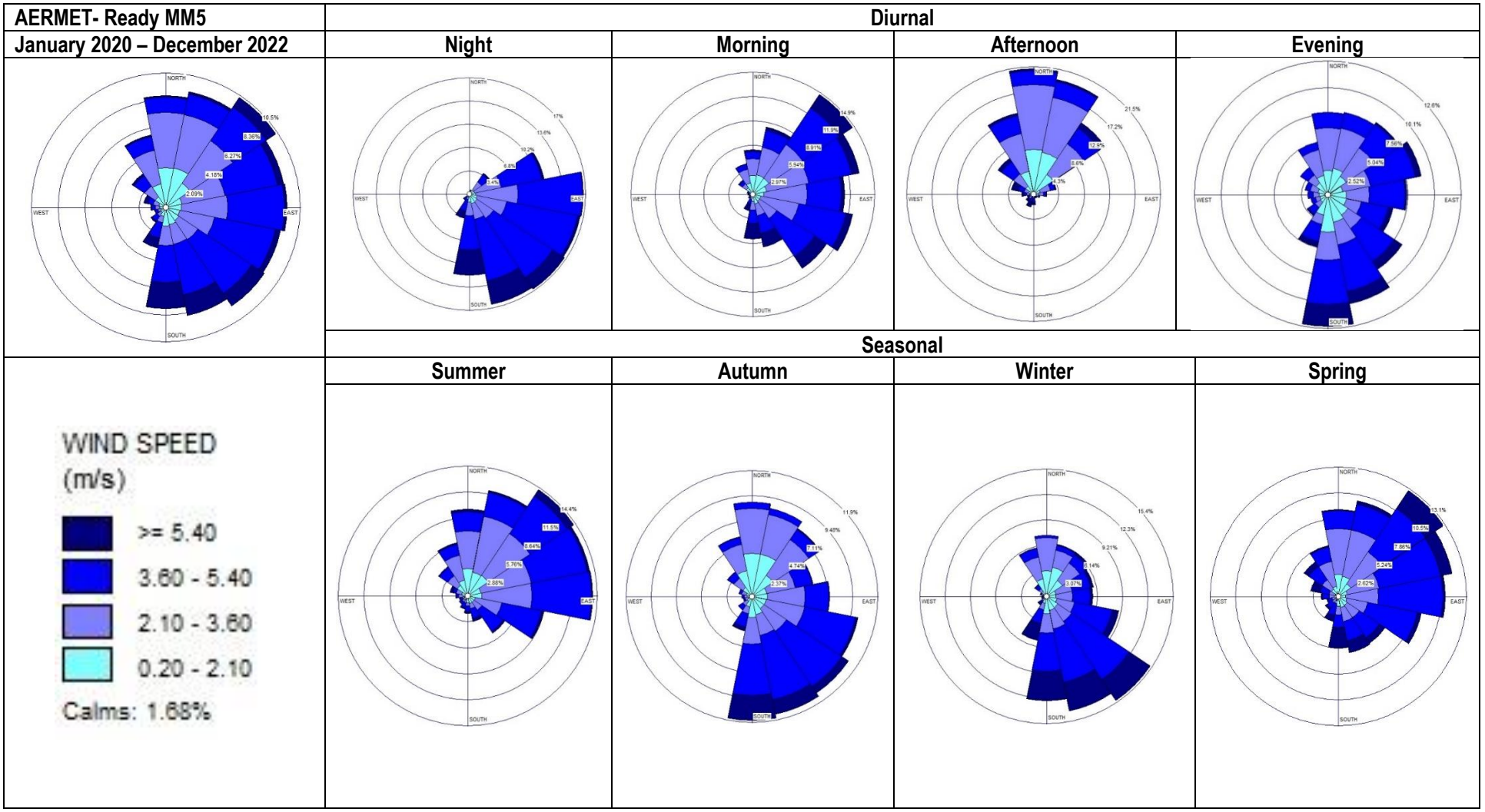


Figure 23: Diurnal and Seasonal Wind Roses

8-3.5 Extreme Weather Conditions

Rainfall conditions are highly variable, and droughts and floods do occur.

8-3.6 Atmospheric Stability

During the daytime, the atmospheric boundary layer is characterised by thermal turbulence due to the heating of the earth's surface and the predominance of an unstable layer. During unstable conditions, ground level pollution is readily dispersed thereby reducing ground level concentrations. Night-times are characterised by weak vertical mixing and the predominance of a stable layer. These conditions are normally associated with low wind speeds and less dilution potential. During windy and/or cloudy conditions, the atmosphere is normally neutral (which causes sound scattering in the presence of mechanical turbulence).

For low level releases, such as activities associated with mining operations, the highest ground level concentrations would occur during weak wind speeds and stable (night-time) atmospheric conditions. However, windblown dust is likely to occur under high winds (neutral conditions).

8-4 WETLANDS

Wetland delineations were determined using a combination of accepted methodologies from the DWS 'A practical field procedure for identification and delineation of wetlands and riparian areas' (DWAF, 2005) and the "Updated manual for identification and delineation of wetlands and riparian areas" (DWAF, 2008). The wetland delineations approach also includes consideration of the Corps of Engineers Wetlands Delineation Manual (U.S. Army Corps of Engineers, 2010).

Based on the NFEPA database the following information with regards to the Tharisa mining area is noted (as cited in SAS, 2013):

- The Upper Crocodile Sub-Management Area is not regarded as important in terms of:
  - Fish sanctuaries, rehabilitation or corridors; and
  - Translocation and relocation zones for fish.
- The Sterkstroom River is the major drainage line in the mining area and is a Class C (moderately modified) system; and
- No NFEPA-defined wetlands in the mining area are considered to be important in terms of biodiversity conservation.

SAS identified wetlands within the project area during the 2013 and 2014 studies. These have been grouped as follows (SAS, 2013):

- North-western wetlands (Wetlands 1 and 2);
- North-eastern wetlands (Wetlands 3 to 5);
- South-eastern wetlands (Wetlands 6 and 7);
- South-western wetland (Wetland 10) and artificial wetland (Wetland 9); and
- Sterkstroom River (Wetland 8).

The artificial wetland in the south-west is believed to have been formed due to earthworks and increased runoff from the tarred roads to the south, which led to localised changes in hydrology such as ponding, which supports wetland vegetation (SAS, 2013).

During the 2013 SAS survey, it was noted that the valley seep wetland (Wetland 3) just north of the west open Pit has been impacted by waste rock disposal. The wetland features are described in Table 8.

Table 8: Wetland Features Identified in the Project Area

North West Group				
Wetland 1 (West Open Pit Area)	Unchannelled Valley Bottom	1.1 (moderately low)	Category C	Category C (Ecologically important and sensitive on provincial or local scale)
Wetland 2 (West Open Pit Area)	Channelled Valley Bottom		Category C/ D	
North East Group				
Wetland 3 (East WRD Area)	This wetland has been affected by waste by waste rock disposal.			
Wetland 4 (North East WRD Area)	Unchannelled Valley Bottom	1.2 (moderately low)	Category C	Category C (Ecologically important and sensitive on provincial or local scale)
Wetland 5 (North East WRD Area)	Channelled Valley Bottom	1.1 (moderately low)	Category B	
South Eastern Group				
Wetland 6 (TSF2 Area)	Channelled Valley Bottom	1.1 (moderately low)	Category C	Category C (Ecologically important and sensitive on provincial or local scale)
Wetland 7 (TSF2 Area)				
Sterkstroom River Wetland				
Wetland 8 (Sterkstroom River)	Channel (River)	2.0 (moderately high)	Category C	Category C (Ecologically important and sensitive on provincial or local scale)
South Western Wetland Group				
Wetland 9 (Artificial Wetland)	Unchannelled Valley Bottom	Not Determined	Not Determined	Category C (Ecologically important and sensitive on provincial or local scale)
Wetland 10	Channelled Valley Bottom	Not Determined	Category C (based on vegetation assessment)	

**Category B – Largely unmodified.*
**Category C – Moderately modified.*
**Category D – Largely modified.*
**Ecoservices and function ranking ranges from 0.5 (low) to 3 (high)*

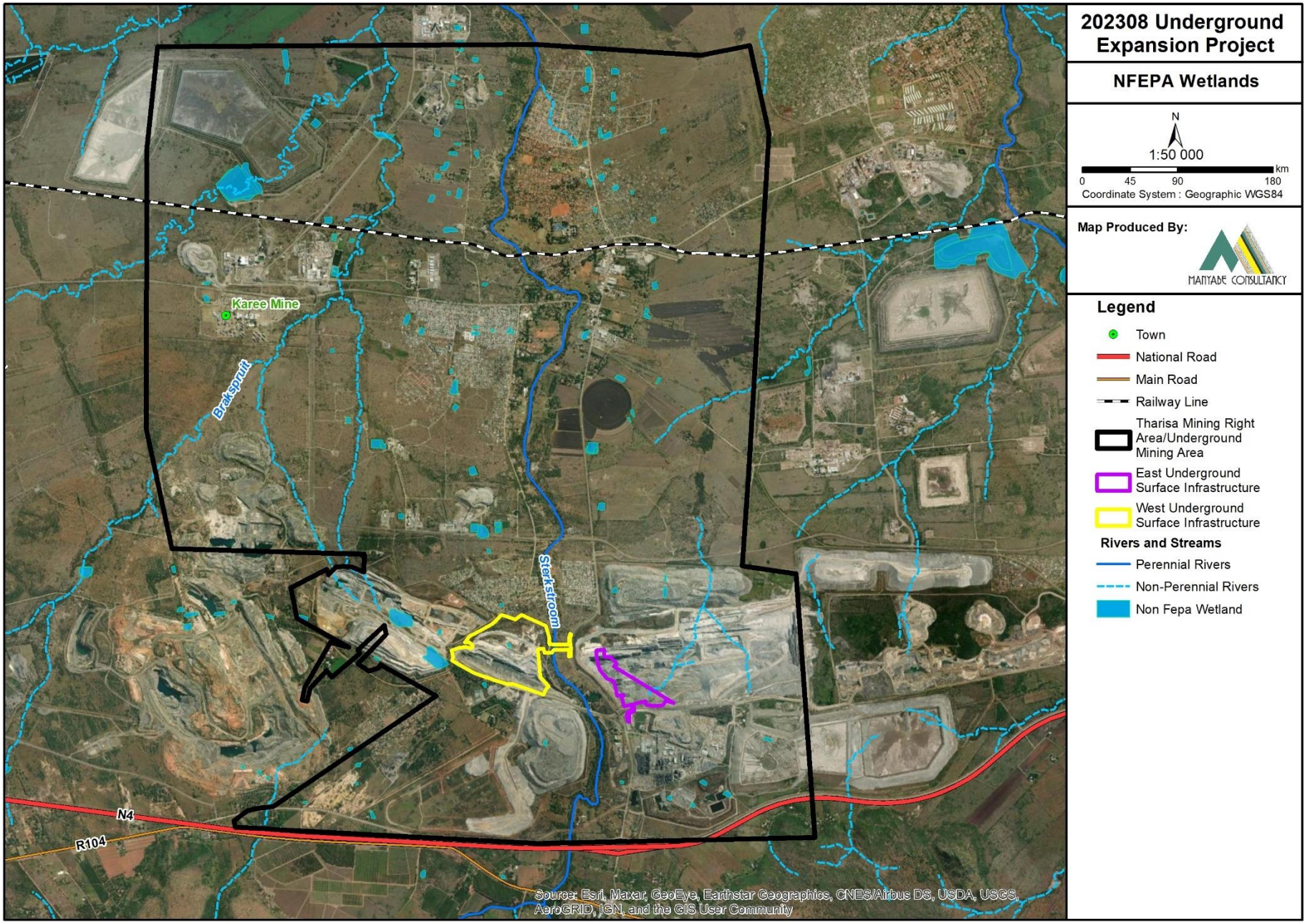


Figure 24: Wetland Map

8-5 SURFACE WATER

Tharisa Mine is located in the Crocodile (West) and Marico Water Management Area (WMA) and is located mainly in the Quaternary Catchment Area (QCA) A21K. The Crocodile River is a major tributary of the Limpopo River (Drainage Region A) which discharges into the Indian Ocean (Mozambique). The Pienaars, Apies, Moretele, Jukskei, Hennops, Magalies and Elands rivers are all major tributaries of the Crocodile River which make up the A20 tertiary hydrological catchment with its 39 quaternary catchments (GCS, 2022).

The main river upstream of the project site is the Sterkstroom River, which is a source of water for the Buffelspoort Dam. The water quality of the Sterkstroom River (a tributary of the Crocodile River) must be continuously monitored to assess the impacts of the mine on water quality.

This river originates in the headwaters of the A21K quaternary catchment, which then flows through the Buffelspoort Dam (approximately 5.8 km upstream) and then traverses the mine and continues towards the Crocodile River. The Sterkstroom River has an ecological category of class C (DWS, 2014). Class C means the river system is moderately modified and a loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged (Kleynhans, Louw, & Graham, 2008).

Water quality was described from existing monthly water quality results for 2022. Water quality was analysed for a total of 11 sampling points located within the Sterkstroom River and in Tharisa Mine water circuits. The sampling locations are provided in Table 9 and Figure 25.

Table 9: Sampling Locations

Sampling Point	Description	Latitude	Longitude
SW01	Upstream on the Sterkstroom River	-25.75711	27.48329
SW02	Downstream on the Sterkstroom River	-25.72562	27.48292
SW03	Middle Stream (Sterkstroom River)	-25.73562	27.486
SW07	Old Hernic Quarry	-25.7366	27.48786
SW08	Sewage Treatment Plant	-25.73878	27.49435
SW10	MCC Dam	-25.7395	27.50306
SW11	TSF Dissipator	-25.73963	27.5048
SW12	Raw Water	-25.74643	27.50217
SW13	Stormwater Dam	-25.73836	27.49333
SW14	Process Water Dam	-25.74096	27.49308

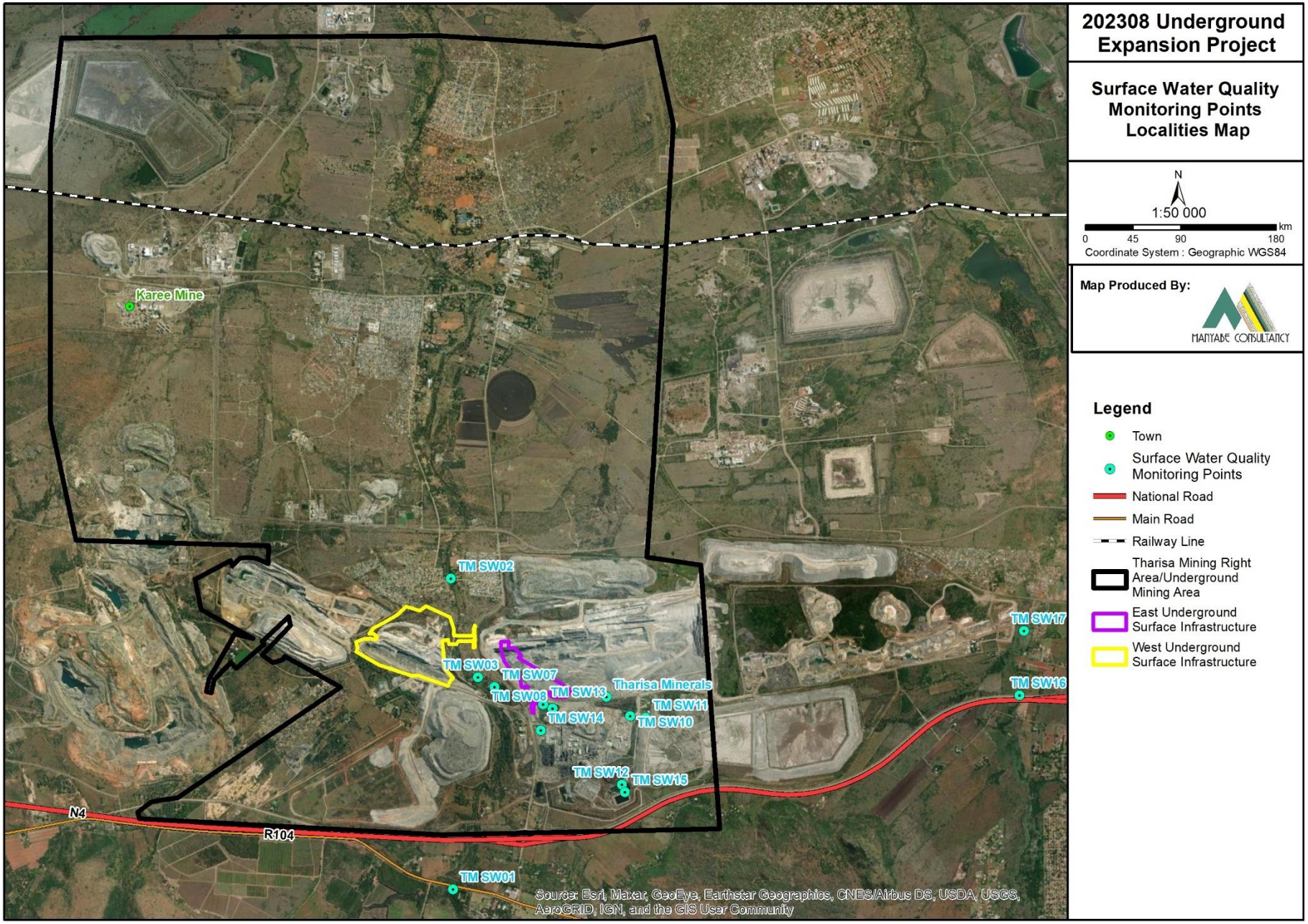


Figure 25: Surface Water Monitoring Points

8-6 GROUND WATER

Groundwater is defined as water which is located beneath the ground surface in soil/rock pore spaces and in the fractures of lithological formations and is a valuable resource. In arid areas, groundwater is frequently the sole source of water and thus essential to agriculture and other developments. Groundwater quality and quantity are key indicators of the resource value and status and can have significant effect on the suitability and availability for use. Mine-related activities have the potential to influence the quality and availability of groundwater through seepage of contaminants that may reach underlying aquifers.

Groundwater enters the mine as direct recharge from rainfall or as seepage from the TSFs or WRDs. According to the Groundwater Resources Association (GRA) II datasets, the average recharge for the entire catchment is about 28 mm/a, or about 0.000077 m/d (SLR, 2014).

Due to mine dewatering, the local groundwater flow directions in the deeper fractured aquifer are generally re-directed towards the mine. The general groundwater flow direction is from south to north, or southeast to northwest. Groundwater within the mining area is neutral (pH~7.8) and non-saline (average TDS of 340 mg/l). The average sulphate concentration is ~38.9 mg/l and the average nitrate as N concentration is ~5.8 mg/l.

8-6.1 Aquifer Classification

Tharisa Mine is underlain by a shallow upper weathered aquifer and a deeper fractured aquifer. The weathered overburden is highly variable in thickness from 3 m to more than 30 m based on existing borehole logs and evidence of borehole depths. The deeper fractured bedrock aquifer is characterised by very low matrix permeability, poorly connected joints/fractures and dolerite/diabase dykes (that may act as barriers to groundwater flow).

In the vicinity of the water courses, alluvium either fully or partially, replaces the weathered overburden and the watercourses do lose and gain water to the alluvium aquifer. Recharge of the alluvial aquifers is also through lateral groundwater flow from the shallow weathered aquifer and by rainfall events. The thickness of the alluvial sediments has been estimated at 3 to 5 m with its lateral distribution restricted to the immediate banks of the current active channel.

The interface between the overlying weathered or alluvial aquifer and the deeper fractured aquifer features is relatively impermeable. Its effective permeability is determined by interconnected and open fracture systems. These fracture systems can potentially allow for rapid vertical groundwater flow from the weathered overburden as well as surface water bodies to greater depths. Whilst in general the weathered aquifer and lower fractured aquifer are poorly connected; this is not always the case.

The aquifer system is defined as a minor aquifer region with potential for higher yielding zones (defined by the groundwater specialist in accordance with Parsons (1995). Pump tests of a range of boreholes indicated that the average upper aquifer yield is between 1 and 2.5 litres /second.

8-6.2 Groundwater Recharge

Quaternary catchment A21K receives an estimated average annual groundwater recharge of 24.4 million m^3 (Mm^3), of which 3.4 Mm^3 per annum or 13.8% is required for the Reserve, consisting of both basic human needs (estimated at 0.5Mm^3/a) and an ecological component (estimated at 2.9Mm^3/a). This equates to an approximate recharge across the catchment of about 28 mm/a.

8-6.3 Groundwater Levels

The groundwater elevations within the mining area range ~1 175 to 1 210 mamsl. During the September 2021 to March 2023 monitoring period stable groundwater levels were observed in TM GW COMM 01, TM GW COMM 02, TM GW COMM 05, TM GW MCC, TM GW New Well and TM GW RPM. A significant decrease (~20 m) in groundwater level is observed in TM GW MCC from July 2022 to August 2022. Seasonal variation in groundwater levels is observed in the remainder of the monitoring boreholes (TM GW Dissipator 1, TM GW Dissipator 2, TM GW HP5 and TM GW Sec) during the September 2021 to March 2023 monitoring period (refer to Table 10 and Figure 26 for the monitoring points localities).

Table 10: Summary of Groundwater Monitoring Localities

Monitoring Locality ID	Co-ordinates		Elevation (mamsl)	Description	
TM GW COMM 01	27° 29' 35.1600" E	25° 44' 59.6760" S	1 218	Community boreholes south of the mine	South of the plant and to the east of the PGMs Smelter Plant.
TM GW COMM 02	27° 30' 56.7360" E	25° 44' 53.9760" S	1 224		South of TSF 1 and TSF 2.
TM GW COMM 05	27° 28' 33.0060" E	25° 44' 20.9700" S	1 211		Located at Retief Primary School, to the west of West WRD 1.
TM GW Dissipator 1	27° 30' 15.8040" E	25° 44' 22.4520" S	1 208		Located east of the mining concentrator area and north-west of the TSF1.
TM GW Dissipator 2	27° 30' 15.2460" E	25° 44' 21.0480" S	1 207		The dissipator borehole is located east of the mining concentrator area and west of the TSF 1.
TM GW HP5	27° 30' 05.4360" E	25° 44' 31.9560" S	1 212	Mine Boreholes located east of the mining concentrator area and north-west of TSF1.	Located north of the plant and south of the mining concentrator area.
TM GW MCC	27° 30' 10.0620" E	25° 44' 28.4040" S	1 211		Groundwater monitoring at Hardpark is located east of the mining concentrator area and west of the TSF 1.
TM GW MEW	27° 29' 58.5960" E	25° 44' 53.0520" S	1 220		The borehole is located at the Marikana Engineering Workshop- south of the plant and to the east of the PGMs Smelter Plant.
TM GW New Well	27° 29' 58.5960" E	25° 44' 53.0520" S	1220		The borehole is located at the Marikana Engineering Workshop- south of the plant and to the east of the PGMs Smelter Plant.
TM GW RPM	27° 30' 09.4320" E	25° 44' 22.7760" S	1 207		Located at the RPM Workshop.
TM GW Sec	27° 29' 25.9800" E	25° 44' 23.5680" S	1 205		The borehole is located to the northwest of the plant.
TM GW TSF 01	27° 29' 58.3440" E	25° 44' 52.5900" S	1 219		West of TSF 1 and east of the PGMs Smelter Beneficiation Plant.
TM GW SBH	27° 30' 43.2720" E	25° 43' 35.9400" S	1 188		Samancor Borehole is located south of the Far East WRD 2.
TM GW WM 03	27° 29' 18.8160" E	25° 44' 31.6080" S	1 198		In line with west mine activities

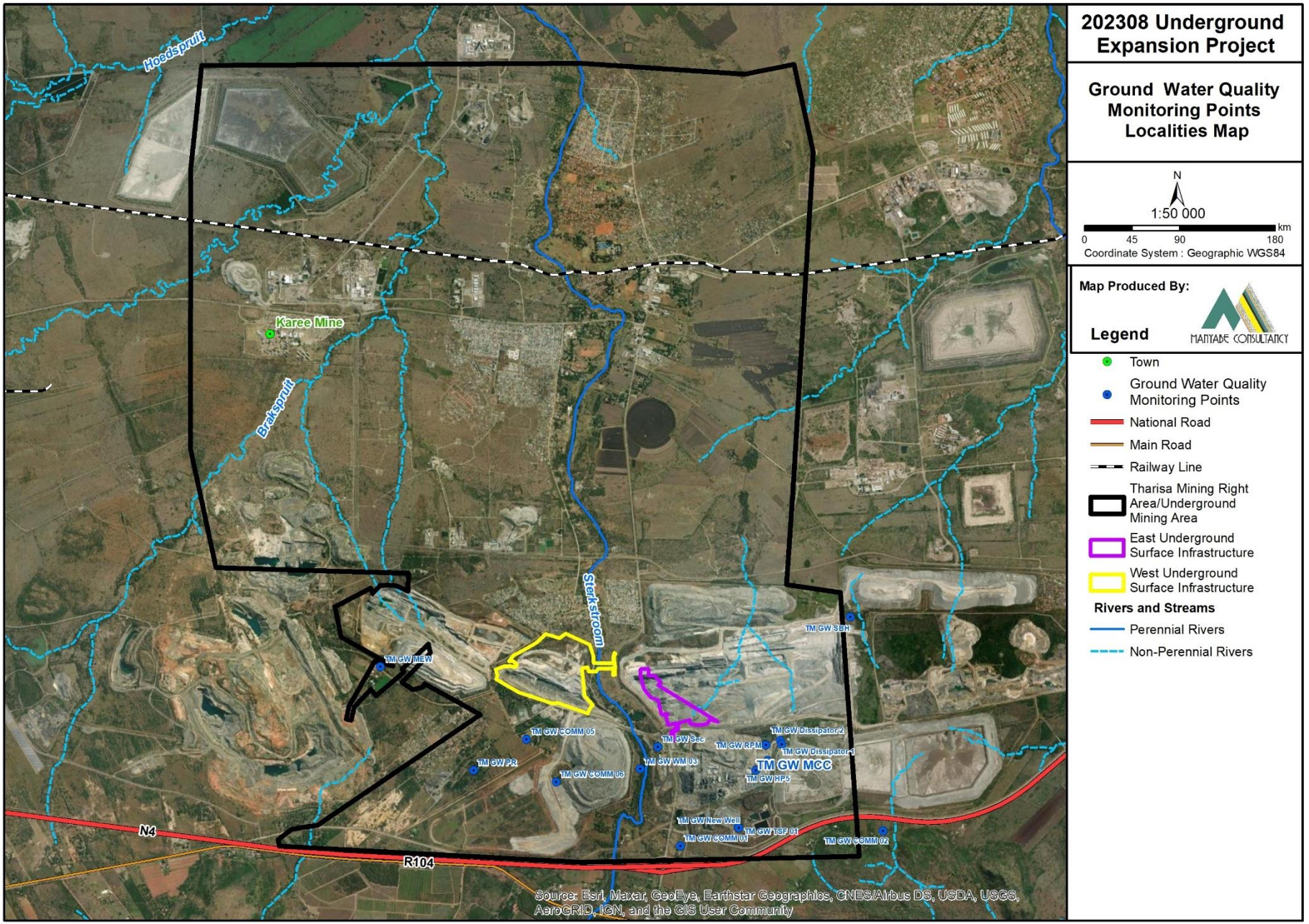


Figure 26: Ground Water Monitoring Points

8-6.4 Groundwater Use

Most of the boreholes are used for domestic and agricultural (livestock and irrigation) purposes. The weathered aquifer, as well as the alluvial aquifer along the Sterkstroom River, supports most irrigation and domestic water-supply boreholes throughout the region. Boreholes (community boreholes/third party) located within the Tharisa MR area are used for domestic purposes and agricultural purposes (livestock and irrigation).

8-6.5 Groundwater Quality

In general, groundwater in the community boreholes can be described as neutral (pH ~7.6) and saline (average TDS of 430 mg/l). The sulphate concentration in the community boreholes is low (below 70 mg/l) except for TM GW Comm 06. The sulphate concentration in TM GW Comm 06 increased to ~95 mg/l in September 2022. Low nitrate as N concentrations (below 10 mg/l) are observed in all community boreholes except TM GW Comm 06. The nitrate as N concentration in TM GW Comm 06 increased to 57 mg/l in September 2022. The time series of the sulphate and nitrate as N concentration from September 2021 to March 2023 in the community boreholes is shown in Table 11.

Table 11: Groundwater Quality Results (March 2023).

Site Name	Tharisa GW Guidelines (WUL 2020)	TM GW COMM 01	TM GW COMM 02	TM GW COMM 05	TM GW Dissipator 1	TM GW Dissipator 2	TM GW HP5	TM GW MCC	TM GW MEW	TM GW New Well	TM GW PR	TM GW RPM	TM GW SBH	TM GW Sec	TM GW TSF 01	TM GW WM 03
pH	6-9	7.53	7.90	7.57	8.19	8.22	8.26	8.23	7.98	8.39	8.01	8.33	8.27	7.73	7.56	7.97
EC mS/m	70	65.00	53.80	**78.20**	**74.90**	**127.50**	**92.00**	**133.70**	55.30	51.50	29.35	**114.40**	**156.70**	**170.70**	38.80	**140.40**
TDS mg/l	-	423.41	350.45	509.40	487.90	830.54	599.29	870.92	360.22	335.47	191.19	745.20	1020.74	1111.94	252.74	914.57
Ca mg/l	32	23.34	**34.46**	**45.12**	**33.85**	**40.84**	**64.21**	**58.49**	**50.61**	**38.60**	29.87	**41.99**	**108.79**	**68.89**	22.66	**67.56**
Mg mg/l	50	**52.94**	32.62	**56.68**	**55.06**	**77.85**	**102.92**	**109.80**	**51.92**	49.55	19.33	**74.74**	**101.96**	**193.65**	24.06	**93.52**
Na mg/l	20	10.12	11.32	9.38	**24.15**	**60.14**	**20.01**	**23.23**	10.04	14.35	6.34	**114.16**	**91.64**	18.84	7.77	18.68
K mg/l	-	0.49	0.28	0.57	1.43	0.31	0.26	0.73	0.80	0.83	1.15	5.82	11.74	1.05	0.68	0.93
Cl mg/l	30	20.35	12.70	26.34	18.98	**76.22**	24.94	**67.23**	6.96	12.86	**<1.62**	**50.62**	**76.21**	**164.34**	7.79	**59.44**
SO_4 mg/l	70	**72.86**	15.90	60.82	40.88	**119.48**	**78.78**	**120.19**	8.79	36.79	3.54	**119.85**	**189.28**	**163.31**	25.40	**126.43**
NO_3 as N mg/l	6	**7.84**	<0.459	2.96	3.87	**29.61**	**9.51**	**21.07**	1.60	1.58	**7.13**	**52.14**	**86.21**	**30.42**	1.52	**79.61**
NO_3 as NO_3 mg/l	-	34.69	<2.03	13.09	17.13	131.08	42.08	93.28	7.10	6.99	31.56	230.81	381.62	134.68	6.75	352.41
F mg/l	0.5	**0.52**	<0.466	<0.466	<0.466	<0.466	<0.466	<0.466	<0.466	<0.466	<0.466	<0.466	<0.466	**0.67**	<0.466	<0.466
Al mg/l	-	0.08	0.09	0.10	0.13	0.11	0.01	0.11	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.08	0.09
Fe mg/l	-	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Mn mg/l	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Hardness mg/l	-	276.29	220.35	346.06	311.26	422.57	584.17	598.21	340.16	300.42	154.18	412.63	691.54	969.47	155.65	553.83
Cd mg/l	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Co mg/l	-	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Cr mg/l	0.05	<0.007	<0.007	<0.007	0.01	<0.007	0.04	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007
Cu mg/l	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ni mg/l	-	0.01	0.02	0.02	0.01	0.02	<0.005	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01
Pb mg/l	-	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009
Zn mg/l	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Red bold and shaded text: values exceed the WUL Guideline Limit.
< : Less than i.e., value is below the detection limit.
- : no guideline values.

8-7 TERRESTRIAL ECOLOGY (FLORA AND FAUNA)

The mine falls within the Marikana Thornveld which is an important vegetation type that requires careful consideration when developing mining projects. Based on the NWBSP, the project area occurs within a Terrestrial CBA2 and is earmarked as ESA1 and ESA2 classifications (Figure 27). This suggests that patches of provincially Endangered and/or Vulnerable ecosystems, or endemic vegetation types, are present and any further modification should be limited to existing irreversibly modified or heavily degraded areas. Also, the ESAs suggest the presence of important habitats or supporting movement corridors within the region.

The project area includes a terrestrial CBA and a critically endangered river (the Sterkstroom) defined by the North-West Province 2009 biodiversity assessment, and a High Biodiversity area in terms of the recently published Mining Biodiversity Guidelines. It is important to note that these national guidelines and assessments were published after the mine was approved in 2008. The area has been transformed by agricultural and mining activities (both on the project sites and in the surrounding areas), yet aquatic and terrestrial habitat, although limited, does still exist within the project area which is suitable for fauna and flora species, including some Red Data and protected species.

The NWBSP (READ, 2015) is a comprehensive revision of the 2009 provincial Biodiversity Conservation Assessment that incorporates the latest information on biodiversity and the environment in the North West Province. It is also aligned with the national standards for developing biodiversity sector plans. The purpose of the NWBSP is to inform land use planning, environmental assessments, land, and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact biodiversity. This is done by providing a map of biodiversity priority areas within the North West Province, referred to as CBAs and ESAs, with accompanying land use planning and decision-making guidelines. See Table 12 for more detailed explanations.

Ridges are often included as ESAs because they often act as refuges for fauna and flora. Considering that the project area lies relatively close to the Gauteng border, the Gauteng ridge guideline was used to determine whether there are sensitive ridges surrounding the project area [Gauteng Department of Agriculture, Rural Development and Environment (GDARDE), 2019). There are several classes for ridges, with Class 1 being the most natural and Class 4 being the least natural. There are no sensitive ridges within the project area. Further, southeast of the project area, approximately 12.5 km away, there are ridges of Class 2 classification. This area forms part of the Bushveld Basin which generally has occasional ridges supporting broad-leafed woodlands on sandy soils (READ, 2015).

Table 12: North West Province Conservation Plan Categories

Map Category	Definition	Desired Management Objectives
Protected Areas (PA)s	Those areas that are proclaimed as formally protected or pending declaration as protected under NEMPAA.	Must maintain areas in a natural state and rehabilitate degraded areas. Development is subjected to NEMPAA objectives.
CBAs	Any natural or near-natural terrestrial or aquatic area required to meet targets for biodiversity patterns and/or ecological processes. Divided into Irreplaceable Areas and Important Areas, Biodiversity Corridor or protected areas buffer area.	Must be kept in a natural state, with no further loss of habitat or biodiversity. Only low-impact, biodiversity-sensitive land-uses are appropriate.
ESAs	Natural, near natural or degraded areas are required to be maintained in an ecologically functional state to support CBAs and/or Protected Areas. Areas with no natural habitat remaining, but which retain potential importance for supporting ecological processes.	Maintain in a functional, near-natural state, but some habitat loss is acceptable. A greater range of land-uses over wider areas is appropriate, subject to an authorisation process that ensures the underlying biodiversity objectives are not compromised.

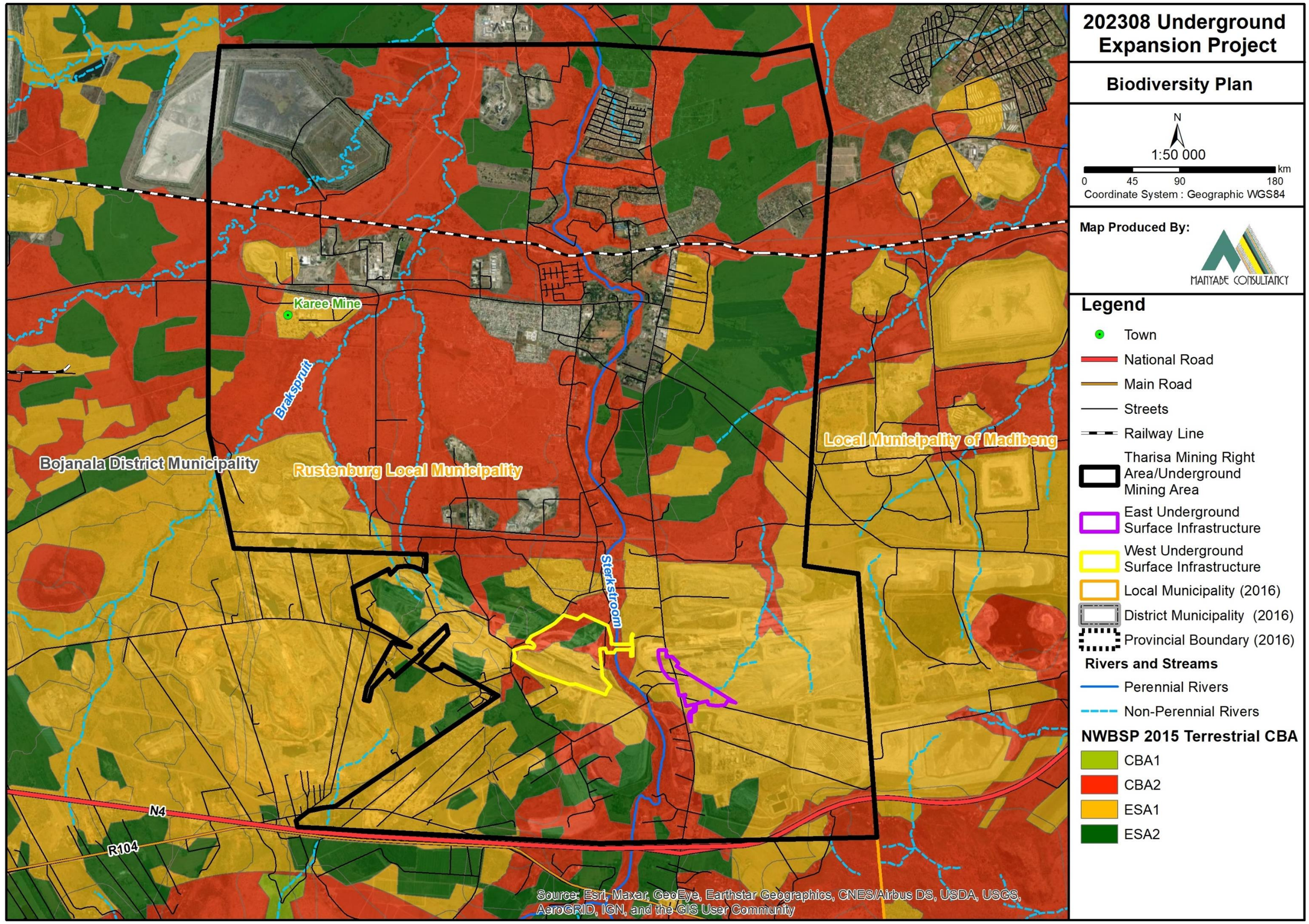


Figure 27: CBAs and ESA Areas

8-8 SOIL AND LAND CAPABILITY

Soils are structured with a high clay content. Land capable for use as grazing dominates the project area.

8-8.1 Soil Chemical Characteristics

The dominant soils at Tharisa Mine are neutral to slightly alkaline (pH of 5.2 to 7.3), which is within accepted range for good nutrient mobility. These soils tend to be saline in character. Due to the generally high clay content of the soils, the cation exchange capacity (CEC) of the soils is moderate to high. Majority of the soils within the Tharisa MRA have moderate erodibility. These soils are not that prone to erosion, but compaction and contamination of these soils require assessment and mitigation.

8-8.2 Dry Land Agricultural and Irrigation Potential

Due to the general low levels of Potassium (K), Zinc (Zn) and Phosphorus (P) in the soils, the dryland production potential, especially of the shallower Valsrivier, Swartland, Sterkspruit, and Mayo soil forms is low. In order to increase the productivity to a viable and sustainable cropping potential, additional fertilisers will be required. Majority of the pre-mining footprint had a grazing land capability. In terms of soil structure and drainage capability, the irrigation potential of the soils can be described as moderate. With adequate drainage and good water management, the soils can be economically cultivated. Existing infrastructure and mining related activities at Tharisa Mine have influenced the natural capability of the land.

8-9 AIR QUALITY

Existing sources of emissions in the region and the characterisation of existing ambient pollution concentration is fundamental to the assessment of cumulative air impacts. A change in ambient air quality can result in a range of impacts which in turn may cause a disturbance and/or health impacts to nearby receptors.

The main pollutant of concern in the region is particulate matter (TSP; PM_{10} and $PM_{2.5}$) resulting from vehicle entrainment on the roads (paved and unpaved surfaces), mining and smelter activities, farming activities and windblown dust from exposed surfaces, mine waste dumps and TSFs. Gaseous pollutants such as sulphur dioxide (SO_2), nitrogen dioxide (NO_x), carbon monoxide (CO), and carbon dioxide (CO_2) would result from vehicles, mining equipment, and processing emissions.

Monitoring data collected in the vicinity of the mining area, which encompasses dust fallout records, SO_2 and NO_2 records, were used to understand the ambient air quality. Real-time records of particulate matter with an aerodynamic diameter of less than 10 microns (PM_{10}) and 2.5 microns ($PM_{2.5}$) were not available for assessment. Data covering the period January 2022 to December 2022 was assessed. The ambient air quality monitoring locations are shown in Figure 29.

8-9.1 Dust Fallout

The dust fallout rates measured for the period January 2022 to December 2022 are discussed below.

For the residential sites, the results are summarised in Table 13. For ease of understanding, the minimum and maximum at a particular site are reported. Also, the number of exceedance(s) observed per site is discussed. Overall, for the residential sites, five (5) exceedances were measured. Two (2) of the exceedances occurred at TMD03 in April (605 mg/m²/d) and December (607 mg/m²/d), at TMD13 in December (639 mg/m²/d) and at TMD22 in November (603 mg/m²/d) and December (669 mg/m²/d). Site TMD22 is therefore not in compliance as exceedances were in sequential months (Figure 29).

For the non-residential sites, the results are summarised in Table 14. For ease of understanding, the minimum and maximum at a particular site are reported. Also, the number of exceedance(s) observed per site is discussed. Overall, for the non- residential sites, no exceedances were measured throughout the year. As a result, all the non- residential sites complied with the standard.

Table 13: Site Identification, Coordinates, and Dust Fallout Rates for 2022 (Residential)

Sampling Type		Dust Fallout				
Site Category		Residential				
Standard		600 mg/m²/d1				
Tharisa Mine		Coordinates		Minimum Dust Fallout	Maximum Dust Fallout	No. of Exceedance
Site ID/Category	Site Name	Latitude	Longitude	mg/m²/d	mg/m²/d	
TM D02	Toll Gate	25.75206	27.49561	24	284	0
TM D03	North of West Mine	25.72892	27.47808	100	607	2
TM D07	Ind TC	25.73436	27.48811	130	527	0
TM D08	School	25.73839	27.47650	27	263	0
TM D09	Glenross	25.74867	27.51553	124	297	0
TM D10	Hettie Le Roux	25.75267	27.50472	243	492	0
TM D11	Lapologang	25.73753	27.47050	201	639	1
TM D12	Mmaditlhokwa 1	25.72764	27.48858	156	437	0
TM D13	Mmadithlokwa 2	25.72386	27.48814	100	320	0
TM D15	East of Siding	25.69122	27.49181	61	248	0
TM D18	Wonderkop WRD	25.72435	27.51759	272	465	0
TM D19	Bokamoso	25.72718	27.53345	217	665	2
TM D20	Mmaditlhokwa 3	25.72669	27.47453	155	412	0
TM D21	Mmaditlhokwa far-west			24	284	0
TM D22	Marikana Engineering Workshop			100	607	2
TM D23	Pretorius Residence			130	527	0
TM DKiep1		25.74552	27.47434	27	263	0
*Exceedance of limit value						

(1) South African Standard, GN R 827 of 1 November 2013

Table 14: Site Identification, Coordinates, and Dust Fallout Rates for 2022 (Non-Residential)

Sampling Type		Dust Fallout				
Site Category		Non-Residential				
Standard		1200 mg/m²/d[1]				
Tharisa Mine		Coordinates		Minimum Dust Fallout	Maximum Dust Fallout	No. of Exceedance
Site ID/Category	Site Name	Latitude	Longitude	mg/m²/d	mg/m²/d	
TM D01	Ind N4 2	25.74522	27.49236	252	1030	0
TM D04	Ind N4 1	25.74750	27.50719	26	266	0
TM D05	Ind Lonmin 1	25.74653	27.51939	71	492	0
TM D06	Ind Lonmin 2	25.72325	27.49372	39	231	0
TM D14	Ind N4 2	25.72640	27.50710	132	663	0
*Exceedance of limit value						

8-9.2 Toxic Heavy Metals and Hazardous Compounds in Dust fall (2021 -2022)

The filter samples analysed were TMD01, TMD04, TMD06, TMD11 and TMD12 for June 2022. A summary of findings is as follows and Table 15:

- As: Concentrations were all below the reporting limit (as determined by the analytical laboratory as 3 x the instrumental detection limit);
- Cd: Concentrations ranges between 0.001% (TMD01) – 0.003% (TMD11). The concentrations measured at the other sites were below the reporting limit:
- Cr: Concentrations ranges between 0.03 – 0.27%;
- Ni: Concentrations ranges between 0.01 – 0.07%; and
- Pb: Concentrations ranges between 0.0009 – 0.005%.

Table 15: Elemental Concentration in Samples (%)

	As	Cd	Cr	Ni	Pb
TMD01	**	0.001	0.042	0.011	0.001
TMD04	**	**	0.265	0.069	0.005
TMD06	**	**	0.065	0.025	0.003
TMD11	**	0.003	0.082	0.020	0.002
TMD12	**	**	0.030	0.010	0.001

** Below reporting limit value (0.001)

Results of the enrichment factor calculation are represented graphically in Figure 28. Except for Cd, all the other elements returned EFs below 1. As indicated earlier, values of EF close to unity (EF = 1), indicate that the elemental concentrations are similar to global average soil and that the material originates from surrounding surface soil rather than an ore body. Whether such dust is generated by natural weathering or anthropogenic (mining) activities, the heavy metal contents of these samples do not pose any additional hazard or health risk.

As per the Cd, the following conclusions are reached for the two sites with EF greater than one (1):

- TD M01 – Ind TP (EF = 1.76), indicates - minimal enrichment (suggestive of no or minimal pollution); and
- TD M11 - Lapologang (EF = 2.73), indicates moderate enrichment.

These values are still within the range of natural variability of the global average reference values.

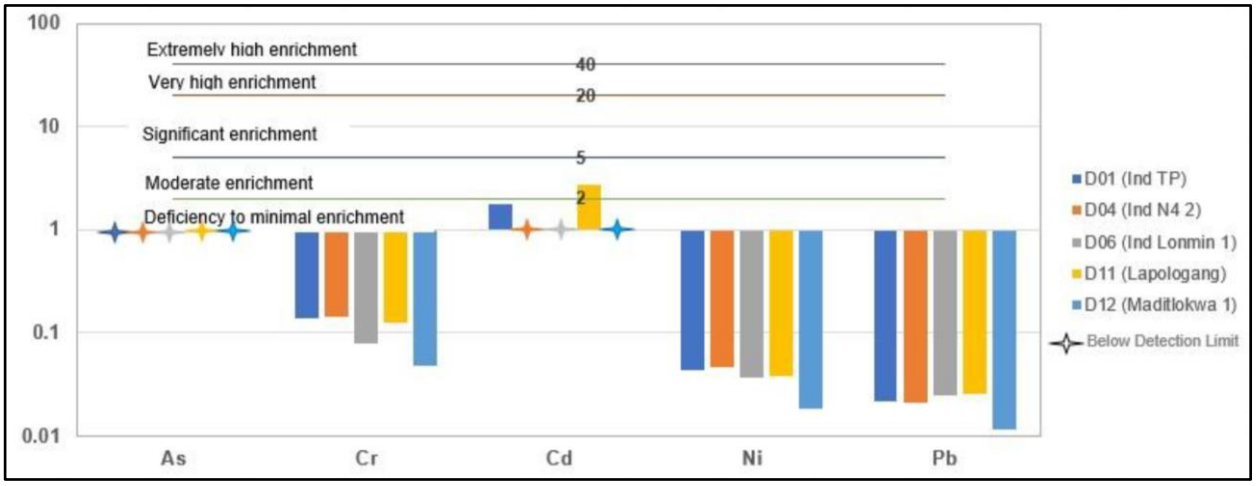


Figure 28: Enrichment Factors

Based on dust fallout results provided and the laboratory results from the samples analysed, it is concluded that the activities of Tharisa Mine do not constitute a hazard to the persons or environment surrounding their operations.

The levels of SiO_2 on dust fall filters indicate that the dust is indistinguishable from normal mineral dust for this component. The assessment is that even if the material originated from the Tharisa's mining area or activities, there is no additional hazard or health risk associated with this dust than posed by normal mineral dust from the surroundings.

We note for the record that there are no environmental exposure limit values for quartz in South African regulations. The EF calculated for total elemental Cr was below unity for all the analysed samples. This indicates that the material was within the range of normal soil, without any indication of enrichment from proximity to the Tharisa mining activities. Although the presence of Cr(VI) was recorded in the samples, the concentrations of total Cr and Cr(VI) are within the range of natural occurrence.

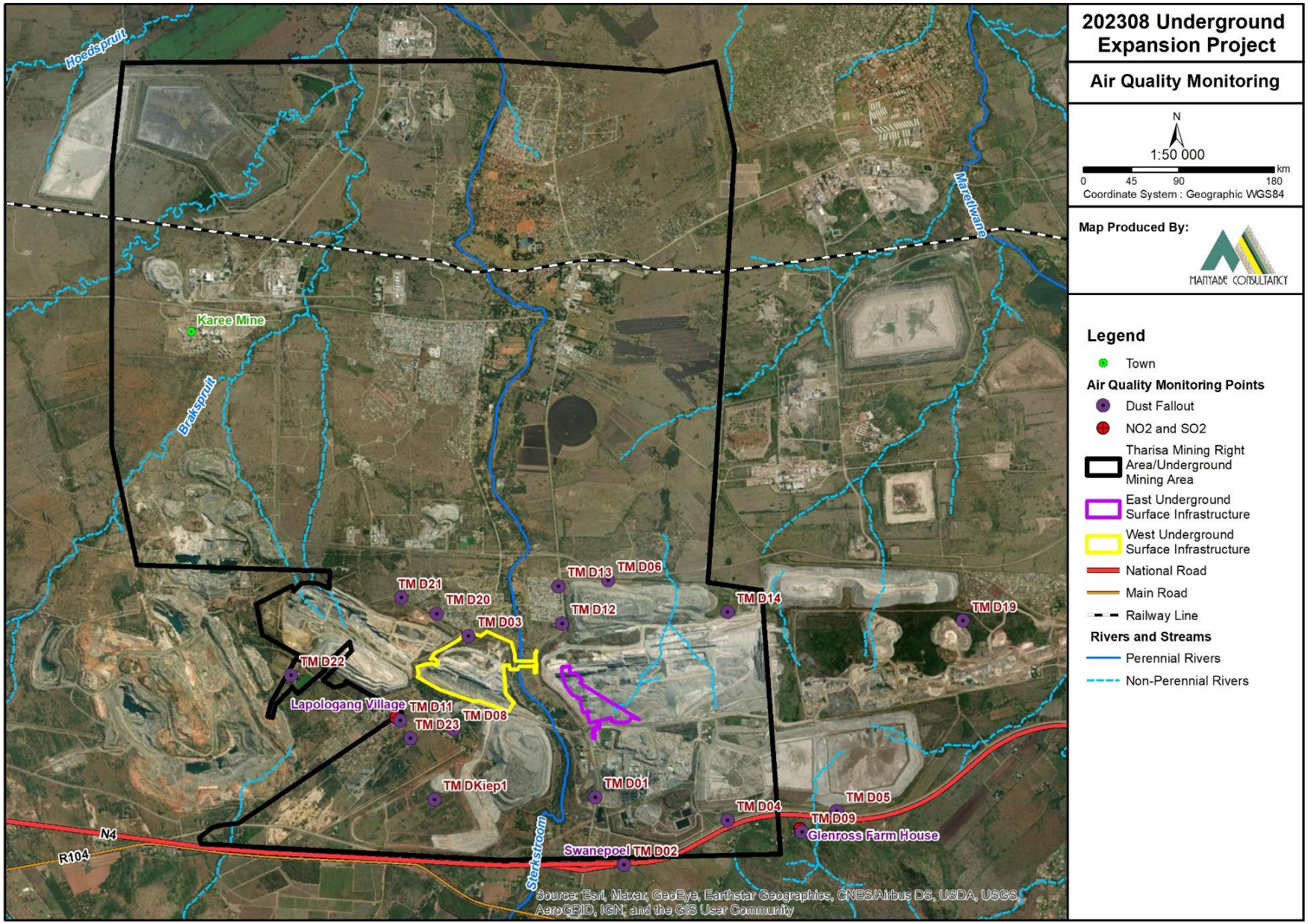


Figure 29: Dust Fallout Monitoring Points

8-10 NOISE

The noise generating activities associated with the proposed **Underground Expansion Project** at East and West mines could cause an increase in ambient noise levels in and around the mining area.

8-10.1 Current Ambient Noise

Tharisa Mine is located in an area where the character of ambient noise is already affected by industrialisation and economic activity, which over time, has resulted in an increase in road traffic noise and noise generated by intensive mining activities by surrounding mines. Road traffic emanates specifically from the N4 and various secondary roads, such as the Marikana Road that runs between the East and West mining areas at Tharisa Mine. The N4 has a wide noise footprint, affecting people living within a zone of approximately 1.2 km either side of the road, while noise generated by surrounding mining activities affects communities, farmers and other third parties in the immediate surrounds.

These land use types and associated activities represent perennial sources of noise in the area, such as:

- Industrial noise – noise generated from the usage of heavy equipment and machinery; excavators, trucks etc.; and
- Traffic noise – noise generated from the usage of light (motorcycles and cars) and heavy vehicles (buses and trucks).

Noise emissions from these anthropogenic elements (activities mentioned above) and noise emissions from natural elements such as insects, birds, weather events etc. contribute to the existing soundscape (acoustic baseline environment) of the area.

The results of the noise monitoring survey undertaken in March 2023 are presented in Table 16 and are discussed below. The monitoring points are indicated in Figure 30 The ambient noise levels recorded on-site, and the rating limits according to the South African National Standards (SANS) 10103:2008 guidelines, are presented side by side for comparison. The sound pressure level. (SPL) is given in the a-weighted scale, which is used to filter the sound levels according to the human ear’s varying response to different frequencies.

Table 16: Baseline Noise Measurements

Sample ID	Type of district	Period	SANS 10103:2008 Rating Limit dBA	Ambient Noise Levels (dBA) - Field Measurement	Min (dBA)	Max (dBA)	Start Date	End Date	Duration	Compliant (Yes / No)
N1	Residential	Daytime	45	54	38	81	06/03/2023	08/03/2023	47:59:59	No
		Night-time	35	52	36	77				No
N2	Residential	Daytime	45	52	38	80	08/03/2023	09/03/2023	31:43:38	No
		Night-time	35	50	43	73				No
N3	Residential	Daytime	45	55	36	80	01/03/2023	03/03/2023	48:00:00	No
		Night time	35	46	31	67				No
N4	Residential	Daytime	45	50	34	76	03/03/2023	05/03/2023	42:43:41	No
		Night-time	35	52	32	62				No
	Indicates current LAeq levels above either the SANS 10103:2008 daytime or the night-time rating limit.									

8-10.2 Day-Time Results

Noise monitoring locations (Figure 30); Receptor 1 (54 dBA), Receptor 2 (52 dBA), Receptor 3 (55 dBA) and Receptor 4 (50 dBA), all recorded ambient noise levels that exceeded the SANS 10103:2008 guidelines maximum limit rating of 45 dBA allowable for outdoor daytime ambient noise in rural districts.

The results from the monitoring surveys suggest that the ambient noise levels at all measurement locations were in exceedance and not compliant with the acceptable standards for daytime noise in rural districts.

8-10.3 Night-Time Results

Noise monitoring locations (Figure 30); Receptor 1 (52 dBA), Receptor 2 (50 dBA), Receptor 3 (46 dBA) and Receptor 4 (52 dBA), all recorded ambient noise levels that exceeded the SANS 10103:2008 guidelines maximum limit rating of 35 dBA allowable for outdoor night-time ambient noise in rural districts.

The results from the monitoring surveys suggest that the ambient noise level at all measurement locations was in exceedance and not compliant with the relevant SANS regulatory limit values for night-time ambient noise in rural districts.

8-10.4 Audible Noise Sources

A summary of noise sources that were audible and dominant during the noise monitoring survey, contributing to the existing day and night-time soundscape are discussed below, these include:

- Anthropogenic: Traffic noise on the national road (N4) and mining activity from Tharisa mining operations; and
- Natural: Birds (birdsong/chirping) and insects.

Table 17 provides a more detailed breakdown of noise sources audible during the noise monitoring surveys.

Table 17: Noise Sources Identified

Location ID	Day	Noise Type	Night	Noise Type
N1	Birds (birdsong/chirping)	Intermittent	Birds (birdsong/chirping)	Intermittent
	Traffic noise from the national road (N4) and Marikana Road	Continuous	Traffic noise from the national road (N4) and Marikana Road	Continuous
	Insects (Crickets)	Intermittent	Insects (Crickets)	Intermittent
	Noise from mining activity (Tharisa Mine)	Continuous	Noise from mining activity (Tharisa Mine)	Continuous
	Noise from pets (dogs barking)	Intermittent	Noise from pets (dogs barking)	Intermittent
	Music Playing	Continuous		
N2	Birds (birdsong/chirping)	Intermittent	Birds (birdsong/chirping)	Intermittent
	Traffic noise from the national road (N4) and Marikana Road	Intermittent	Traffic noise from the national road (N4) and Marikana Road	Intermittent
	Noise from mining activity (Tharisa Mine)	Continuous	Noise from mining activity (Tharisa Mine)	Continuous
N3	Birds (birdsong/chirping)	Intermittent	Birds (birdsong/chirping)	Intermittent
	Traffic noise from the national road (N4)	Continuous	Traffic noise from the national road (N4)	Continuous
	Noise from mining activity (Tharisa Mine)	Continuous	Noise from mining activity (Tharisa Mine)	Continuous
	Insects (Crickets)	Intermittent	Insects (Crickets)	Intermittent
	Human voices (People talking)	Intermittent		
	Man working in the garden using a leaf blower.	Intermittent		
N4	Birds (birdsong/chirping)	Intermittent	Birds (birdsong/chirping)	Intermittent
	Insects (Crickets)	Intermittent	Insects (Crickets)	Intermittent

Location ID	Day	Noise Type	Night	Noise Type
	Traffic noise from the national road (N4)	Intermittent	Traffic noise from the national road (N4)	Intermittent
	Noise from pets (dogs barking)	Intermittent	Noise from pets (dogs barking)	Intermittent
	Music Playing	Continuous	Music Playing	Continuous
	Human voices (People talking)	Intermittent		
	Noise from mining activity (Tharisa Mine)	Continuous		

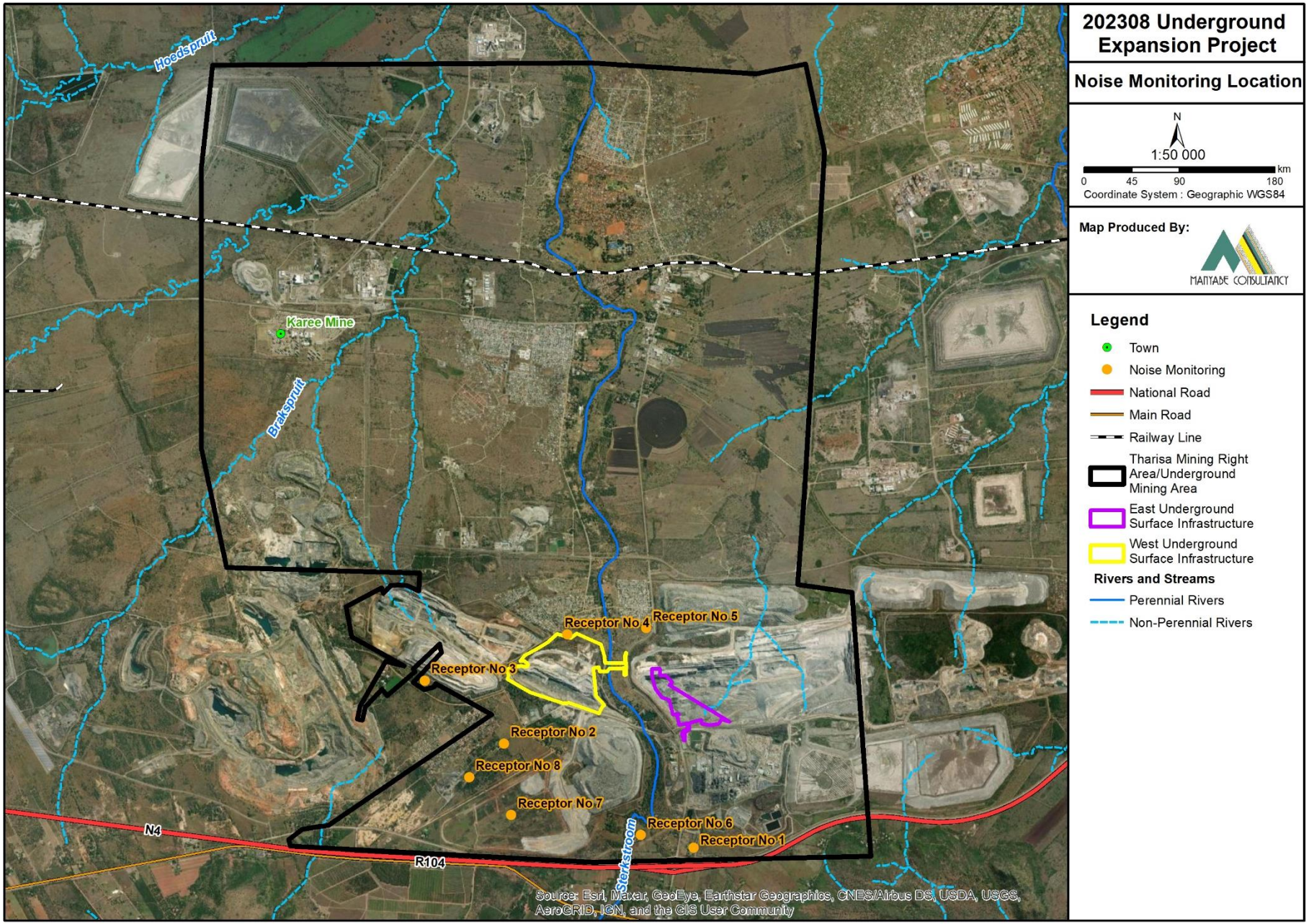


Figure 30: Noise Monitoring Locations

8-11 VISUAL AESTHETIC

The visual character of an area is determined by considering landscape character, scenic quality, sensitivity of the visual resource, sense of place and visual receptors. Mine-related infrastructure and activities has the potential to alter the visual aspects in a project area and surrounding area.

In general, the landscape character surrounding the mine consists of flat plains with a gentle slope towards the north, the Magaliesberg Mountain range to the south and gabbro-norite hills in the north. The area surrounding the mine is largely characterised by mining activities including the Marikana Platinum Mine to the west, Western platinum Mine to the north and Samancor Western Chrome Mine to the east. Within the Tharisa MRA, the area is relatively flat and the East and West mining sections are separated by the perennial Sterkstroom River and the Marikana Road. The natural environment within and around the MRA has been extensively disturbed by past and current mining and private farming activities. As such, mining activities and specifically residue facilities have become an integral part of the landscape topographical features and character.

The project area is largely disturbed and is characterised by Tharisa's mining-related infrastructure and activities as well as private farming and community related activities. Natural elements within the MR area exist, including various scattered patches of natural habitat and the Sterkstroom River, separating the East and West mining areas.

8-12 HERITAGE/ ARCHAEOLOGY AND PALAEONTOLOGY

This section describes the existing status of the heritage and cultural environment that may be affected by the project. Heritage (and cultural) resources include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological or industrial features may also be part of heritage resources as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

Paleontological resources are fossils, the remains or traces of prehistoric life preserved in the geological (rock stratigraphic) record. They range from the well-known and well publicised (such as dinosaur and mammoth bones) to the more obscure but nevertheless scientifically important fossils (such as palaeo-botanical remains, trace fossils, and microfossils). Paleontological resources include the casts or impressions of ancient animals and plants, their trace remains (for example, burrows and trackways), microfossils (for example, fossil pollen, ostracodes, and diatoms), and unmineralised remains (for example, bones of Ice Age mammals).

The most important heritage resources discovered in the area were stone-walled settlements, graveyards, a historical village and homestead, mining heritage remains, isolated and randomly scattered stone tools, historical houses and outdated and discarded agricultural implements. Graveyards located within the mining area have since been relocated with all associated consultations and permits.

There are several churches within the MRA. These churches include the African Faith Mission (AFM), Uniting Reform Church (URC), New Earth Apostolic Church (NEAC) Ts'enolo Apostolic Church (TAC) and many other apostolic churches whose members assemble at various venues including private homes, schools and/or hired venues.

Heritage resources of high significance have been identified within the MRA. Tharisa obtained a permit in terms of the NHRA, for the exhumation and relocation of graves to be disturbed by the mining of the east pit.

Although no paleontological resources are expected within the MRA, these resources are protected by national legislation and must be reported to the South African Heritage Resources Agency (SAHRA) should they be identified on-site.

A HIA and Palaeontological Assessments are currently underway, which will confirm the presence of the resources.

8-12.1 Cultural Heritage Background

Tharisa Mine is located in the Central Bankeveld of the North West Province of South Arica. The Central Bankeveld is covered by older grabbo penetrated by younger vulcanic magma which formed the series and chains of pyramid-shaped granite hills from the Pilanesberg in the north-west to Onderstepoort near Pretoria in the east. These hills, as part of the Magaliesberg valley, represent a unique ecozone characterised by grassveld, savannah veld and near wooded valleys. The region has abundant surface water supplies. The Pienaar, the Moretele, the Hex and the Apies Rivers all drain their waters into the Crocodile River.

Tharisa is also located to the north of the Magaliesberg Mountain range, which is known for its rich and diverse range of heritage resources. Various Stone Age sites are scattered along the Magaliesberg and are also located within caves and rock shelters within the mountain. Rock engraving sites have been located further towards Maanhaarrand and Rustenburg in the west.

Blockhouses along the Magaliesberg and colonial farm homesteads are still common in Marikana and on the outskirts of Brits (Madibeng). The most abundant heritage, however, are those that date from the Late Iron Age and which are associated with the numerous Tswana chiefdoms who occupied this region during the last four centuries.

8-12.2 Heritage and Palaeontological Resources at Tharisa Mine

Heritage resources identified at Tharisa Mine include stone walled settlements, graveyards, a historical village and homestead, mining heritage remains, isolated and randomly scattered stone tools, historical houses and outdated and discarded agricultural implements.

8-13 SOCIO-ECONOMIC ENVIRONMENT

The mining sector is a big contributor to the economy of South Africa as well as the region. The Rustenburg area has a large concentration of mining activities, with the mining sector creating the biggest job opportunities. The proposed projects to be implemented have many positive benefits and spinoffs both during the construction and operational phases. The benefits and positive impacts have a countrywide reach. The impacts of the positive benefits of the projects have long-term implications starting from the lowest unit, which is the individual, graduating to households and/or family unit, to the local level up to the country level.

The study area falls within Ward 31, 32 and 45 of the Rustenburg Local Municipality, BDM, North West Province.

WARD 31

According to the latest population census [Statistics South Africa (Stats SA), 2011], the total population for the ward is 13 734. The median age of the ward is 29 years of age, which is about 10 percent higher than the figure in Bojanala: 27 and about 20 percent higher than the figure in North West: 25. As can be seen from Table 18 below, the majority of Ward 31 population is aged between 20 and 29 (26.2%). The 80+ years of age population is relatively small (0.4%).

Table 18: Population by Age Category

Column	Rustenburg Ward 31		Bojanala		North West	
0-9	17.2%	2,252	20.2%	289,735	22%	736,650
10-19	9.6%	1,252	16.1%	230,766	18.5%	620,245
20-29	26.2%	3,436	20.2%	290,577	18%	602,157
30-39	22%	2,887	15.5%	223,059	13.7%	459,720

40-49	15.1%	1,974	12.3%	176,679	11.7%	392,045
50-59	7.3%	954	7.9%	113,328	7.8%	261,441
60-69	1.7%	218	4.3%	61,325	4.5%	150,360
70-79	0.6%	84	2.4%	34,455	2.6%	85,926
80+	0.4%	51	1.2%	16,656	1.2%	40,237

Source: Statistics South Africa, 2011

Table 19 below indicates that the majority (97.9%) of Ward 31 population is Black African, which is much higher than that of North West (89.8%) but less than that of Bojanala (91.4%). This number is followed by 1.2% White persons, which is less than that of North West (7.3%) and Bojanala (7%).

Table 19: Population Group

Column	Rustenburg Ward 31		Bojanala		North West	
Black African	97.9%	13,450	91.4%	1,377,821	89.8%	3,152,063
Coloured	0.3%	36	0.7%	10,931	2%	71,409
Indian or Asian	0.5%	71	0.6%	8,576	0.6%	20,652
Other	0.1%	18	0.3%	4,904	0.3%	10,444
Unspecified	0%	0	0%	0	0%	0
White	1.2%	159	7%	105,274	7.3%	255,385

Source: Statistics South Africa, 2011

Table 20 shows that the majority of persons within this ward speaks Isizulu (29.5%) as their home language, which is about 80 percent of the figure in Bojanala: 36.47 and about three-quarters of the figure in North West: 39.76.

Table 20: Population by Language Most Spoken at Home

Column	Rustenburg Ward 31		Bojanala		North West	
IsiXhosa	29.5%	4,045	36.5%	818,050	39.8%	2,191,230
Setswana	26.3%	3,610	36.5%	818,050	39.8%	2,191,230
Xitsonga	13.6%	1,861	5.3%	119,090	2.3%	127,146
Sesotho	13.2%	1,815	3%	67,458	3.7%	201,153
Sepedi	4.1%	564	3.4%	75,539	1.5%	83,999
IsiZulu	3.4%	465	2.4%	54,661	1.5%	84,835
Other	10%	1,375	12.9%	290,006	11.5%	630,987

Source: Statistics South Africa, 2011

According to Stats SA (2011), Ward 31 has a total of 8239 households. There is a total of 48.6% households in this ward that are classified as informal dwellings (shacks), more than 1.5 times the rate in Bojanala: 28.3% and more than double the rate in North West: 20.5%.

Table 21: Households by Type of Dwelling

Column	Rustenburg Ward 31		Bojanala		North West	
House	37.2%	3,066	59%	309,104	67.3%	738,773
Shack	48.6%	4,004	28.3%	148,221	20.5%	224,975
Flat in backyard	4.6%	380	3.2%	16,944	2.7%	29,344
Traditional	3.8%	313	0.8%	4,039	1.6%	17,529
Other	5.7%	473	8.7%	45,674	8%	87,599

Source: Statistics South Africa, 2011

From these households, Table 22 below shows that a large percentage (63.6%) are getting water from a regional or local service provider, which is about 80 percent of the rate in Bojanala: 74.42% and about 90 percent of the rate in North West: 73.63%

Table 22: Population by Water Source

Column	Rustenburg Ward 31		Bojanala		North West	
Service provider	63.6%	8,732	74.4%	1,121,813	73.6%	2,584,258
Other	14.9%	2,043	4.7%	70,570	3.3%	115,101
Tanker	7.8%	1,077	4.4%	65,819	4.4%	154,943

Borehole	7.2%	984	11.4%	171,129	15.5%	542,139

Source: Statistics South Africa, 2011

In terms of access to toilet facilities, as shown in Table 23 below, 30.2% of the population have access to flush or chemical toilets, which about 80 percent of the rate in Bojanala: 38.04% and about two-thirds of the rate in North West: 46.16%. Estimated 7.6% of the population have no access to any toilets, which is about 1.5 times the rate in Bojanala: 4.76% and about 25 percent higher than the rate in North West: 6.03%.

Table 23: Population by Toilet Facilities

Column	Rustenburg Ward 31		Bojanala		North West	
Pit latrine without ventilation	40.9%	3,369	43.6%	228,631	33.8%	371,565
Flush toilet	29.3%	2,413	37%	193,771	45.3%	497,447
Pit latrine with ventilation (VIP)	16.2%	1,331	10.9%	56,929	11.2%	122,434
None	7.6%	622	4.8%	24,920	6%	66,262
Other	6.1%	503	3.8%	19,731	3.7%	40,510

Source: Statistics South Africa, 2011

Another variable to consider when looking at service delivery indicators is access to refuse disposal. Within Ward 31, 16.1% are getting refuse disposal from a local authority or private company, which is about one-third of the rate in Bojanala: 50.33% and about one-third of the rate in North West: 48.09% (Table 24).

Table 24: Population by Refuse Disposal

Column	Rustenburg Ward 31		Bojanala		North West	
Own dump	65.6%	9,015	40%	602,524	42.3%	1,486,089
Service provider (regularly)	15.7%	2,151	48.8%	735,817	46.7%	1,637,612
None	13.2%	1,807	6.1%	92,625	6.2%	217,765
Communal dump	2.9%	393	2%	29,636	1.8%	64,500
Other	2.7%	368	3.1%	46,903	3%	103,986

Source: Statistics South Africa, 2011

In terms of economic indicators, one can see from Table 25 below that 54.7% of the population are employed, about 1.3 times the rate in Bojanala: 42.42% and about 1.5 times the rate in North West: 37.12%.

Table 25: Population by Employment Status

Column	Rustenburg Ward 31		Bojanala		North West	
Do not know	0.8%	47	2.3%	10,273	2.1%	18,290
In the formal sector	79.8%	4,704	71.1%	314,968	68.3%	585,824
In the informal sector	11.6%	681	13.3%	58,955	14.9%	128,017
Private household	7.9%	463	13.3%	58,875	14.7%	126,264
Unspecified	0%	0	0%	0	0%	0

Source: Statistics South Africa, 2011

The average annual income within Ward 31 is R57 500, which is nearly double the amount in Bojanala: R30 000 and nearly double the amount in North West: R30 000. When considering the monthly income of those that are employed (Table 26), the majority (40%) of the Ward 31 population earn between R40 000.00 – R75 000.00 per year.

Table 26: Annual Household Income

Column	Rustenburg Ward 31		Bojanala		North West	
R0	4.9%	285	7.6%	33,322	8.4%	70,643
Under R4800	2.8%	162	2.7%	11,655	3.3%	27,479
R5k - R10k	4.3%	253	5.5%	23,890	7.2%	60,597
R10k - R20k	7.4%	433	16.4%	71,687	20%	168,666
R20k - R40k	23.5%	1,379	21%	91,578	18.7%	157,273
R40k - R75k	40%	2,348	22.1%	96,372	17.8%	150,385
R75k - R150k	13.5%	793	11.5%	50,121	11.4%	95,774
R150k - R300k	1.1%	62	5.8%	25,509	6.5%	54,668
R300k - R600k	0.4%	23	2.2%	9,431	2%	17,238

Column	Rustenburg Ward 31		Bojanala		North West	
R600k - R1.2M	0%	1	0.6%	2,579	0.5%	4,578
R1.2M - R2.5M	0%	2	0.2%	904	0.2%	2,002
Over R2.5M	0%	0	0.2%	685	0.2%	1,572
Unspecified	2.2%	129	4.3%	18,960	3.9%	32,494

Source: Statistics South Africa, 2011

WARD 32

According to the latest population census Stats SA, 2011, the total population for the ward is 14 017. The median age of the ward is 28 years of age, which is about 10% higher than that of North West (28). As can be seen from Table 27 below, the majority of Ward 32 population is aged between 20 and 29 (27.3%). The 80+ years of age population is relatively small (0.3%).

Table 27: Population by Age Category

Column	Rustenburg Ward 32		Bojanala		North West	
0-9	16.3%	2,175	20.2%	289,735	22%	736,650
10-19	11.1%	1,483	16.1%	230,766	18.5%	620,245
20-29	27.3%	3,639	20.2%	290,577	18%	602,157
30-39	20.7%	2,765	15.5%	223,059	13.7%	459,720
40-49	15.1%	2,017	12.3%	176,679	11.7%	392,045
50-59	6.6%	883	7.9%	113,328	7.8%	261,441
60-69	1.8%	241	4.3%	61,325	4.5%	150,360
70-79	0.7%	94	2.4%	34,455	2.6%	85,926
80+	0.3%	39	1.2%	16,656	1.2%	40,237

Source: Statistics South Africa, 2011

Table 28 below indicates that the majority (90.5%) of Ward 32 population is white, which is much higher than that of North West (89.8%) but less than that of Bojanala (91.4%). This number is followed by 8.4% white persons, which is higher than that of North West (7.3%) and Bojanala (7%).

Table 28: Population Group

Column	Rustenburg Ward 32		Bojanala		North West	
Black African	90.5%	12,686	91.4%	1,377,821	89.8%	3,152,063
Coloured	0.6%	84	0.7%	10,931	2%	71,409
Indian or Asian	0.3%	38	0.6%	8,576	0.6%	20,652
Other	0.3%	37	0.3%	4,904	0.3%	10,444
Unspecified	0%	0	0%	0	0%	0
White	8.4%	1,172	7%	105,274	7.3%	255,385

Source: Statistics South Africa, 2011

Table 29 shows that the majority of persons within this ward speaks Setswana (28.4%) as their home language, which is about half the figure in Bojanala (54.3%) and North West (62.4%).

Table 29: Population by Language Most Spoken at Home

Column	Rustenburg Ward 32		Bojanala		North West	
Setswana	28.4%	3,975	54.3%	818,050	62.4%	2,191,230
Xitsonga	16.1%	2,258	7.9%	119,090	3.6%	127,146
IsiXhosa	15.6%	2,183	5.5%	82,701	5.4%	190,601
Sesotho	10.1%	1,420	4.5%	67,458	5.7%	201,153
Afrikaans	8.5%	1,194	7.1%	106,561	8.8%	309,867
Not applicable	4.4%	611	1.9%	29,219	1.5%	52,949
Other	17%	2,377	18.9%	284,426	12.5%	437,005

Source: Statistics South Africa, 2011

According to Stats SA (2011), Ward 32 has a total of 6 978 households. There is a total of 29.7% households in this ward that are classified as informal dwellings (shacks), a little higher than the rate in Bojanala (28.3%) and about 1.5 times the rate in North West (20.5%) Table 30.

Table 30: Households by Type of Dwelling

Column	Rustenburg Ward 32		Bojanala		North West	
House	45.3%	3,164	59%	309,104	67.3%	738,773
Shack	29.7%	2,074	28.3%	148,221	20.5%	224,975
Flat in backyard	16.9%	1,177	3.2%	16,944	2.7%	29,344
N/A	4.1%	284	3.9%	20,238	2.9%	31,798
Other	4%	281	5.6%	29,475	6.7%	73,330

Source: Statistics South Africa, 2011

From these households, Table 31 below shows that a large percentage (63.8%) are getting water from a regional or local service provider, which is about 90% of the rate in Bojanala (74.42%) and about 90% of the rate in North West (73.63%).

Table 31: Population by Water Source

Column	Rustenburg Ward 32		Bojanala		North West	
Service provider	63.8%	8,949	74.4%	1,121,813	73.6%	2,584,258
Borehole	20.9%	2,926	11.4%	171,129	15.5%	542,139
Tanker	10.5%	1,472	4.4%	65,819	4.4%	154,943
Other	2.6%	361	4.7%	70,570	3.3%	115,101

Source: Statistics South Africa, 2011

In terms of access to toilet facilities, as shown in Table 32 below, 73.7% of the population have access to flush or chemical toilets, which is nearly double the rate in Bojanala (38.04%) and about 1.5 times the rate in North West (46.16%). 6% of the population have no access to any toilets, which is about 25% higher than the rate in Bojanala (4.76%) and about the same as the rate in North West (6.03%).

Table 32: Population by Toilet Facilities

Column	Rustenburg Ward 32		Bojanala		North West	
Flush toilet	70.8%	4,943	37%	193,771	45.3%	497,447
Pit latrine without ventilation	12%	834	43.6%	228,631	33.8%	371,565
Pit latrine with ventilation (VIP)	6.1%	429	10.9%	56,929	11.2%	122,434
None	6%	416	4.8%	24,920	6%	66,262
Other	5.2%	360	3.8%	19,731	3.7%	40,510

Source: Statistics South Africa, 2011

Another variable to consider when looking at service delivery indicators is access to refuse disposal. Within Ward 32, 61.1% are getting refuse disposal from a local authority or private company, which is about 20% higher than the rate in Bojanala (50.33%), and about 25% higher than the rate in North West (48.09%) (Table 33 below).

Table 33: Population by Refuse Disposal

Column	Rustenburg Ward 32		Bojanala		North West	
Service provider (regularly)	57.8%	8,107	48.8%	735,817	46.7%	1,637,612
Own dump	27.8%	3,897	40%	602,524	42.3%	1,486,089
None	6.7%	943	6.1%	92,625	6.2%	217,765
Service provider (not regularly)	3.3%	462	1.5%	22,980	1.4%	50,422
Other	4.3%	608	3.6%	53,559	3.4%	118,064

Source: Statistics South Africa, 2011

In terms of economic indicators, one can see from Table 34 below that 87.5% of the population are employed are employed in the formal and informal sectors, which is more that the rate in Bojanala (84.5%), and North West (83.2%).

Table 34: Population by Employment Status

Column	Rustenburg Ward 32		Bojanala		North West	
Do not know	1.4%	90	2.3%	10,273	2.1%	18,290
In the formal sector	82.1%	5,409	71.1%	314,968	68.3%	585,824
In the informal sector	7.4%	485	13.3%	58,955	14.9%	128,017

Private household	9.2%	608	13.3%	58,875	14.7%	126,264
Unspecified	0%	0	0%	0	0%	0

Source: Statistics South Africa, 2011

The average annual income within Ward 32 is R57 500.00,which is nearly double the amount in Bojanala (R30 000.00) and North West (R30 000.00). When considering the monthly income of those that are employed (Table 35), the majority (31.8%) of the Ward 32 population earn between R40 000.00 – R75 000.00 per year.

Table 35: Annual Household Income

Column	Rustenburg Ward 32		Bojanala		North West	
R0	5.6%	363	7.6%	33,322	8.4%	70,643
Under R4800	1.8%	117	2.7%	11,655	3.3%	27,479
R5k - R10k	4.1%	269	5.5%	23,890	7.2%	60,597
R10k - R20k	11%	713	16.4%	71,687	20%	168,666
R20k - R40k	19.1%	1,243	21%	91,578	18.7%	157,273
R40k - R75k	31.8%	2,074	22.1%	96,372	17.8%	150,385
R75k - R150k	13.8%	897	11.5%	50,121	11.4%	95,774
R150k - R300k	4.7%	307	5.8%	25,509	6.5%	54,668
R300k - R600k	1.4%	92	2.2%	9,431	2%	17,238
R600k - R1.2M	0.3%	17	0.6%	2,579	0.5%	4,578
R1.2M - R2.5M	0.1%	6	0.2%	904	0.2%	2,002
Over R2.5M	0.1%	7	0.2%	685	0.2%	1,572

Source: Statistics South Africa, 2011

WARD 45

According to the latest population census Stats SA, 2011, the total population for the ward is 6 831. The median age of the ward is 32 years of age, which is a about 20 percent higher than the figure in Bojanala: 27 and about 1.3 times the figure in North West: 25.As can be seen from Table 36 below, the majority of Ward 45 population is aged between 20 and 29 (24.3%). The 80+ years of age population is relatively small (0.9%).

Table 36: Population by Age Category

Column	Rustenburg Ward 45		Bojanala		North West	
0-9	11.5%	748	20.2%	289,735	22%	736,650
10-19	8%	521	16.1%	230,766	18.5%	620,245
20-29	24.3%	1,577	20.2%	290,577	18%	602,157
30-39	23.2%	1,509	15.5%	223,059	13.7%	459,720
40-49	18.8%	1,225	12.3%	176,679	11.7%	392,045
50-59	9.8%	639	7.9%	113,328	7.8%	261,441
60-69	2.5%	160	4.3%	61,325	4.5%	150,360
70-79	1%	64	2.4%	34,455	2.6%	85,926
80+	0.9%	60	1.2%	16,656	1.2%	40,237

Source: Statistics South Africa, 2011

Table 37 below indicates that the majority (99.1%) of Ward 45 population is Black African, which is much higher than that of North West (89.8%) but less than that of Bojanala (91.4%). This number is followed by 0.4% Other persons, which is less than that of North West (0.3%) and Bojanala (0.3%).

Table 37: Population Group

Column	Rustenburg Ward 45		Bojanala		North West	
Black African	99.1%	6,771	91.4%	1,377,821	89.8%	3,152,063
Coloured	0.2%	16	0.7%	10,931	2%	71,409
Indian or Asian	0.1%	8	0.6%	8,576	0.6%	20,652
Other	0.4%	29	0.3%	4,904	0.3%	10,444
Unspecified	0%	0	0%	0	0%	0
White	0.1%	7	7%	105,274	7.3%	255,385

Source: Statistics South Africa, 2011

Table 38 shows that the majority of persons within this ward speaks Setswana (33.6%) as their home language, which is about three-fifths of the figure in Bojanala: 54.27 and about half the figure in North West: 62.43.

Table 38: Population by Language Most Spoken at Home

Column	Rustenburg Ward 45		Bojanala		North West	
Setswana	33.6%	2,292	54.3%	818,050	62.4%	2,191,230
Not applicable	24.6%	1,683	1.9%	29,219	1.5%	52,949
IsiXhosa	13.7%	938	5.5%	82,701	5.4%	190,601
Xitsonga	12.1%	829	7.9%	119,090	3.6%	127,146
Sesotho	7.1%	483	4.5%	67,458	5.7%	201,153
Other	2%	139	2.6%	39,869	1.7%	60,872

Source: Statistics South Africa, 2011

According to Table 39, Ward 45 has a total of 2 521 households. There is a total of 37.5% households in this ward that are classified as informal dwellings (shacks), about 1.3 times the rate in Bojanala: 28.3% and nearly double the rate in North West: 20.5%.

Table 39: Households by Type of Dwelling

Column	Rustenburg Ward 45		Bojanala		North West	
House	49.2%	1,244	59%	309,104	67.3%	738,773
Shack	37.3%	944	28.3%	148,221	20.5%	224,975
N/A	5.8%	146	3.9%	20,238	2.9%	31,798
Apartment	3.5%	89	1.4%	7,520	1.8%	19,452
Other	4.2%	107	7.4%	38,899	7.6%	83,222

Source: Statistics South Africa, 2011

From these households, Table 40 below shows that a large percentage (85%) are getting water from a regional or local service provider, which is about 10 percent higher than the rate in Bojanala: 74.42% and about 20 percent higher than the rate in North West: 73.63%.

Table 40: Population by Water Source

Column	Rustenburg Ward 45		Bojanala		North West	
Service provider	85%	5,805	74.4%	1,121,813	73.6%	2,584,258
Vendor	12.9%	878	3.7%	55,015	1.9%	67,395
Other	1.9%	128	4.7%	70,570	3.3%	115,101
Borehole	0.2%	16	11.4%	171,129	15.5%	542,139

Source: Statistics South Africa, 2011

In terms of access to toilet facilities, as shown in Table 41 below, 57.7% of the population have access to flush or chemical toilets, which about 1.5 times the rate in Bojanala: 38.04% and about 25 percent higher than the rate in North West: 46.16%. Estimated 1.7% of the population have no access to any toilets, which is about one-third of the rate in Bojanala: 4.76% and about one-quarter of the rate in North West: 6.03%.

Table 41: Population by Toilet Facilities.

Column	Rustenburg Ward 45		Bojanala		North West	
Flush toilet	55.3%	1,399	37%	193,771	45.3%	497,447
Pit latrine without ventilation	31.4%	794	43.6%	228,631	33.8%	371,565
Pit latrine with ventilation (VIP)	8.2%	207	10.9%	56,929	11.2%	122,434
Chemical toilet	2.5%	63	1.1%	5,547	0.9%	9,449
Other	2.7%	69	7.5%	39,104	8.9%	97,323

Source: Statistics South Africa, 2011

Another variable to consider when looking at service delivery indicators is access to refuse disposal. Within Ward 45, 84.3% are getting refuse disposal from a local authority or private company, which is more than 1.5 times the rate in Bojanala: 50.33% and more than 1.5 times the rate in North West: 48.09% (Table 42).

Table 42: Population by Refuse Disposal

Column	Rustenburg Ward 45		Bojanala		North West	
Service provider (regularly)	83.9%	5,732	48.8%	735,817	46.7%	1,637,612
Other	12.2%	834	1.1%	16,086	1.1%	36,866
Own dump	3.1%	212	40%	602,524	42.3%	1,486,089
Service provider (not regularly)	0.4%	27	1.5%	22,980	1.4%	50,422

Source: Statistics South Africa, 2011

In terms of economic indicators, one can see from Table 34 below that 38.4% of the population are employed, about 90 percent of the rate in Bojanala: 42.42% and a little higher than the rate in North West: 37.12%.

Table 43: Population by Employment Status

Column	Rustenburg Ward 45		Bojanala		North West	
Do not know	0.3%	6	2.3%	10,273	2.1%	18,290
In the formal sector	77.5%	1,711	71.1%	314,968	68.3%	585,824
In the informal sector	7.9%	175	13.3%	58,955	14.9%	128,017
Private household	14.3%	316	13.3%	58,875	14.7%	126,264
Unspecified	0%	0	0%	0	0%	0

Source: Statistics South Africa, 2011

The average annual income within Ward 45 is R57 500, which is nearly double the amount in Bojanala: R30 000 and nearly double the amount in North West: R30 000. When considering the monthly income of those that are employed (Table 44), the majority (44.6%) of the Ward 45 population earn between R40 000.00 – R75 000.00 per year.

Table 44: Annual Household Income

Column	Rustenburg Ward 45		Bojanala		North West	
R0	6.3%	137	7.6%	33,322	8.4%	70,643
Under R4800	1%	22	2.7%	11,655	3.3%	27,479
R5k - R10k	2%	44	5.5%	23,890	7.2%	60,597
R10k - R20k	4.7%	102	16.4%	71,687	20%	168,666
R20k - R40k	15%	327	21%	91,578	18.7%	157,273
R40k - R75k	44.6%	975	22.1%	96,372	17.8%	150,385
R75k - R150k	15.2%	333	11.5%	50,121	11.4%	95,774
R150k - R300k	2%	43	5.8%	25,509	6.5%	54,668
R300k - R600k	0.5%	10	2.2%	9,431	2%	17,238
R600k - R1.2M	0.1%	1	0.6%	2,579	0.5%	4,578
R1.2M - R2.5M	0.1%	3	0.2%	904	0.2%	2,002
Over R2.5M	0%	0	0.2%	685	0.2%	1,572
Unspecified	8.7%	189	4.3%	18,960	3.9%	32,494

Source: Statistics South Africa, 2011

SECTION 9: POTENTIAL IMPACTS IDENTIFIED

9-1 HISTORICAL IMPACTS AND MANAGEMENT MEASURES

Impacts which were identified as part of the existing mining activities and infrastructure are presented in previous approved EMPrs. The management measures identified within these EMPrs will still need to be complied with in terms of NEMA.

9-2 POTENTIAL IMPACTS AS A RESULT OF THE PROPOSED PROJECT

A number of potential impacts have been identified which will be considered further in the process as required. Typical impacts that will be investigated as part of this EIA include:

CONSTRUCTION PHASES
• Sedimentation of the Sterkstroom River from site clearing. • Loss of soil resources and land capability due to site clearing and grubbing of the footprint areas associated with the construction of the underground infrastructure. • Soil erosion, soil compaction, and loss of topsoil. • Benefits resulting from employment programmes and income opportunities created by the mine. • Benefits resulting from local supply chain and procurement. • Loss of natural vegetation and habitat. • Dust generation. • Possible impacts to groundwater from seepage. • Reduced recharge of groundwater due to increased run-off. • Pollution of the Sterkstroom River from hydrocarbon spills from construction machinery. • Destruction of wetlands. • Introduction of AIPs resulting in further alteration of the natural vegetation profiles of freshwater resources. • Alteration of the natural topography of the area, changing its baseline sense of place. • Noise impacts from construction machinery and vehicles. • Loss of heritage/ cultural and paleontological resources.
OPERATIONAL PHASE
• Sedimentation of watercourses due to operational activities. • Soil erosion, dust generation, soil compaction, and loss of topsoil. • Possible impacts to groundwater from seepage and spillages such as hydrocarbons. • Reduced groundwater quantity as a result of dewatering for underground mining. • Risk of subsidence. • Air pollution through dust generation and gaseous emissions. • Creation of Jobs. • Noise disturbance from operational and maintenance activities.
CLOSURE/ REHABILITATION.
• Pollution to surface water from hydrocarbon spillage from rehabilitation equipment. • Contamination of surface water resources by Acid Mine Drainage (AMD). • Compaction of soil, soils erosion and contamination of soil resources from heavy vehicles. • Potential for establishment of alien invasive vegetation. • Noise disturbance from decommissioning machinery and vehicles (however not expected to impact any receptors). • Increase in dust fallout. • Loss of employment and enterprise development opportunities. • Risk of subsidence. • Groundwater Contamination.

Specialist baseline and impact assessments will be conducted for these impacts.

SECTION 10: METHODOLOGY TO BE USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL AND SOCIAL IMPACTS

The following methodology complies with Regulation 31(2)(l) of the NEMA, which will be utilised in the rating of significance of potential environmental and social impacts of the proposed **Underground Expansion Project** at East and West mines, during the Impact Assessment Phase.

10-1 PROJECT INITIATION

The best way of expressing the cost-benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood) of that event. Many risks are accepted or tolerated on a daily basis, because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, which is potentially death, but the likelihood of such an event happening is so low that parachutists are prepared to take that risk. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again, using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die. Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms, this means distinguishing between the inherent risk (the risk that a parachutist will die if the parachute does not open) and the residual risk (the risk that the parachutist will die if the parachute does not open, but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

10-1.1 Consequence

The ascription of significance for decision-making becomes then relatively simple. It requires the consequences to be ranked (Table 45) and a likelihood to be defined of that consequence occurring. It should be noted that there is no equivalent 'high' score in respect of benefits as there is for the costs. This high negative score serves to give expression to the potential for a fatal flaw where a fatal flaw would be defined as an impact that cannot be mitigated effectively and where the associated risk is accordingly untenable. Stated differently, the high score on the costs, which is not matched on the benefits side, highlights that such a fatal flaw cannot be 'traded off' by a benefit and would render the proposed project to be unacceptable.

Table 45: Summary of Project Activities

Environmental Costs	Inherent Risk
Human health – morbidity/mortality. Loss of species	High
Reduced faunal populations, loss of livelihoods, individual economic loss	Moderate-high
Reduction in environmental quality – air, soil, water. Loss of habitat, loss of heritage, amenity	Moderate
Nuisance	Moderate-low
Negative change – with no other consequences	Low
Environmental Benefits	**Inherent Benefit**
Net improvement in human welfare	Moderate-high
Improved environmental quality – air, soil, water. Improved individual livelihoods	Moderate
Economic development	Moderate-low
Positive change – with no other consequences	Low

10-1.2 Likelihood

Although the principle is one of probability, the term 'likelihood' is used to give expression to a qualitative rather than quantitative assessment, because the term 'probability' tends to denote a mathematical/ empirical

expression. A key point here is that likelihood of the consequence occurring must de facto take into account the good international industry best practice that is 'intrinsically built-in' to activities or methods.

For example, an electricity transformer will never be constructed without bunding and stones to contain any oil spills due to potential failure of the transformer. To highlight bunding as a specific mitigation measure to reduce the consequence of a spill is simply inappropriate. Likelihood descriptors that can be used to characterise the likelihood of the costs and benefits occurring are presented in Table 46 below.

Table 46: Likelihood descriptors and definitions

Likelihood Descriptors	Definition
Highly unlikely	The possibility of the consequence occurring is negligible.
Unlikely but possible	The possibility of the consequence occurring is low but cannot be discounted entirely.
Likely	The consequence may not occur, but a balance of probability suggests it will.
Highly likely	The consequence may still not occur, but it is most likely that it will.
Definite	The consequence will definitely occur.

10-1.3 Residual risk

The residual risk is then determined as a function of the consequence together with the likelihood of that consequence. The residual risk categories are shown in Table 47 where consequence scoring is shown in the rows and likelihood in the columns. The implications for decision-making of the different residual risk categories are shown in Table 48. Additional mitigation to manage (and potentially further reduce) and monitor the residual risk may also be defined. All mitigation is then prescribed in the EMPr. What is important is that the residual risk is what decision-makers must accept if they decide to authorise the proposed activity even if that residual risk is 'high'. The residual risk cannot and will not be artificially reduced within the assessment to 'low' to facilitate decision-making.

Table 47: Residual risk categories

		Residual risk				
Consequence	High	Moderate	High	High	Fatally flawed	
	Moderate – high	Low	Moderate	High	High	High
	Moderate	Low	Moderate	Moderate	Moderate	Moderate
	Moderate – low	Low	Low	Low	Low	Moderate
	Low	Low	Low	Low	Low	Low
		Highly unlikely	Unlikely but possible	Likely	Highly likely	Definite
		Likelihood				

Table 48: Implications for decision-making of the different residual risk categories shown in Table 47

Rating	Nature of implication for Decision – Making
Low	Project can be authorised with low risk of environmental degradation
Moderate	Project can be authorised but with conditions and routine inspections
High	Project can be authorised but with strict conditions and high levels of compliance and enforcement
Fatally Flawed	The project cannot be authorised

10-1.4 A note on cumulative impacts

Impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts will be included in the assessment of individual impacts. The nature of the impact will be described in such a way as to detail the potential cumulative impact of the activity, if there is indeed a cumulative impact. For example, dust and air emissions cannot be assessed in isolation of the potential cumulative impact of increased emissions into the atmosphere. Similarly, if water quality is improved within the immediate surroundings of the proposed activities, this will most certainly have a ripple effect/ cumulative impact on the greater water quality in the area.

Once all the impacts have been assessed and significance ratings allocated, the EAP will assess the project on a holistic basis to determine the overall project impact on the receiving environment. This will be a function

of the individual impacts as well as the cumulative nature of combining all those impacts within a single context/ project.

10-1.5 Describing the impact

The EIA Regulations, 2014, as amended, also require, in addition to consequence, likelihood and significance (as described above), that the nature, extent, duration, reversibility and irreplaceable loss of a resource also be highlighted for identified impacts. These additional impact attributes are defined as follows:

10-1.6 Nature of the impact

The nature of an impact refers to a description of the inherent features, characteristics and/ or qualities of the impact.

10-1.7 Scale/ extent of the impact

Extent refers to the impact footprint or stated differently, the spatial area over which the impact would manifest. Note that if a species were to be lost, then the extent would be global because that species would be lost to the world.

Table 49: Listing of descriptors and associated definitions to determine the extent of an impact.

Extent Descriptors	Definitions
Site	The impact footprint remains within the cadastral boundary of the site
Local	The impact footprint extends beyond the cadastral boundary of the site, to include the immediately adjacent and surrounding areas
Regional	The impact footprint includes the greater surrounding area within which the site is located
National	The scale/ extent of the impact is applicable to the Republic of South Africa
Global	The scale / extent of the impact is global (or world-wide)

10-1.8 Duration of the impact

Duration is the period of time for which the impact would be manifest. Importantly, the concept of reversibility is reflected in the duration scoring. In other words, the longer the impact endures, the less likely is the reversibility of the impact.

Table 50: Listing of descriptors and associated definitions to determine the duration of an impact.

Duration Descriptors	Definitions
Construction period only	The impact endures for only as long as the construction period of the proposed activity. This implies the impact is fully reversible. Like noise and dust.
Short term	The impact continues to manifest for a period of between 3 – 10 years. The impact is reversible.
Medium term	The impact continues to manifest for a period of 10-30 years. The impact is reversible with relevant and applicable mitigation and management actions.
Long term	The impact continues for a period in excess of 30 years. However, the impact is still reversible with relevant and applicable mitigation and management actions.
Permanent	The impact will continue indefinitely and is irreversible.

10-1.9 Irreplaceable loss of resources

Irreplaceable loss of resources refers to the degree to which the impact will result in the loss of a resource that is impossible to replace.

Extent Descriptors	Definitions
High	The impact is most likely to or will result in the irreplaceable loss of a resource/s.
Medium	The impact may result in the irreplaceable loss of a resource/s, however applicable mitigation or management interventions may prevent complete loss or provide a suitable substitute/"offset".
Low	The impact will not result in the irreplaceable loss of a resource/s.

SECTION 11: POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED ACTIVITY AND ALTERNATIVES

Refer to SECTION 9: for the potential positive and negative impacts which have been identified for the proposed **Underground Expansion Project** at East and West mines. A detailed assessment of the potential positive and negative environmental and social impacts associated with the proposed **Underground Expansion Project** at East and West mines will be developed and included in the EIA and EMPr Report.

SECTION 12: POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

Mitigation measures are implemented to ensure that the identified impacts from the proposed project activities are reduced as far as possible.

The specialist studies will assess potential environmental and social impacts that may occur as a result of activities related to the proposed **Underground Expansion Project** at East and West mines. Appropriate mitigation and management measures to avoid and/or minimise the identified impacts associated with the project will be developed and included in the EIA and EMPr Report. Refer to SECTION 9: for the potential positive and negative impacts which have been identified for the proposed **Underground Expansion Project** at East and West mines.

Specialist will be informed to be cognisant of the following mitigation measure objectives:

- To find more environmentally sound ways of undertaking specific activities;
- To enhance any environmental and social benefits of a proposed activity;
- To avoid, minimise or remedy negative environmental impacts; and
- To ensure that any residual negative environmental impacts are environmentally acceptable.

The identification of appropriate mitigation measures will be conducted in a hierarchal manner:

- Preventative measures will be identified to avoid, where possible, negative impacts that may arise as a result of the proposed activity;
- Measures will be identified to minimise and/or reduce the negative impacts to “as low as practicable” levels; and
- Measures will be identified to compensate or remedy residual negative impacts that are unavoidable and cannot be minimised or reduced any further.

Table 52 below provides high level mitigation measures for potential impacts identified for the proposed project. Additional measures will be provided for in the EMPr to be developed during the Impact Assessment Phase.

SECTION 13: MOTIVATION WHERE NO ALTERNATIVES WERE CONSIDERED

This section is not applicable. Refer to SECTION 6: for the alternatives which have been considered, which will further be assessed in the Impact Assessment Phase.

SECTION 14: STATEMENT MOTIVATION THE PREFERRED SITE

To minimise the extent of the project disturbance, the project footprint (surface infrastructure) will be located on previously disturbed areas. No location alternatives for the proposed project could be considered.

SECTION 15: PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

15-1 DESCRIPTION OF ALTERNATIVES TO BE CONSIDERED INCLUDING THE OPTION OF NOT GOING AHEAD WITH THE ACTIVITY

Refer to SECTION 6: for consideration of alternatives.

15-2 DESCRIPTION OF ASPECTS TO BE ASSESSED AS PART OF THE EIA PROCESS

Different impacts can occur during the different phases of a project, from pre-construction to final rehabilitation and closure phase. For this reason, project specific activities that will be undertaken during each project phase will need to be assessed in light of the methodology detailed in SECTION 10: of this report.

The following aspects will be assessed as part of the EIA process:

- Closure and Rehabilitation;
- Socio Economic;
- Community Health;
- Climate Change;
- Blasting and Vibration;
- Air Quality;
- Groundwater;
- Noise;
- Heritage and Palaeontology;
- Terrestrial Ecology;
- Aquatic Ecology & Wetlands; and
- Surface Water.

15-3 DESCRIPTION OF ASPECTS TO BE ASSESSED BY SPECIALISTS

The following specialists' studies will be undertaken, for the various environmental aspects:

- Closure and Rehabilitation Plans;
- Social Impact Assessment;
- Community Health Assessment;
- Climate Change Assessment;

- Blasting and Vibration Assessment;
- Air Quality Impact assessment;
- Ground Water Impact Assessment;
- Noise Impact Assessment;
- Heritage Impact Assessment and Paleontological Studies;
- Terrestrial Ecology Assessment;
- Aquatic Ecology & Wetlands Assessment; and
- Surface Water Impact Assessment.

The specialists will assess the impacts (including cumulative effects) of the proposed activity/aspect in relation to the construction, operational, closure and decommissioning phases. The reports will detail appropriate and implementable measures to avoid, mitigate and manage the potential impacts that have been identified.

15-4 TERMS OF REFERENCE FOR SPECIALIST STUDIES

Table 51 outlines the studies proposed during the EIA Phase of the project and the proposed scope of work to be undertaken as part of the S&EIR process:

Table 51:Terms of Reference for Specialist Studies

Study	Terms of Reference
Closure and Rehabilitation Plans	The closure and rehabilitation plan will be in alignment with the broader Tharisa rehabilitation plan and will provide details as to how site rehabilitation (whether it will be concurrent with on-going operations, or at closure) should be undertaken, with step by step break-down of disturbed areas to be rehabilitated, when those areas should be rehabilitated, as well as a description of the actual rehabilitation measures to be implemented. The plan with detail the following: • Principles of Rehabilitation. • Rehabilitation objectives with respect to re-vegetation and maintenance. • Areas and activities to be rehabilitated. • Conclusions and summary of rehabilitation plan.
Social Impact Assessment	• An in-depth desktop study will be conducted making use of existing material including but not limited to existing literature, social/socio-economic statistical data, maps, and aerial imagery. • Identification of and engagement with key stakeholders (specifically on communities, community representatives, local businesses etc.) will be done in close collaboration with the client's public participation team. • A three-day site visit will be conducted during which formal and informal interviews, focus group discussions will be conducted with key stakeholders and representatives of key organisations. • Identified impacts and sensitivities will be assessed using the agreed upon assessment conventions. As adapted to better and more meaningfully apply to the social environment. • A standalone Social Impact Assessment Report will be produced on the understanding that the EAP will feed findings and recommendations into the EIA and EMPr Report for the project. • A Social Impact Assessment Report (from which findings will be included in the broader EIA and EMPr Report).
Community Health Assessment	The scope of the Community Health Assessment is to identify and describe the physical and health quality parameters of relevance within the Tharisa Minerals Mine project area; to evaluate results of other specialists' studies on ground and surface water quality, noise, transportation and air pollution; to predict potential impacts resulting from the planned project activities and consider cumulative impacts on receptors health; and to produce appropriate management and mitigation plans required to ensure that impacts are adequately addressed. The following tasks will be undertaken:

Study	Terms of Reference
	• Conduct a Community Health Assessment of current situation at Tharisa Minerals Mine. The assessment should cover all aspects related to any possible health concerns that might arise from the site, focussing but not limited to the following: o Health concerns for the employee working on the site. o Health concerns for the surrounding communities. o Recommend on actions/mitigations that must be put in place to avoid any possible health concerns. • Identify, map and describe the physical and health quality parameters of relevance within the project affected area; • Evaluate results of other specialist studies on ground and surface water quality, noise, air quality and socio-economic conditions; • Predict potential health impacts resulting from both the current as well as planned project activities; • Consider cumulative impacts on receptors' health; and • Produce appropriate management and mitigation plans required to ensure that impacts are adequately addressed.
Climate Change Assessment	The scope of the Climate Change Assessment consists of: • Impact of the project on climate change - Carbon footprint calculation: An assessment of the extent to which a project will contribute to climate change over its lifetime. The life cycle emissions of the project will be considered including both the construction and the operational phases; • Project resilience to climate change - Vulnerability assessment: The resilience of the (project) to climate change, considering how climate change will impact on its operation, through factors such as rising temperatures, and extreme weather patterns etc; and • How identified climate change impacts may be avoided, mitigated, or remedied.
Blasting and Vibration Assessment	In terms of Regulation 4.16 (2) of the Mine Health and Safety Act, 1996 (Act No. 29 of 1996), no blasting operations may be caried out within a horizontal distance of 500m from surface structures unless the necessary preventative measures have been implemented to prevent any significant risk. It is therefore required to conduct a risk assessment identifying the hazards that will affect the surface structures (including water bodies). A report will be compiled which will identify the different types of structures from the plan provided which will be affected by hazards (ground vibrations and air blasts). The geology plays an integral part of the extent to which vibrations will be felt. Furthermore conducting predictions, setting out minimum criteria and to provide mitigating measures to assist in preventing any significant risk. The report is compiled with the aid of survey data and site-specific geological data.
Air Quality Impact assessment	• A study of legal requirements pertaining to air quality, including both emission limits and ambient air quality standards and guidelines. • National and international standards and guidelines will be referenced, including but not limited to the South African National Ambient Air Quality Standards (NAAQSs) and Dustfall Regulation (NDR), World Health Organisation (WHO); United States Environmental Protection Agency (US EPA), and European Community. • Desktop review of all available project and associated data, including: o On-site/ near-site meteorological for the period available. o Simulated meteorological data for a period of three (3) years (2019-2020). o Assess the results from the ambient air quality sampling to date (SO_2/NO_2). o Dust fallout results for the period available year. o Identify all current sources of air pollution in the area (other mines and industries; wild fires; domestic fuel burning; etc.). o Identify all sensitive receptors (including any nearby residential dwellings and proposed receptors (temporary or permanent workers accommodation site(s)) in the vicinity of the mine). o Assess the potential for air quality impacts. • The compilation of an emissions inventory for the proposed underground operations incl.: o Identification and quantification of all emissions associated with the proposed operations. o Pollutants quantified will be limited to particulate matter (TSP, PM_{10} and $PM_{2.5}$) and gaseous emissions (SO_2, NO_2 and CO) as well as selected metals (such as chromium). o Use will be made of engineering design parameters, design emission standards, emissions factors published by the US EPA and Australian National Pollutant Inventory (NPI).

Study	Terms of Reference
	• Atmospheric dispersion simulations of all PM_{10}, $PM_{2.5}$ and dust fallout, and gaseous pollutants for the operations reflecting highest hourly, daily and annual average concentrations due to routine emissions from the current mining operations and the proposed expansion operations. • An international approved dispersion model will be used such as the US EPA American Meteorological (AERMOD). • Dispersion modelling will be done for the following scenarios: o Incremental impacts from the underground operations alone. o Cumulative impacts form the current mining operations (to be taken from the Tharisa Mine Waste Management Application) and the underground expansion operations. • Impact assessment by comparing ambient pollutant concentration levels to the relevant air quality standards and limits. • The identification of air quality management and mitigation measures based on the findings of the compliance and impact assessment. • Additional recommendations to the mine's air quality monitoring programme. • A specialist air quality impact assessment report will be compiled.
Ground Water Impact Assessment	The study will involve the following tasks: • Data Review and inclusion of latest hydrogeological data from previous studies. • Groundwater flow numerical modelling (Hydrogeological Impact Assessment). • Site Wide Static Mine Water Balance to calculate potential water surplus/shortage. • General admin, project management and meetings.
Noise Impact Assessment	The study will focus on the evaluation of impacts for humans. • Noise Impact Assessment. • Noise emissions inventory. • Noise propagation modelling. • Noise impact assessment and management plan. • Noise impact report.
Heritage Impact Assessment and Paleontological Studies	A Heritage Screener will involve desktop heritage screening assessment for the for the planned Underground Mining.
Terrestrial Ecology Assessment	**<u>The faunal surveys will include the following:</u>** • A survey of the project areas (if permitted); • Compilation of an expected species list; • Compilation of an identified species list; • Identify any Red Data or listed species present or potentially occurring in the area; • A proximity assessment to any protected or ecologically important areas; and • A habitat assessment and delineation. The field survey for fauna will be undertaken concurrently with vegetation surveys. All animals observed in the area will be noted. Ecological indicators, such as calls, tracks and dung will be noted and regarded as indicative of the presence of that particular animal. A detailed fauna lists will be compiled and discussed in relation to the floristic survey findings. The probability of occurrence for species not observed during field surveys will be considered if applicable regarding available habitats. Protected and endemic species will be the focus of discussion. Faunal composition of disturbed sites will be compared to the composition of undisturbed areas. The current status of the faunal environment will be determined and an evaluation of the extent of site-related effects in terms of certain ecological indicators, as well as identification of specific important ecological attributes such as rare and endangered species, protected species, sensitive species and endemic species will be made. The faunal environment and habitat will be characterised in relation to biota and the extent of site related effects. Presence of red data and protected species will be indicated on a map. **<u>The plants and vegetation surveys will include the following</u>**: • A survey for Red and Orange Data plant species; • Vegetation units will be identified, classified and delineated; • Habitat types will be classified and delineated;

Study	Terms of Reference
	• The survey will be conducted in consultation with local authorities who have information to be considered; and • The survey area will include the project area. Protected, endemic, exotic, alien invasive and culturally significant species will also be discussed as separate issues and related back to relevant legal requirements. Furthermore the identification of red data and protected species as listed according to the International Union for Conservation of Nature (IUCN) List, NEMBA and other Provincial and National legislation will be completed. Depending on the vegetation and terrain, the timed meander sampling could be used during vegetation assessments, however, should dominant vegetation types require other methods be used, then these shall be motivated. **The Habitat features surveys will include the following:** • The identification of these features and delineation thereof; and • The location of any unique or protected habitat features. All sensitive areas, as described by the provincial and national legislation, will be identified. The locality and extent, as well as species composition of sensitive areas such as the wetlands or pans, streams, rivers and rocky outcrops will be conducted to identify and map all such sensitive areas present. Sensitive areas will be identified and delineated.
Aquatic Ecology & Wetlands Assessment	The areas will be traversed on foot to identify local freshwater resources. The following will be achieved to supplement the approach: • A desktop assessment of all available datasets; • GIS processing to preliminary identify water accumulation areas; • The delineation of water resources in accordance with the DWAF (2005) guidelines, whereby the outer edges will be identified; and • A functional and integrity assessment of the water resources. The "Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries" (Macfarlane, et al., 2014) will be used to determine the appropriate buffer zone for the proposed activity. The risk assessment will be completed in accordance with the requirements of the DWS General Authorisation (GA) in terms of Section 39 of the NWA for water uses as defined in Section 21(c) or Section 21(i) (GN. 509 of 2016).
Surface Water Impact Assessment	The following scope of work is proposed to be undertake the floodlines determination: • Site Assessment to understand the site drainage and characteristics that may assist in modelling as well as measuring the culvert crossings downstream and status if accessible; • Baseline assessment, including water quality and design flood peak determination using topographical data; • Stormwater Management Plan (SWMP) Update; • Floodline modelling for the Sterkstroom River traversing the site; • Water Balance Update, and • Impacts identification and rating.

15-5 PROPOSED METHOD OF ASSESSING THE ENVIRONMENTAL ASPECTS INCLUDING THE PROPOSED METHOD OF ASSESSING ALTERNATIVES

The EIA will be undertaken according to a standardised methodology, which is detailed in SECTION 10: of this report, which complies with Regulation 31(2)(l) of the NEMA.

15-6 THE PROPOSED METHOD OF ASSESSING DURATION SIGNIFICANCE

Refer to SECTION 10: for the significance assessment, which includes duration.

15-7 STAGE AT WHICH THE COMPETENT AUTHORITY WILL BE CONSULTED

A pre-application meeting was convened with the DMRE on Thursday, 19 October 2023.

The meeting objectives were as follows:

- Introduce Tharisa (the proponent) &MC (the appointed EAP).
- Provide project background of the proposed applications.
- Present designs.
- Confirm specialist studies to be undertaken.
- Confirm department's requirements on submission of the EA- WML Application, and EMPr Section 102 amendment.

The DMRE will be consulted throughout the project application phases as follows:

- Acknowledgment of receipt of the application for amendment of an EA in terms of the NEMA and the EIA Regulations of 2014, as amended, and WML in terms of NEMWA, was received on 25 October 2024. The Draft Scoping Report has been finalised, and the Final Scoping Report is being submitted to the DMRE for approval with comments and feedback received from I&APs and authorities.
- A Draft EIA and EMPr Report will also be compiled which will include management measures to avoid, mitigate and manage the potential impacts identified in the Impact Assessment. The report will also be subjected to PPP for another 30 days. Subsequently, the report will be finalised, incorporating comments from I&APs for submission to the DMRE.
- The DMRE will then decide on the submission. The decision will then be communicated to all stakeholders.

15-8 MITIGATION, MANAGEMENT AND MONITORING OF IDENTIFIED IMPACTS

The summary of potential impacts has been indicated in Section 9-2. These impacts require further investigation during the Impact Assessment Phase. Section 15-3 provides an indication of the independent specialist studies, field surveys and assessments that are required to form part of the Impact Assessment Phase. The specialist studies will consider the development footprint proposed for the surface infrastructure, and the MR area as a whole. With this information, the proposed project will be able to fully assess and investigate the feasible and reasonable alternatives proposed in SECTION 6:. The possible mitigation measures that could be applied and the level of risk is depicted Table 52 below.

Table 52: High Level Mitigation Measures for Potential Impacts Identified for the Proposed Project.

Phase	Potential Impact	Aspects Affected	Significance	Mitigation Type	Significance
Construction	Sedimentation of the Sterkstroom River from site clearing.	Freshwater Ecosystems	High Negative	• Minimise through soil management programme. • Appropriate storm water management measures must be implemented as per the SWMP. • Clean upslope runoff must be diverted around construction areas. 108197603	Medium Negative
	Loss of soil resources and land capability due to site clearing and grubbing of the footprint areas associated with the proposed expansion project infrastructure in preparation of the construction activities.	Soil, Land Use and Land Capability	Medium Negative	• Minimise through soil management programme. • Minimise through site clearing procedures. • Appropriate storm water management measures must be implemented as per the SWMP. • Limiting the area of impact to as small a footprint as possible, inclusive of waste management facilities; resource stockpiles and the length of servitudes; access and haulage ways; and conveyancing systems wherever possible. • Separation of the usable soils and ferricrete base materials from each other and from the soft overburden. • Restriction of vehicle movement over unprotected or sensitive areas, which will reduce compaction. • Topsoil to be stripped and stockpiled separately.	Low Negative
	Soil erosion, soil compaction, and loss of topsoil.	Soil, Land Use and Land Capability	Medium Negative		Low Negative
	Benefits resulting from employment programmes and income opportunities created by the mine.	Social	Medium Positive	• Implementation of Tharisa's procurement policy. • Identify and support community development.	High Positive
	Loss of natural vegetation and habitat.	Biodiversity	Medium Negative	• Locate all temporary stockpiles, constructors' camps, laydown areas, ablution facilities etc. • Develop and implement a construction SWMP prior to the commencement of site clearing activities. • Rehabilitate and re-vegetate all disturbed areas as soon as possible following disturbance.	Low Negative
	Dust generation.	Air Quality	Medium Negative	• Control through dust management measures a per the Dust Monitoring Programme. • Regular watering of the site roads. • Dressing off of tip faces, unused roads and disturbed areas. • Minimising unnecessary disturbance of non-construction areas. • Use of chemical additives to control dust to be employed, if necessary, under Best Available Techniques Not Entailing Excessive Cost (BATNEEC) principles.	Low Negative
	Possible impacts to groundwater from seepage.	Groundwater	Medium Negative	• Minimise through soil management programme. • Appropriate storm water management measures must be implemented as per the SWMP. • Minimise hazardous chemical and waste management practices. • Clean upslope runoff must be diverted around construction areas.	Low Negative
	Reduced recharge of groundwater due to increased run-off.	Groundwater	Medium Negative	• Minimise through soil management programme.	Low Negative

Phase	Potential Impact	Aspects Affected	Significance	Mitigation Type	Significance
				• Appropriate storm water management measures must be implemented as per the SWMP.	
	Pollution of the Sterkstroom River from hydrocarbon spills from construction machinery.	Freshwater Ecosystems	High Negative	• Servicing of construction vehicles must take place only in dedicated areas that are equipped with drip trays. • Bunded containment and settlement facilities must be provided for hazardous materials, such as fuel and oil. • Spill-sorb or a similar product must be kept on site, and used to clean up hydrocarbon spills in the event that they should occur. • Water quality monitoring must be undertaken downstream of the construction areas, before and during construction where practical, to detect any increase in suspended solids or turbidity. • Appropriate storm water management measures must be implemented as per the SWMP. • Spill kits to clean up hydrocarbon spills must be available. • Surface water management measures, such as sediment traps and PCDs are to be constructed first to ensure that runoff and dirty water spills are contained.	Medium Negative
	Destruction of wetlands.	Wetlands	High Negative		Medium Negative
	Introduction of AIPs resulting in further alteration of the natural vegetation profiles of freshwater resources.	Biodiversity and Freshwater Ecosystems	Medium Negative	• Control through Alien Invasive Management Plan. • Ensure the removal of any alien invasive vegetation encountered on the construction area. • Regular inspection of established vegetation.	Low Negative
	Alteration of the natural topography of the area, changing its baseline sense of place.	Visual	Medium Negative	• Minimise through mine designs and screening.	Low Negative
	Noise impacts from construction machinery and vehicles.	Noise	Medium Negative	• Control through agreed-upon construction hours. • Regular planned mobile plant maintenance and services, with special attention paid to the maintenance of engine efficiency and silencer effectiveness.	Low Negative
	Loss of heritage/ cultural and paleontological resources.	Heritage, cultural and paleontological resources.	Medium Negative	• Conduct heritage impact assessment to identify heritage sites within the project area. • If any heritage sites are identified, appropriate steps as per the Heritage Resources Act will be undertaken. • Chance find procedure must be implemented.	Low Negative
Operational and Maintenance Phase	Sedimentation of watercourses due to operational activities.	Freshwater Ecosystems, Biodiversity and Wetlands	High Negative	• Minimise through soil management programme. • Appropriate storm water management measures must be implemented as per the SWMP. • Clean upslope runoff must be diverted around construction areas.	Medium Negative
	Soil erosion, dust generation, soil compaction, and loss of topsoil.	Soils, Land Use and Land Capability	Medium Negative	• Minimise through soil management programme. • Appropriate storm water management measures must be implemented as per the SWMP. • Limiting the area of impact to as small a footprint as possible, inclusive of waste management facilities; resource stockpiles and the length of servitudes; access and haulage ways; and conveyancing systems wherever possible.	Low Negative

Phase	Potential Impact	Aspects Affected	Significance	Mitigation Type	Significance
				• Separation of the usable soils and ferricrete base materials from each other and from the soft overburden. • Restriction of vehicle movement over unprotected or sensitive areas, which will reduce compaction. • Topsoil to be stripped and stockpiled separately.	
	Possible impacts to groundwater from seepage and spillages such as hydrocarbons.	Groundwater	High Negative	• Groundwater monitoring. • Appropriate storm water management measures must be implemented as per the SWMP.	Medium Negative
	Reduced groundwater quantity as a result of dewatering for underground mining.	Groundwater	High Negative	• Control through groundwater monitoring programme. • Compensation of impacted landowners where proven to be impacted from mine dewatering.	Medium Negative
	Risk of subsidence.	Water, Biodiversity Soils, Land Use and Land Capability	Medium Negative	• Subsidence monitoring.	Low Negative
	Air pollution through dust generation and gaseous emissions.	Air Quality	Medium Negative	• Minimise through dust management plan. • Minimise through vegetation establishment. • Control through dust management measures a per the Dust Monitoring Programme. • Regular watering of the site roads. • Dressing off of tip faces, unused roads and disturbed areas. • Minimising unnecessary disturbance of non-operational areas. • Use of chemical additives to control dust to be employed, if necessary, under BATNEEC principles.	Low Negative
	Creation of Jobs.	Social	Medium Positive	• Implementation of Tharisa procurement policy. • SLP implementation.	High Positive
	Noise disturbance from operational and maintenance activities.	Noise	Medium Negative	• Control through noise reduction infrastructure. • Control through agreed-upon operational hours. • Regular planned mobile plant maintenance and services, with special attention paid to the maintenance of engine efficiency and silencer effectiveness.	Low Negative
Decommissioning and Rehabilitation Phase	Pollution to surface water from hydrocarbon spillage from rehabilitation equipment.	Surface Water	Medium Negative	• Hydrocarbon management measures. • Appropriate storm water management measures must be implemented as per the SWMP. • Implementation of closure and rehabilitation plans.	Low Negative
	Contamination of surface water resources by AMD.	Surface Water	High Negative	• Decant management based on geochemistry results. • Surface and Groundwater monitoring.	Medium Negative
	Compaction of soil, soils erosion and contamination of soil resources from heavy vehicles.	Soils, Land Use and Land Capability	Medium Negative	• Minimise through soil management programme. • Appropriate storm water management measures must be implemented as per the SWMP.	Low Negative

Phase	Potential Impact	Aspects Affected	Significance	Mitigation Type	Significance
				• Reinstatement of stored soils onto areas of disturbance where infrastructure has been demolished. • Contour and stabilize slopes to be free draining. • Cultivation of growing medium, the planting of required vegetative cover and irrigation if required. • Implementation of closure and rehabilitation plans.	
	Potential for establishment of alien invasive vegetation.	Freshwater Ecosystems, Biodiversity and Wetlands	Medium Negative	• Alien Invasive Management Plan. • Minimise through soil management programme. • Ensure the removal of any alien invasive vegetation encountered on the rehabilitated area. • Regular inspection of established vegetation. • Implementation of closure and rehabilitation plans.	Negligible (Negative)
	Noise disturbance from decommissioning machinery and vehicles (however not expected to impact any receptors).	Noise	Low Negative	• Regular planned vehicle services. • Implementation of closure and rehabilitation plans.	Low Negative
	Increase in dust fallout.	Air Quality	Low Negative	• Use of chemical additives to control dust to be employed, if necessary, under BATNEEC principles.	Low Negative
	Loss of employment and enterprise development opportunities.	Social	Medium Negative	• Develop and implement Labour and Human Resources Plan (LHRP) that addressed the impacts associated with retrenchment, job losses and reduced demand for local goods and services. • Develop a closure plan which will aim to reinforce the objectives of the SLP by reducing the reliance on Tharisa for employment by promoting skills transfer to ensure alternative livelihoods. • Implementation of closure and rehabilitation plans.	Low Negative
	Risk of subsidence.	Water, Biodiversity Soils, Land Use and Land Capability	Medium Negative	• Subsidence monitoring. • Implementation of closure and rehabilitation plans.	Low Negative
	Replenishment of groundwater aquifer.	Groundwater	Medium Negative	• Surface and Groundwater monitoring. • Implementation of closure and rehabilitation plans.	Low Negative

SECTION 16: PARTICULARS OF THE PPP WITH REGARDS TO THE IMPACT ASSESSMENT PROCESS THAT WILL BE CONDUCTED

Refer to SECTION 7: for the PPP to be undertaken throughout the application phases.

16-1 STAKEHOLDER ENGAGEMENT DURING IMPACT ASSESSMENT PHASE

The objectives of public participation during the Impact Assessment Phase are to verify that I&APs issues have been considered in the Impact Assessment, and to comment on the findings of the S&EIR, including the potential negative and positive impacts and the proposed management measures.

MC will compile and announce the availability of Draft EIA and EMPr Report. The report will be subjected to PPP of at least 30 days and will reflect the incorporation of comments received, including any comments of the competent and commenting authorities.

The following processes will be undertaken to announce the Draft EIA and EMPr Report:

- Letters will be sent to all I&APs, written in any of the manners provided for in section 47D of the NEMA, announcing the availability of the Draft EIA and EMPr Report to the municipal councillor of the ward in which the site is situated and any organisation of ratepayers that represent the community in the area, the municipality which has jurisdiction in the area, any organ of state having jurisdiction in respect of any aspect of the activity; and any other party as required by the CA.
- SMS notifications of the availability of the Draft EIA and EMPr Report for public comment will be distributed.
- Four (4) focus group meetings will be held with the adjacent landowners within a 5km radius; community organisations, such as: rate payers associations, HOAs, interest groups, etc.; relevant state departments at local, district, provincial and national levels; ward councillor; NGOs/ various environmental protection agencies/ bodies; and any other party perceived as playing a role within the community/ study area, to discuss the Draft EIA and EMPr Report.
- Telephonic consultation will be undertaken with I&APs to obtain comments about the Draft EIA and EMPr Report.
- The Draft EIA and EMPr Report will be made available on the MC website (https://manyabeconsultancy.com/stakeholder-engagement/); and at the Marikana Public Library; and
- Subsequent to the 30 days' period, all comments and representations received from I&APs will be considered and recorded in the CRR. All I&APs who would have participated in the PPP will be thanked, and their comments acknowledged.

16-2 ANNOUNCEMENT OF THE SUBMISSION OF THE FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT TO THE COMPETENT AUTHORITY

- The Final EIA and EMPr Report will consider and address all comments raised by I&APs, as per the CRR.
- The Final EIA and EMPr Report will be submitted to the DMRE for review and consideration towards a decision.
- All registered I&APs will be notified of the submission and the availability of the Final EIA and EMPr Report on MC website for review and commenting, should they choose to do so.
- Any additional comments will be directed to DMRE and copied to MC.

16-3 NOTIFICATION OF AUTHORITY DECISION

MC will ensure that all registered I&APs are provided with access to the decision and the reasons for such decision. I&APs will be drawn to the fact that appeals may be lodged against the decision in terms of the

National Appeals Regulations of 2014 (GNR. 993), if such appeals are available in the circumstances of the decision. The decision will be advertised through the following methods:

- Personalised letters to individuals and organisations on the stakeholder database; and
- Placement of a newspaper advert in the same local newspaper where the project and the availability of the Draft Scoping Report was announced, translated in both English and Setswana.

16-4 DESCRIPTION OF THE TASKS THAT WILL BE UNDERTAKEN DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The following activities will take place as part of the planned S&EIR process going forward:

- Acknowledgment of receipt of the application for amendment of an EA in terms of the NEMA and the EIA Regulations of 2014, as amended, and WML in terms of NEMWA, was received on 25 October 2024. The Draft Scoping Report has been finalised, and the Final Scoping Report is being submitted to the DMRE for approval with comments and feedback received from I&APs and authorities.
- The Specialists studies will be undertaken, and potential impacts as identified in this Final Scoping Report will be assessed during the Impact Assessment Phase.
- A Draft EIA and EMPr Report will also be compiled which will include management measures to avoid, mitigate and manage the potential impacts identified in the Impact Assessment. The report will also be subjected to PPP for another 30 days.
- Subsequently, the report will be finalised, incorporating comments from I&APs for submission to the DMRE.
- The DMRE will then decide on the submission. The decision will then be communicated to all stakeholders.

SECTION 17: 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

The EMPr will incorporate measures aimed at mitigating and managing impacts of the proposed project. Mitigation measures as prescribed in the approved EMPrs will be incorporated into the EMPr, which will assist in the development of a more effective environmental management tool for Tharisa's current operations.

The updated EMPr will allow for a greater level of alignment between the different EMPrs in terms of management measures and monitoring reporting requirements. Detailed mitigation and management measures for identified positive and negative impacts associated with the proposed **Underground Expansion Project** at East and West mines will be developed and included in the EMPr.

Table 52 above provides high level mitigation measures for potential impacts identified for the proposed project.

SECTION 18: OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

18-1 IMPACTS ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

Table 52 provides high level mitigation measures for potential impacts identified for the proposed project. Detailed mitigation and management measures of potential positive and negative social economic impacts associated with the proposed **Underground Expansion Project** at East and West mines will be developed and included in the EMPr. Extensive specialist work will be conducted which will include incorporation of understanding of the socio-economic environment within the area. This aspect will be further investigated by the appointed Social Impact Assessment specialist during the Impact Assessment Phase.

18-2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NHRA

A HIA screener and Palaeontological Assessment exemption letter will be compiled.

SECTION 19: OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

Not Applicable.

SECTION 20: UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I **Mpho Manyabe**, the EAP responsible for compiling this report, undertake that the information provided in this report is correct, and that the level agreement with I&APs and stakeholders have been correctly recorded and reported in this Final Scoping Report.

It must be noted that the Draft Scoping Report was subjected to PPP for commenting by the general public and state departments in parallel with the submission of the application forms to DMRE. Comments and objections received from stakeholders have been recorded accordingly in this Final Scoping Report.

SECTION 21: STATEMENT OF MC'S INDEPENDENCE

I **Mpho Manyabe**, declare that -

- I act as the independent EAP in this application for the proposed **Underground Expansion Project** at East and West mines.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting EIAs, including knowledge of the relevant Acts, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations and all other applicable legislation, policies and guidelines.
- undertake to disclose to the applicant and the CA all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the CA; and the objectivity of any report, plan or document to be prepared by myself for submission to the CA.
- I will ensure that information containing all relevant facts in respect of the application is distributed or made available to I&APs and the public at large and that participation by I&APs is facilitated in such a manner that all I&APs, state department and CA will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application.
- I will ensure that the comments of all I&APs are considered and recorded in reports that are submitted to the CA in respect of the application, provided that comments that are made by I&APs in respect of a final report that will be submitted to the CA may be attached to the report without further amendment to the report.
- I will keep a register of all I&APs that participated in a PPP; and all the particulars furnished by me in this form are true and correct.
- I will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations.

Signature of the EAP

Date: 13 November 2024

EAP Company: Manyabe Consultancy (Pty) Ltd

SECTION 22: CONCLUSION

This Final Scoping Report has been complied in accordance with Appendix 2 of the NEMA EIA Regulations of 2014, as amended, and provides a description of the proposed project. This report serves to detail the outcome of the scoping assessment requirements for the proposed **Underground Expansion Project**. Various alternatives have been identified, with a couple being carried through for investigation in the Impact Assessment Phase of the S&EIR process, due to the need for specialist assessment and input. Further investigations are required to fully characterise the receiving environment as well as to investigate the potential negative and positive impacts associated with the proposed project. The Draft Scoping Report was subjected to PPP for review by all identified I&APs. All comments received during the review of the Draft Scoping Report have been incorporated into this Final Scoping Report for submission to the DMRE for approval.

The Draft Scoping Report was subjected to PPP for commenting by the general public and state departments in parallel with the submission of the application forms to DMRE. Comments and objections received from stakeholders have been recorded in this Final Scoping Report accordingly.

The following activities will take place as part of the planned S&EIR process going forward:

- Acknowledgment of receipt of the application for amendment of an EA in terms of the NEMA and the EIA Regulations of 2014, as amended, and WML in terms of NEMWA, was received on 25 October 2024. The Draft Scoping Report has been finalised, and the Final Scoping Report is being submitted to the DMRE for approval with comments and feedback received from I&APs and authorities.
- The Specialists studies will be undertaken, and potential impacts as identified in this Final Scoping Report will be assessed during the Impact Assessment Phase.
- A Draft EIA and EMPr Report will also be compiled which will include management measures to avoid, mitigate and manage the potential impacts identified in the Impact Assessment. The report will also be subjected to PPP for another 30 days.
- Subsequently, the report will be finalised, incorporating comments from I&APs for submission to the DMRE.
- The DMRE will then decide on the submission. The decision will then be communicated to all stakeholders.

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APPENDICES

APPENDIX 1: LOCALITY MAP, MASTER PLAN; LAYOUT PLAN AND OTHER SITE MAPS

APPENDIX 2: AUTHORITY CORRESPONDENCE

APPENDIX 3: PUBLIC PARTICIPATION PROCESS

APPENDIX 4: EAP DETAILS (CV, QUALIFICATIONS AND REGISTRATION BODIES CERTIFICATES)

APPENDIX 5: EXISTING APPROVALS