ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE MODIKWA PLATINUM MINE SOUTH 3 OPENCAST MINING PROJECT: WATER USE LICENSE AND ENVIRONMENTAL AUTHORIZATION APPLICATION ON FARM WINTERVELD 293 KT SITUATED WITHIN THE SEKHUKHUNE DISTRICT MUNICIPALITY, LIMPOPO PROVINCE.

DRAFT EIA and EMPR Report

Report Prepared for:

MODIKWA
PLATINUM MINE

Report Prepared by:

Segope Water & Environmental Services

Date: September 2024

mineral resources & energy

Department:
Mineral Resources and Energy
REPUBLIC OF SOUTH AFRICA

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR LISTED ACTIVITIES ASSOCIATED WITH THE ENVIRONMENTAL AUTHORISATION FOR THE PROPOSED MODIKWA PLATINUM MINE SOUTH 3 OPENCAST MINING AND ASSOCIATED INFRASTRUCTURES.

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

NAME OF THE APPLICANT	: Modikwa Platinum Mine
TEL NO.	: 013 230 2031
POSTAL ADRESS	: Private Bag X9120, Driekop, 1129
PHYSICAL ADRESS	: 292 KT Onverwacht Hill, Steelpoort region, Mpumalanga 1129
DMR REFERENCE NUMBER	: LP30/5/1/2/3/2(129MR)

PROJECT INFORMATION:	
EIA & EMPR Report	Application for an Environmental Authorisation combined with a Water Use License Application (WULA) for the Modikwa Platinum Mine South 3 opencast mining at Fetakgomo-Tubatse Local Municipality within the Sekhukhune District Municipality, Limpopo Province.
Competent Authority	Limpopo Department of Mineral Resources & Energy (DMRE)
Reference No.	LP30/5/1/2/3/2(129MR)
Applicant	Modikwa Platinum Mine
Consultants	Segope Water and Environmental Services
Report Type	EIA & EMPR
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Where site inspections, testing or fieldwork have taken place, the report is based on the information made available by Segope Consulting during the visit, visual observations and any subsequent discussions with regulatory authorities. The data and information used in this report were provided to Segope Consulting by the client and also referred to other outside sources (including historical site investigation information and third-party expert research).

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IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others, the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014(as amended in April 2017), any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is, therefore, an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

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

OBJECTIVES OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The objective of the environmental impact assessment process is to, through a consultative process-

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location development footprint on the approved site as contemplated in the accepted scoping report;

(c) identify the location of the development footprint within the preferred approved site as contemplated in the accepted scoping report based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified

development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the —

(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

(ii) 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;

(e) identify the most ideal location for the activity within the preferred development footprint of the approved site as contemplated in the accepted scoping report based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity;

(g) identify suitable measures to avoid, manage or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

EXECUTIVE SUMMARY

Background

Modikwa Platinum Mine (hereafter referred as 'MPM') has appointed Segope Water and Environmental Services (hereafter referred as 'Segope Consulting') as an independent consulting company, to carry out a full Scoping and Environmental Impact Assessment (S&EIA) process to assess any potential environmental, social and economic impacts of the proposed opencast mining project. Segope Consulting has lodged an application for an Environmental Authorization (EA) for the opencast mine in the Sekhukhune District Municipality (SDG) under the Fetakgomo-Tubatse Local Municipality (FTLM) in Limpopo Province with Department of Mineral Resources and Energy (DMRE) file reference: LP30/5/1/2/3/2(129MR). In addition to the EA applications, a Water Use License with reference number WU37864 was applied to the Department of Water and Sanitation (DWS).

MPM is located approximately 20 km west of Burgersfort and 18 km north of Steelpoort on the Eastern Limb of the Bushveld Complex, situated in the FTLM within the SDM of the Limpopo Province. MPM's Mining Right area includes portions of the farms: Maandagshoek 254 KT, Driekop 253 KT, Hendriksplaats 281 KT, Onverwacht 292 KT and Winterveld 293 KT.

MPM is proposing to develop opencast mining activities on Farm Winterveld 293 KT and holds a Prospecting Right over the mining right application area. Access to the South 3 project area will be through a haul road from the South 2 shaft and/or through the tarred road that joins Mahlakwena and Tukakgomo then the road joins R555.

This Environmental Impact Assessment (EIA) and Environmental Management Programme (EMPR) has been compiled in terms of the provisions of Appendix 3 and 4 of the National Environmental Management Act (NEMA, Act 107 of 1998) EIA Regulations of 2014, as amended, as well as the requirements of the EIA and EMPR template issued by the DMRE.

The South 3 Project commenced on the 2nd of January 2024 with the pre-application consultation, where meetings were held with the affected communities and tribal houses of the affected farm to inform them about MPM's intentions to apply for an EA over Farm Winterveld 293KT. The application was lodged at the Limpopo Department of Mineral Resources and Energy (DMRE) on the 8th of April, 2024.

Prior to the EIA phase and the compilation of the EIA/EMPR report, the scoping phase was conducted, and all comments received during the scoping public participation process were incorporated into the final scoping report which was submitted for approval to the DMRE. The DMRE issued a letter of acceptance of the scoping report on the 5th of July 2024 and the requirements contained in that letter have been addressed in this report.

Most of the information contained in this draft report is the information collected during the scoping phase of the application and the Impact Assessment at South3. This report will be updated following the EIA phase Public Participation Process (PPP). The full EIA process includes the assessment of potential environmental and socio-economic impacts, further investigations by specialists in their respective fields, and the undertaking of the legislated required participation with interested and affected parties.

Project Description

The extent of the project site at farm Winterveld 293 KT encloses an area of approximately 282 hectares, and a mining right may not exceed a period of 30 years. South 3 Opencast operation is an extension of the existing MPM operations. An application is being made to amend the current environmental authorisation to include proposed additional mining-related infrastructure and activities associated with the Opencast. The key components of the proposed infrastructures associated with the proposed amendment include:

- Opencast pit for extraction of the ore-bearing materials,
- A waste rock dump for the storage of waste rock generated at the South 3 Opencast,
- Pollution Control Dams,
- Offices and associated infrastructure,
- Haul road connecting the existing South 2 Shaft with the South 3 Opencast,
- Septic Sewage System,
- Stormwater management infrastructure,
- Disturbances of the Tubatsane River's un-named tributaries during the development of the haul road.

From the first site visit that was conducted on the 14th of March 2024, it was noted that the site area, where undisturbed, is dominated by bushes and shrubs. Assuming that all phases of the project adhere to the mitigation and management commitments stipulated in this EIA and EMPR, the EAP believes that significant impacts identified during the assessment can be mitigated and managed to reduce their level of significance and that impacts can be managed effectively by implementing the suggested mitigation strategies.

Project Need and Desirability

The existing authorized South 2 Shaft, with its approved infrastructure, has been identified as the most viable option as a replacement for South 1 Shaft to effectively maintain the Life of Mine (LOM) for MPM until approximately 2040. However, the current metallurgical plant is being operated far below its design capacity due to a shortage of ore materials. Thus, the South 3 Opencast Project provide the required material to minimize this gap and thus provide the much-needed economic benefits in the area which is prone to a high unemployment rate.

A further number of benefits associated with the proposed South 3 Opencast Project have been identified by MPM which include:

- Exploiting the natural mineral resources as appropriate under the MPRDA;
- Creation of employment opportunities;
- Retaining and the possible creation of employment opportunities on local and regional scale during the operational phase; and
- Continued long-term supply of platinum ore for further processing to the existing MPM processing plant and Polokwane Smelter.

Alternatives Considered

The following alternatives were taken into account during the pre-feasibility phase of this project:

- Accessing the orebody without the need for an Opencast mining method;
- Utilization of existing infrastructure such as roads;
- Utilization of existing waste rock dumps versus the establishment of a new one;
- Location – where is the best location for specific project infrastructure;
- Method of Transportation – transportation of ore via conveyor or haul road to the plant and;
- No-go Option – the option for the proposed South 3 Opencast development not to take place at all.

Summary of the Baseline Environment

The baseline environment was assessed during each of the specialist studies undertaken as part of the environmental assessment process. This was to determine the current status of the environment surrounding the proposed South 3 Opencast. The baseline environment associated with the South 3 is broadly summarized below with detailed baseline descriptions for each of the environmental aspects discussed in **Section 9**.

Geology and Topography - The geology of the area underlying the MPM South3 area consists mainly of the Critical and Main Zones of the Rustenburg Layered Suite of the Bushveld Igneous Complex. The topography of the proposed South 3 area is extremely rugged, dominated by gentle slopes and mountains on the north and northeastern sides with a broad relatively flat land towards the south and southwest.

Land Use and Climate - The proposed project site is predominately a naturally vegetated area, covered mainly by natural wooded grasses, with areas along the water courses eroded. The effects of the historical land uses are evident in the project area, with both erosion and compaction having impacted the soil resource and the capability of the land. The regional climate of the project area is classified as a warm to hot climate with relatively high humidity in summer, and average daily temperatures varying from 32°C in January to 24°C in July. Rainfall occurs mostly between November and April with the highest rainfall during January. The prevailing wind direction is mostly from the south-southeast to north-northwest.

Soils and Land Capability - The study area is primarily characterised by soils of Mispah/Glenrosa, Coega, and Rocky Outcrops formation in the crest. In the midslope positions, the soils of the Bonheim/Abbotspoort and the Inhoek/Dundee formations were identified in the valley bottom. The type of soils identified within the study area render it largely suitable for grazing and wildlife purposes due to the dominance of the shallow soils and rocky outcrops. The soils of moderate potential, such as the Bonheim/Abbotspoort, will require extensive management strategies to be cultivated due to the inherent soil properties associated with these soils. However, the loss of moderate potential agricultural soils and the permanent change in

land use (for the lifespan of the MPM south3 open cast and associated infrastructure) will be localised within the study area.

Biodiversity - The proposed site falls into the Sekhukhune Plains Bushveld vegetation type; it is also surrounded by the Sekhukhune Mountain Bushveld. The vegetation present within the project area consists of those belonging to the Sekhukhune Mountain Bushveld and Sekhukhune Plains Bushveld types. Three habitat units were identified within the project area during the field assessment and are the Transformed, Riparian and Sekhukhune Mountain Bushveld habitats. No red data species were identified.

Wetland Delineation-The wetland delineation study determined the wetlands and river resources to be limited to one type of Hydrogeomorphic unit. No wetlands were found according to this study in the proposed South 3 area.

Surface Water - The main surface water features associated with the South 3 project area are the perennial Tubatsane and the non-perennial Mofafa river catchments. Surface water drainage around the South 3 project area flows via several unnamed ephemeral tributaries and drainage lines and is generally in a south-westerly direction at the project site to joins the Steelpoort River, also known as Tubatse River.

Hydropedology - The study area is primarily characterised by soils of Mispah/Glenrosa, Coega and Rocky Outcrops types in the crest and in the midslope positions, the soils of Bonheim/Abbotspoort, and along the valley bottom, the soils of Inhoek/Dundee type were identified. Water either infiltrates via the preferential flow paths created by the tree roots or flows downslope as overland flow, as these areas can saturate quickly due to limited storage capacity. The potential impacts from the proposed development will likely pertain to the impacts experienced once the land is excavated for the development of the opencast pits, waste rock dump and the associated access road. Appropriate mitigation measures, such as diverting clean water back into the nearby watercourses, are deemed necessary to ensure functionality during all phases of development.

Groundwater – Twenty-two boreholes inclusive of monitoring and privately owned abstraction boreholes have been identified within a radius of 2 km around the South 3 infrastructure and the proposed new WRD. Groundwater depths ranging between 1.43 and 22.85 metres below the surface were found. The project area is situated on intergranular (weathered) and fractured rock aquifers, indicating a very permeable water aquifer. Recommendation to protect the groundwater resource have been made based on the Geohydrological Impact Assessment.

Air Quality - With regards to air quality, the main sources likely to contribute to cumulative particulate impact are the surrounding mining operations, agricultural activities, as well as vehicle entrainment on unpaved road surfaces and household and biomass burning. Numerous individual homesteads are located within and around the proposed project area. Larger residential areas include Steelpoort and Burgersfort (located approximately 3.5 km to the east and 16 km east of the project area respectively). The proposed activities at the South 3 Opencast Project in the author's reasoned opinion, can proceed provided the recommendations in this Report are implemented. Recommendations have been made based on the dispersion modelling results.

Noise - It is concluded that the proposed activities at the MPM will have minimum impact on the ambient noise levels at the nearest noise-sensitive receptors. The proposed mining activities measuring above the SANS guidelines for rural districts will be limited to the project site. Successful noise management should be based on the fundamental principles of precaution, the polluter pays and prevention.

Visual- A broad-scale assessment of visual sensitivity, based on the physical characteristics of the overall study area, economic activities and land use that predominates, determined that the area would have a **LOW** visual sensitivity. This was mainly due to the close proximity of the study area to agricultural activities, mining and housing which degrades the local visual resources. Another important factor contributing to the visual sensitivity of an area is the presence or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. Receptors likely to be impacted by the proposed development are the nearby property owners, people travelling on the R555 Road and residents of the various towns surrounding the development.

Cultural Heritage - Areas of cultural and heritage importance such as graves and archaeological remains have been identified within the regional area, and some are in close proximity to the proposed position of the WRD and open-pit areas. The proposed project therefore needs to receive comments from SAHRA and implement the mitigation measures.

Socio-Economic - The Zone of Influence (ZOI) is the area within which a project has impacts or influence. Typically, the social ZOI is unique to each project and is larger than the actual project footprint which is comprised of the mine lease area or land used for mining and mining-related infrastructure. The zone of the primary physical impact caused by the operation includes the operation's primary site(s) and associated mine-managed infrastructure such as roads. The mine is located on land leased from the Samancor Chrome Mine. Samancor and the neighbouring communities therefore were identified as stakeholders in the zone of primary physical impact.

Stakeholder Engagement Process

The stakeholder engagement process undertaken for this project aimed to comply with the relevant legislative requirements of the various environmental authorisation processes, namely the EIA process in terms of NEMA, EMP in terms of MPRDA and the WULA in terms of the NWA. Details relating to the specific stakeholder engagement activities including introductory meetings, announcement of the project, focus group meetings, and availability of draft and final reports are included in **Section 8** of this report.

Summary of Key Components Raised by Stakeholders

Stakeholders raised several components during the engagement process and these have been addressed in the EIA/EMPR. The key components raised include the following:

- Environmental authorisation process
- Cultural heritage and graves
- Water quality and quantity
- Blasting Impact Issues
- Water Use Licence Application (WULA)

- Land claims
- Management measures
- Access
- Future mine planning
- Social Labour Plan
- Community benefits
- Recruitment
- Local customs and protocols

Summary of Impact Assessment

A summary of the footprint areas that will be disturbed due to the construction and operation of the proposed infrastructures is given below. All infrastructures will be located on farm Winterveld 293 KT. The proposed infrastructures and their areas are:

- South 3 Opepits;
- Waste Rock Dump;
- South 3 Opencast offices, workshops, and stores;
- Change houses;
- Salvage transfer yard;
- Wash bay and service area;
- Parking area;
- Fuel and material storage and handling facilities;
- Explosive storage and waste explosive materials and packaging destruction areas;
- Access roads;
- Topsoil stockpile areas;
- Electricity provision and distribution facilities;
- Security;
- Stormwater management infrastructure;
- Pollution control dams; and
- Septic sewage system

A total of approximately 282 ha might be disturbed during the operation and construction of the mentioned infrastructures. During the assessment phase, the cumulative impact associated with the proposed project was assessed and determined to be of Moderate significance, however, through the implementation of the mitigation measures, the overall impact significance of the proposed activities can be lowered to Low. The table below provides a summary of the potential impacts associated with the proposed project as well as the proposed mitigation measures.

Summary of potential Impacts and proposed mitigation measures

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
Surface and groundwater		
Ground and surface water contamination	Negative	➢ Vegetation clearance and the exposure of soils must be kept to an absolute minimum. ➢ Temporary erosion control measures (e.g., sediment nets, berms, etc.) must be employed around working areas. ➢ The recommended water quality monitoring programme must be implemented at least a year before construction, to obtain a suitable baseline for the wet and dry seasons. ➢ Erosion and sediment control, as well as the containment and management of dirty water runoff, are the most important aspects of preventing negative impacts on the Tubatsane and Mofafa Rivers. ➢ Energy dissipation measures need to be implemented at steep sections as well as at the exits of the proposed stormwater channels. ➢ Sufficient freeboard in the Pollution Control Dams (PCDs) and other dirty water dams must be ensured at all times. The dams must be strictly managed following GN704 regulations. ➢ The construction of suitably sized PCDs should be investigated. ➢ Dirty water must not be discharged to the environment. Excess water within the mine water circuit must be appropriately dealt with, in agreement with the DWS. ➢ It is recommended that runoff is diverted off the roads through suitably spaced berms. ➢ Suitably sized culverts will be placed where linear infrastructure crosses the minor non-perennial drainage lines. ➢ Post-mine closure rehabilitation must ensure that erosion prevention is adequate for the long term. **<u>The following mitigation measures are recommended in the operation phase:</u>** • The numerical model should be recalibrated as soon as more hydrogeological data such as monitoring holes are made available. This would enhance model predictions and certainty. • It is recommended that there should be regular testing or monitoring of surrounding soil, and

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		water resources to detect any change in chemistry so that remedial measures are implemented in time. • Throughout the existence of the project, the chemical and physical parameters of the water samples should be tested and compared with the SANS 241: 2015 standards. • There should be soil, water resources and land pollution mitigation measures on-site. • Wastewater sources should be identified, and mitigation measures put in place to prevent groundwater contamination. • Regarding the stockpile, there should be regular monitoring of any heavy metal which could be exposed, as such could result in leaching during rainfall. • According to section 21(S21) of the National Water Act 36 of 1998, if a proposed project triggers any of the listed S21 activities, a Water Use Licence (WUL) should be applied for. • For this project, there will be activities which include abstraction of water from groundwater, dust suppression, dewatering, and Run of Mine (ROM) stockpiles. Thus, a water use license has been applied for. • It is recommended that compliance of relevant legislations be ensured, NEMA Act 107 of 1998, NWA Act 36 of 1998, NEM: waste Management Act 59 of 2008. • It is recommended that during the existence of the project, there should also be regular maintenance of ablutions, to avoid leakage of waste into the ground. • There should be boreholes in and around the mining right area, to monitor the groundwater quality and quantity.
Geomorphology	Negative	➢ Include environmental awareness aspects into the site induction program to ensure all staff are aware of the location and importance of habitats. ➢ Establish emergency response measures and a clearly defined chain of communication to rapidly deal with any unforeseen impacts to the watercourses, e.g. spills. ➢ No stockpiling of the material may take place within the watercourse areas and temporary construction camps and infrastructure should also be located outside the watercourse footprint. ➢ Regular cleaning up of the watercourse areas should be undertaken to remove litter. ➢ Design and implement a construction stormwater management plan that aims to

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		minimize the concentration of flow and increase flow velocity, as well as minimize sediment transport off-site. ➢ Where practically possible, the major earthworks should be undertaken during the dry season (roughly from April to August) to limit erosion due to rainfall runoff. ➢ Store and handle potentially polluting substances and waste in designated, bunded facilities. ➢ Waste should be regularly removed from the construction site by suitably equipped and qualified operators and disposed of in approved facilities. ➢ Locate temporary waste and hazardous substance storage facilities a minimum of 100m from any watercourse edge. ➢ Keep sufficient quantities of spill clean-up materials on site.
Potential reduction of catchment yield of the aquifers through dewatering	Negative	➢ Regularly monitor groundwater levels as per the recommendations of the geohydrological report.
Excavated materials that are stockpiled in incorrect areas can interfere with natural drainage, and cause sedimentation and water pollution.	Negative	➢ The areas excavated must have been vegetated. ➢ Berms to separate dirty and clean water systems and serve as an erosion control measure should be constructed. ➢ The stockpiles must be vegetated to prevent erosion and subsequent siltation of clean and dirty water streams, as well as surface water resources. ➢ Upslope diversion and down-slope silt containment structures should be constructed. ➢ Surface water resources must be monitored pre-mining and during construction, as per the monitoring programme.
Terrestrial Ecology		
Not rehabilitating the disturbed areas to allow for agriculture.	Negative	➢ Since rivers are highly sensitive areas or no-go areas, no mining should occur within 100m of the identified river without determining the conditions for WUL from the DWS to avoid unnecessary disturbance of water resources. ➢ The identified water resources provide habitat for aquatic animals, water sources for

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		livestock, and form part of the sources of freshwater in South Africa. Since wetlands and rivers are highly sensitive areas or no-go areas, no mining should occur within 500 m of the identified wetlands and 100 m from the identified rivers without determining the conditions for WUL from the DWS. ➢ Proper rehabilitation and after-care of the disturbed area during mining should take place to prevent colonization by invader species. ➢ All mitigation measures proposed in this report must be implemented during all phases of the proposed project. ➢ It is recommended that the management measures stipulated in this report be included in the proposed project's official EMPR and that these be assessed for efficacy during all phases of the project and adapted accordingly to ensure minimal disturbance of the study area ecology.
Geology and Soils		
Land use change will affect the soil and land use capability both during the construction phase and post-mining operations. Loss of agricultural soils and land expected.	Negative	➢ To minimize effects, mining operations must be situated on the ground with low- to medium potential for agriculture. ➢ Affected land owners will be compensated as agreed by the mine and the affected parties. ➢ Wherever possible, restore areas damaged by mining so they may be used as agricultural land. If not, additional land uses that are regarded socially, economically, or ecologically appropriate throughout the decommissioning period must be taken into account. ➢ Stormwater management should be implemented daily throughout the site establishment/construction phase. ➢ Minimize the period of exposure to soil disturbances through a planning schedule. ➢ Bulk delivery of materials should be maximized to reduce the frequency of deliveries. ➢ Implementation of waste management during the construction phase and throughout the mining operation. ➢ Soils will be stripped according to the soil types and recommended depths.
Hydrocarbon spills can occur	Negative	➢ Prevent any spills from occurring. ➢ If a spill occurs, it is to be cleaned up immediately and reported to the appropriate

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
when using heavy machinery, as they all use oils and diesel to run. There is a chance of these breaking down and/or leaking during construction activities of roads, removal of topsoil and digging excavations for building and plant foundations. Contamination of area with hydrocarbons or hazardous waste materials.		authorities. ➢ All storage areas (for fuels and lubricants) will be compacted and have bunded containers to prevent soil pollution and appropriate oil separators installed. ➢ Water runoff traps should be constructed at the vehicle service sites to prevent polluted water runoff into areas that are not impacted. ➢ All vehicles are to be serviced regularly in a correctly bunded area. ➢ Hydrocarbon management procedure to contain details of emergency clean-up procedures and, ➢ Leaking vehicles will have drip trays placed under them where the leak is occurring
Storage of topsoil	Negative	➢ The topsoil will be stripped and loaded onto a dump truck. ➢ Topsoil will be stripped from all areas where physical surface disturbance will occur and stored at a designated area for future topsoil backfilling. ➢ Topsoil is to be stripped when the soil is dry (as far as practical possible), to reduce compaction; and ➢ To be stripped according to the stripping guideline and management plan, contained within this report and further recommendations contained within the rehabilitation plan and stockpiled accordingly. ➢ The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate. ➢ Ensure stockpiles are placed in a free-draining location to limit erosion loss. ➢ The movement of heavy vehicles should be limited to existing roads and be limited to areas where construction of haul roads is to take place. ➢ Compaction of the removed topsoil should be avoided by prohibiting traffic on stockpiles. ➢ Prevent unauthorized borrowing of stockpiled soil. ➢ Minimize the period of exposure to soil disturbances through a planning schedule ➢ The stockpiles will be vegetated where the natural establishment of vegetation by the

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		naturally occurring vegetation is not sufficient to reduce the risk of erosion.
Pollution		
Waste Management/Pollution Control	Negative	➢ Completely remove all the waste material from the site and transport it to another location for treatment and proper disposal. This so-called off-site solution is usually the most expensive option. An alternative is on-site remediation, which reduces the production of leachate and lessens the chance of groundwater contamination. On-site remediation may include temporary removal of the hazardous waste, construction of a secure landfill on the same site, and proper replacement of the waste. It may also include treatment of any contaminated soil or groundwater. Treated soil may be replaced on-site and treated groundwater returned to the aquifer by deep- well injection. ➢ A less costly alternative is full containment of the waste. This is done by placing an impermeable cover over the hazardous-waste site and by blocking the lateral flow of groundwater with subsurface cut-offs walls. It is possible to use cut off walls for this purpose when there is a natural layer of impervious soil or rock below the site. The walls are constructed around the perimeter of the site, deep enough to penetrate to the impervious layer. They can be excavated as trenches around the site without moving or disturbing the waste material. The trenches are filled with bentonite clay slurry to prevent their collapse during construction, and they are backfilled with a mixture of soil and cement that solidifies to form an impermeable barrier. Cut-off walls thus serve as vertical barriers to the flow of water, and the impervious layer serves as a barrier at the bottom.
Socio-economic		
Recruitment strategies for the mine	Positive	N/A
Advantage to previously disadvantage individuals	Positive	N/A

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
Community development programmes	Positive	N/A
Upgrades and expansion of services will benefit local area	Positive	N/A
Increased income generation for local community	Positive	N/A
Increased job opportunities for local mining communities	Positive	N/A
Economic injection to the area and Limpopo	Positive	N/A
Noise		
Noise emanating from heavy machinery and transport vehicles	Negative	➢ Noise barriers in the form of berms should be constructed as close to the noise sources as possible. ➢ Mining-related machines and vehicles must be serviced regularly to ensure noise suppression mechanisms are effective, e.g. installing exhaust mufflers where possible. ➢ Noisy machinery must be used predominately during daylight hours. ➢ A grievance mechanism to record complaints should be kept on-site and investigated. ➢ Regular monitoring of noise to take place.
Noise from blasting	Negative	Blasting operations are generally intermittent and should be limited to the day when ambient noise levels are highest.

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
Infrastructure (e.g. contractor's yard, weighbridge, workshop and stores)	Negative	➢ To reduce the visual impact of permanent structures, colors for roofing, walls, etc. should have a matt finish to reduce reflection. ➢ Infrastructure must be located away from sensitive and elevated areas.
Location of stockpiles, pollution control dams and discard dumps	Negative	➢ Place as far away as possible from roads and settlements. ➢ Topsoil stockpiles must be vegetated as soon as possible, to reduce erosion and decrease visual disturbance. ➢ Keep stockpiles as low as possible to reduce visual impact. ➢ Plant fast-growing indigenous trees around the dams to enhance visual.
Lighting pollution	Negative	➢ Avoid up-lighting of structures but rather direct the light downwards and focused on the object to be illuminated. ➢ Use non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators specifically in the site camps.
Heritage and Cultural		
Heritage resources disturbed/destroyed	Negative	➢ From an archaeological and heritage point of view, the proposed Environmental Authorization may be approved subject to mitigation measures implemented on the identified burial sites. ➢ It should be noted that according to the area screening report generated, the area of interest is of relatively high theme sensitivity. And during a site visit graves were identified on site. ➢ The planners for the proposed mine must provide for a 100m buffer zone for the recorded burial sites or the burial sites must be dealt with according to the South African Heritage Resources Agency. ➢ No heritage mitigation work is allowed without the consent of descendant families. ➢ The EA application may be approved to proceed as planned under the observation that
Paleontologicalsites disturbed/destroyed	Negative	
Cultural places disturbed/destroyed	Negative	

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		project work does not extend beyond the surveyed site. ➢ Recorded buildings and structures should be preserved in situ in accordance to section 34 of the NHRA. ➢ A 100m buffer zone should be provided to protect the identified building structures unless instructed to do otherwise by the relevant authorities. ➢ Should chance archaeological materials or human burial remains be exposed during subsurface mining work on any section of the proposed development laydown sites, work should cease on the affected area and the discovery must be reported to the heritage authorities immediately so that an investigation and evaluation of the finds can be made. ➢ The overriding objective, where remedial action is warranted, is to minimize disruption in mining scheduling while recovering archaeological and any affected cultural heritage data as stipulated by the NHRA regulations. ➢ Subject to the recommendations herein made and the implementation of the mitigation measures and adoption of the project EMPR, there are no other significant cultural heritage resources barriers to the proposed mining development. The Heritage authority may approve the EA application to proceed as planned with special commendations to implement the recommendations here in made. ➢ If during development, operational or closure phases of this project, any person employed by the applicant, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance, work must cease at the site of the find and this person must report this find to their immediate supervisor, and through their supervisor to the site manager. ➢ The site Manager must then make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area before informing an archaeological practitioner.

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		➢ It is the responsibility of the applicant to protect the site(s) from publicity (i.e., media) until a mutual agreement is reached. Noteworthy that any measures to cover up the ➢ suspected archaeological material or to collect any resources is illegal and punishable by law. In the same manner, no person may exhume or collect such remains, whether of recent origin or not, without the endorsement by MPHRA. ➢ The applicant is reminded that unavailability of archaeological materials (e.g., pottery, stone tools, remnants of stonewalling, graves, etc.) and fossils does not mean they do not occur, archaeological material might be hidden underground, and as such the client is reminded to take precautions during mining. ➢ Overall, impacts to heritage resources are not considered to be significant for the project receiving environment. It is thus concluded that the project may be cleared to proceed as planned subject to the Heritage Authority ensuring that detailed heritage monitoring procedures are included in the project EMPR for the mining phase, include chance archaeological finds mitigation procedure in the project EMPR). ➢ The findings of this report, with approval of the MPHRA, may be classified as accessible to any interested and affected parties within the limits of the laws.
Traffic		
Increased traffic volumes on the existing road networks	Negative	➢ It is expected that workers will use both private and public transport and the proposed development of the project can be supported from a traffic flow point of view with provision being made on site to accommodate the safe loading and off-loading of staff using public transport as well as an in-house traffic management plan.
Blasting and Vibration		
Blasting and vibration	Negative	➢ Blast designs can be reviewed before the first blast is planned and done. Site conditions may change, or present certain difficulties not envisaged now. This will confirm if planned

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		designs are applicable and expected outcomes are still within acceptable norms and standards. ➢ The current proposed stemming lengths used provides for some control on fly rock. Consideration can be given to increase this length for better control. Specific designs where distances between blast and point of concern are known should be considered. Recommended stemming length should range between 20 and 30 times the blasthole diameter. In cases for better fly control this should range between 30 and 34 times the blast holes diameter. Increased stemming lengths will also contribute to more acceptable air blast levels. ➢ Calculated minimum safe horizontal distance is 500m. The final blast designs that may be used will determine the final decision on safe distance to evacuate people and animals. This distance may be greater pending the final code of practice of the mine and responsible blaster's decision on safe distance. The blaster has a legal obligation concerning the safe distance and he needs to determine this distance. ➢ During blasting care must be taken to ensure all people and animals cleared to outside the unsafe area as determined by the blaster. ➢ A further consideration of blasting times is when weather conditions could influence the effects yielded by blasting operations. It is recommended not to blast too early in the morning when it is still cool or when there is a possibility of atmospheric inversion or too late in the afternoon in winter. Do not blast in fog. Do not blast in the dark. Refrain from blasting when wind is blowing strongly in the direction of an outside receptor. Do not blast with low overcast clouds. These 'do nots' stem from the influence that weather has on air blast. The energy of air blast cannot be increased but it is distributed differently and therefore is difficult to mitigate. It is recommended that a standard blasting time is fixed. ➢ Video of each blast will help to define if fly rock occurred and from were. Immediate mitigation measure can then be applied if necessary. The video will also be a record of blast conditions.
Safety		

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
Blasting	Negative	➢ Clearly demarcated areas and erect signs to indicate blasting zones.
Roads and vehicles	Negative	➢ Speed limits must be in place on site and before access roads on a provincial or national road. ➢ Ensure drivers are trained in road safety.
Surrounding neighbours	Negative	➢ Personnel are not permitted on other property without permission. ➢ Avoid conflict with surrounding landowners. ➢ Safety specialist will be appointed, and assessments will be conducted. Recommendations will be implemented.
Air Quality		
Dust pollution	Negative	➢ The removal of vegetation will be minimized during stripping to reduce the effects of dust pollution as a result of exposed soil. ➢ Water or dust control agents must be used in working areas, and roads will be sprayed for dust suppression on a regular basis in designated susceptible areas during heavy usage. ➢ Dust monitoring must be undertaken in accordance to the monitoring programme. It is recommended that topsoil stockpiles be vegetated to sustain biological components and prevent dust emissions. ➢ Reduction of dust fallout levels and particulate matter. ➢ All magnesite, vermiculite, iron & vanadium haul trucks must be covered by a tarpaulin.
Geotechnical Investigation		
Mine Infrastructures Development	Negative	The geo-technical report provided a general overview of the prevailing geotechnical conditions on the site, to guide decision-making with regards to the proposed Mine infrastructures establishment including foundation and structural designs. The classifications were based on desk study information and fieldwork. ➢ A wide range of geotechnical conditions were evaluated to characterize the site into prevailing geotechnical zones.

Impact	Impacts'status before mitigation	Proposed mitigation/improvement measures/ recommendations
		➢ Results from the investigation (incorporating previous investigations, soil profiling, and general field investigation results), confirm that the underlying bedrock is sequentially covered by weathered rock, residual soil, and transported soil. ➢ Earthwork activities will need to be carried out strictly in accordance with the current SANS 1200 guidelines to ensure safe working procedures and maintain stability of the site. ➢ The topography of the site comprises of flat slopes exhibiting an undulating surface expression with an average gradient of less than 3.6% (2.06°) towards the east. ➢ The project area is not subject to the formation of sinkholes and subsidence's due to the occurrence of water-soluble rock types (i.e., dolomite or limestone). As such, the area is classified as 'non-dolomitic.

Closure and Rehabilitation

The main activity that takes place during this phase of the project is the demolition and removal of certain mining-related infrastructure. The potential impacts associated with demolition activities are similar to the anticipated impacts to occur during the construction phase. The impacts and mitigation measures have been identified during the discussions of the construction activities. **Section 12.3** of this report gives details relating to closure and rehabilitation.

Post Closure

This is a period of maintenance and monitoring of the areas that would have been associated with the various project-related structures and infrastructure. The activities are limited to monitoring activities and limited erosion and vegetation repair if necessary. It is not anticipated that any significant impacts will arise during this period. Please refer to **Sections 12, 17 and 18** for specific post-closure measures relating to monitoring and closure objectives.

Environmental Management

In terms of the South 3 opencast project, all negative environmental impacts identified will be managed and mitigated whilst positive impacts will be enhanced through the implementation of the commitments stipulated in the EMPR. MPM will be responsible for ensuring that all environmental obligations pertinent to the South 3 opencast project are met. The implementation of the EMP and the meeting of the environmental objectives and targets is also the responsibility of MPM. An EMPR specific to the South 3 opencast has been prepared and documented in PART B of this report.

Conclusion

Segope Consulting has undertaken the EIA and EMPR for the proposed South 3 Opencast Project in accordance with the requirements of the MPRDA and NEMA. This has included a comprehensive stakeholder engagement process which has sought to identify stakeholders. These parties have been provided with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the impact assessment phase of this study.

Specialists input has been sought for all key environmental aspects. To date, there are no serious flaws that have been identified for the proposed South 3 Opencast Project. However, certain identified potential impacts require careful mitigation and monitoring.

An EMPR has been developed as part of this EIA process to ensure the mitigation of these impacts as far as practically possible. It is anticipated that it will be possible to successfully mitigate the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures taken.

It is recommended that the proposed South 3 Project is allowed to proceed, given the relatively small potential contribution of the project to cumulative impacts (given appropriate

environmental management) and also considering the positive social impacts associated with the project. MPM should, however, continue to examine its existing management measures for their entire operations and should put initiatives in place to reduce its contribution to the existing environmental condition in the MPM area.

There are multiple baseline and specialist studies have been conducted as part of the Impact Assessment and these include but not limited to:

- Environmental screening
- Terrestrial biodiversity impact assessment
- Hydrological assessment
- Surface and stormwater management plan
- Wetland delineation
- Hydrogeological impact assessment
- Hydropedology
- Soil and land capability assessment
- Geotechnical studies
- Socioeconomic impact assessment
- Waste management plan
- Rehabilitation plan
- Blasting and vibration impact assessment
- Traffic impact assessment
- Air quality impact assessment and
- Heritage, paleontological and archaeological assessments

It is the EAP's reasoned opinion that this project should be authorized based on the following:

- Where unavoidable, the identified impacts can be mitigated through the implementation of the identified mitigation measures indicated in the EMPR.
- When managed in accordance with the management/ mitigation measures specified in the EMPR, the proposed mining project is unlikely to result in any significant cumulative impacts, and
- Should the proposed mining project not be implemented, the land use of the area will not change but there will not be realization of additional local economic development opportunities as well as procurement of local goods and services that would have emanated from the proposed mine.

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LIST OF ABBREVIATIONS

alms	Above Mean Sea Level
ABA	Acid Base Accounting
AAP	Anglo American Platinum
ARC	Agricultural Research Council
ARM MC	African Rainbow Minerals Mining Consortium Limited
BA	Basic Assessment
BGIS	Biodiversity Geographic Information System
BID	Background Information Document
BIC	Bushveld Igneous Complex
BPG	Best Practice Guidelines
BAP	Biodiversity Action Plan
CPI	Consumer Price Inflation
CRR	Comment and Response Report
DD	Due Diligence
DAFF	Department of Agriculture, Forestry, and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DP	Development Planning
DSR	Draft Scoping Report
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMP	Environmental Management Programme
FET	Further Education Colleges
FSR	Final Scoping Report
GN	General Notice
GTLM	Greater Tubatse Local Municipality
GSDM	Greater Sekhukhune District Municipality
I&AP	Interested and Affected Parties
IHIA	Invertebrate Habitat Integrity Assessment
IHAS	Invertebrate Habitat Assessment System
IWUL	Integrated Water Use Licence

IWWMP	Integrated Water and Waste Management Plan
ktpm	kilo tonnes per month
kV	Kilo Volt
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LOM	Life of Mine
LWUA	Lebalelo Water User Association
MAR	Mean Annual Rainfall
mbs	Meters below surface
Mn	Manganese
MPM	Modikwa Platinum Mine
MPRDA	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
NAF	Non-acid Forming
NBA	National Biodiversity Assessment
NEM:BA	National Environmental Management: Biodiversity Act
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NPAES	National Protected Area Expansion Strategy
NTS	Non-Technical Summary
NWA	National Water Act (Act No. 36 of 1998).
PGM	Platinum Group Metals
RPM	Anglo American Platinum Rustenburg Platinum Mines Limited
RSIP	Rehabilitation Strategy and Implementation Programme
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
TA	Tribal Authority
TSF	Tailings Storage Facility
TDS	Total Dissolved Solids
TOR	Terms of Reference
VIA	Visual Impact Assessment
WUL	Water Use Licence
WULA	Water Use Licence Application
ZOI	Zone of Influence

PART A:
SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. INTRODUCTION

1.1 Background

Modikwa Platinum Mine (hereafter referred as 'MPM') is located approximately 20 km west of Burgersfort and 18 km north of Steelpoort on the Eastern Limb of the Bushveld Complex, situated in the Fetakgomo-Tubatse Local Municipality (FTLM) within the Sekhukhune District Municipality (SDM) of the Limpopo Province. The MPM's mining right area includes portions of the farms: Maandagshoek 254 KT, Driekop 253 KT, Hendriksplaats 281 KT, Onverwacht 292 KT and Winterveld 293 KT (**Figure 1.1).**

The proposed South 3 opencast is to be located within portion 0 of Farm Winterveld 293 KT which is owned by Samancor Chrome Mine, and for which MPM has a lease agreement (**Figure 1.2**). Access to South 3 will be through a gravel road which joins a tarred road leading to R555 in Steelpoort town, which then joins the regional road (R37) from Burgersfort.

The MPM South 2 Shaft is currently operating under the existing approved Environmental Management Programme (EMPR) Amendment. South 2 Shaft is an extension of South 1 Shaft and Onverwacht Hill shaft developments. An application is being made to amend the current environmental authorisation to include the proposed additional mining-related infrastructure at South 3 Opencast. The proposed additional opencast mining together with the mining-related infrastructure at the South 3 Opencast project (**Figure 1.3**) are necessary and will effectively increase the Life of Mine (LoM) for MPM into the future.

MPM appointed Segope Water and Environmental Services (Hereafter referred as Segope Consulting) as an independent Environmental Assessment Practitioner (EAP) to undertake an integrated Environmental Authorisation (EA) process and the associated stakeholder engagement to meet the requirements of the National Environmental Management Act (NEMA, 107 of 1998), the Mineral and Petroleum Resource Development Act (MPRDA, 28 of 2002) and the National Water Act (NWA, 36 of 1998).

The EA process entails the undertaking of an EIA including Scoping and Environmental Impact Assessment (S&EIA) phases. The Environmental Impact Assessment and Environmental Management Programme (EIA & EMPR) report is prepared in accordance to the MPRDA, Regulation GN 527 of 23 April 2004, Regulations 50 and 73, and the associated listed activities under regulation GN 544, GN 545 and GN 546 printed in terms of NEMA 2017.

All information as required by the 2010 DMR Guidelines and Templates in terms of the EIA and EMPR report and the Consultation Report have been considered in this document and relevant appendices. In terms of the NWA, MPM will require a WUL for activities associated with this project. A WULA as well as an Integrated Waste Water Management Plan (IWWMP) will be compiled in terms of the same appointment by MPM.

1.2 Purpose of the Environmental Impact Assessment

The first phase of the EA process was the Scoping Phase, which was completed on the 5th July 2024, after receiving the Scoping Report (SR) acceptance from the DMRE (Reference: LP30/5/1/2/3/2(129MR)). During the Scoping phase, various stakeholder groups were identified

and stakeholders were encouraged to participate in the project so that significant issues requiring further investigation and assessment by specialists could be identified. Stakeholders had the opportunity to verify that the issues raised by them were captured, understood, interpreted and contextualised.

The SR was submitted to the DMRE, LEDET, DWS and other stakeholders on the 8th of April 2024. The SR was also made available to registered interested and affected parties (I&APs) for a commenting period of 30 days from the 08th of April to the 21st of May 2024. Comment on the remainder of the Scoping Phase were received and are included in this report.

The second phase of the authorisation process is the Environmental Impact Assessment (EIA) phase, which includes specialist investigations, the assessment of impacts, and the preparation of an EMPR. Registered I&AP were invited to participate in the public review period of the impact assessment phase of the project to ensure that the assessment of impacts and proposed management of impacts have addressed their concerns.

The EIA & EMPR report will be updated with comments received from stakeholders during the public review period and the public meeting of the EIA phase. The Final EIA and EMPR Report will be submitted to the DMRE, LEDET, DWS and other stakeholders who will consider the findings in consultation with various other authorities. The DMRE will then decide regarding the granting of EA to MPM for the proposed South 3 Opencast Project.

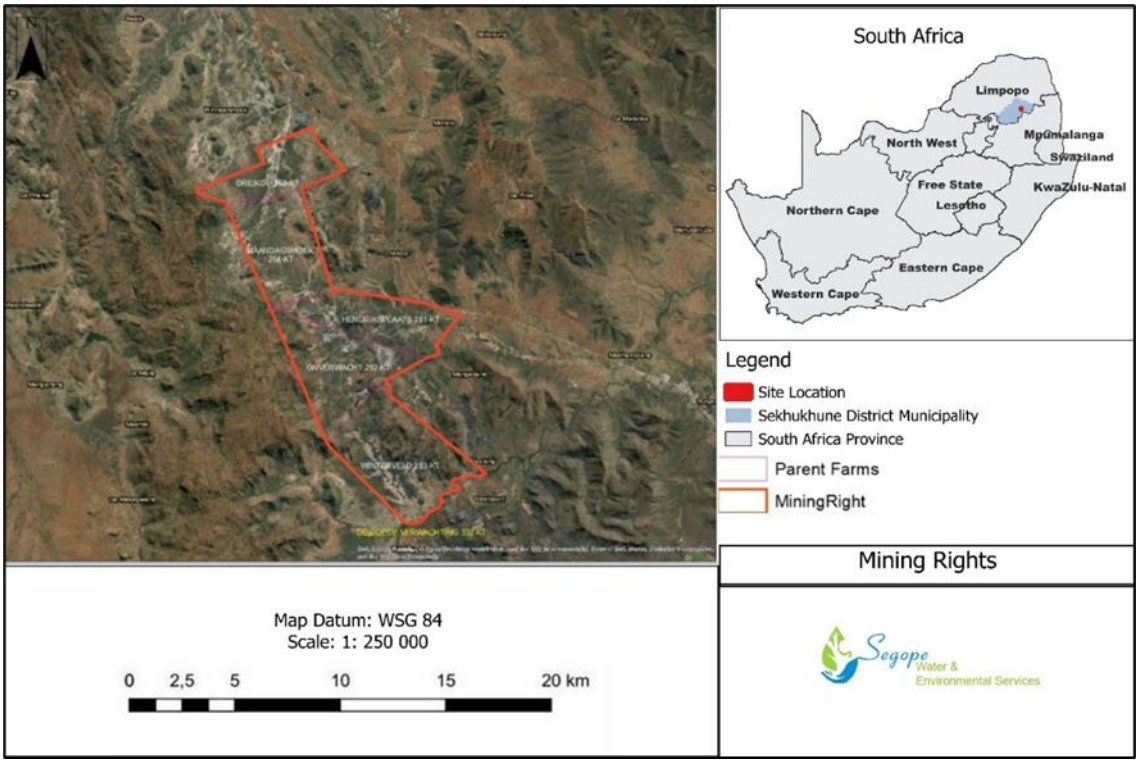


Figure 1.1: MPM Mining Right Areas

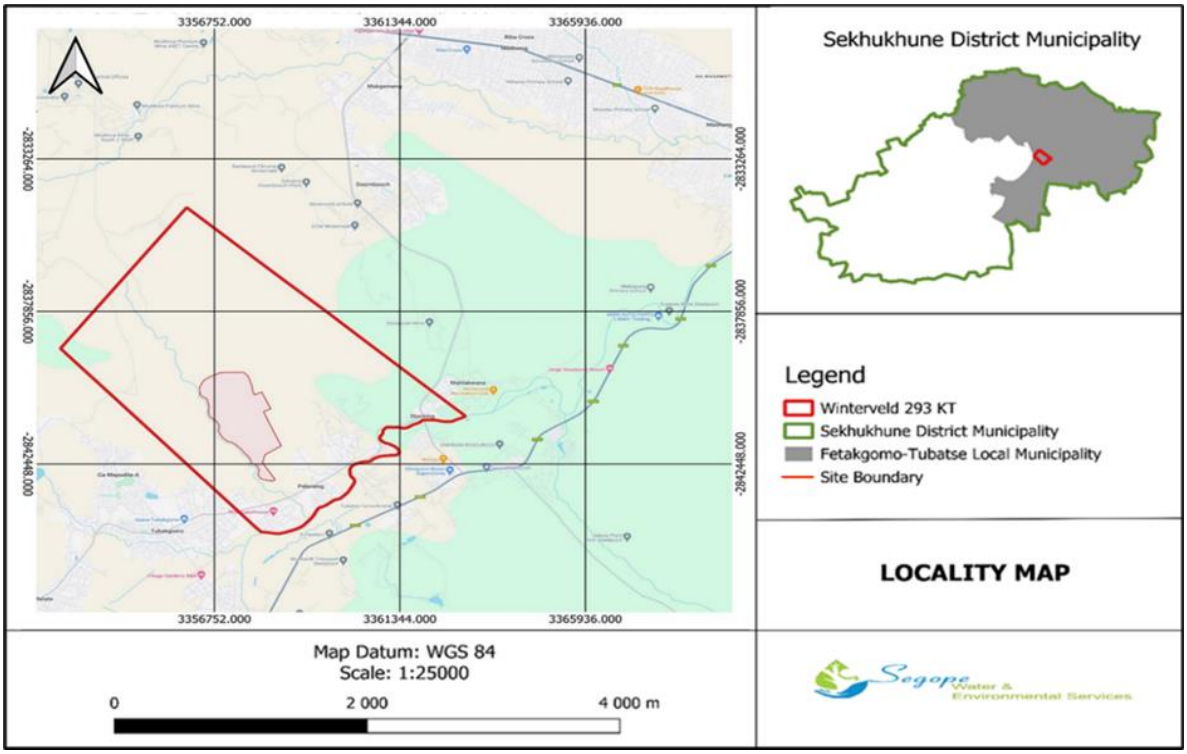


Figure 1.2: Regional Location of the proposed MPM proposed South 3 project

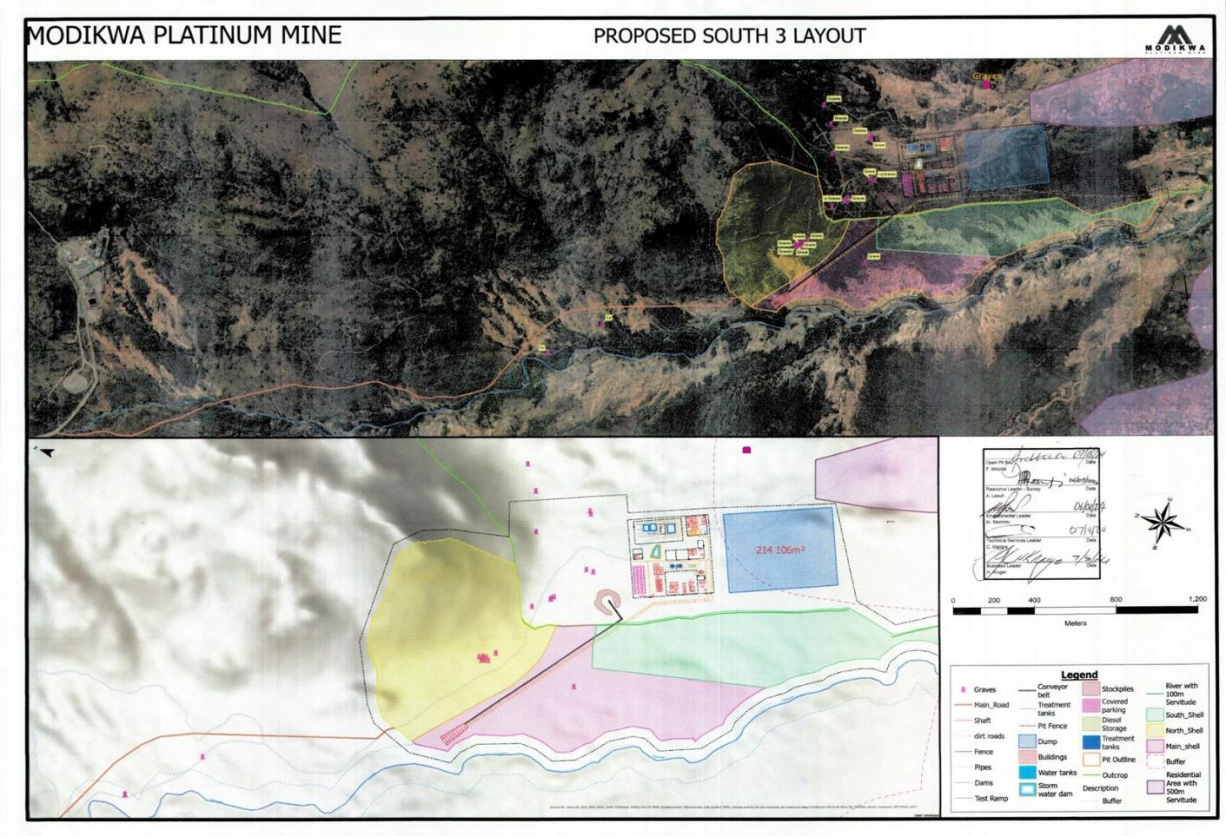


Figure 1.3: General layout of the proposed South 3 project

2. PROJECT DETAILS

This section provides details of parties involved in the MPM South 3 opencast Project, the affected surface areas as well as the report structure of EIA & EMPR.

2.1 Proponent Details

Table 2.1 below presents the details of the applicant.

Table 2.1:Applicant and mine owner details

Name of Mine	Modikwa Platinum Mine
Contact Person	Mr. Hendrik Kruger
Physical Address	292 KT Onverwacht Hill, Steelpoort region, Mpumalanga 1129
Postal Address	Private Bag X9120,Driekop, 1129
Email	Hendrik.Kruger@angloamerican.com
Telephone	013 230 2017

2.2 Details of Environmental Assessment Practitioner

Segope Consulting was appointed by MPM to facilitate the environmental authorisation (EA) process for its proposed activities. Segope Consulting has appointed a lead Environmental Assessment Practitioner (EAP) and associated project team to undertake the necessary environmental authorisation process. The project team's details are given in **Table 2.2** below. Refer to **Appendix A** for the EAP team Curriculum Vitaes.

Table 2.2: Project team details

Environmental Assessment Practitioner	Description	Role	Email
Mr. Letladi Maisela	Director	Report Review and Approval	Letladi.maisela@segope.co.za
Ms. Lorato Rakuba	Environmental Scientist	Report Reviewer	Lorato.rakuba@segope.co.za
Ms. Dineo Makhubela	Environmental Scientist	Report Reviewer	Dineo.Makhubela@segope.co.za
Ms. Tshimangadzo Rasifudi	Environmental Scientist	Report Compiler Project Manager	Tshimangadzo.rasifudi@segope.co.za

2.3 Details of Specialists

The specialists listed in **Table 2.3** undertook the specialist studies associated with the Impact Assessment Phase of this proposed project and have conducted the necessary and required specialist investigation and subsequent reporting. Specialist declarations are provided in the relevant specialist Appendices. Refer to **Appendix H** for specialist reports.

Table 2.3: Specialist team

Specialist field	Company	Contact Person
Public Participation	Segope Consulting	Letladi Maisela
Water Use Licence Application	Segope Consulting	Letladi Maisela
Soils, Land Use, Land Capability	Enviro-Solum Consulting	Tshiamo Setsipane
Hydropedological Study	Enviro-Solum Consulting	Tshiamo Setsipane
Heritage Impact Assessment	Archaetnos	Dr. Anton Van Vollenhoven
Terrestrial Biodiversity	Segope Consulting	Lorato Rakuba
Groundwater Impact Assessment	Segope Consulting	Tshimangadzo Rasifudi
Surface Water Study	Segope Consulting	Tshimangadzo Rasifudi
Geo-Technical Study	Onno Fortuin Consulting	Andon van der Merwe
Air Quality	VJ Ai Modelling Services	Vladimir Jovick
Environmental Noise	Thlago Environmental Health and Safety Solutions	Tumelo Onkaetse
Visual Impact Assessment	Tshisevhe Tshifhango	Tshisevhe Tshifhango
Socio-Economic Study	Segope Consulting	Dineo Makhubela
Traffic Impact Assessment	Segope Consulting	Dineo Makhubela
Wetland Delineation	Segope Consulting	Dineo Makhubela
Ecological Impact Assessment	Segope Consulting	Lorato Rakuba
Floodlines	Onno Fortuin Consulting	Onno Fortuin
Stormwater Management Plan	Onno Fortuin Consulting	Onno Fortuin
Blasting Impact Assessment	Charmdane Mining Services	Tshifhiwa Netshiavha

2.4 Competent Authorities Details

The EA for the proposed amendment project is required from the DMR and DWS. Details of the competent authorities are given in **Table 2.4** below.

Table 2.4: Competent authority details and department

Authority	Contact Person	Contact Details	
DMR (Polokwane Office)	Mr. Cedric Kolani	**Tel:**	015 287 4700
		Email:	Thivhulawi.kolani@dmr.gov.za
DWS (Lydenburg Office)	Mr. Adam Ramalisa	**Tel:**	013 235 4206
		Email	ramalisaA@dwa.gov.za

2.5 Municipalities' Details

The project area is located within the jurisdiction of the SDM and FTLM. The project falls within the Ward 2 of the FTLM. Details of the relevant municipalities are provided in **Table 2.5**.

Table 2.5: Local and district municipality details

Municipality	Contact Person	Contact Details	
Sekhukhune District Municipality	Ms. Mapule Mokoko	**Tel:**	013 262 7308
		Email:	mahlangug@sekhukhune.gov.za
Fetakgomo-Tubatse Local Municipality	Mr. Eric Masindi	**Tel:**	013 2311208
		Email:	emasindi@tubatse.gov.za
Fetakgomo- Tubatse Local Municipality Ward 2	Cllr M Makina	**Tel:**	013 231 1000
		Email:	smalepeng@tubatse.gov.za

2.6 Legal Structure of the EIA and EMPR Report

The EIA and EMPR Report was compiled in accordance with Sections 31 and 33 of NEMA EIA Regulation 543, Sections 50 and 51 of the MPRDA Regulations, and the 2010 DMR Guidelines. It includes the consolidated results of the public participation and authority consultation processes conducted to date. **Table 2.6** to **Table 2.10** below provides summary of requirements of Sections 50 and 51 of the MPRDA, a summary of the recommended requirements as per 2010 DMR Guidelines and Template for an EMP Report and the requirements of Section 31 and 33 of the NEMA EIA Regulations. In each table, cross references are provided to the report sections where these requirements have been addressed.

Table 2.6:Structuring of the final EIA & EMPR in terms of the MPRDA regulations Section 50 and 51 requirements

Legal and Regulatory Requirement	Cross Reference to ReportSection
1. The contents of an environmental impact assessment report **(and all subsequent requirements)**	Sections 8, 9, 10, 11, 12, 13,
2. An environmental management programme contemplated in section 39(1) of the Act **(and all subsequent requirements)**	Sections 15, 16,17, 18, **Error! Reference source not found.**, 19, 20, 21, 22

Table 2.7: Structuring of the final EIA and EMPR report in terms of the 2010 DMR guidelines and template for an Environmental Impact Assessment

Requirements		Location in the report
1	**The baseline environment (Regulation 50 (a)) (and all subsequent requirements)**	Section 9
2	**The proposed mining operation (and all subsequent requirements)**	Section 1.1, 2, and 5,

3	**The potential impacts (and all subsequent requirements)**	Sections 9 and 12
4	**The alternative land use or developments that may be affected - (Regulation 50 (b)) (and all subsequent requirements)**	Section 1, 5 and 9
5	**The potential impacts of the alternative land use or development (and all subsequent requirements)**	Sections 1, 5, 9 and 12
6	**An identification of potential social and cultural impacts (Regulation 50 (c)) (and all subsequent requirements)**	Sections 12
7	**An assessment and evaluation of potential impacts (and all subsequent requirements)**	Sections 11 and 12
8	**Identify the alternative land uses which will be impacted upon (Regulation 50 (d)) (and all subsequent requirements)**	Section 1 and 5
9	**Provide, in listed format, the results of a specialist study, which study must be conducted in accordance with generally accepted principles of sustainable development by integrating social, economic and environmental factors into a comparisonof the costs and benefits of the alternative land uses with those of the mining operation on an equitable basis.**	Section 9 Appendix H
10	**Attach the specialist study as an annexure**	Appendices H1 to H14
11	**Provide a list of all the significant impacts as identified in the assessment conducted in terms of Regulation 50 (c) and(Regulation 50 (e)) (and all subsequent requirements)**	Sections 12
12	**The identification of interested and affected parties Regulation 50 (f)) (and all subsequent requirements)**	Sections 8
13	**The details of the engagement process (and all subsequent requirements)**	Sections 8 and 9
14	**Details regarding the manner in which the issues raised were addressed (and all subsequent requirements)**	Sections 8
15	**The appropriate mitigatory measures for each significant impact of the proposed mining operation (Regulation 50 (g)) (and allsubsequent requirements)**	Sections 12, and 15
16	**Description of the arrangements for monitoring and management of environmental impacts (Regulation 50 (h)) (and allsubsequent requirements)**	Section 16
17	**Inclusion of technical and supporting information (Regulation 50 (i))**	Appendices G to L

Table 2.8: Structuring of the final EIA and EMP report in terms of the 2010 DMR guidelines and template for an Environmental ManagementProgramme

Requirements		**Location in thereport**
1	**Description of environmental objectives and specific goals for mine closure (Regulation 51 (a)) (and all subsequentrequirements)**	Sections 9, 12, 14 and 15
2	**Description of environmental objectives and specific goals for the management of identified environmental impacts emanatingfrom the**	Sections 12, 14, 15 and 16

	proposed mining operation (and all subsequent requirements)	
3	**Description of environmental objectives and specific goals for the socio-economic conditions as identified in the social and labor plan (and all subsequent requirements)**	Sections 9
4	**Description of environmental objectives and specific goals for historical and cultural aspects (and all subsequentrequirements)**	Sections 12, 14 and 15
5	**Describe the appropriate technical and management options chosen for each environmental impact, socio-economic conditionand historical and cultural aspect in each phase of the mining operation (Regulation 51 (b)) (and all subsequent requirements)**	Sections 12, 14 and 15
6	**Provide Action plans to achieve the objectives and specific goals contemplated in Regulation 50 (a) (and all subsequentrequirements)**	Sections 12, 14 and 15
7	**Procedures for environmentally related emergencies and remediation (and all subsequent requirements)**	Sections 14, 15, 17 and 18
8	**Planned monitoring and environmental management programme performance assessment (and all subsequent requirements)**	Sections 14 and 15
9	**Financial provision in relation to the execution of the environmental management programme (and all subsequentrequirements)**	Sections 17
10	**Environmental Awareness Plan (Section 39 (3) (c))**	Sections 17
11	**Attachment of specialist reports, technical and supporting information.**	Appendix H
12	**SECTION 39 (4) (a) (iii), Capacity to manage and rehabilitate the environment (and all subsequent requirements)**	Section 18
13	**UNDERTAKING**	Section 22

Table 2.9:Structuring of the final EIA report in terms of NEMA EIA regulations Section 31 requirements

Legal and Regulatory Requirement		**Cross Reference toReport Section**
1	**If a competent authority accepts a scoping report and advises the EAP in terms of regulation 30(1)(a) to proceed with the tasks contemplated in the plan of study for environmental impact assessment, the EAP must proceed with those tasks, including thepublic participation process for environmental impact assessment referred to in regulation 28(1)(g)(i)-(iv) and prepare an environmental impact assessment report in respect of the proposed activity**	
2	**An environmental impact assessment report must contain all information that is necessary for the competent authority toconsider the application and to reach a decision contemplated in regulation 35 (and all subsequent requirements)**	Sections 2.2, 5, 7, 8, 9, 10, 11, 12, 14, 15 and 20

Table 2.10: Structuring of the final EMP report in terms of NEMA EIA regulations Section 33 requirements

Legal and Regulatory Requirement		Cross Reference toReport Section
1	**A final environmental management programme must comply with section 24N of the Act (and all subsequent requirements)**	Sections 2.2, 5, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17 and 22

3. METHODOLOGY APPLIED IN CONDUCTING THE EIA

3.1 Objectives and approach

The objectives of the EIA for the MPM South 3 opencast Project are to:

- Gain a detailed understanding of the baseline environment at the sites proposed for development;
- Determine and assess the impacts to receptors and resources in the vicinity of the proposed development;
- Identify potential weaknesses associated with the proposed project;
- Consider and assess project alternatives in terms of environmental impacts;
- Develop environmental management measures to mitigate negative impacts and enhancepositive impacts;
- Engage stakeholders to ensure that feedback on the results of the study is provided and that the assessment and management of impacts are identified and concerns considered; and
- Provide sufficient information to the authorities to inform the environmental authorisationdecision.

The impact assessment phase of the EIA has been undertaken in two components: technical investigations as well as reporting and stakeholder engagement feedback.

3.2 Legal framework

As previously mentioned, the proposed South 3 opencast Project requires environmental authorisation in terms of the following:

- EIA in terms of the NEMA (Act No. 107 of 1998) and Regulations of June 2010 in GovernmentNotice (GN) 544 (listed *activities 11, 18, 22, 23*) and R546 (*14*);
- The EMPR as required under the MPRDA (Act No. 28 of 2002) (Act No.28 of 2002);
- The WUL and accompanying IWWMP under the NWA (Act No. 36 of 1998); and

The competent authorities for the respective authorisation processes are:

- DMRE for the EA amendment.
- DWS for the WUL and the IWWMP.

The EIA Process and WULA processes is being conducted simultaneously as integrated process completed by a combined public participation process.

The sections below describe the legal framework to undertake the environmental authorisationprocesses.

- MPRDA – The EMP will be undertaken in terms of Section 102 of the MPRDA and relevant Mineral and Petroleum, Social and Environmental Regulations.
- NEMA - A number of listed activities (**Table 3.1**) have been identified in terms of NEMA GN numbers R543, R922 (of November 2013) and R546 of 18 June 2010 relevant to the MPM proposed South 3 Opencast Project.
- NWA- A number of waters uses have been identified in terms of the NWA as described in **Table 3.1**.

3.3 Listed activities to be authorized

A number of listed activities, as shown in **Table 3.1**, have been identified in terms of NEMA GN numbers R544 and R546 (of 18 June 2010 and November 2013) and the NWA relevant to the MPM's proposed South 3 opencast project.

Table 3.1: Activities Triggered by the MPM South 3 Opencast Project

APPLICABLE LEGISLATION	LISTED ACTIVITY TRIGGERED/ LEGAL PROCESS TO BE FOLLOWED	DESCRIPTION OF THE ACTIVITY TO BE UNDERTAKEN	STATUS OF THE APPLICATION	COMPETENT AUTHORITY
MPRDA (Act No. 28 of 2002)	Section 102: Amendment of rights, permits, programme and plans	Amendment of mining method in order to develop an opencast operation on the Farm Winterveld 293 KT including hauling, crushing and screening activities.	New Application	DMRE: Limpopo Regional Office
NEMA (Act No. 107 of 1998): GN. R 982: EIA Regulations, 2014	Regulation 31	Amendment of an existing and valid Environmental Authorisation, resulting in change of scope, resulting in increased level of impact.	New Application	DMRE: Limpopo Regional Office
	Regulation 40	Informing and soliciting inputs from the public about the application process.	New Application	
	Regulation 41	Method of informing the public.	New Application	
	Regulation 42	Register of Interested and Affected Parties (I&AP).	New Application	
	Regulation 43	Comments by I&AP on reports produced.	New Application	
	Regulation 44	Inclusion of I&AP Comments in reports.	New Application	
NEMA (Act No. 107 of 1998): GN. R 983: EIA Regulations, Listing Notice 1 of 2014	Activity 9	Infrastructure with internal diameter of 0.36 m exceeding 1 km in length for transportation of water.	New Application	DMRE: Limpopo Regional Office
	Activity 10	Infrastructure with internal diameter of 0.36 m exceeding 1 km in length for transportation of sewage, effluent, process water, waste water, return water, slimes.	New Application	
	Activity 11	The development of facilities for transmission and distribution of electricity.	New Application	

APPLICABLE LEGISLATION	LISTED ACTIVITY TRIGGERED/ LEGAL PROCESS TO BE FOLLOWED	DESCRIPTION OF THE ACTIVITY TO BE UNDERTAKEN	STATUS OF THE APPLICATION	COMPETENT AUTHORITY
	Activity 12	The development of buildings exceeding 100 square meters in size	New Application	
	Activity 14	Storage of dangerous goods (e.g. diesel) in containers in excess of 80 to 500 m^3.	New Application	
	Activity 24	Development of roads and haul roads wider than 8 m.	New Application	
	Activity 25	Development of infrastructure for treatment of effluent, wastewater or sewage with daily throughput of 2 000 m^3 but less than 15 000 m^3.	New Application	
NEMA (Act No. 107 of 1998): GN. R 984: EIA Regulations, Listing Notice 2 of 2014	Activity 9	Establishment of an electricity substation.	New Application	DMRE: Limpopo Regional Office
	Activity 15	Clearance of an area of more than 20 ha of indigenous vegetation	New Application	
	Activity 16	Development of a dam with dam wall of 5 m OR area covering 10ha or more.	New Application	
	Activity 17	Any activity requiring a mining right, including any associated infrastructure (e.g. Return Water Dam, Pollution Control Dams, Waste Rock Dump) Undertake mining related activities such as: • Site offices, • conveyor belt • Ablution facilities, • Security gate, • Workshop, • Septic tank, • Crushing & Screening	New Application	
	Activity 21	Primary processing of mineral resources, e.g. extraction, crushing, and screening.	New Application	
	Activity 28	Commencement of an activity requiring emission Licence in terms of Sec 21 of NEM: AQA.	New Application	

APPLICABLE LEGISLATION	LISTED ACTIVITY TRIGGERED/ LEGAL PROCESS TO BE FOLLOWED	DESCRIPTION OF THE ACTIVITY TO BE UNDERTAKEN	STATUS OF THE APPLICATION	COMPETENT AUTHORITY
NWA (Act No. 36 of 1998): Section 21	Section 21a	Abstraction of raw water from boreholes and reuse of process water.	New Application	DWS: Lydenburg Regional Office
	Section 21b	Storage of clean water in reservoirs for potable use.	Existing Application (NB: GA requirements)	
	Section 21c & i	Interception of tributaries of Tubatsane River as a result of open cast operation as well as the haul road from South 2 to South 3 Opencast mine and associated infrastructure.	New Application	
	Section 21e	Re-use of effluent from septic tanks for gardening.	New Application	
	Section 21f	Discharge of treated sewage effluent	New Application	
	Section 21g	Dust suppression, waste rock dump, PCD, ore stockpile, and Disposal of contaminated water	New Application	
	Section 21j	Dewatering of mine pit for safety of people and equipment		

4. BACKGROUND OF THE PROJECT

The MPM current production rate is 240 ktpm and the mine comprises of the mining infrastructures described in **Table 4.1**. MPM exploits platinum ore reserves of the UG2 layer and the existing environment surrounding.

The proposed South 3 area is characterized by hills and mountains in the north and northeastern regions. The area is dominated by a broad relatively flat land towards the south and western parts. The lower-lying flat plain areas are at an average height of 750 metres above mean sea level (mamsl). The highest ridges have elevations of approximately 1 300 mamsl at the northeastern parts of the project site. The area encompasses intrusive igneous rocks, mainly norite and pyroxenite. Lithologies has mainly a south to south-eastern strike and dips at an angle of ±10-15° in a westerly direction. MPM South3 is aiming to exploit ore reserves of the UG2 layer, hosted within these rocks.

Table 4.1: Overview of the mining operation and water and waste management systems

Aspect	Method/system
Mining and beneficiation	
Life of mine	• MPM is currently operating at a production rate of 240 ktpm; • The life of the UG2 open pits from construction to final rehabilitation is anticipated to be approximately ten years with the life of the Merensky pits inthe region of twenty years; • The life of the main shafts (North 1, South 1 and South 3 Opencast) is anticipatedto continue until approximately 2040.
Mining via shafts	MPM has the following shafts: • Operational: o North 1 shaft decline; o South 1 shaft decline; o South 2 Shaft; o Onverwacht Hill Adit; o Merensky Adit. Ore from the shafts is transported to the primary crusher and plant via overlandore conveyor. • Dormant and under care and maintenance: o Mid shaft decline; o Maandagshoek Winze shaft.
Open pit mining	Open pit operations include the following: • Existing pits: o North 1 pit (mined out); o Merensky Pit Onverwacht (initiated). • Planned pits: o North Pit 2; o South Pit 1; o South Pit 2. • The ore will be transported via truck to the primary crusher stockpile and waste rock to waste dumps on surface.
Processing Plant	• Ore from the crusher stockpile is put through a process of crushing, screening and flotation; • The final concentrate comprises platinoid minerals, namely platinum, rhodium, palladium, ruthenium, iridium and osmium with gold, copper and nickel cobalt and chrome as by-products in the final concentrate;
	• The concentrate is trucked to the Polokwane Smelter.
Support infrastructure	• Additional mine and community support infrastructure includes the central office, Montrose Village, Area Village, a clinic and roads.

Topsoil stockpiles	• Soil is stripped and stockpiled from each area where construction of the mine infrastructure takes place.
Water supply	• Raw water is supplied to the mine via an off-take from the Lebalelo pipeline. MPM has an allocation from the Lebalelo Water User Association (LWUA) of 8 Ml/day with current daily use (potable and make-up) of 6.6 Ml/day (1,980Ml/annum); • Water is released from the Arabie Dam into the Olifants River and MPM abstracts the water at the Havercroft Weir. Water is stored in the 24Ml concrete dam on site; • Potable water is supplied to South 3 Opencast via the South 2 borehole; • Process water is sourced from mine water (dewatering of mine workings, tailing return water and dirty stormwater runoff) and augmented with rawwater as required.
Electricity Supply	• Electricity supply to MPM is provided by ESKOM.
Waste rock	• Waste rock is disposed of onto three existing waste rock dumps: one at North 1shaft, one at South 2 shaft and one at South 1 shaft; • Waste rock minimization at MPM is being achieved by crushing the rock forreuse at the crusher plant located near South shaft.
Tailings Storage Facility	• The tailings disposal system comprises a tailings dam, two-compartment returnwater dam and a silt sump at the return water dam inlet; • The life of the tailings dam is forty years (up to 2043),
Domestic and industrial waste	• Currently all domestic solid waste is removed to the municipal landfill site at Burgersfort; • Old motor oils and filters and grease are collected in specially built containers and collection sumps at the earth moving contractor's yard. The oils and greaseare removed from these sites by various recycling companies/contractors; • Other recyclable waste is sorted and stored at the salvage yard for removal by various recycling companies/contractors.
Sewage	• Sewage effluent from the mine is treated in a 450 m³/day activated sludge sewage treatment plant (Central sewage plant) and the final treated effluent is stored inthe plant stormwater dam for re-use in the plant. The sludge drying beds are cleaned as needed and the dried sludge is disposed of at an appropriate facility; • Sewage plants associated with the mine accommodation villages (Montrose and Area Village); • Sewage sludge from the shaft and village accommodation sewage plants will be dried at the Central sewage plant.

5. PROJECT DESCRIPTION

5.1 Project Location

MPM is located approximately 20 km north of Burgersfort and 18 km north-west of Steelpoort on the Eastern Limb of the Bushveld Complex, in the FTLM within the SDM of the Limpopo Province.

5.2 Tribal Authorities

Mahlakwena community is the closest to the proposed South 3 Opencast (± 500 m), and it is included in the study as a result of its proximity to the proposed mining site and supporting infrastructure. There are no formal towns adjacent to the project site. The nearest established towns to project area are identified below in **Table 5.1.**

Table 5.1:Project Area in Relation to Adjacent Towns and Villages

Town/Village	Approximate Distance and Direction in relation to the project
Burgersfort	20 km in an Easterly direction
Ohrigstad	45 km in an East-South-Easterly direction
Lydenburg	56 km in a South-South-Easterly direction
Groblersdal	95 km in a South-Westerly direction
Steelpoort	5 km in a Southerly direction
Jane Furse	30 km in a West-South- Westerly direction

5.3 Details of the properties affected by the proposed amendment project

Table 5.2 below shows the property ownership relating to the South 3 opencast and the farms in relation to the proposed infrastructures. Land ownership has been determined using WINDEED and the property information obtained from WINDEED has been provided in **Appendix B1.** The Lease agreement between MPM and Samancor is provided as **Appendix B2.**

Table 5.2:Properties where proposed activities will occur

Farm Name	Portion	Title deed	Owner
Winterveld 293 KT	Ptn 0	T133491/1997	Samancor Chrome

5.4 Employment

It is estimated that approximately 150 temporary jobs may be created during the construction phase of the proposed amendment project.

As the South 2 Shaft project is a replacement project, some of the labor from the existing South 1 Shaft will be transferred to South 2 Shaft, at the end of life of South 1 Shaft. Over the operational life of South 3 Opencast, additional permanent job opportunities estimated at 100 employees will be created during the 8-year lifespan of the mining project before underground operations commence. There are however, opportunities for unskilled labour to be contracted for activities such as establishing erosion control measures during closure and rehabilitation, and for maintaining these measures post-closure. Unskilled labour can also be procured for pre-construction activities.

More accurate employment figures will be available as the authorisation process progresses. The MPM Recruitment Policy will apply during the employment of people as part of the South 3 Project.

The MPM's policies on recruitment, employment and procurement of contractor services are subject to the mine's obligations in accordance with the Mining Charter. The MPM labour policies pertinent to this project are set out in:

- The MPM Social and Labour Plan (2019-2023);

- The MPM Local Procurement Procedure (2013); and
- The MPM Community Recruitment Agreement (2024).

5.5 Project Infrastructure

MPM South 2 Shaft is currently operating under the existing approved Environmental Management Programme (EMP) Amendment. South 2 Shaft is an extension of South 1 Shaft and Onverwacht Hill shaft developments. An application is being made to amend the current environmental authorisation to include proposed additional mining related infrastructure at South 3 Opencast. Refer to **Appendix D** for the proposed site layout plan.

The proposed additional Opencast mining together with the mining related infrastructure at South 3 Opencast project is necessary and will effectively increase the LoM for MPM into the future. Infrastructure to be constructed at South 3 Opencast includes the following:

- South 3 Opencast;
- Waste Rock Dump
- South 3 Opencast offices, workshops, and stores;
- Change houses;
- Salvage transfer yard;
- Wash bay and service area;
- Parking area;
- Fuel and material storage and handling facilities;
- Explosive storage and waste explosive materials and packaging destruction areas;
- Access roads;
- Topsoil stockpile areas;
- Electricity provision and distribution facilities;
- Security;
- Stormwater management infrastructure
- Pollution control dams;
- Septic sewage system

The above proposed key infrastructure will have secondary infrastructure and activities associated with it. These include:

- Disturbances of the unnamed tributaries associated with haul road construction from South 2 shaft to South 3 Opencast project.

6. TECHNICAL INVESTIGATIONS AND REPORTING

6.1 Terms of Reference

During the Scoping Phase, a number of potential environmental, social and cultural impacts associated with the proposed development were identified. A Terms of Reference (ToR) was developed for specialists to undertake specific studies to investigate these.

6.2 Specialist Studies

The following specialist studies have been undertaken based on the outcome of the scoping phase of the project and issues raised during the stakeholder engagement process. The specialist studies include the baseline of the existing environment which is summarized in **Section 9** of this report. Findings of these studies have been used to prepare the EIA and EMPR Report (**Part A** and **Part B** of this document, respectively).

- Environmental screening
- Terrestrial biodiversity impact assessment
- Hydrological assessment
- Surface and stormwater management plan
- Wetland delineation
- Hydrogeological impact assessment
- Hydropedology
- Soil and land capability assessment
- Geotechnical studies
- Socioeconomic impact assessment
- Waste management plan
- Rehabilitation plan
- Blasting and vibration impact assessment
- Traffic impact assessment
- Air quality impact assessment and
- Heritage, paleontological and archaeological assessments

In addition to the above a Financial Provision assessment in terms of Regulation 54 of the MPRDA has been conducted to determine the quantum financial provision of the MPM.

6.3 Assessment of Impacts

An assessment of the anticipated impacts was undertaken for both pre- and post-mitigation. The impact assessment methodology is provided in **Section 11.**

6.4 Reporting and Development of an Environmental Management Program

An EMPR for the MPM South 3 Opencast Project was developed to mitigate, or enhance, the anticipated impacts of the project, refer to **Part B of this document.** The results of this study, impact assessment and environmental management programme were collated and recorded in this report and have been released for public comment.

7. PROJECT MOTIVATION

7.1 Project need and desirability

The MPM South 1 Shaft is currently producing Platinum Group Metals ore and is reaching the end of itsLife of Mine (LOM). The existing authorised South 2 shaft with the associated infrastructure,has been identified as the viable option as replacement for South 1 Shaft. With the infrastructure and activities associated with the South it will effective2 shaft, it will steadily maintain the LOM for MPM until approximately 2040, but

will not necessarily increase overall production. Production at South 3 Opencast will increase steadily to maintain the ore production rate from the two shafts at a reasonably constant rate. South 1 Shaft will simultaneously steadily decrease until its LOM is complete. In order for the South 3 Opencast project to continue, new infrastructure will have to be constructed.

7.2 Benefits of the project

A number of benefits associated with the proposed South 3 Project have been identified by MPM which include:

- The proposed project is in alignment with the goals of the green energy transition;
- Exploiting the natural mineral resources as appropriate under the MPRDA;
- Creating employment opportunities during construction phase and decommissioning phase;
- Contribution to economic benefits for local communities, particularly in terms of job creation, infrastructure development, and long-term economic upliftment in Tubatse and surrounding areas;
- The project is anticipated to contribute to clean energy, given platinum's role in green technologies like hydrogen fuel cells, this mining project would be highly desirable for its contribution to reducing carbon emissions.;
- Retaining, and possible creation, of employment opportunities on local and regional scale during operational phase; and
- Continued long term supply of platinum ore for further processing at the existing MPM processing plant and Polokwane Smelter.

7.3 No-go Option

If the Platinum Ore reserves at South 3 Project remain unmined, South Africa and the local communities around the proposed mining operation will sacrifice the benefits of employment and income generation in the area as well as the development of BBBEE opportunities during construction, operation and eventual closure and rehabilitation. This implies lost opportunities for economic growth, community development, and global competitiveness in a vital industry. Furthermore, not undertaking the proposed project also risks hindering the country's ability to contribute to the global clean energy transition and continued recognition of the country's mineral capability at a global scale. The limited agricultural activities which are currently being undertaken will continue and the benefits will not be realized.

The project, if approved, would be managed responsibly, with strict environmental safeguards, a commitment to social responsibility, and a clear plan for rehabilitation. By rejecting the project, the decision-makers would not only lose out on these economic and social benefits; However, it is far more beneficial to **approve the project** with the necessary oversight and management than to miss out on the many advantages it offers.

8. STAKEHOLDER ENGAGEMENT PROCESS (IN FULFILMENT OF SECTION 39(3)(B) OF THE MPRDA ACT READ TOGETHER WITH REGULATION 50(F)

This section records the stakeholder engagement undertaken to date during the various phases of the authorisation process for the MPM South 3 Opencast Project. It describes the engagement activities undertaken during the scoping phase and provides details of the stakeholders identified, engagement meetings held, and a summary of key issues raised by stakeholders to date.

It also outlines the engagement activities that has been undertaken during the impact assessment and decision-making phases of the process. Proof of stakeholder engagement and correspondences are attached as **Appendix G** in this report.

This session will be updated before final submission of EIA & EMPR Report to the authorities.

8.1 Stakeholder engagement process

The stakeholder engagement process being undertaken for this project aims to comply with the relevant legislative requirements of the various environmental authorisation processes, namely the EIA in terms of NEMA, MPM's EMPR in terms of MPRDA and the WULA in terms of the NWA.

The various authorisation processes and associated stakeholder engagement process are running concurrently in a single integrated process to meet the requirements of the above-mentioned legislation.

8.2 Objectives

The objectives of the stakeholder engagement are:

During Scoping Phase

To provide sufficient and accessible information to stakeholders in an objective manner to enable them to:

- Ensure that stakeholder engagement meets legal and regulatory obligations;
- Raise issues of concern and suggestions for enhanced benefits;
- Verify that the issues raised by the stakeholders have been recorded;
- Identify and manage risks early in the project cycle;
- Secure an informed decision-making process;
- Provide input for consideration in the TOR for specialist studies, impact assessment and management planning; and
- Contribute relevant local and traditional knowledge to the environmental assessment.

Furthermore, stakeholder engagement during the scoping phase will assist with building trust, addressing concerns, mitigating risks, and maximizing benefits for all parties involved.

During Impact Assessment Phase

- Verify that their issues have been considered in the environmental assessment;

- Comment on the findings of the environmental assessment;
- Lay a foundation for informed, transparent, and responsible decision-making. This will ensure that the project considers all aspects (for instance, environmental, social, economic impacts, etc.) while promoting community trust, regulatory compliance, and long-term sustainability;
- Prevention of Delays and Conflicts - Early identification and resolution of potential issues through stakeholder engagement can prevent costly delays and conflicts later in the project; and
- Incorporation of Traditional Knowledge and Cultural Considerations.

During the Decision-making Phase

- Advise stakeholders of the outcome, i.e. the authority decision on the project, and how and by when the decision can be appealed;
- Provide stakeholders with clear information about how and why decisions are made;
- Building Consensus and Support in order to foster buy-in and support for decisions by involving those affected by the outcome;
- Addressing possible concerns and conflicts through iidentifying, understanding, and mitigating potential conflicts or concerns before finalizing decisions;
- Identify and reduce the likelihood of negative outcomes or unintended consequences.

8.3 Stakeholder identification

The NEMA Regulations (GN R 543) and Sections 10(1)(b),16(4)(b), 22(4)(b), 27(5)(b) and 39 of the MPRDA require identification of and consultation with communities and I&APs. In terms of Section 24 0 (2) of NEMA, specific State Departments were identified and recognized as commenting authorities on aspects of this EIAr/EMPR Amendment. Representatives from these departments are included in the stakeholder database – refer to (Appendix H:1).

The Segope Consulting stakeholder engagement process commenced with the stakeholder identification process during the scoping phase. A stakeholder database was developed for verification and updates to existing stakeholder databases from previous MPM EIA processes, and other processes in the project area.

In addition, community leaders and members,and other I&APs were identified through networking and referrals from other stakeholders, and from previous interactions with MPM.

The stakeholder database represents a broadspectrum of sectors of society, and has been categorized as indicated in the sections below. The current database, as included in **Appendix G1** comprises of various stakeholders, and is being updated throughout the process.

In terms of the NEMA Regulations (GN R543) I&APs are required to register for the process – refer to Box 1. Only formally registered stakeholders will continue to receive information and notifications of opportunities to comment after completion of the Scoping Phase, and will be able to appeal the authority decision should they wish to.

Box 1. Distinction between I&AP's and Registered I&APs

The NEMA Regulations (GN R543) distinguishes between I&APs and registered I&APs.

I&APs, as stated in Section 24(4)(d) of the NEMA include: (a) any person, group of persons or organisation interested in or affected by an activity;and (b) any organ of state that may have jurisdiction over any aspect of the activity.

In terms of the Regulations "***registered interested and affected parties***" means:

An interested and affected party whose name is recorded in the register opened for that application.

For that purpose, an EAP managing an application must open and maintain a register which contains the names, contact details and addresses of:

(a) All persons who have submitted written comments or attended meetings with the applicant or EAP; and
(b) All persons who have requested the applicant or EAP managing the application, in writing, for their names to be placed on the register.

All organs of state which have jurisdiction in respect of the activity to which the application relates.

The initial I&APs on the database were invited to register for the environmental decision-making process during the announcement phase in January 2024. To date, various stakeholders have registered as I&APs for this process – refer to **Appendix G1** for a list of the formally registered I&APs.

The database comprises stakeholders, representing various sectors of society as shown in the examples below.

- National Government: such as the DMR, Department of Environment, Forestry and Fisheries (DFF), DWS and Department of Land Affairs (DLA)
- Provincial Government: LDEDET
- Local and District Government: SDM, FTLM; and FTLM Ward 2
- Traditional Authorities
- Environmental and conservation groups: South African Heritage Resource Agency Limpopo Tourism and Parks Board
- Business and commerce: Steelpoort Business Forum
- Landowner: Samancor
- Community Based Organizations: Tlou ya Mamphela Nkone NPO
- Transport: Limpopo Roads Agency
- Tourism: Limpopo Tourism Agency
- Education: Steelpoort Primary school, Sekhukhune FET College
- Agriculture: Agri Limpopo, Agricultural Research Council, Agri SA.

The stakeholder database is reviewed and updated after each round of engagement during the EIA and EMPR Amendment process.

8.4 Identification of landowners

The identification of landowners in the project area is an important part of the stakeholder engagement process. Segope Consulting conducted deeds search to identify landowners adjacent to and in the immediate surroundings of the proposed project area. The proposed project area is currently owned by Samancor Chrome Mine (Samancor) and MPM has the lease agreement.

8.4.1 Identification of District and Local Municipalities

The project area falls within the jurisdiction of the SDM and the FTLM in the Limpopo Province. Details of the relevant municipalities and respective ward councilors are provided in **Table 8.1.**

Table 8.1:District and Local Municipalities

Municipality	Contact Person	Telephone number
Greater Sekhukhune DistrictMunicipality	Ms. Mapule Mokoko, (Municipal Manager)	013 262 7312
Fetakgomo-Tubatse Local Municipality	Mr. Simon Malepeng (Municipal Manager)	013 231 1000
Fetakgomo- Tubatse Local Municipality Ward 2	Cllr M Makina	013 231 1000

8.4.2 Identification of relevant Government Departments

The relevant authorities applicable to the environmental authorisation process for the proposed project are provided in **Table 8.2**.

Table 8.2:Relevant Government Departments

Department	Contact Person	Office Tel Number
LEDET (EIA/EMPR) - Polokwane Office	Ms. Tsakane Tshuketana	015 290 7164
DMRE (EIA/EMPR) - Polokwane Office	Mr. Cedric Kolani	015 287 4700
DWS (IWUL and IWWMP)	Mr. Adam Ramalisa	013 235 4206
Department of Land Affairs (DLA)	Mr. TG Makamu	015 297 3539
Department of Land Claims Commission	Mr. M Maluleke	066 479 2209

8.5 Introductory meetings with key stakeholders

- Different engagement sessions were held with different stakeholders.
- The first engagement was held on 11 December 2023 with Kgosi Mabanna and the Tribal council.
- Engagements were also held with the community leaders of Mahlakwena on 5 February 2024.
- A public participation meeting was held on 22 February 2024, invitations to the meeting were sent out through newspaper advertisement, site notices and emails. (Refer to **Appendix G2** for attendance register)
- Engagements were held with the Mojalefa family with their legal representative on 24 February2024.

8.6 Stakeholder engagement during scoping

8.6.1 Announcement

A consultation process was undertaken with intent of informing key community leaders, local communities (directly affected people) and about the proposed development and the EIA process underway. Stakeholders were notified of the opportunity to comment on the proposed project. The I&APs were informed by means of newspaper advert, tribal authority meeting, onsite notices, Draft Scoping Report and Background Information Document (BID).

8.6.2 Onsite notices

A2 laminated on-site notices informing I&APs about the proposed project were placed at key points along the Mine site fence on 13 February 2024. Draft Scoping Report, and BID were placed at the following locations:

- **Figure 8.1**: Steelport Post Office
- **Figure 8.2**: Steelpoort Pick n Pay notice board

- **Figure 8.3**: Morago Liquor Tavern
- **Figure 8.4:** Khazang Ubuntu Tuckshop

Figure 8.1: Steelport Post Office

Figure 8.2: Steelpoort Pick n Pay notice board

Figure 8.3: Morago Liquor Tavern

Figure 8.4: Khazang Ubuntu Tuckshop

8.6.3 Background Information Document

A Background Information Document (BID) was compiled, which provided a description of the proposed project and information on the Scoping & EIA process together with WULA process that are to be followed. The purpose of this document was to inform all I&APs about the proposed project and afford them an opportunity to comment. The BID was submitted to all the I&AP's together with notification letters. Refer to **Appendix F3** for the BID.

8.6.4 Advertisement

In fulfilment of the EIA Regulations and Water Use License regulations, an initial newspaper advertisement was placed in the Sekhukhune Times Edition 413 on the 11 January 2024, this was for thepublic participation to be held on the 14 January 2024 at Jorge Resort in Steelpoort. This meeting commenced on the said date, however was disrupted and couldn't continue due to concerns raised by thecommunity regarding the venue of the meeting and that the community was not properly consulted by the Mine or the team conducting the public participation meeting. The meeting was adjourned and further consultations were undertaken thus resolving the issues that were raised. Another meeting on another date at a different venue (Mahlakwena Sport Ground) was arranged and a further advert for this meeting was published in the Sekhukhune Times Edition 418 Newspaper on 15 February 2024. Refer to **Appendix G4** for proof of the Newspaper Adverts, notifying I&APs to participate in the proposed project. The meeting was scheduled for the 24th of February 2024.

8.6.5 Opportunities for comment

In addition to opportunities to comment verbally at engagement meetings, stakeholders were encouraged to submit their comments to Segope consulting, as follows:

- By email, fax or letter; or
- By telephone call

- By WhatsApp messages

All comments raised by stakeholders during announcement have been recorded in a Comment and Response Report (CRR), attached as (**Appendix F5**).

8.6.6 Public comment on Scoping Report

The Scoping Report (SR) was made available for public comment for a period of 30 days from the 08th of April to the 21st of May 2024. The availability of the SR was announced as follows:

- Distribution of a letter to stakeholders, inviting stakeholders to comment on the SR and to register as an I&AP.

8.6.7 Public comment on the Scoping Report

Legislation requires that the Final Scoping Report (FSR) must be made available for stakeholder comment for a period of 21days. The SR was made available for both public and authority comment for a period of 30 days.

Comments received during the Scoping period are as follows:

- The Mojalefa family claim to have graves on the Winterveld Farm and requested engagement in this regard. Various meetings were held with them and their legal representative, Mr. Mmala. A meeting was held with them on the 24th of February 2024 to address this issue.
- Mr. Amos Mamagase sent an email asking for business opportunities within the project as abusiness person.
- Steelpoort Business Forum asked for engagement from the mine regarding the proposed mining project.
- Abraham Maroga, Maria Simelane, Flora Maroga and Christina Makola also claim to have graves on the proposed site.
- Refer to **Appendix F1**: List of the registered I&APs.

The issues raised above were dealt with as part of the EIA Process and also as part of the continuous engagement with the I&AP.

8.7 Stakeholder engagement during Impact Assessment Phase

DMR have accepted the SR and the Plan of Study for the EIA and gave permission to proceed with the impact assessment phase of the project. Stakeholder engagement during the Impact Assessment Phase revolves around a review of the findings of the impact assessment presented in the draft EIA and EMPR Report, which is made available for public comment, and registered stakeholders notified of the opportunity to comment.

8.7.1 Public comment on Draft EIA/EMPR Process

The Draft EIA and EMPR Report was made available for public comment for a period of 30 days**.** The availability of the report was announced as follows:

- Distribution of the Executive Summary of the Draft EIA and EMPR Report, providing stakeholders with a summary of the key findings and recommended management measures;
- Making the Draft EIA and EMP Amendment Report and Executive Summary available for public viewing and comment in the same public places as during the scoping phase;
- SMS and telephonic notification of stakeholder engagement meetings.

8.8 Public comment on Final EIA & EMPR Amendment Report

The Final EIA & EMPR Report was prepared at the end of the comment period, and updated with additional issues, comments and suggestions raised by stakeholders. Legislation requires that the Final EIA & EMPR Report must be available for stakeholder comment for a period of 21 days before submission to authorities.

The Final EIA & EMPR Report was made available for public comment as follows:

- Distribution of a letter informing registered stakeholders that they will have 30 days, to comment directly to the competent authorities, as detailed in **Table 8.3**.
- Made available at the MPM main security office; and

Table 8.3: Authorities Contact Details

Authority	Contact Person	Contact Details	
Department of Mineral Resources (Polokwane Office)	Mr. Cedric Kolani	Tel:	015 287 4700
		Email:	Thivhulawi.kolani@dmr.gov.za
		Physical Address	BROLL Building, 101 Dorp Street,Polokwane
		Postal Address	Private Bag X9467 Polokwane 0700
Limpopo Department of Economic Development, Environment and Tourism (Polokwane Office)	Ms. Tsakane Tshuketana	Tel:	015 290 7164
		Email:	TshuketanaTL@ledet.gov.za
		Physical Address	Cnr Dorp and Suid Street, Polokwane
		Postal Address	Private Bag X 9484, Polokwane, 0700
Department of Water and Sanitation (Lydenburg Office)	Mr. Adam Ramalisa	Tel:	013 235 4206
		Email	ramalisaA@dwa.gov.za
		Physical Address	Corner Shurinck and Rossouw Street, Lydenburg
		Postal Address	Private Bag x 11259, Nelspruit, 1200

8.9 Summary of key comments raised by stakeholders

The Comments and Response Report (CRR) containing a comprehensive record of all comments, concerns, questions and suggestions received from stakeholders throughout the stakeholder engagement process will be updated throughout the EIA process.

8.10 Notification of Authority decision

Stakeholders will be advised in writing (mail, email, fax and SMS) and by advertisements in the Sekhukhune Time Newspapers of the authority decision on the EIA & EMPR and WULA, and details on the procedure to appeal the decision, should registered stakeholders wish to, relating to each authorisation.

9. DESCRIPTION OF BASELINE ENVIRONMENT

This section of the report presents an overview of the proposed South 3 baseline environment within which the project will be undertaken. Available information from information provided by specialist baseline studies commissioned as part of the proposed project were used for this section.

Specialists have been appointed to undertake the necessary specialist impact assessments. During this study a baseline description as well as the potential impacts of the proposed amendment project on them has been reported on, and all findings are incorporated into this EIA &EMPR Report.

9.1 Geology

The information provided in the geology section is a summary of the information provided in the Groundwater Specialist Report. Please refer to ***Appendix H1*** *for the full Report.*

Figure 9.1 below illustrates the regional geology of the proposed project area. The study area falls within the Pilgrims Rest 1:250 000 geology series maps. The geology of the area consists mainly of the Critical and Main Zones of the Rustenburg Layered Suite of the Bushveld Igneous Complex. The project area encompasses intrusive igneous rocks, mainly norite and pyroxenite. Lithologies has mainly a south to south-eastern strike and dips at an angle of ±10-15° in a westerly direction. MPM is aiming to exploit ore reserves of the UG2 layer, hosted within these rocks.

Various post-Bushveld dykes and faults have also been identified within the area. Two main dyke and fault orientations have been identified, namely a main northeast-southwest orientation and a less prominent west-southwest–east-northeast orientation. These structures are often associated with deeper weathering, while preferential weathering also takes place within pyroxenite-dominant zones. Weathering up to 45 metres has been reported. The igneous rocks have a groundwater environment that supports aquifers of an intergranular and fractured type, i.e. where groundwater occurrence is associated with both shallower weathered material and deeper fractured bedrock. The Geology is further discussed as part of the Groundwater and Visual baseline description.

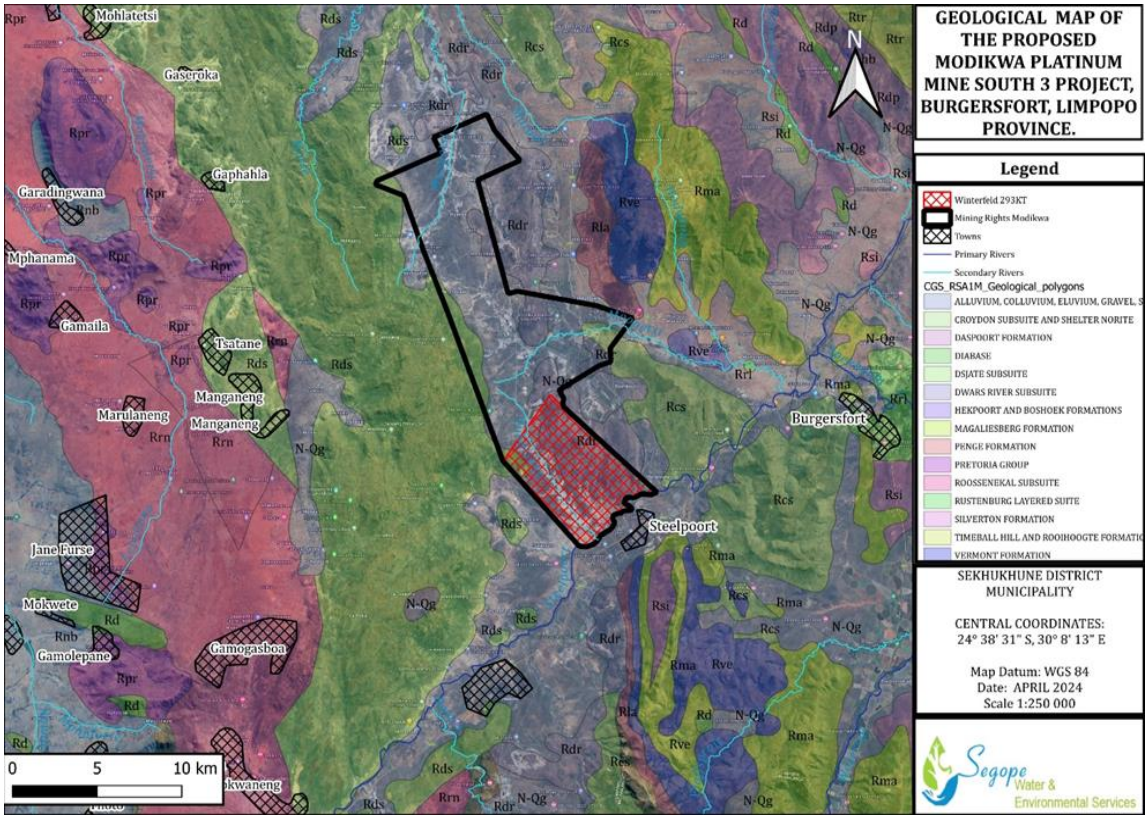


Figure 9.1: Geology of the proposed project area

9.2 Topography

The topography of the project area is rugged and characterized by hills and mountains in the north and northeastern regions. The area is dominated by a broad relatively flat land towards the south and western parts. The lower-lying flat plain areas are at an average height of 750 metres above mean sea level (mamsl). The highest ridges have elevations of approximately 1 300 mamsl at the northeastern parts of the project site. The topography of the project site is influenced and, is directly related to the underlying geology, and past and present climatic/drainage conditions.

The MPM provided Laser Imaging Detection and Ranging (LIDAR) data. The Digital Terrain Model (DTM) for the LIDAR dataset was evaluated with a 0.5 m resolution by using the LAS point cloud provided by the MPM. The topography of the study area in the vicinity of the mine site falls on 1:25 000 map sheets 2430 CA as presented in **Figure 9.2**.

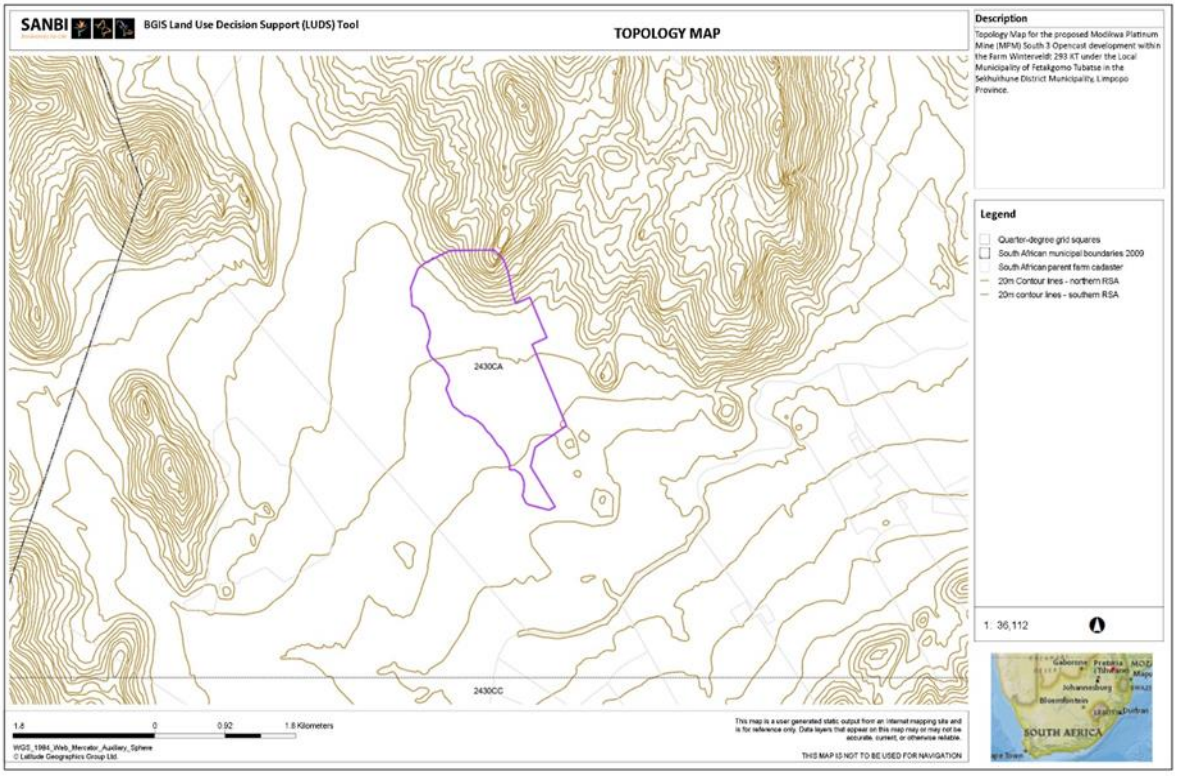


Figure 9.2: Topography of the project site

9.3 Visual

The information provided in the visual section is a summary of the information provided in the Visual Specialist Report. Please refer to ***Appendix H2*** *for the full Report.*

A broad-scale assessment of visual sensitivity, based on the physical characteristics of the overall study area, economic activities and land use that predominates, determined that the area would have a **LOW** visual sensitivity. This was mainly due to the close proximity of the study area to agricultural activities, mining and housing which degrades the local visual resources. Another important factor contributing to the visual sensitivity of an area is the presence, or absence of visual receptors that may value the aesthetic quality of the landscape and depend on it to produce revenue and create jobs. Receptors likely to be impacted by the proposed development are the nearby property owners, people travelling on the R555 Road and residents of the various towns surrounding the development. The proposed MPM S3 Project identified 55 potentially sensitive visual receptor locations within 10kms of the Project are shown in **Figure 9.3** below. **Table 9.1** shows the zones of visual impact rating in terms of proximity to the MPM South 3 project area.

The distance of the viewer / receptor location from the development is an important factor in the context of experiencing visual impacts which will have a strong bearing on mitigating the potential visual impact. A high impact rating has been assigned to receptor locations that are located within 3km of the proposed MPM South 3 Project. The visual impact of a Project diminishes beyond 5 to 10km, as the development would appear to merge with the elements on the horizon. Any visual receptor locations beyond these distance limits have therefore not been assessed as they fall outside the study area and would not be visually influenced by the proposed development.

At this stage of the process, zones of visual impact for the proposed MPM S3 Project have been delineated according to distance from the boundary of the mine application site. Based on the height and scale of the project, the distance intervals chosen for the zones of visual impact, as shown in **Tables 9.1**, are as follows:

- 0 – 1 km (very high impact zone).
- 1km –3km (high impact zone).
- 3km – 5 km (medium impact zone).
- 5km- 10km (low impact zone).

Table 9.1: Zones of visual impact rating in terms of proximity to the MPM South 3 Project

Radius	Visual Receptors	Visibility rating in terms of proximity
0-1km	• SR4 (RCB Guesthouse)	Very High
1- 3 km	• SR3 (Phabema Guesthouse) • SR5 (Village gardens B&B) • VR41(Pelaneng Town) • VR43 (Ga Mapodila-A) • VR42 (Tukakgomo Town) • R555 road	High
3 km- 5km	• VR44 (Tukakgomo Town) • VR38 (Mahlakwana Town) • VR40 (Stocking Town) • R555 Road	Medium
5-10km	• SR2 (Jorge Steelport Resort) • SR1 (Marlotti Lodge) • VR1 –VR37 (Homesteads) • VR12 (Tubatse Town) • VR49 (Doornbosch Town) • VR48 (Makgameng Town) • VR47 9Difagate Town) • VR46 (Ga Mogoadi Village) • VR45 (Ga Phasha Town) • VR50 (Ga Mapuru) • R555 road	Low

The landform, drainage and vegetation within the MPM South 3 Project site influences the level of screening visibility of the mine and associated infrastructure. The development footprint should therefore be designed so as to minimise tree and vegetation removal in order to reduce visual impacts as far as possible. The MPM S3 Project is located in a flat area with natural landscapes or mountainous scenic resources with minimal local or regional significance. The area has only five sensitive receptors and minimal land uses that depend on the visual aesthetic

of the area and thus, the visual receptor sensitivity is rated as **LOW.** This rating is further supported by the fact that there are no known proclaimed nature reserves, private reserves or game farms in the vicinity of the proposed project.

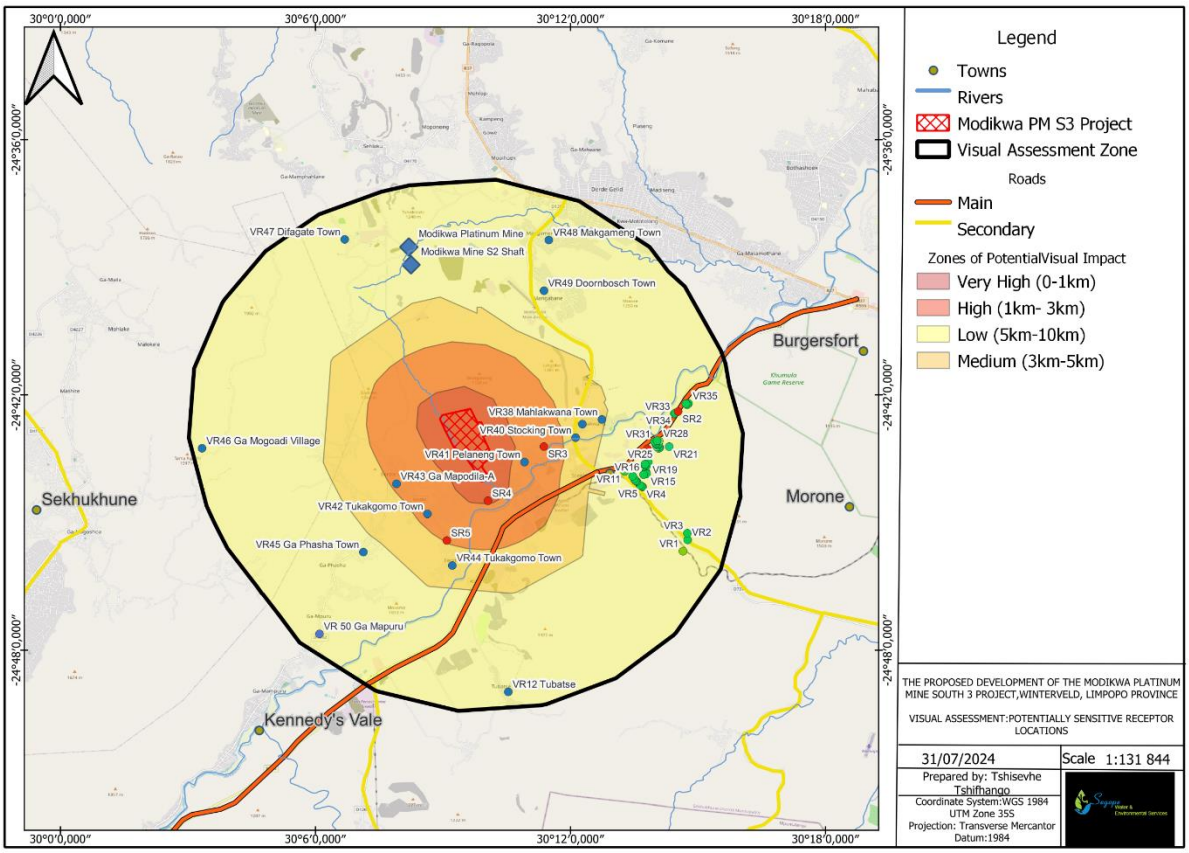


Figure 9.3: Potentially sensitive receptor locations within 10kms of the MPM S3 Project

The proposed MPM South 3 Project and its associated infrastructure will have a visual impact on the study area. The visual impact will differ amongst places, depending on the distance to the Project. The pre-mitigation Visual Significance is rated ***Medium*** as the local sense of place is degraded to some degree by the mining activities and is likely to become further degraded by cumulative impacts of mining activities envisioned in the area. Existing trees along the R555 and gravel roads would offer partial screening, and the existing human developments increases the visual absorption capacity of the locality to some degree. Further moderation of the impact is due to the contained project zone of visual influence. The Bushveld vegetation that is profolic in the area restricts views from most local homesteads. The post-mitigation Visual Significance is rated ***Low***. The retention of a natural vegetation buffer along the R555, would effectively screen the high exposure views as seen from the road receptors.

Due to the limited space available for an alternative, the No-go was assessed. While the site does add value to the local environment in terms of sense of place, the agricultural landscape context of the adjacent mines is a main feature in the local landscape. As such, the value of maintaining the status quo of the property is rated Low. Economic benefits for maintaining the status quo would not be comparable given the urgent need to move towards renewable energy. Due to the extent and location of the project, the visual impact of the proposed development cannot be eliminated in its entirety, but mitigation measures have been proposed to minimise the visual

impacts. No buffer areas or areas to be avoided from a visual impact perspective are applicable for this development, but very strict measures should be put in place to ensure the safety of all receptors identified in the study area. A condition of the EA should be that an ECO and / or ELO should be appointed to monitor the requirements set out by the EA, EMP and DMRE.

It is therefore concluded that the potential visual impacts do not represent a fatal flaw to the project. Although aesthetic characteristics are subjective, mining facilities and their associated infrastructure is mostly perceived as symbols of employment, and local prosperity.

9.4 Climate

MPM is situated in Limpopo province, which is a summer rainfall area, with a warm to hot climate and relatively high humidity in summer. Average daily temperatures vary from 32°C in January to 24°C in July. The wind direction is mostly from south-southeast to north-northwest. The Mean Annual Precipitation (MAP) for this area is approximately 705.85 mm, with the highest concentrations of rainfall between October and March (**Table 9.2**). The winter months contribute very little to the annual rainfall. **Figure 9.4** depicts the long-term annual average climatic conditions throughout the year.

Table 9.2: Temporal Distribution of Rainfall and Evapotranspiration in the Study Site

Month	Mean Monthly Rainfall (mm)	Mean Monthly Evaporation(mm)
January	128.65	229.6
February	123.8	198.7
March	72.6	198.1
April	51.3	162.4
May	11.3	151.2
June	11.35	129.7
July	7.95	119.8
August	10.15	173.2
September	28.9	192.7
October	41.35	228.1
November	102.75	215
December	115.75	216.9
Annual	705.85	2201.5

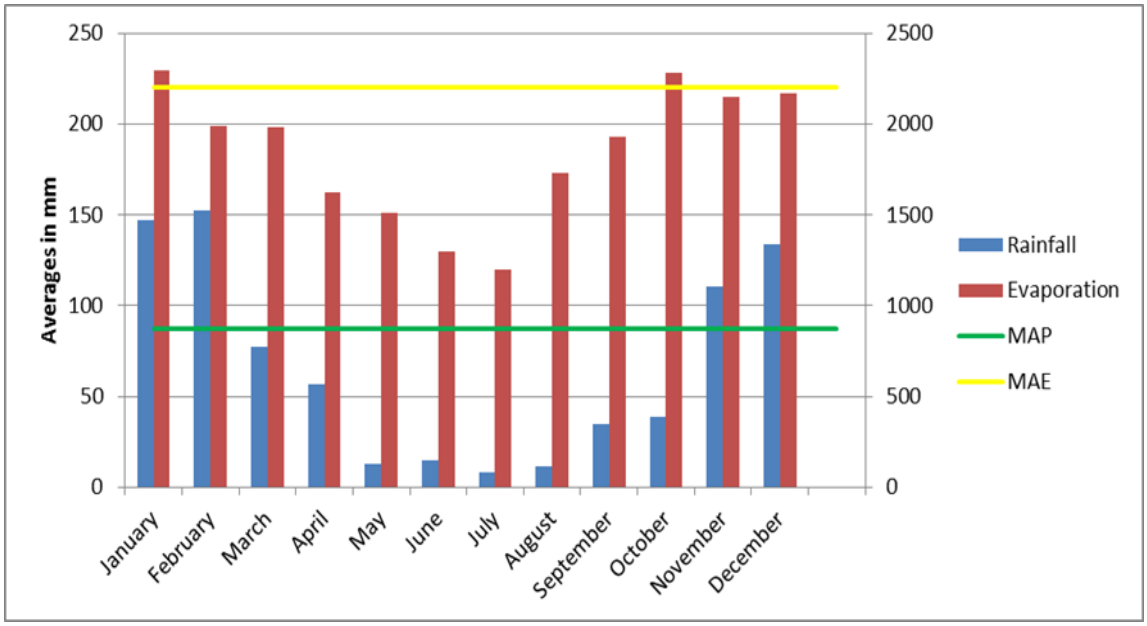


Figure 9.4: Summary of Climatic Information

9.5 Soils and Land Capability

The information provided in this section is a summary of the information provided in the Soils, Land Use and Land Capability Specialist Report. Please refer to ***Appendix H3*** *for a copy of the full report.*

The effects of the historical land use are evident in the study area, and form part of the baseline information, with the effects of both erosion and compaction having impacted the soil resource and the capability of the land.

9.5.1 Soil characterization

The SOTER Database indicates that the majority of the study area is characterised by calcic vertisols and, to a lesser extent, dominated by lithic leptosols. Calcic vertisols are characterised by high clay and the presence of lime. These soils typically represent serious management constraints in terms of cultivation. As these soils are prone to waterlogging due to their slow infiltration rates and may hinder root penetration, thus limiting the choice of crops to be cultivated. However, these soils tend to be very fertile and typically occur in extensive level plains where reclamation and mechanical cultivation can be envisaged. The lithic leptosols are severely limited to agricultural use, with plant roots confined to a small volume of soil that cannot provide adequate anchorage, water and nutrients. These soils with root-restrictive layers can be profitably used for cropping under sustainable and/or intensive management or left for extensive grazing and wood chopping. **Figure 9.5** below illustrates the SOTER dominant soils associated with the study area.

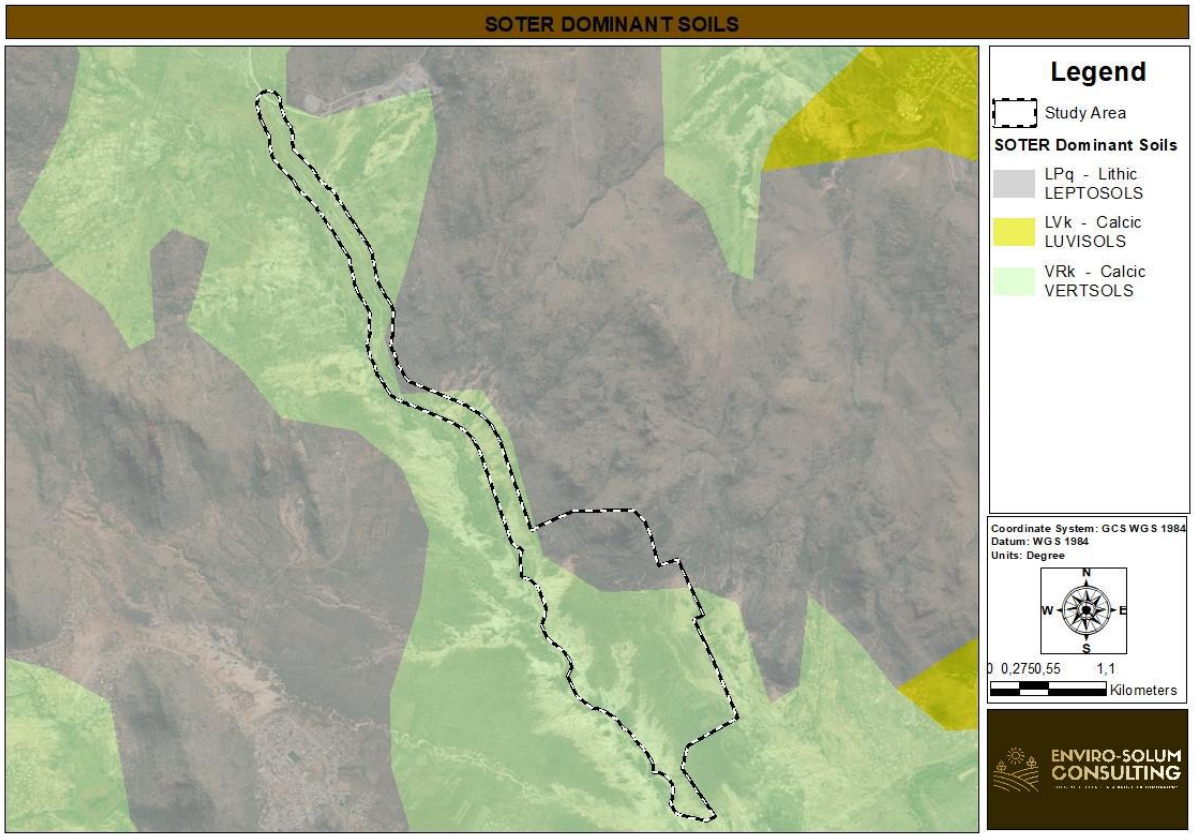


Figure 9.5: Dominant Soil Types associated with the study area

The majority of the study area is characterised by soil depths between 450 mm and 750 mm. This soil depth is considered suitable for various crops, and deeper soils can hold more plant nutrients and water than shallow soils with similar textures. The remaining portions of the study area are characterised by soils with a depth of less than 450 mm. This shallower depth implies that these soils are severely limited to agricultural use, with plant roots confined to a small volume of soil that cannot provide adequate anchorage, water and nutrients. Shallow soils with root-restrictive layers can be profitably used for cropping under sustainable and/or intensive management. **Figure 9.6** illustrates the soil depth associated with the study area.

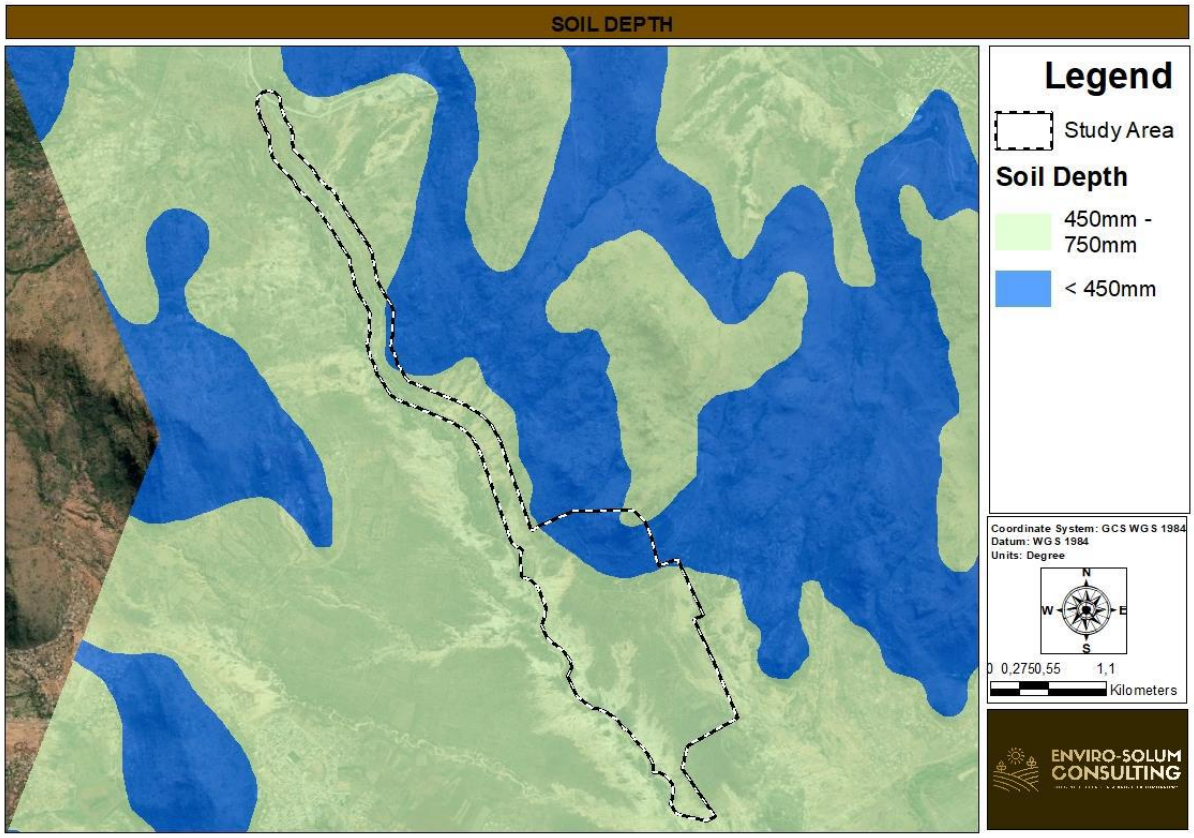


Figure 9.6: Soil Depth Associated with the study area

9.5.2 Soil PH

The soil pH associated with the soils occurring within the entire study area ranges between 7.5 and 8.4, which is considered slightly alkaline to alkaline. The high soil pH can be attributed to other factors, which include but are not limited to:

- Drier climate, limiting leaching and soil weathering;
- Parent material; and
- Soil texture.

This pH range can still be considered acceptable. However, phosphorus fixation by calcium is a common occurrence in alkaline soils and thus may not be available for plant uptake.

9.5.3 Land Capability and agricultural potential

Land Capability is defined as the most intensive long-term use of land for rain-fed farming, determined by the interaction of climate, soil, and terrain. The soil physical properties with which the agricultural potential for this assessment, agricultural sensitivity, was inferred were in consideration of observed limitations to land use due to physical soil properties and prevailing climatic conditions. **Figure 9.7** below depict the land capabilities.

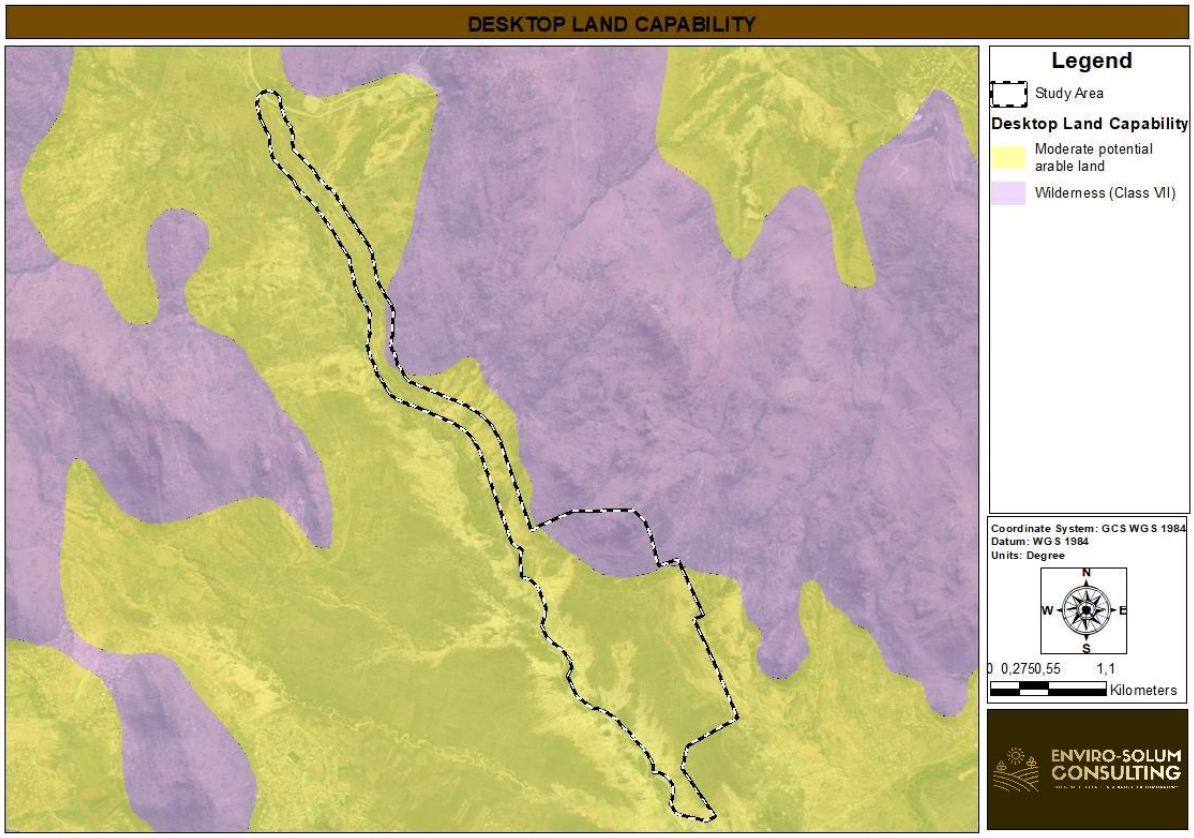


Figure 9.7: Land Capability Map

9.6 Biodiversity

The information provided in the flora baseline description is a summary of the information provided in the Biodiversity Specialist Report. Please refer to ***Appendix H4*** *for the full report.*

9.6.1 Regional vegetation

The proposed site falls into the Sekhukhune Plains Bushveld vegetation type, it is also surrounded by the Sekhukhune Mountain Bushveld (Mucina and Rutherford 2006).

Sekhukhune Plains Bushveld

This vegetation type had previously been classified as Mixed Bushveld (Acocks, 1953, Low and Rebelo, 1996). It occurs widely throughout the Limpopo Province, occurring mostly in lower river basins and plains at an altitude of between 700 - 1 100 m. The area is mainly semi-arid plains with open valleys associated with the small hills and mountains running parallel to the larger escarpment mountains. Predominantly found is closed thornveld with a variety of Aloes and other succulents (Muncina and Rutherford, 2006). Erosion dongas are prominent in the clay rich soils of the area (Mucina and Rutherford, 2006).

Sekhukhune Mountain Bushveld

The Sekhukhune Mountain Bushveld (SVcb 28) was previously known as the Sourish Mixed Bushveld (Acocks, 1953) or the Mixed Bushveld (Low and Rebelo, 1996). Siebert et al. 2002) called it the Kirkia wilmsii-Terminalia prunioides Closed Mountain Bushveld, Combretum hereroense-Grewia vernicosa Open Mountain Bushveld, Hippobromus pauciflorus-Rhoicissus tridentate Rock Outcrop Vegetation.

This vegetation type is found within the Limpopo and Mpumalanga provinces and is comprised of mountains and undulating landscapes. It is known to be dry with open to closed micro-phyllus and broad-leaved savanna. On the mountain slopes, the bushveld vegetation is taller in the valleys with a well-developed herb layer. In the dryer habitats, a number of xerophytic adapted species are present (Mucina and Rutherford, 2006).

9.6.2 Regional Sensitivity

Sekhukhune Plains Bushveld

Sekhukhune Plains Bushveld occurs mainly on semi-arid plains and open valleys between chains of hills and small mountains that run parallel to the escarpment. It is dominated by short, open to close thornveld with an abundance of Aloe species and other succulents. It is heavily degraded in some places and overexploited by man for cultivation, mining and urbanisation. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous trees and invasion by alien species is common throughout the area. There is a high level of degradation of much of the remaining vegetation by unsustainable harvesting and utilisation (Manjwe 2021). The vegetation type's conservation status is regarded as **Endangered.**

Sekhukhune Mountain Bushveld

Sekhukhune Mountain Bushveld occurs on dry, open to closed microphyllous and broad-leaved savanna on hills and mountain slopes that form concentric belts parallel to the northeastern escarpment. This open bushveld is often associated with having ultramafic soils on southern parts. The bushveld on ultramafic soils contains a high diversity of edaphic specialists. The Bushveld of mountain slopes are generally taller than those in the valleys, and a well-developed herb layer. The bushveld found in the valleys and dry northern aspects are usually dense, like thicket, with an herbaceous layer that comprises of many short-lived perennials. Dry habitats contain a number of species with xerophytic adaptations, such as succulence and underground storage organs. Both man-made and natural erosion dongas occur on footslopes of clays rich in heavy metals. An increasing area along the Dwars River Subsuite is under pressure from mining activities and its associated urbanisation. (Manjwe 2021). This vegetation type's conservation status is regarded as **Least Concern**.

9.6.3 Limpopo Conservation Plan

Conservation plan (C-plan) is a strategic plan used to enables us to identify the most important natural resources and preserve an interconnected network of healthy ecosystems. The ecosystems are then divided into different categories which include: critical biodiversity areas (CBA), ecological support areas (ESA), protected area (PA) and other natural areas (ONA).

The proposed site for the South 3 opencast project falls within CBA1- these areas are maintained to a natural or near natural state to ensure that the existing ecological services and functioning of the ecosystem are able to continue. As well as ESA 2- these areas are required to provide support to the functioning of the CBA.

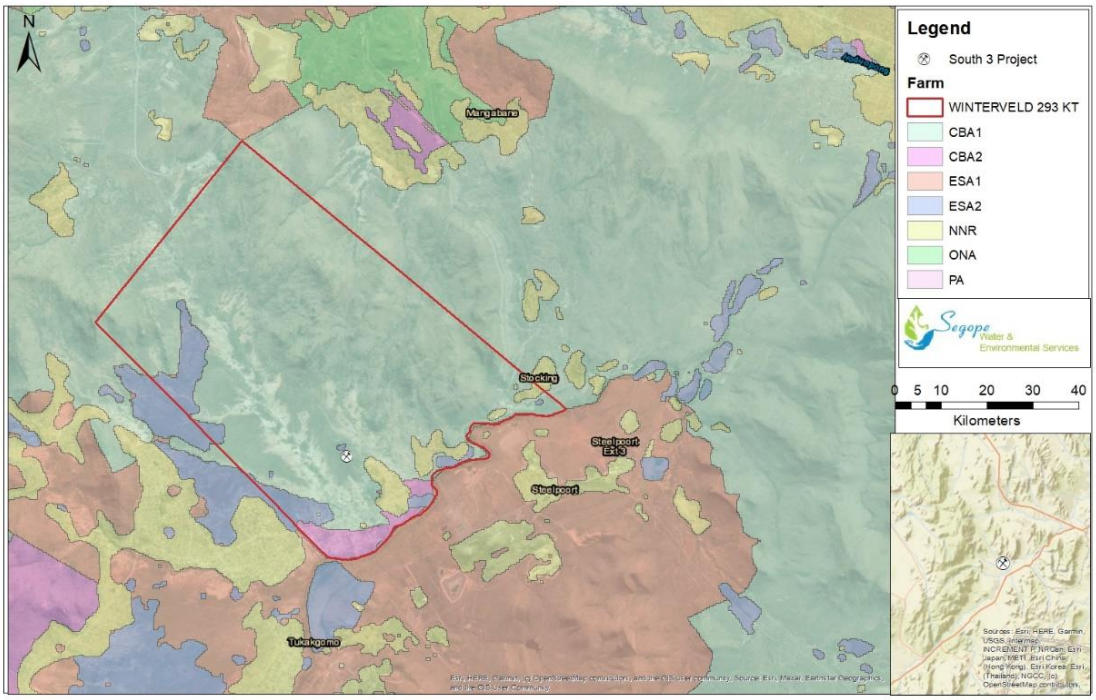


Figure 9.8: Biodiversity of the proposed South 3 area

9.6.4 Wetlands

The information provided in the wetland baseline description is a summary of the information provided in the Biodiversity Specialist Report. Please refer to ***Appendix H5*** *for the full Biodiversity Specialist Report.*

The wetland delineation was completed with the aid of aerial imagery, as well as verification in the field. The project area covers approximately 273 hectares and no wetlands were spotted or observed onsite. The delineation was conducted using the four specific indicators as mentioned namely Terrain Unit, Soil form, Vegetation, and Hydrology indicators.

9.6.5 The Present Ecological State Status

The present ecological status category (PESC) is the practicality of restoring a system following an assessment of the changes that have occurred to arrive at an attainable ecological management. The PESC status is defined as follows:

Category A: Unmodified natural
Category B: Largely natural
Category C: Moderately modified
Category D: Largely modified

Based on the site observations and the Provincial Water Resources Assessments for the National Water Balance of 1999, the sensitivity and present ecological status for the B41J quaternary catchment is **given as B**.

9.6.6 Blasting

The information provided in the sensitivity baseline description is a summary of the information provided inthe Blasting Impact Assessment Report. Please refer to ***Appendix H6*** *for the full Biodiversity Specialist Report.*

The objective of the Blasting Impact assessment study can be defined as outlining the expected environmental effects that blasting operations could have on the surrounding environment with regards to expected ground vibration, air blast and fly rock and proposing specific mitigation measures if required. These effects are investigated in relation to the blast site area and surrounds of possible influence on nearby powerlines, houses and the owners or occupants. **Figure 9.9** below shows a typical blast design and operation.

The study assessed the impact of the proposed Project on the following:

- Community Houses and Graves
- Existing powerlines
- River and Wetlands
- Roads
- Livestock and wild animals

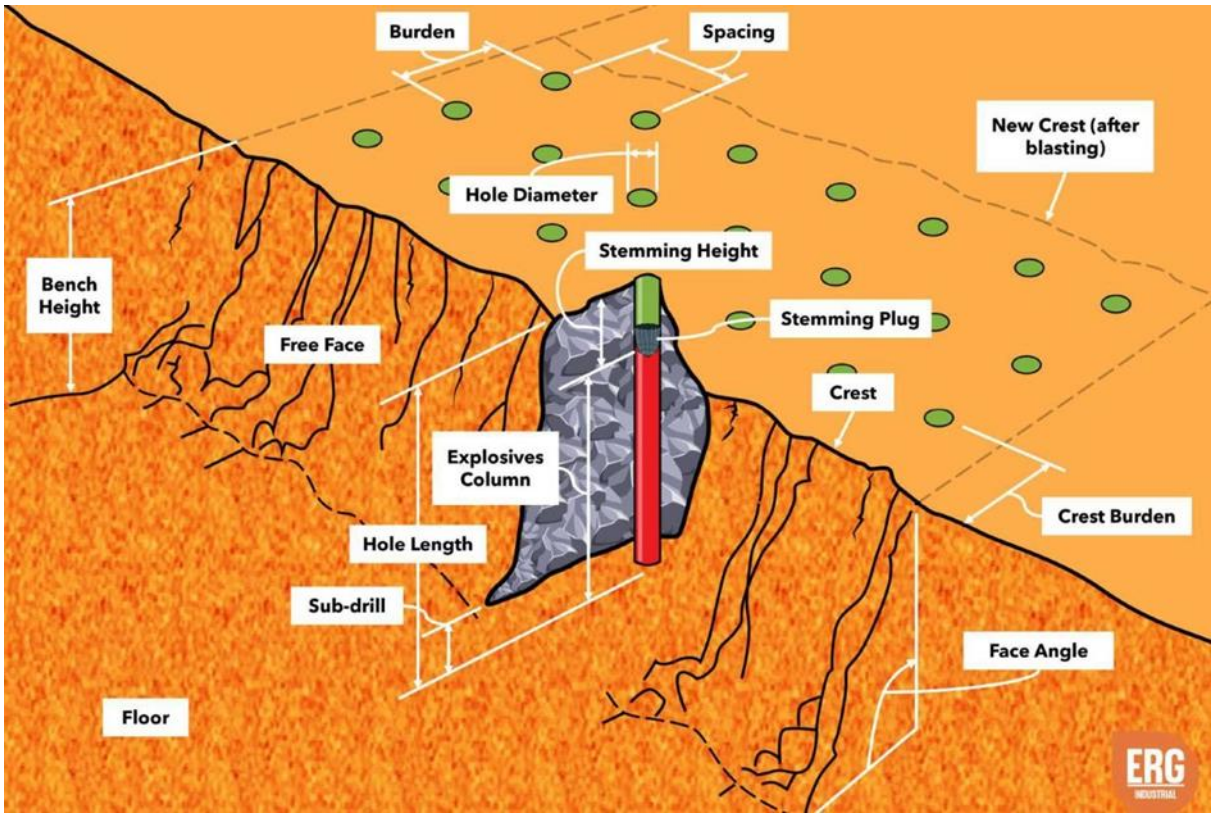


Figure 9.9: Blast Design and operation

Site Investigation

Sensitivity mapping was conducted on typical areas and distance from the proposed mining area. This sensitivity map uses distances normally associated where possible influences may occur and where influence is expected to be very low or none. Two different areas were identified in this regard:

- A highly sensitive area of 500m around the proposed mining area. Normally, this 500m area is considered an area that should be cleared of all people and animals prior to blasting. Levels of ground vibration and air blast are also expected to be higher closer to the pit area;
- An area 500m to 1500m around the mine area can be considered as being a medium sensitive area. In this area, the possibility of impact is still expected, but it is lower. The expected level of influence may be low, but there may still be reason for concern, as levels could be low enough not to cause structural damage but still upset people; and
- An area greater than 1500m is considered low sensitivity area. In this area, it is relatively certain that influences will be low with low possibility of damages and limited possibility to upset people.

Desktop studies was done to preliminary check the orientation and the feel of the environment where the proposed project is located. As part of desktop studies screening tool was used to assess the applied area and its surroundings. From the screening report it was found that the project is highly sensitive on the animal species, terrestrial biodiversity and heritage. This gave the blasting impact assessor an indication of possible mammals and graves/burial sites on site that may be affected by blasting activity.

Charmdane Mining (Pty) Ltd conducted an assessment on the area of interest to identify the infrastructures/features that may be affect by blasting activity. The Blasting Impact Assessment was the conducted on the 24th of July 2024, and the following discoveries were made (**Table 9.3**):

Table 9.3: Discoveries made on site.

Features	Distance from the Mining Area
Eskom Powerlines	Powerline=742,168 m South main powerline, there are poles within the community and ranges between 510-600m away from the proposed operation.
Identified Graves	880m East and 308m to 540m North
Transnet Railway line & infrastructures	Not found on site
Community Houses	Within the MR closest house is about 51m east of Sothern side of the planned open pit.
Road Network	Gravel roads 620,839 m south (Gravel- D1392), series of unnamed gravel road and about 2085,146 m south there is a Tar Road-R555
Dams, Wetlands, streams and animal habitat	Non-Perennial (less than 80m-Tubatsane River) and perennial river system = 1538,255 m South (Steelpoort River)
Proposed MPM Infrastructure (Offices Area)	Less than 250m from North Shell
Other Mining operations	About 3km North 4,5 North West

Figure 9.10: Infrastructures, Powerlines and water tank stand (about 595,1m East of the South Shell Pit)

Figure 9.11:Different types of houses around the mining area

Figure 9.12:State of some houses closer to the proposed operation

Figure 9.13: Graves identified within the proposed open cast and outside

Buffer zone map and Model of Blasting Vibration

Figure 9.14 below indicates the blasting radius and nearby infrastructures, whereas Figure 9.15 indicates the overall blasting impact assessment for the South 3 area.

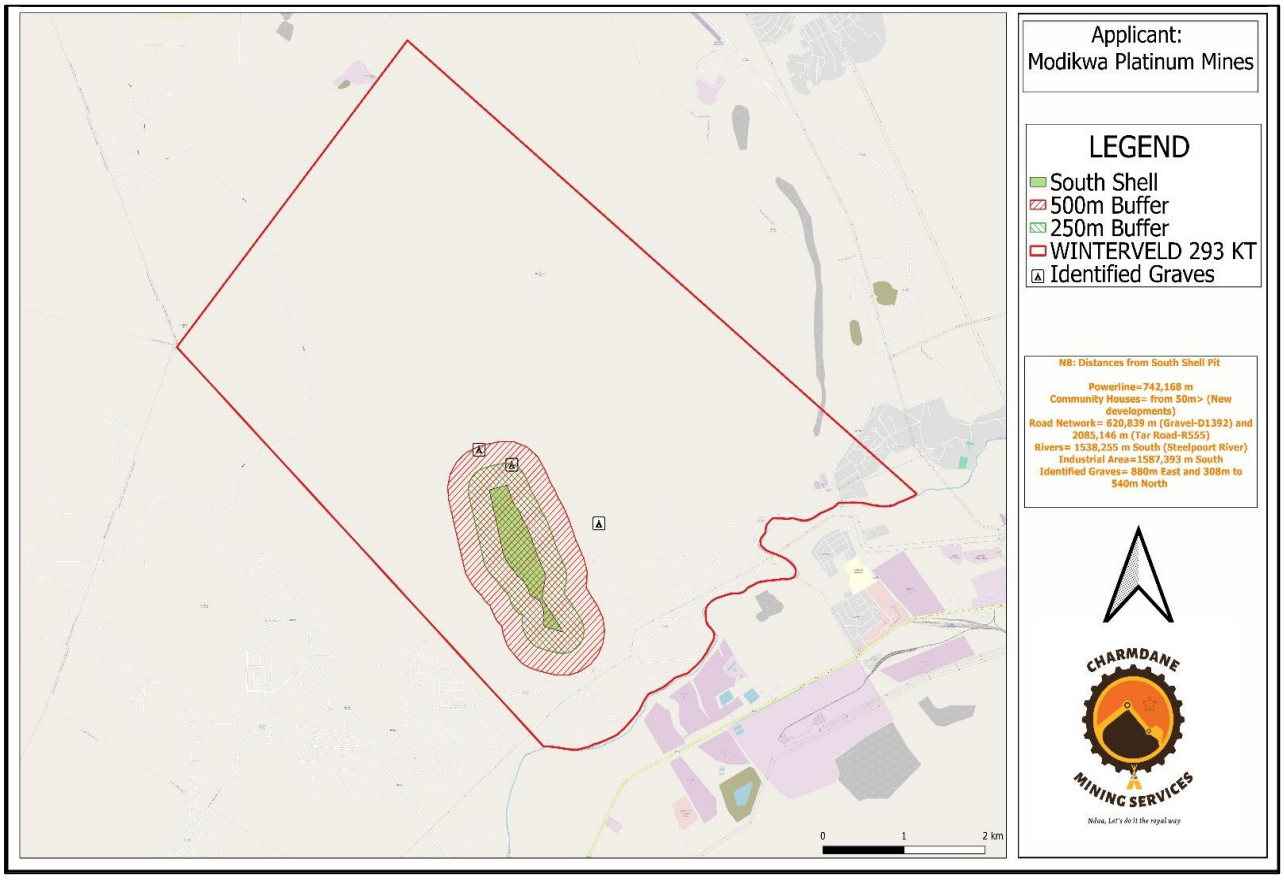


Figure 9.14:South Shell Blasting Radius and nearby infrastructures

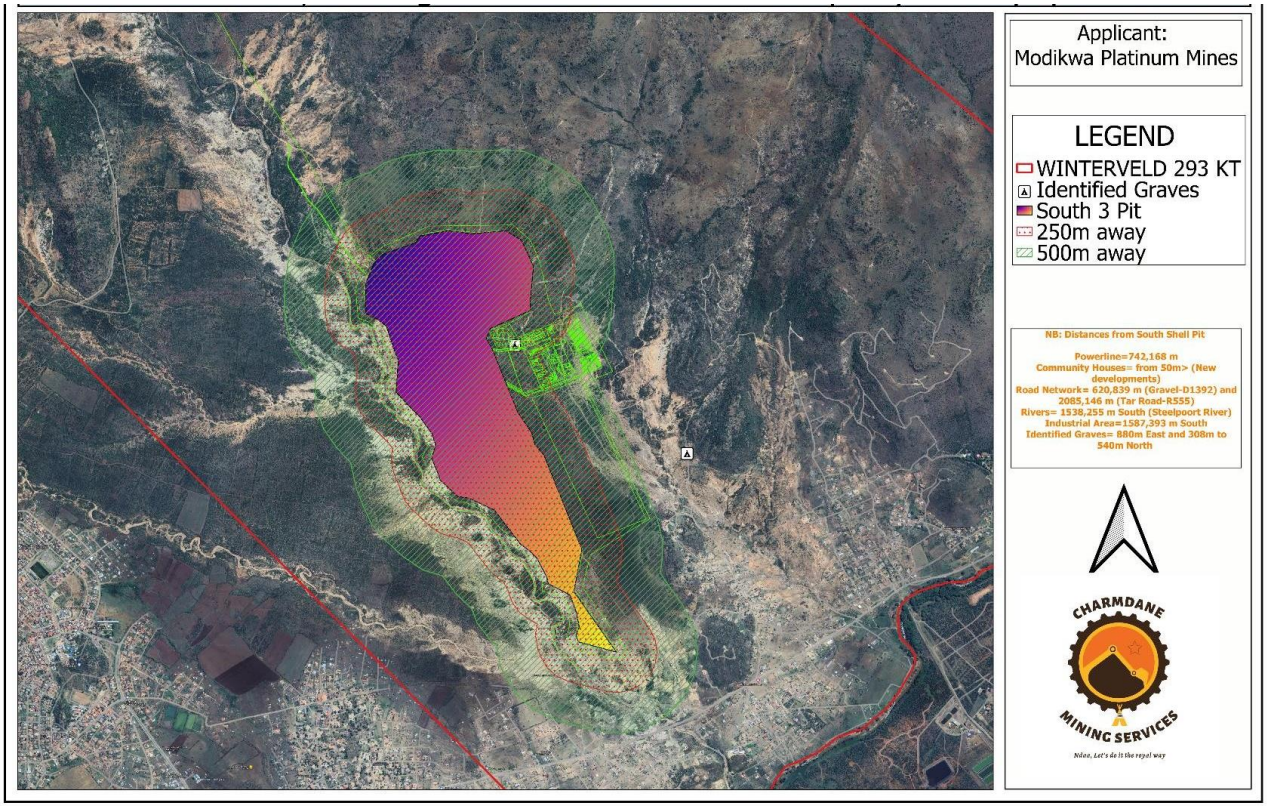


Figure 9.15: The Overall Blasting Impact Assessment for the South 3 Open Cast area

Considering the blasting radius of 500m, the community houses located at a distance of 500m or more from the blasting area are expected to experience minimal impacts. However, areas within a 500m radius from the blasting area will likely experience high impacts.

This Blasting Impact Assessment report may need to be reviewed and updated if necessary. There is no reason to believe that this operation cannot continue if attention is given to the recommendations made. Monitoring of the infrastructure on a quarterly basis will assist the applicant to minimize liability should any of the infrastructure be damaged through blasting activity.

9.6.7 Sensitivity Mapping

The information provided in the sensitivity baseline description is a summary of the information provided in the Environmental Screening Report. Please refer to ***Appendix H7*** *for the full Biodiversity Specialist Report.*

The results of the Screening Report generated for the proposed South 3 Opencast Mine project, show that the relative terrestrial biodiversity theme sensitivity is classified as VERY HIGH due to proposed site falling within a Critical Biodiversity Area (CBA)1, CBA 2, Ecological Support Area (ESA) 1, and ESA2. (**Figure 9.9**). According to Section 3 (1) of GN R. 320, 'an applicant intending to undertake an activity identified in the scope of this protocol, on a site identified on the screening tool as being of "very high sensitivity" for terrestrial biodiversity, must submit a Terrestrial Biodiversity Specialist Assessment'.

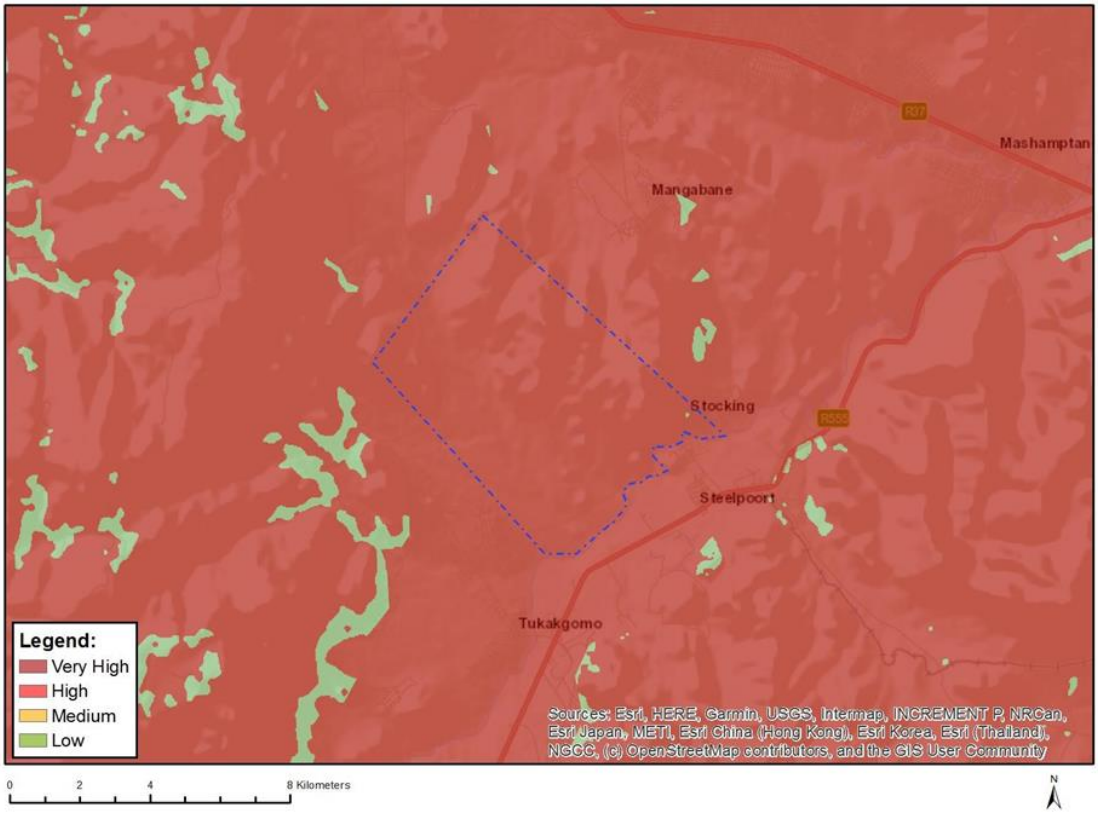


Figure 9.16: Relative terrestrial biodiversity theme

9.7 Surface Water

The information provided in this surface water section is a summary of the information provided inthe Surface Water Specialist Report. Please refer to ***Appendix H8*** *for the full report.*

9.7.1 Catchment description

The mining lease area of the proposed project falls within quaternary catchment B41J with an area of 69100 ha and a net mean annual runoff (MAR) of 13.30 million cubic meters (mcm). The area comprises mainly relatively flat terrain and undulating valleys with areas of significant erosion associated with wide, open and eroded drainage lines. The South 3 project area falls within the Tubatsane and Mofafa river catchments. Surface water surrounding the South 3 project area flows via a number of unnamed ephemeraltributaries and drainage lines, which is wide and shallow downstream of South 3 prior to the confluence with the Steelport River.

9.7.2 Surface Water Hydrology

The project area is drained by the Tubatsane River (perennial river) and the Mofafa River (non-perennial, intermittent river) (**Figure 9.17**) These two streams, one on each side of the proposed South 3 project area, do not have a confluence with each other and they are both tributaries to the Steelport River. All runoff from the project area flows in a south-easterly direction to join the Steelpoort River downstream of the project area, which is a major tributary of the Olifants River System.

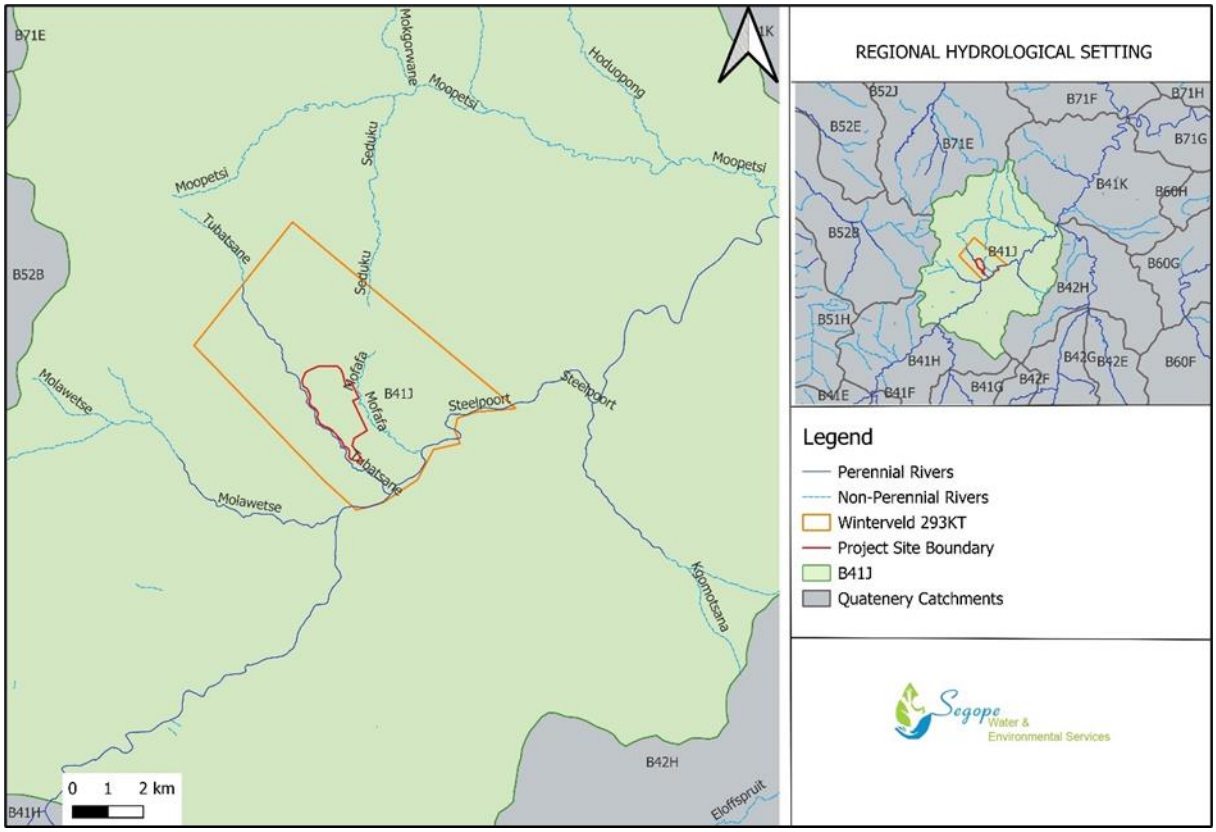


Figure 9.17: Regional Hydrological Setting

9.7.3 Mean Annual Runoff

Certain infrastructure, such as pollution control dams, and waste rock dumps would cause an increase in hydrologically ineffective areas. Being dirty, surface water emanating from these areas would be captured and treated to a quality level as close to the source as possible. Consequently, the MAR would decrease as shown in **Table 9.4**.

The mining-associated infrastructure is estimated to take-up approximately 282 ha of the effective catchment area. For this project, WR2012 quaternary runoff data (Middleton and Bailey, 2012) was estimated for the 282-ha area to be taken up by the project to obtain runoff volume that will be reduced. The percentage reduction of the B41J catchment area due to the proposed opencast mining activity and its associated surface infrastructure with an area of approximately 282 ha is given **Table 9.4**.

Table 9.4: Project site MAR

Quaternary Catchment B41J Area (ha)	Baseline Quaternary Catchment B41J MAR (mcm)	Project site Area (ha)	% of B41J covered by the Project Site	Project Site MAR (mcm)
69100	13.30	282	0.41	0.84

9.8 Groundwater

The information provided in the groundwater section is a summary of the information provided in the Groundwater Specialist Report. Please refer to ***Appendix H1*** *for the full report.*

9.8.1 Topography and Surface Drainage

The topography of the project area is extremely rugged, characterized by steep-sided hills and mountains in the north and north-eastern regions of the area, with a broad relatively flat land towards the south and western parts.

The lower lying areas at a flat plain are at an average height of 750 meters above mean sea level (mamsl). The highest ridges have elevations of approximately 1 300 mamsl at the north-eastern side of the project area. The topography of the project site is highly influenced and, in most cases, is directly related to the underlying geology, as well as past and present climatic/drainage conditions.

The investigation area falls on 1:25 000 map sheets 2430 CA (Figure 2.1). The area is drained by the perennial river, Tubatsane River and a non-perennial Mofafa River. Both these rivers flow in a south-westerly direction to join the Steelpoort River at the South of the project area. The drainage of an area forms part of the Quaternary Drainage Region B41J. The regional Hydrological setting is shown in below.

9.8.2 General Geology

The study area falls within the Pilgrims Rest 1:250 000 geology series maps. The geology of the area consists mainly of the Critical and Main Zones of the Rustenburg Layered Suite of the Bushveld Igneous Complex. The project area encompasses intrusive igneous rocks, mainly norite and pyroxenite. Lithologies has mainly a south to south-eastern strike and dips at an angle of ±10-15° in a westerly direction. MPM is aiming to exploit ore reserves of the UG2 layer, hosted within these rocks.

9.8.3 Regional Hydrogeology

The Rustenburg Layered Suite rocks typically act as secondary aquifers (intergranular and fractured rock aquifers) (Haupt, C.J). However, the multi-layered weathering system present on these rocks could prove to have up to two aquifer systems present in the form of a shallow, saprolitic aquifer with a weathered, intergranular soft rock base associated with the contact of fresh bedrock and the weathering zone, and a fractured bedrock aquifer. These aquifer systems are discussed below:

Shallow, saprolitic aquifer

The primary source of recharge into a shallow aquifer is rainfall that infiltrates the aquifer through the unsaturated (vadose) zone. In these systems, vertical movement of water is faster than lateral, as water moves predominantly under the influence of gravity. This aquifer may contain coarse, anorthositic sediment or turf clay sediment when underlain by Anorthosite or Gabbro-norite, respectively. The hydraulic conductivity of this aquifer ranges between 10-8 and 10-2 m/day, and porosity ranges between 0.4 and 0.7 for turf clay sediments. The hydraulic conductivity of the

course, anorthositic sediment can reach up to 20 m/day with porosities ranging between values of 0.25 to 0.5.

Shallow weathered aquifer

This aquifer, which is recharged by rainfall, is often perched due to the impermeable clay horizons that might have developed underneath it. The recharge to this aquifer is estimated to be 3 - 5% of the annual rainfall. The well-developed clay layers in this aquifer restrict the downward filtration of recharged rainwater into the primary fractured aquifer. The most significant water accumulation is generally confined to the contact between the weathered and "fresh" bedrock. The borehole yields in this aquifer is high due to the sandy nature of the weathered pyroxenite.

Fractured, bedrock aquifer

Groundwater movement in this aquifer is predominantly associated with secondary structures in this aquifer (fractures, faults, dykes, etc.). The average water level depth ranges between 5 and 40 mbgl. Borehole yields in the Rustenburg Layered Suite fractured aquifers are generally low and can be expected to be between 0.1 and 2 l/s, with regional flow resembling flow in the porous medium, obeying Darcy's law. These formations contain limited quantities of water resources due to the poor storage capacity of the igneous rock.

Groundwater quality in this area is expected to be intermediate to poor, with EC values ranging from 4.4 to 120mS/m and possibly elevated Ca, Mg, Cl, and SO_4 and carbonate alkalinity concentrations according to Haupt, C.J., (1995). Both the porosity and the hydraulic conductivity of the Rustenburg Layered Suite fractured aquifers are known to be low (Williams *et al*., 2020). The commonly expected values of porosity and hydraulic conductivity for Igneous rock types, similar to those present in the Rustenburg Layered Suite, are 0.05 and 10-5 $m.d^{-1}$, respectively (Kruse man & de Ridder, 1994). Groundwater movement in this aquifer will be preferential in secondary structures such as joints, faults, and fractures.

Deeper fractured aquifer

The presence of weathering and fracturing zones within the country rock controls groundwater occurrence. Groundwater is generally restricted to depths of 40 – 70m below the surface, with most water strikes occurring in fracturing below the weathering. The most profound water strikes (70m) are associated with the contact zones of the main SW – SE trending dykes. Zones of high transmissivity are known to be associated with the dolerite dykes, and borehole yields varying from 2 to 20 l/s have been obtained in the general area. Aquifers are confined, anisotropic, and secondary with limited storage.

9.8.4 Baseline Hydrogeological Assessment

Hydrocensus

A Hydrocensus was conducted on 13th and 14th June 2024 by Segope Water and Environmental Services (Segope Consulting). Hydrocensus was conducted to locate existing boreholes, springs and surface water resources. A Hydrocensus was done within 2 Km radius from the central point of the South 3 site. Given that groundwater flow direction generally follows the surface topography of the area; the Tubatsane River was considered being the major receptor. Up gradient regions were considerate as background water quality.

A total of 21 Boreholes were found within 2km radius from the site central point. This included monitoring boreholes, privately owned boreholes for domestic purposes as well as abandoned unused boreholes. A summary of the groundwater information gathered during the Hydrocensus and Hydrocensus points are detailed in **Table 9.5** and **Figure 9.18**, respectively.

No springs were identified within the 2 km radius. The use of groundwater in the community is predominately for domestic purposes. Although the aquifers are of limited extent with relatively low storage resulting in boreholes having relatively low sustainable yields, and therefore only moderate abstraction potential, groundwater is the sole source of water for most rural settlements around the proposed mining property.

Table 9.5: Hydrocensus Information

No.	ID	Latitude	Longitude	Elevation	Property	Casing Height	Static Water Level(mbgl)	Static water Level (mamsl)	Sampled(y/n)	Borehole use	Comment on Borehole condition
1	BH01	24°43'22.07"S	30°10'2.33"E	790m	Winterveld 293 KT	0.3 m	23.15	22.85	Yes	Monitoring	Good condition to take depth and sample
2	BH02	24°43'43.75"S	30°10'6.02"E	784 m	Winterveld 293 KT	0.36 m	14.60	14.24	Yes	Monitoring	Good condition to take depth and sample
3	BH03	24°42'43.09"S	30°9'9.46"E	817m	Winterveld 293 KT	0.075 m	1.52	1.145	Yes	Monitoring	Good condition to take depth and sample
4	BH04	24°43'22.88"S	30°10'11.82"E	777m	Winterveld 293 KT	0.1010 m	-	-	No	Monitoring	Borehole had Sewage
5	BH05	24°42'50.09"S	30°10'9.56"E	794m	Winterveld 293 KT	1.005 m	-	-	No	Monitoring	Borehole Blocked
6	BH06	24°43'28.08"S	30°10'11.86"E	782m	Winterveld 293 KT	0.21 m	15.91	15.71	Yes	Domestic	Good condition to take depth and sample
7	BH07	24°42'57.64"S	30°10'10.94"E	800m	Winterveld 293 KT	1 m	-	-	No	Monitoring	Borehole blocked
8	BH08	24°42'44.17"S	30° 9'50.70"E	823m	Winterveld 293 KT	0.03m	-	-	No	Domestic	Borehole Blocked
9	BH09	24°43'35.27"S	30°10'11.86"E	763m	Winterveld 293 KT	-	-	-	Yes	Domestic	Borehole equipped
10	BH10	24°43'26.32"S	30°10'15.36"E	775m	Winterveld 293 KT	0 m	5.13	5.13	Yes	Not used	An open hole with no protection and unused
11	BH11	24°43'45.12"S	30°10'30.16"E	759m	Winterveld 293 KT	-	-	-	No	Domestic use	Borehole equipped
12	BH12	24°43'45.17"S	30°10'27.67"E	763m	Winterveld 293 KT	-	-	-	Yes	Domestic use	Borehole equipped
13	BH13	24°43'45.12"S	30°10'30.16"E	760m	Winterveld 293 KT	-	-	-	No	Domestic use	Borehole equipped
14	BH14	24°43'46.53"S	30°10'36.76"E	754m	Winterveld 293 KT	-	-	-	No	Domestic use	Borehole equipped
15	BH15	24°43'47.79"S	30°10'24.30"E	760m	Winterveld 293 KT	-	-	-	No	Domestic use	Borehole equipped
16	BH16	24°43'35.21"S	30°10'6.29"E	782m	Winterveld 293 KT	0.07m	-	-	No	Monitoring	Dry hole
17	BH17	24°43'40.71"S	30°10'31.88"E	757m	Winterveld 293 KT	-	-	-	No	Domestic use	Borehole equipped
18	BH18	24°43'43.93"S	30°10'27.30"E	762 m	Winterveld 293 KT	-	-	-	No	Domestic use	Domestic Use
19	BH19	24°43'50.00"S	30°10'17.56"E	772m	Winterveld 293 KT	-	-	-	No	Domestic use	Domestic Use
20	BH20	24°43'44.08"S	30°10'30.44"E	761m	Winterveld 293 KT	-	-	-	No	Domestic use	Domestic Use
21	BH21	24°43'36.78"S	30°10'22.81"E	766m	Winterveld 293 KT	-	-	-	No	Domestic use	Domestic Use

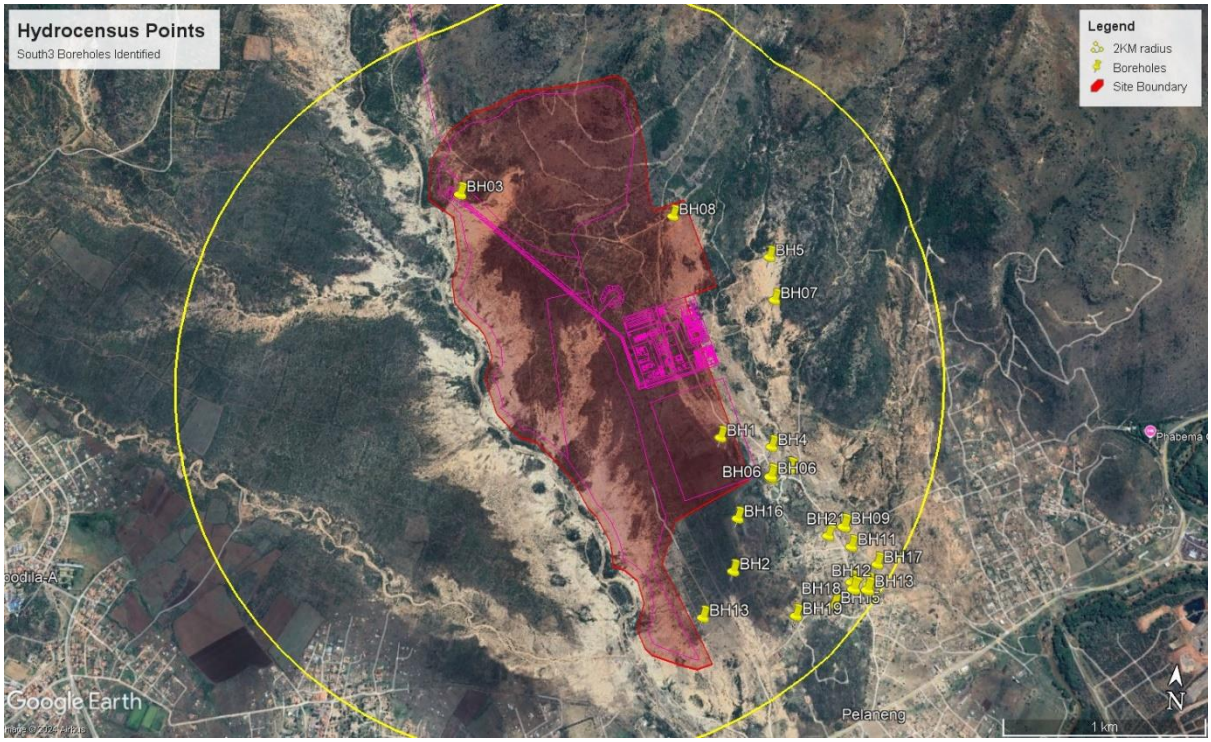


Figure 9.18: Hydrocensus points

9.8.5 Groundwater Quality

Water samples were collected from seven (7) boreholes around the site during the investigation. The water results were compared with the maximum recommended concentrations for domestic use as defined by the SANS 241-1: 2015 target water quality limits. The SANS 241-1: 2015 standard is applicable to all water services institutions and sets numerical limits for specific determinants to provide the minimum assurance necessary that the drinking water is deemed to present an acceptable health risk for lifetime consumption.

The following groundwater parameters were analyzed to understand the quality and Hydrochemical characteristics of the groundwater samples taken:

- Dissolved Aluminum
- Dissolved Arsenic
- Dissolved Cadmium
- Dissolved Calcium
- Total Dissolved Chromium
- Dissolved Cobalt
- Dissolved Copper
- Total Dissolved Iron
- Dissolved Lead
- Fluoride
- Chloride
- Nitrite as NO_2
- Nitrate as NO_3
- Sulphate
- Ortho Phosphate as PO_4
- Ammoniacal Nitrogen as NH_4
- Hexavalent Chromium
- Total Alkalinity as $CaCO_3$

- Dissolved Magnesium
- Dissolved Manganese
- Dissolved Mercury
- Dissolved Molybdenum
- Dissolved Nickel
- Dissolved Potassium
- Dissolved Selenium
- Dissolved Sodium
- Carbonate Alkalinity as $CaCO_3$
- Bicarbonate Alkalinity as $CaCO_3$
- Electrical Conductivity @25°C
- pH
- Total Dissolved Solids
- Total Suspended Solids
- Dissolved Zinc

Groundwater quality against SANS standards

The groundwater quality against SANS standards for the seven boreholes are summarized as follows:

- Electrical Conductivity and total dissolved solids exceed the SANS standard limits in BH01 and BH12 samples, indicating a high mineralization level on these samples.
- Nitrates exceeds SANS standards in BH06 and BH12 and this may be likely due to nitrogen fixation from the natural vegetation in the area.
- The sample BH01 also have Chloride, Sodium, Zinc and total Manganese values elevated above SANS standards.
- Samples BH06, BH09, and BH13 have Zinc levels above SANS standards.
- Manganese levels are also above SANS standards in samples BH02 and BH06, likely due to local geology.

9.8.6 Baseline Hydrochemical facies and Groundwater Quality classification at the South 3 Site

The Piper plot shown in **Figure 9.19** indicates the classification of groundwater at the South3 site using a Piper plot. The plot shows that groundwater from BH01 is of sodium chloride type with dominant chloride anions and sodium-potassium type cations. This suggest that the groundwater chemistry is mainly controlled by a mixing and ion exchange processes (Ahmed et al., 2010).

Groundwater from BH02, BH03 and BH09 can be classified as magnesium bicarbonate type dominated by bicarbonate ions, with no dominant cations, indicating enriched water quality associated with water rock interaction. The BH03 Borehole is located upstream of the project site whereas the BH2 and BH09 are located downstream of the project site and this indicates that magnesium bicarbonate groundwater types are found in areas covering the downstream and upstream sessions of the proposed project site.

Groundwater from BH06 is a mixed type, dominated by calcium cations, with no dominant anions. Similarly, water from BH13 is also a mixed type, and also dominated by calcium type cations, however the bicarbonates were also found as dominant anions in this sample. Groundwater from BH12 can be can be classified as well-mixed water with no dominant cations

and anions. The three boreholes namely BH06, BH12 and BH13 containing mixed water types are located downstream of the project area.

In general, the water quality at the proposed project can be described as dominated by mixed and magnesium bicarbonate types with alkaline earths metals generally exceeding alkalies.

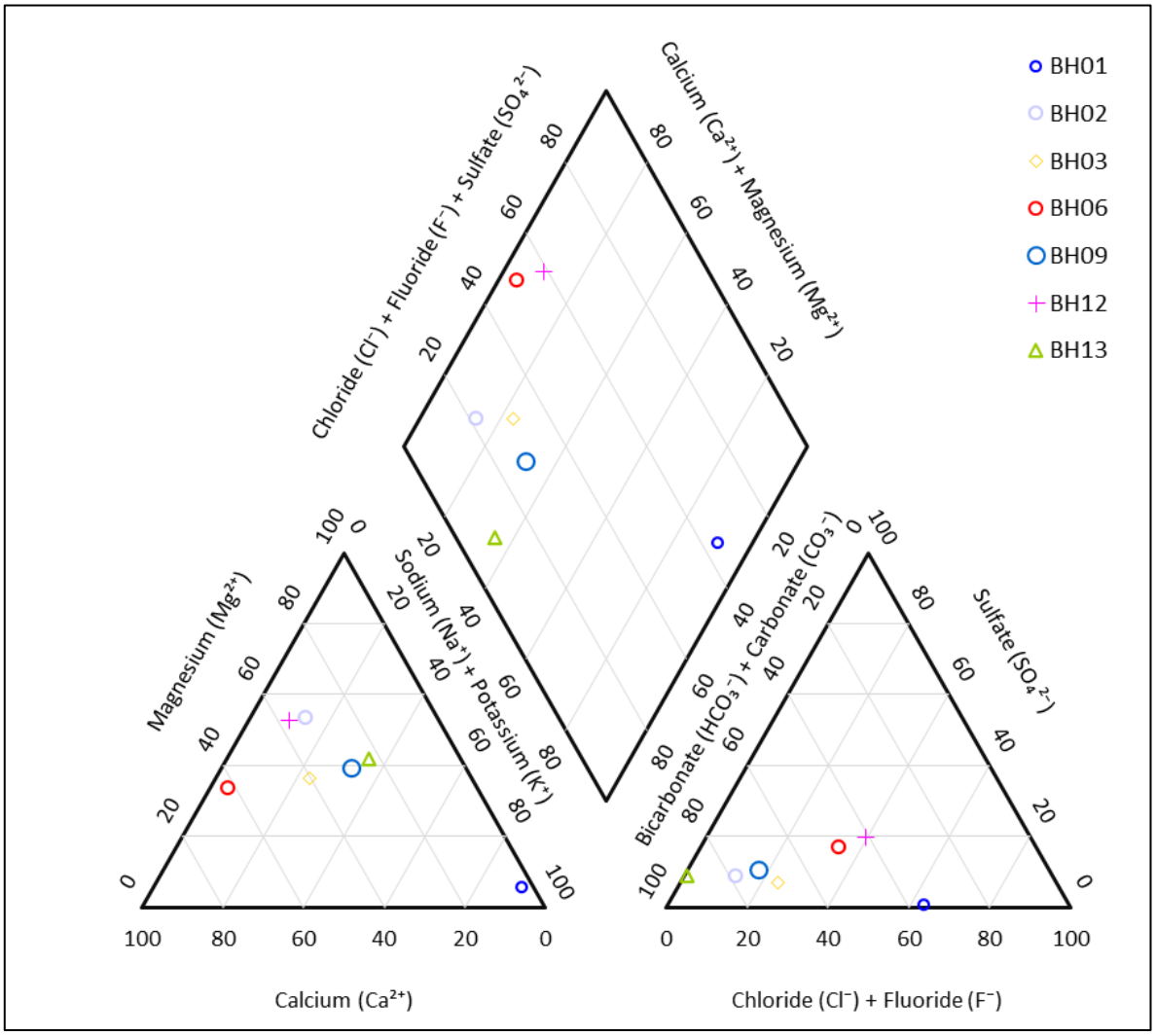


Figure 9.19: Groundwater classification at the South3 Site

9.8.7 Groundwater Levels

Groundwater depths ranging between 1.43 and 22.85 metres below the surface were found for the project area. The project area is situated on intergranular (weathered) and fractured rock aquifers, indicating a very permeable water aquifer. The groundwater levels within the study area were measured to determine the groundwater flow direction.

9.9 Air Quality

Current sources of dust from MPM operations may include:

- Disturbed land, especially associated with mining activities;

- Unsealed / Unpaved access roads;
- The ore and waste rock stockpiles;
- Conveyor belt transfer points;
- The ROM pad and plant site;
- The dry surfaces of the slime's dams;

Ambient air quality monitoring:

A dust fallout monitoring programme may be established at South 3 Opencast. The locations of these monitoring stations if required, will be compared to the National Dust Control (NDC) Regulations (Gazette No. 3674 - GN827, 1 Nov 2013) for non-residential and residential areas. The NDC Regulations defines two different area classifications:

- Residential areas; and
- Non-residential areas.

The infrastructure and activities associated with the proposed South 3 Opencast Project may have an impact on the air quality, especially during the construction phase of the proposed project. Impacts might also occur during the operational phase of the waste rock dump. The potential impact will be assessed and appropriate management measures will be assigned during the Air Quality specialist study and findings included in the EIA/EMPR.

9.10 Noise

The baseline information provided in the noise section is a summary of the information provided in the Noise Specialist Report. Please refer to ***Appendix H9*** *for the full report.*

9.10.1 Description of the environment

The following observations were made in and around the South 3 area:

- There was no traffic nearby the mine during the time of the noise survey.
- There were no mining activities.
- The wind and weather conditions play an important role in noise propagation

During the noise assessment, survey readings were carried out at the different measuring points and the prevailing atmospheric conditions i.e. wind speed was taken into consideration. The wind which may influence the outcome of the readings was counted by the wind shield installed on the sound level meter.

The potential noise-sensitive developments/ receptors (Residential areas) were identified using Google Earth. Noise-sensitive developments/ receptors are located at the boundary. These sensitive developments and receptors are in close proximity to the proposed new development:

- Mahlakwena, Steelport (approximately 9.5 km)
- Ga-Mapodile-A (approximately 9.2 km)
- Tukakgomo (approximately 10.5 km)

Potential consequences and cases of general noise disturbance and nuisance noise pollution can be linked to:

- Transformation of wildlife habitat due to changes in animal behaviour, mostly animals that rely on noise senses, for hunting, preying and mating;
- Reduced habitat utilisation due to animals moving away from vicinity of noisy activity;
- Blockage of migration path or deter foraging close to noisy activity;
- Sleep disturbance and social behaviour effects – a cause of concern for fatigue and annoyance responses and effects on performance;
- Interference with communication;
- Noise-induced hearing impairment
- Elevated stress leading to cardiovascular and psychophysiological effects and conditions;
- In severe cases, multiplicity of these concerns can lead to mental health effects;
- Individual and collective community complaints from sensitive receptors.

9.10.2 Potential and current noise sources

Typically, but not limited to noise generated by surrounding mining, transportation and residential areas. The following are noise sources in the vicinity of and the boundaries MPM area:

- Road noise from the vehicles engines and the tyres contact with the road surface.
- Noise from the warning devices on the trucks i.e. hooters
- Mining related noise from the processing plants and earth moving equipment.
- Domestic noises
- Intermittent traffic along the feeder roads and haul road
- Distant traffic noise from the abutting feeder roads
- Birds
- Wind noise

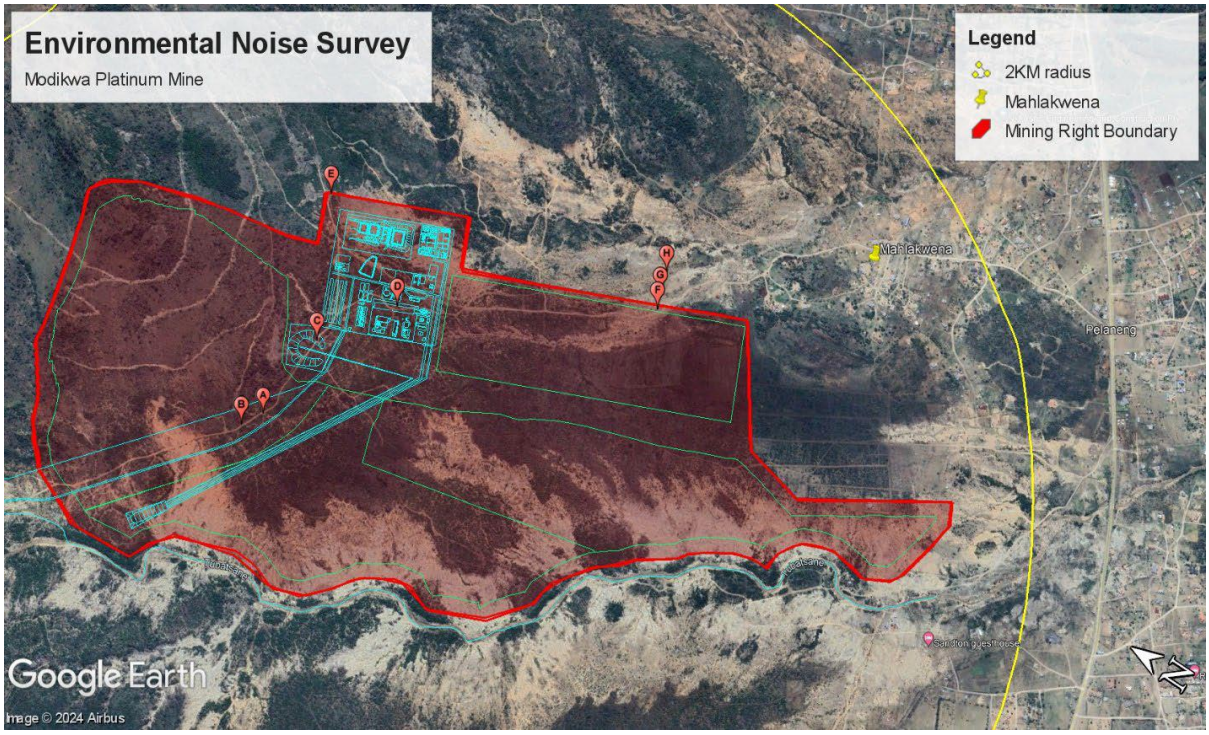


Figure 9.20: Environmental noise sampling points

Table 9.6:Potential Sources of Noise – Construction Phase

Construction Activity	Sources of Noise
Vegetation clearing, soil stripping & stockpiling	Bulldozers, trucks
Haul road construction	Bulldozers, loaders, trucks, compactors
Blasting	Air blast
Construction of access and internal roads	Earth-moving equipment, trucks, dozers
Digging of foundations and trenches	Excavation and diesel engine noise
Building construction	Material handling, mixers, compressors
Plant construction	Material handling, grinding, cutting, drilling
Delivery of materials	Vehicle movements, road noise

Table 9.7:Potential Sources of Noise – Continuous and Operational Phase

Dump Noise sources
• Dump trucks moving on haul roads • Dump trucks ascending, descending and traversing on dumps • Dump trucks tipping • Bulldozers and front-end loaders operating on dumps • Reverse alarms activated on trucks and earth-moving equipment operating on dumps • Drilling and blasting

9.10.3 Noise results for the day and night time periods

The prevailing ambient noise levels at the different measuring points associated with the proposed project are illustrated in **Table 9.8** and

Table 9.9 below.

Table 9.8:Day time noise measurement results at south 3 site

Location ID	Sampling Point/GPS	Sample 1 (LAleq)	Sample 2 (LAleq)	Point Average dB(A)	SANS 10103:2008 Day Limit
	DAY TIME (REFER TO FIGURE 1 FOR SAMPLING POINT REPRESENTATION)				
A1	24°42'46.60"S, 30° 9'26.80"E	38.4	37.6	38.0	
B2	24°42'45.20"S, 30° 9'24.30"E	41.9	38.1	40.0	
C3	24°42'47.30"S, 30° 9'37.60"E	36.0	36.4	36.2	
D4	24°42'52.80"S, 30° 9'46.40"E	31.9	33.5	32.7	
E5	24°42'39.90"S, 30° 9'53.30"E	36.2	36.8	36.5	
F6	24°43'17.70"S, 30°10'3.60"E	35.6	35.4	35.5	50
G7	24°43'17.10"S, 30°10'5.30"E	40.1	34.2	37.2	
H8	24°43'16.40"S, 30°10'8.00"E	36.5	36.2	36.4	
	OVERALL DAY TIME AVERAGE LAleq FOR SITE (SUBURBAN DISTRICTS)			36.6	50
	Comments and observations Meteorological conditions were as follows: Average Temperature: 20 ºC Average Wind Speed: 2.8 m/s				

Table 9.9: Night time noise measurements

Location ID	Sampling Point	Sample 1 (LAleq)	Sample 2 (LAleq)	Point Average dB(A)	SANS 10103:2008 Day Limit
	NIGHT- TIME (REFER TO FIGURE 1 FOR SAMPLING POINT REPRESENTATION)				
A1	24°42'46.60"S, 30° 9'26.80"E	34.2	36.4	35.3	
B2	24°42'45.20"S, 30° 9'24.30"E	33.5	36.6	35.1	
C3	24°42'47.30"S, 30° 9'37.60"E	34.5	33.4	34.0	
D4	24°42'52.80"S, 30° 9'46.40"E	33.2	38.5	35.9	
E5	24°42'39.90"S, 30° 9'53.30"E	36.0	33.2	34.6	40
F6	24°43'17.70"S, 30°10'3.60"E	38.5	36	37.3	
G7	24°43'17.10"S, 30°10'5.30"E	36.5	35.1	35.8	
H8	24°43'16.40"S, 30°10'8.00"E	34.8	33.2	34.0	
	OVERALL DAY TIME AVERAGE Laleq FOR SITE (SUBURBAN DISTRICTS)			35.2	40

	Comments and observations Meteorological conditions were as follows Average Temperature: 6 ºC Average Wind Speed: 1.8 m/s

9.11 Archaeological and cultural heritage

The information provided in the baseline description of the archaeology is a summary of the information provided in the Heritage Specialist Report. Please refer to ***Appendix H10*** *for the full report.*

The surveyed area is largely disturbed due to past human activities, which took the form of animal husbandry and agriculture. Vegetation in the surveyed area varies in height, low in some areas and high in others. The areas where the vegetation growth was higher and denser, consist largely of pioneer plants. These are indications that these areas were disturbed in the recent past.

An existing dirt road is also present in the surveyed area. The proposed development will include a mining road that will connect this new mining area to an existing plant and infrastructure. There are also sings of illegal mining taking place on the mountain side of the surveyed area.

9.11.1 Sites with cultural heritage significance

Ten sites of cultural heritage significance were located during the survey. Ten of these falls into the area of direct impact and four sites fall within the buffer zone of the proposed road development. Site no. 3 is located outside, but it falls within 40 m of the proposed development and may be impacted by the planned development. Some background information is given in order to place the surveyed area in a broad historical and geographical context and to contextualize possible finds that could be unearthed during construction activities.

A large number of heritage reports were completed around the towns of Steelpoort and Burgersfort previously (SAHRA's SAHRIS database; Archaetnos database). The sites found in these reports fall far outside of the impacted area of this survey.

Figure 9.21: Identified Heritage Sites

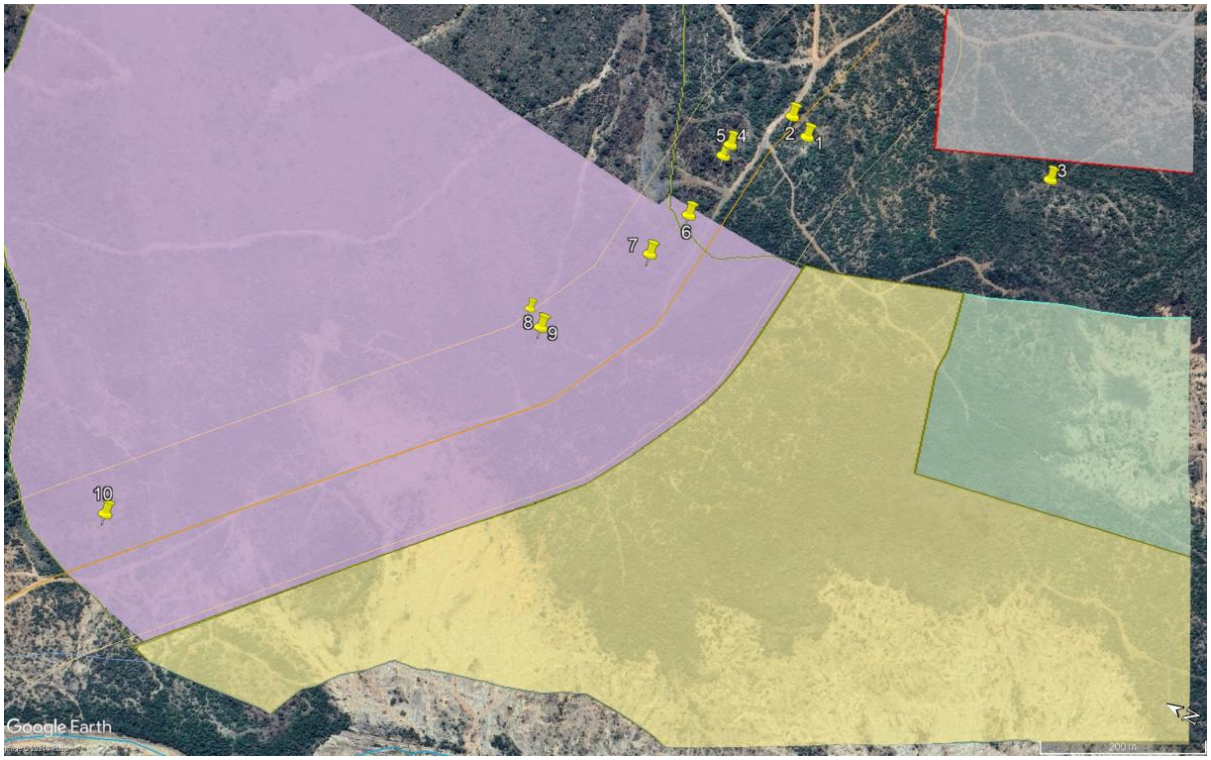


Figure 9.22:Zoomed in view of identified heritage sites found during the survey

9.12 Socio-Economic Structure

The information provided in the baseline description of the Socio-Economic Structure is a summary of the information provided in the Socio-Economic Impact Assessment Specialist Report. Please refer to ***Appendix H12*** *for the full report*

The main objective of the socio-economic was to understand the socio-economic characteristics and baseline of the area that will be impacted by the proposed mining project and how these relate to the dynamics of affected communities and economies. The socio-economic baseline study makes a distinction between two categories consistent with the Primary and Secondary Zone of Influence (ZoI).

The Primary ZoI includes Mahlakwena (Winterveld) community, which is the closest to the South 3 Opencast (± 500 m), and is included in the study as a result of its proximity to the proposed mine sites and supporting infrastructure. Secondly, this community has a long relationship history with MPM since its establishment. The community is under the leadership of Kgoshi Asser Mabanna.

Socio-economic profile of affected communities

MPM South 3 proposed mine and surrounding villages fall under Ward 2 of the FTLM and the Ward Councillor is Mr M Makina. The following villages are found in the Ward: Mapodile Tukakgomo 1, Tukakgomo 2(RDP), Dingindoda, Legabeng, Matimatjatji, Gareagopola, Molawetsi, Mahlakwena and Mshengoville village.

According to the 2011 Stats SA information; the total population of the Fetakgomo Tubatse Local Municipality is approximately 429 471 with 106 050 households; these make Fetakgomo Tubatse Local Municipality (FTLM), a municipality with highest population in the district. 2016 Community Survey as compared to the 2011 Stats SA results that the FTLM records a population increase of 489 902 (12%) with household increase of 125 454. As per the community survey 2016 the FTLM households increased with 19 404 (15%), this might be due to the increased influx of migrant labor due to the expansion of mining activities in the Municipality.

The median age for the municipality population is around 15-19 years for both females and males at 60 670. According to the statistics, there are more females in FTLM than in other local municipalities of the SDM. This could mean that there are more female-headed households within the FTLM which is a factor that MPM has to take into consideration for employment generation and other social responsibility programs.

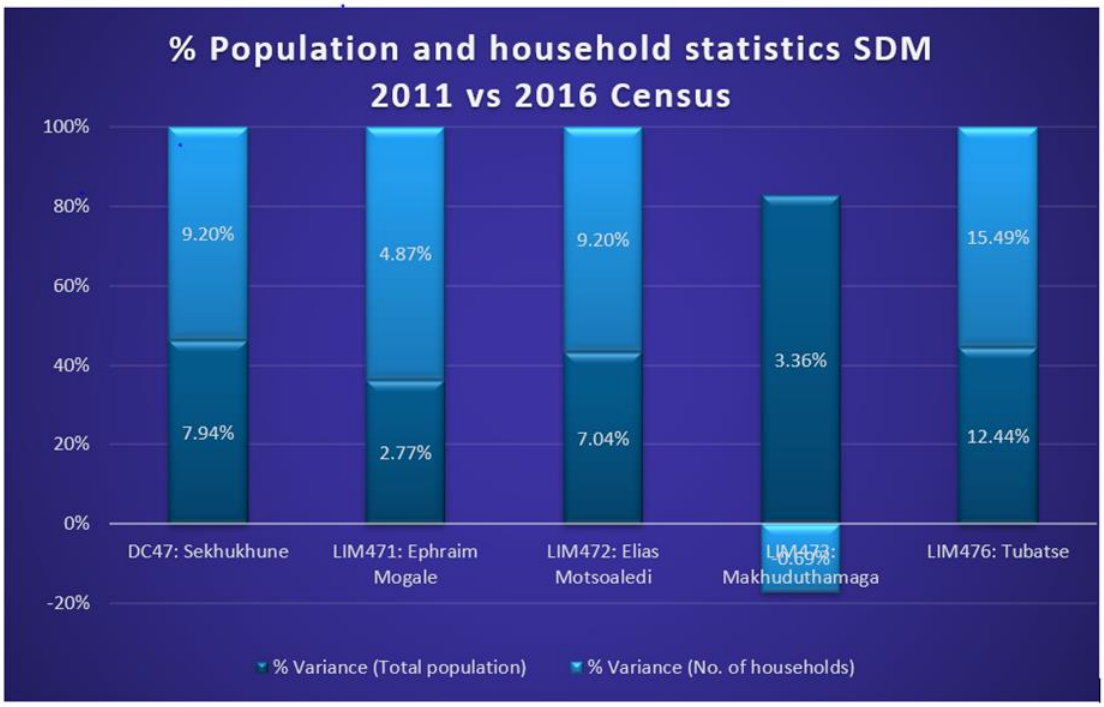


Figure 9.23: Percentage variation population and household statistics for the SDM with comparison of the 2011 Census with the 2016 Community Survey

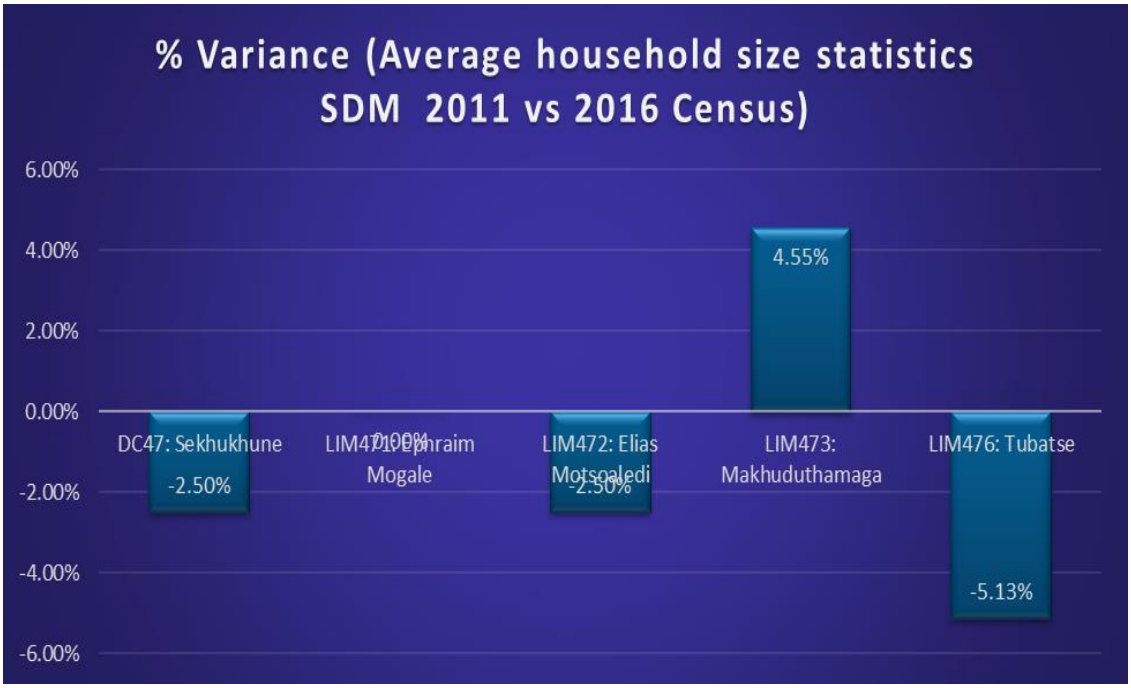
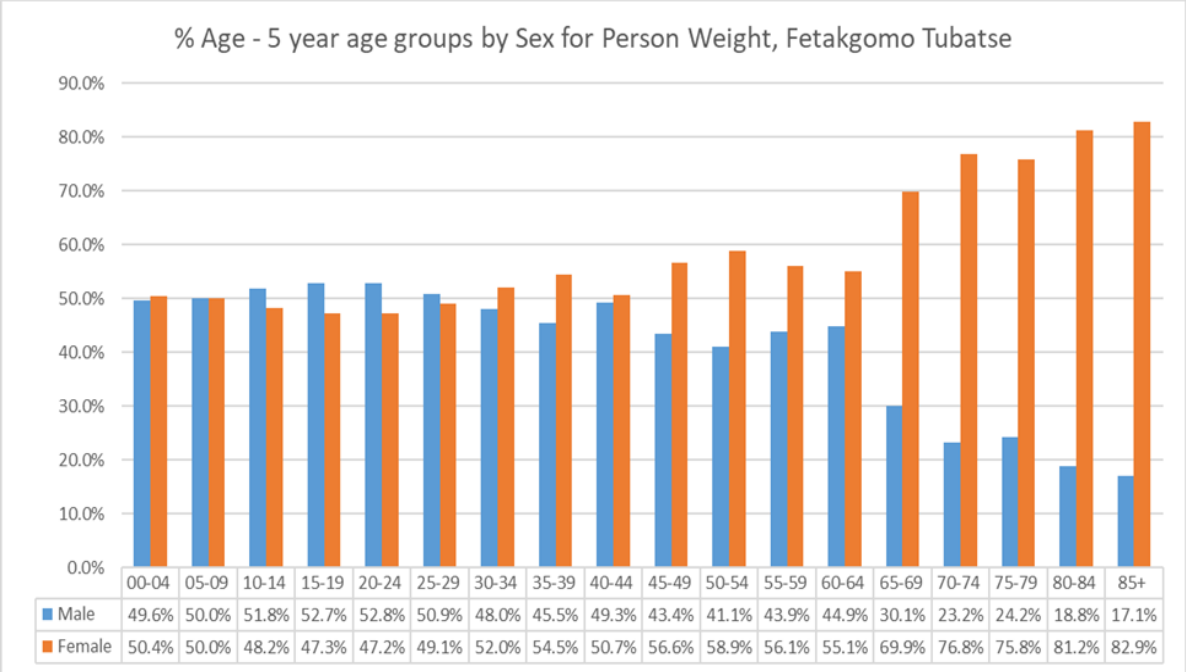


Figure 9.24: Percentage variance of average household size statistics for the SDM with comparison of the 2011 Census with the 2016 Community Survey



	00-04	05-09	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Male	49.6%	50.0%	51.8%	52.7%	52.8%	50.9%	48.0%	45.5%	49.3%	43.4%	41.1%	43.9%	44.9%	30.1%	23.2%	24.2%	18.8%	17.1%
Female	50.4%	50.0%	48.2%	47.3%	47.2%	49.1%	52.0%	54.5%	50.7%	56.6%	58.9%	56.1%	55.1%	69.9%	76.8%	75.8%	81.2%	82.9%

Figure 9.25:Percentage disaggregation of Fetakgomo Tubatse Local Population by Age and Gender Distribution

The above Figures were extrapolated from the Disaggregation of FTLM Population by Age and Gender Distribution of Sekhukhune District 2016/17 – 2020/21 IDP Report. The demographics in the figure above demonstrate that the FTLM there is male population from maximum age of 29 years and below, and rapidly decrease population of males from minimum age of 40 and above which might implicate that the expectancy of male is shorter than that of female. Whereas female population from a minimum age of 29 years and above increases rapidly up to 85+ of age which might also indicate that females have more life expectancy than males. This means that there are more females found in the FTLM. The analysis also indicates that the major population of FTLM is more of youth age (average working group age between 25 – 44 years), which makes the municipality to be vulnerable to employment/job demands. The rapid population growth especially because the drastic increase is majority females which is most likely to increase to have higher birth rates, will reduce per capita income growth and well-being, which tends to increase poverty and also increases landlessness and hence the incidence of poverty.

Mining and its associated activities at the proposed PMP South 3 Mine will have an impact on neighboring communities and the local economy during the construction, operation, and closure phases to varying degrees. Both negative and positive impacts have been identified and the negative impacts can be satisfactorily mitigated if the mine undertakes to implement the recommendations of the specialist studies in noise, air quality, visual assessment and water.

The positive impacts of the project on the local community and businesses are moderate in terms of direct employment, local expenditure and other indirect benefits. Development programme linked to the Social and Labor Plan requirements and MPM's sustainable development objectives will reduce impacts before and after closure.

As observed from the presented statistical data, the FTLM and its Wards are characterized by a growing population due to the influx of job seekers in the area as mining houses expand their operations. Local people are unable to realize the benefits of this expansion due to their lack of skills for the mine-specific careers. The population is predominantly young and in need of educational facilities like secondary schools, and tertiary and training institutions.

The Mine with all the related industries and workforce it employs has a significant impact on the socio-economic structures of the region. Its most important contributions to the upliftment of the area are expenditure, procurement and job creation in the area. Development programme linked to Social and Labor Plan requirements and MPM's sustainable development objectives will reduce impacts after closure. The challenge faced by the FTLM is that mining houses and mining operators source their input supplies and skills from far-flung areas in Gauteng Province and also import materials that would otherwise be manufactured in the area.

Tourism can be used as an alternative for employment because the area is picturesque; with a potential for many activities related to the landscape. It also has a rich cultural base with deep historical significance including many heritage sites and good sites for accommodation within the Olifants River, Potlake Nature Reserve and other privately owned game reserves.

The Mine needs to intervene in these identified needs of the Ward as outlined in the 2018/19 IDP:

- Water and sanitation;
- Roads and stormwater;
- Housing and electricity;
- Education and training (prioritize the secondary school);
- Employment opportunities; and
- Refuse removal.

9.13 Hydropedology

The information provided in the baseline description of the Hydropedology is a summary of the information provided in the Hydropedological Specialist Report. Please refer to ***Appendix H13*** *for the full report.*

The proposed development evokes the Hydropedological investigation as it will likely involve bulk earthworks and excavation during construction. These activities may potentially alter some of the Hydropedological processes recharging the nearby watercourse in proximity to the proposed development and thus a provision of a hydropedology perspective on the functioning of the associated wetlands and watercourses is thus required.

The report is aimed at addressing specific site conditions in the context of current legislation, guidelines and best practice with the ultimate aim of ensuring the conservation and adequate management of the water resources identified within and in the vicinity of the study area.

Hydropedological information generally assists with effective water resource management, as required by the National Water Act (1998), through improved understanding and characterization of hydrological processes.

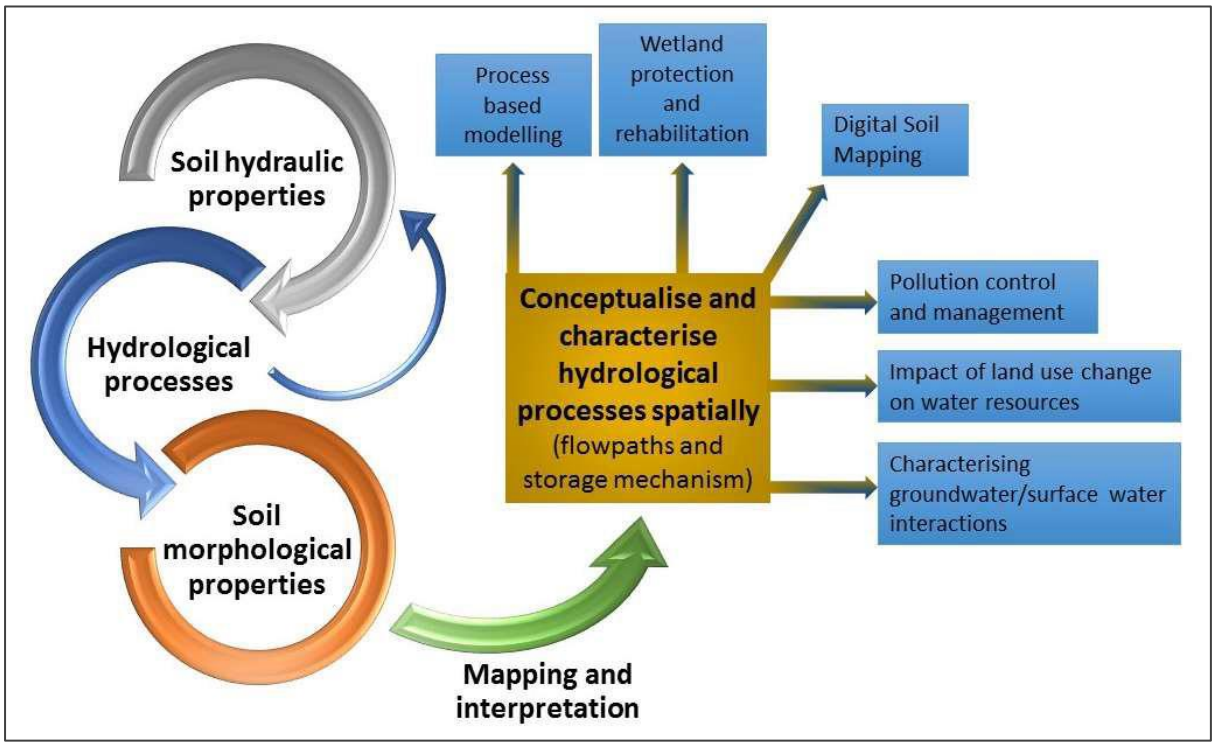


Figure 9.26: Hydropedology and some of the applications of Hydropedological surveys.

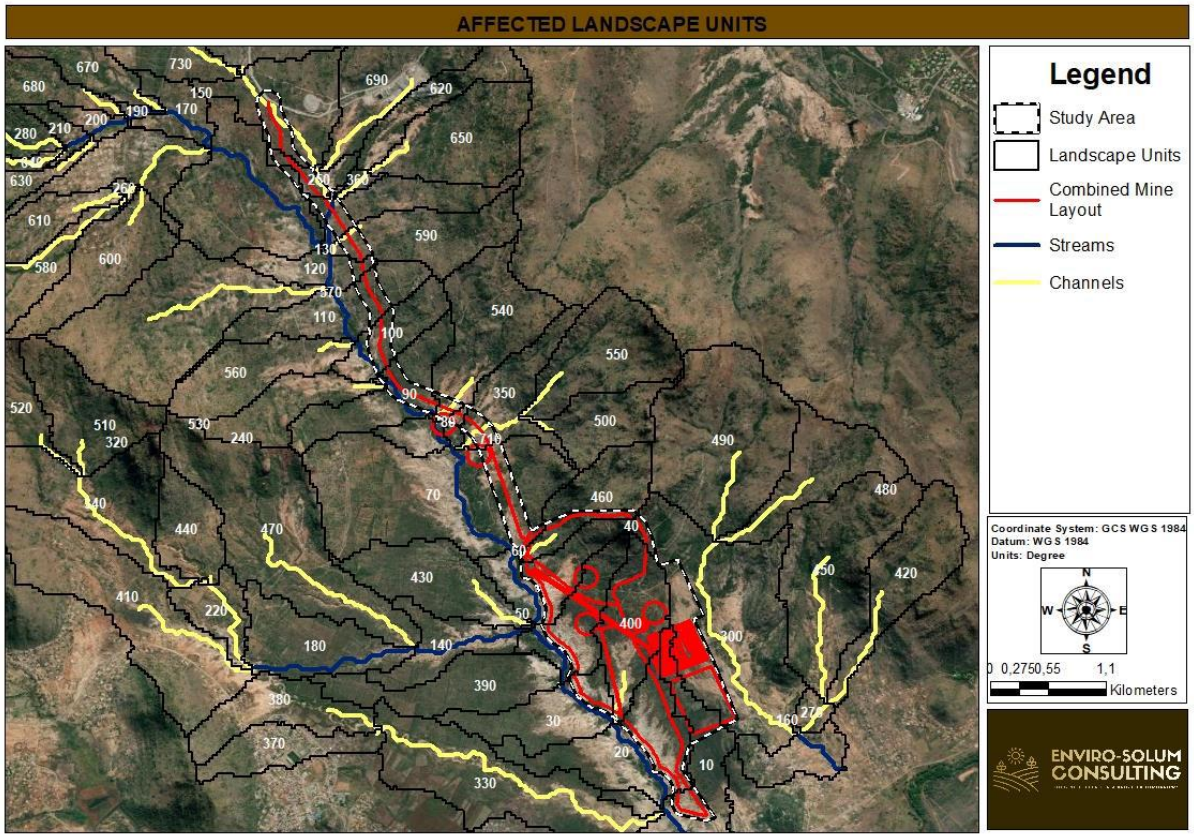


Figure 9.27: Affected landscapes in the study area

The study area falls within the humid subtropical climate zone, characterised by hot and humid summers and cool to mild winters. A deep current of tropical air dominates the humid subtropics at the time of high sun, and daily intense (but brief) convective thundershowers are common but lack any predictability. The entire study area is characterised by rainfall ranging between 401 and 600 mm. The study area can, therefore, be described as water-stressed. While the range of planting dates is limited for supporting rain-fed agriculture under these conditions, a limited range of adapted crops can receive good yields if planted on time.

The study area is primarily characterised by soils of Mispah/Glenrosa, Coega, and Rocky Outcrops typeration in the crest. In the midslope positions, the soils of the Bonheim/Abbotspoort and the Inhoek/Dundee types were identified in the valley bottom.

The type of soils identified within the study area render it largely suitable for grazing and wildlife purposes due to the dominance of the shallow soils and rocky outcrops. The soils of moderate potential, such as the Bonheim/Abbotspoort, will require extensive management strategies to be cultivated due to the inherent soil properties associated with these soils. However, the loss of moderate potential agricultural soils and the permanent change in land use (for the lifespan of the MPM south3 open cast and associated infrastructure) will be localised within the study area. It is the opinion of the specialist that the unmitigated scenario poses a threat to the sustainability of the moderate potential soils, which could be utilised for agricultural purposes. Therefore, integrated mitigation measures must be implemented accordingly to minimise the potential loss of these valuable soils, considering the need for

sustainable development. It is far preferable to incur a minimal loss of potential agricultural land with marginal cultivation potential based on inherent soil properties than to lose agricultural land that has a higher potential and that is much scarcer to the proposed development elsewhere in the country. The study area does not fall under the protected agricultural area (PAA, 2021), likely due to the soils associated with the study area, as well as the climatic conditions and the lack of available options for irrigation water in the immediate surroundings of where the moderate potential soils were identified.

The screening tool analysis was conducted, which presented the findings as the impact on agricultural resources being of High sensitivity in terms of agricultural potential. Based on the outcomes of the field assessment, this was found to have a less significant impact as presented on the screening tool due to the dominant soil types that are not high-potential agricultural soils due to various limitations, including shallower depth and requiring intensive management strategies to cultivate. The land capability of the surrounding soils as well as the agricultural potential, are Low to moderate due to adequate climatic conditions (i.e., rainfall, temperature) and appropriate slope, which allows for intensive commercial agricultural practices.

It is the opinion of the specialist that this study provides the relevant information required for the Environmental Impact Assessment phase of the project to ensure that appropriate consideration of the agricultural resources in the study area are made in support of the principles of Integrated Environmental Management (IEM) and sustainable development.

10.ALTERNATIVES CONSIDERED

The following alternatives (for bi infrastructure) were taken into account during the pre-feasibility phase of this project:

- Utilisation of existing infrastructure – Continuation of the utilisation of the existing waste rock dumps versus the establishment of a new waste rock dump;
- Location – where is the best location for specific project infrastructure;
- Method of Transportation – transportation of ore via conveyor or via haul road to the plant;
- No-go Option – the option for the proposed development not to take place at all, i.e. No Opencast mining.

10.1 Waste Rock Dump

Consideration in terms of the requirements and placement of a new waste rock dump was given in terms of the following:

- The hauling distance and associated hauling costs of moving the South 3 waste rock to the existing plant;
- The impact of the new waste rock dump on the current agricultural land;

The outcomes of the above determined that a new waste rock dump in close proximity to the mining area will be required versus transporting the waste to existing waste rock dumps.

A site selection study for the proposed waste rock dump was commissioned and the identification and selection of the waste rock dump site was done based on a process that considered the criteria as shown in the table below.

10.1.1 Hauling

The ore can be transported by trucks via the existing haul road that links the South 2 Shaft area with the South 3 Opencast project. However, there are a number of considerations which will be evaluated during the impact phase of the project, amongst them:

- The existing haul road is not in a good condition and will need to be upgraded and straightened;
- The number of additional trucks that will be required to transport the ore could increase the risk of road accidents, increase levels of windblown dust and noise disturbance during the transportation of the ore;
- Vehicle emissions may increase the carbon footprint of the project;
- Vehicle failure may also occur, thereby delaying movement of ore and causing potential road safety issues and production bottle necks, amongst other concerns that may arise during the impact phase.

10.1.2 Conveying

A conveyor system will be considered to transport ore from the South 3 Opencast to the processing plant. The total length of the conveyor system will be more than 5 000 m. Other consideration to be evaluated during the Impact Phase includes:

- Most direct route from South 3 to the plant
- Low maintenance costs (compared to hauling);
- Minimal impact of dust fallout expected, as the overland ore conveyor system will be partially enclosed; and
- A lower impact in terms of noise and dust compared to trucking due to less heavy-duty vehicles on existing road network.

10.2 No-go Option

This option implies that the Opencast Mining Project does not proceed and that all processes and infrastructure at South 3 Opencast remain as per the existing configuration without establishing the Opencast mine, the waste rock dump, and supporting infrastructure. Consequently, this will impact negatively on:

- The exploitation of the available resource
- Lack of employment opportunities
- Future employment opportunities associated with the extended LOM
- The dependants of the employees of the mine;

- The contractors providing services to the mine;
- The local support industries that support both the mine and its employees;
- Socio- Economic Development Projects currently being undertaken by the mine;

The areas surrounding the project area is dominated by mining activities with various towns benefiting significantly from these mining operations in the area.

- An existing excavation is already in place at the underground workings at the South 2 Shaft, towhich the overland ore conveyor system can be linked to;
- Most direct route from South 2 Shaft to the South 1 Shaft;
- Low maintenance costs (compared to hauling);
- Minimal impact of dust fallout expected, as the overland ore conveyor system will be partiallyenclosed; and
- A lower impact in terms of noise and dust compared to trucking due to less heavy-duty vehicleson existing road network.

11. METHODOLOGY FOR THE ASSESSMENT OF IMPACT

All specialists were required to assess each identified potential impact according to the followingImpact Assessment Methodology as described below. This methodology has been formalised to comply with Regulation 31(2)(l) of NEMA, which states thefollowing:

(2) An environmental impact assessment report must contain all information that is necessary for thecompetent authority to consider the application and to reach a decision ..., and must include –

(l) an assessment of each identified potentially significant impact, including –

(i) ***cumulative impacts****;*

(ii) the ***nature*** *of the impact;*

(iii) the ***extent*** *and* ***duration*** *of the impact;*

(iv) the ***probability*** *of the impact occurring;*

(v) the ***degree*** *to which the impact can be* ***reversed****;*

(vi) the ***degree*** *to which the impact may* ***cause irreplaceable loss of resources****; and*

(vii) the ***degree*** *to which the impact can be* ***mitigated****.*

Based on the above, the EIA Methodology will require that each potential impact identified is clearly described (providing the nature of the impact) and be assessed in terms of the following factors:

- extent (spatial scale): will the impact affect the national, regional or local environment, or only that of the site?
- duration (temporal scale): how long will the impact last?
- magnitude (severity): will the impact be of high, moderate or low severity? and

- probability (likelihood of occurring): how likely is it that the impact may occur?

To enable the scientific approach for the determination of the environmental significance (importance) of each identified potential impact, a numerical value has been linked to each factor. The ranking scales indicated in **Table 11.1** are applicable:

Table 11.1: Environmental Impact Ranking Scale

Occurrence	**Duration:** 5 – Permanent 4 - Long-term (ceases with the operational life)3 - Medium-term (5-15 years) 2 - Short-term (0-5 years) 1 – Immediate	**Probability:** 5 – Definite/don't know4 – Highly probable 3 – Medium probability2 – Low probability 1 – Improbable 0 – None
Severity	**Extent/scale:** 5 – International 4 – National 3 – Regional 2 – Local 1 – Site only0 – None	**Magnitude:** 10 - Very high/uncertain8 – High 6 – Moderate 4 – Low 2 – Minor

Once the above factors had been ranked for each identified potential impact, the environmental significance of each impact was calculated using the following formula:

Significance = *(duration + extent + magnitude) x probability*

The maximum value that can be calculated for the environmental significance of any impact is 100. The environmental significance of any identified potential impact is then rated as either: high, moderate or low on the following basis:

- More than 60 significance value indicates a high (H) environmental significance impact;
- Between 30 and 60 significance value indicates a moderate (M) environmental significance impact; and
- Less than 30 significance value indicates a low (L) environmental significance impact.

In order to assess the degree to which the potential impact can be reversed, cause irreplaceableloss of resources and be mitigated, each identified potential impact was assessed twice.

- Firstly, the potential impact was assessed and rated prior to implementing any mitigation and management measures; and

- Secondly, the potential impact was assessed and rated after the proposed mitigation and management measures have been implemented.

The purpose of this dual rating of the impact before and after mitigation is to indicate that the significance rating of the initial impact is and should be higher in relation to the significance of the impact after mitigation measures have been implemented.

Specialists were required to list and describe all identified impacts in indicated in **Table 11.2** below. Provision was made in the table for the description of the potential impact identified, the rating of the potential impact without mitigation measures, description of the management measures to mitigate the potential impact, and rating of the potential impact after the management measures have been implemented.

The Specialist assessment of the rating of the identified impact and mitigation and management proposed by MPM, and/or the Specialist, was based on sound, validated scientific information and professional judgement in the context of the specific project and site conditions, and not emotion.

Table 11.2: Example of EIA Table

Nature of the impact	**Significance of potential impact *before* mitigation**						**Mitigation measure**	**Significance of potentialimpact *after* mitigation**					
	Pr	**Du**	**Ex**	**Ma**	**Significance**			**Pr**	**Du**	**Ex**	**Ma**	**Significance**	
Construction Phase													
Description	3	4	3	6	39	**Moderate**	*Description*	1	4	3	6	13	**Low**
Operational Phase													
Description	5	4	3	6	65	**High**	*Description*	3	4	3	6	39	**Moderate**
Rehabilitation and Decommissioning Phase													
Description	3	4	3	6	39	**Moderate**	*Description*	1	4	3	6	13	**Low**

12. IMPACT ASSESSMENT (IN FULFILMENT OF SECTION 39(3)(B)(I)(II) AND (III) OF THE MPRDA ACT READ TOGETHER WITH REGULATION 50(C) AND (E))

The **Table 12.1** lists the main project related activities that will be undertaken during the implementation of the different phases of the proposed South 3 opencast project.

Table 12.1:Proposed project related activities during different project phases

Project Phase	Activity
Pre-construction	• Site clearing and grubbing of the footprint areas associated with the WRD, open pit area, contractor laydown area and all proposed access roads.
Construction	• Construction of the crossings associated with the haul road, including all stormwater and water management infrastructure
	• Construction of sewage treatment facilities
Operation	• Operation, management and maintenance of the WRD and associated accessroad
	• Operation, management and maintenance of the haul road from South3 to South2.
	• Operation, management and maintenance of open pit.
	• Operation, management and maintenance of the crossings associated with the haul road, WRD and the stormwater management infrastructure
	• Operation, management and maintenance of the sewage
Rehabilitation	• The area where the mine operations were will be rehabilitated.
Post-closure	• Demolition of all other project related infrastructure.
	• Removal of all access and haul roads.
	• Handling of potential contaminated soils.
	• Monitoring of groundwater.

The footprint areas that will be disturbed in terms of the construction and operation of the proposed infrastructure are summarized below. All of these infrastructures will be located on the farm Winterveld 293 KT.

The total of 273 ha may be disturbed during the construction and operation phases. The following sections provide further details on the potential impacts (negative and positive), in terms of the various environmental aspects for each aforesaid activity and associated actions that will be undertaken during the implementation of the overall South 3 project.

The potential identified impacts were rated, in terms of the Probability, Duration, Extent and Magnitude that may be associated with the potential impact. The following abbreviations were used in the Impact Assessment Tables to indicate the said impact assessment aspects:

- Pr: Probability;
- Du: Duration;
- Ex: Extend; and

- Ma: Magnitude.

12.1 Pre-Construction Phase

During the pre-construction phase, the following main activity will take place:

- Site clearing and grubbing of the footprint areas associated with the WRD, open pit, contractor laydown area and all proposed access roads.

12.1.1 Preparation for the WRD, access road to the WRD, open pit, contractor laydown area and all proposed access roads.

Activity: Site clearing and grubbing at the location of the WRD, open pit, contractor laydown area and all proposed access roads.

Actions:

- Removal of vegetation (shrubs and trees) to be relocated, monitored and maintained within the on-site nursery;
- Stripping and stockpiling of soils on the proposed topsoil area; and
- Preparation of the contractor's yard. All equipment and vehicles to be used during the pre-construction and construction phases will be stored at this facility.

Potential impacts and mitigation measures and cumulative impact during construction phase are indicated in **Table 12.2**.

Table 12.2: Potential impacts and mitigation measures associated with the site clearing and grubbing of the footprint areas associated with the WRD, open pit, contractor laydown area and all proposed access roads

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Geology	The activities are unlikely to materially affect or be affected by the local geology. No material impact anticipated.						No mitigation measures are required as no material impact is anticipated.					
Topography	The activities are unlikely to materially affect or be affected by the local topography. No material impactanticipated.						No mitigation measures are required as no material impact is anticipated.					
Air Quality	Pre-construction activities may lead to increased levels of fugitive dust as a result of increased vehicle movement.	5	2	1	4	**35 Moderate**	• The relevant exposed construction site areas and access gravel roads will be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff. • Construction material and debris will be kept wet with just enough moisture to keep the dust down without creating undue runoff. • Where resident moisture content is not adequate to control dust and dispersion of particulates during transportation, dust raising materials will be transported in closed body vehicles and/or material will be covered with a tarpaulin. • Transportation of dust raising material without covering must be restricted to an appropriate speed level (roughly 40 km/h) if dispersion of particulates and fugitive dust are observed leaving the transportation vehicles. • Engine idle speeds during operating times should be reduced. • All vehicles and equipment used during the pre-construction phase will be serviced and maintained on a	4	2	1	2	**20 Low**
	Pre-construction activities may lead to increased levels of fugitive dust as a result of excavation work.	5	4	3	8	**75 High**		3	4	1	4	**27 Low**
	Pre-construction activities may lead to increased levels of fugitive dust as a result of the movement of material.	5	4	3	8	**75 High**		3	4	1	4	**27 Low**
	Quantity of noxious vehicle exhaust fumes may be anticipated during the pre-construction phase.	5	4	2	8	**70 High**		4	4	1	2	**28 Low**
	Increased levels of ambient air pollutants; i.e. carbon monoxide (CO), nitrogen dioxide (NO_2) and Sulphur dioxide (SO_2): • The expected increase in the CO, NO_2 and SO_2 ambient air pollutant concentrations can be considered negligible to low in terms of the current ambient air quality, and therefore no	5	1	2	2	**25 Low**		5	1	2	2	**25 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	additional mitigation measures specific to the reduction of these ambient air pollutants are recommended at this stage. Refer to results of the ambient air dispersion model in the Air Quality specialist report.						regular basis. • A dust monitoring programme must be implemented that effectively monitors dust related impacts from the project area.					
	Increased levels of ambient air pollutants; i.e. particulate matter (PM10): • During the pre-construction phase it can be anticipated that the PM10 ambient air concentration may increase in the immediate vicinity of the project area as a result of the combined effect of the pre-construction and construction activities. Refer to results of the ambient air dispersion model in Air Quality specialist report.	5	2	1	4	**35 Moderate**		5	1	1	2	**20 Low**
Soils, Land Use and Land Capability	• Localized loss of soil utilization potential. • Localized loss of vegetative cover and topsoil protection • Possible erosion and impact of sedimentary load on streams and river systems. • Localized loss of soil	5	5	2	4	**55 Moderate**	• Minimize the footprint area of impact by conducting site clearing activities associated with the pre-construction of the required infrastructure on a footprint as small as practically possible. • Strip soils with vegetative cover in tack (after trees have been removed and relocated where applicable in accordance with the relevant	1	4	1	6	**11 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	resource and utilization potential due to contamination by reagents and hydrocarbons spills and/or dirty water. • Localized loss of resource and its utilization potential due to compaction over unprotected ground/soil. • Localized loss of soil and land capability due to reduction in nutrient status - de-nutrification and leaching due to stripping and stockpiling footprint areas.						permission), and stockpile utilizable soils in accordance to the Soil Conservation Plan. • Protect the existing topsoil stockpile area from impacts of erosion, compaction and contamination. • If necessary, vegetate and/or cover with appropriate and suitable indigenous grass species. • If deemed necessary, erosion berms can be installed to prevent gully formation. • Restrict vehicle movement to areas of need. • All vehicles should be serviced on a regular basis at the specific demarcated areas. • Any spillage from vehicles should be cleaned up immediately once occur. • Rehabilitate areas once usefulness is completed. • All soils compacted as a result of the pre-construction activities falling outside the infrastructure footprint areas should be ripped and profiled.					
Flora	Site clearing and grubbing of the proposed infrastructure footprint areas may lead to: • Localized loss of floral habitat within areas of ecological sensitivity; • Localized loss of floral species diversity; and • Localized loss of medicinal, protected and potential RDL floral species.	5	5	2	8	**75 High**	• The proposed development footprint areas should remain as small as possible. • A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area.	2	4	1	6	**22 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	• Potential spreading of alien invasive species						• All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach unnecessarily into the surrounding sensitive areas and the associated buffer zones. • The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • Sensitive flora species are to be handled with care and the relocation of sensitive plant species is to be overseen by a botanist. • Where existing road crossings over riparian features are situated that may require upgrading in terms of the proposed project, upgrading should be undertaken in such a manner as to ensure that hydrological connectivity upstream and downstream ofthe crossings are maintained. • Informal fires in the vicinity of mining activities should be prohibited throughout the life of mine. • Any spillage from vehicles should be cleaned up immediately once occur. • An alien invasive eradication plan should be developed and include, but not be limited tothe following: ➢ Care should be taken with the choice of herbicide to ensure that no additional impact or loss of					

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							indigenous plant species occur due to the use of the herbicide. ➢ Footprint areas should be kept as small as possible when removing alien plantspecies. ➢ No vehicles should be allowed to drive through riparian areas during the eradication of alien and weed species. • Removal of alien and weed species must take place in accordance with existing legislation process and procedures.					
Fauna	Site clearing and grubbing of the proposed infrastructure footprintareas may lead to: • Localized loss of faunal habitat within areas of ecologicalsensitivity; • Localized loss of faunal species diversity; and Localized loss of protected and potential RDL faunal species.	5	5	2	6	**65 High**	• A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach onto surrounding sensitive areas and the associated buffer zones. • The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • No trapping or hunting of fauna is to take place. • It must be ensured that migratory connectivity between sensitive areas	3	4	1	4	**27 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							is maintained where possible. • It is recommended that a speed limit of 40km/h is implemented on all roads running through the project area in order to minimize risk to fauna species from vehicles. • Speed humps may be constructed to help slow vehicles and help mitigate collision with faunal species. • During induction of all personnel and contractors, awareness training in terms of faunal species is recommended to increase awareness, respect and responsibility towards the environment. • All informal fires in the vicinity of the mining operations and new construction areas should be prohibited					
Riparian areas	Site clearing and grubbing of the proposed infrastructure footprint areas, within close proximity or within riparian features, may lead to: • Localized changes to riparian features' ecological and socio-cultural service provision; • Localized changes to riparian features' hydrological function; and • Localized loss of riparian habitat and ecological structure.	5	5	2	8	**75 High**	• The proposed development footprint areas should remain as small as possible. • A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach onto surrounding sensitive areas and the associated buffer zones. sensitive	3	4	1	4	**27 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							habitat areas and associated buffer zones. • The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • All sensitive areas outside the pre-construction area must be kept off-limits to construction vehicles and personnel. • It must be ensured that migratory connectivity between sensitive areas is maintained where possible. • The infrastructure footprints associated with the proposed project should fall outside the 1:100-year floodline of the riparian features or 100 m from the edge of the feature, which ever distance is the greatest, unless exemption from Regulation 704 is applied for and obtained. • All project affected riparian features should be visually inspected and monitored for erosion and incision on a monthly basis, and immediately after heavy rainfall events. • A riparian feature inspection programme and reporting system should be developed and implemented during the life of mine. • Where existing road crossings over riparian features are situated that may require upgrading in terms of the proposed project, upgrading should be undertaken in such a manner as to ensure that					

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							hydrological connectivity upstream and downstream ofthe crossings are maintained. • Future mine planning should ensure that mining activities do not lead to a reductionof stream flow. • Dewatering of any riparian features and connectivity of the riparian features in the vicinity of the mining activities should be maintained.					
	Erosion within the riparian areas.	5	5	2	8	**75 High**	Erosion berms may be installed to prevent gully formation and siltation of the riparian areas/resources. The following points should serve to guide the placement of erosion berms: • Where the track has a slope of less than 2%, berms every 50 m should be installed; • Where the track slopes between 2% and 10%, berms every 25 m should be installed; • Where the track slopes between 10% and 15%, berms every 20 m should be installed; or • Where the track has a slope greater than 15%, berms every 10 m should be installed.	3	4	1	4	**27 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Aquatic Environment	Site clearing and grubbing of the footprint areas associated with the WRD, open pit, and all relevant access/service roads, may lead to: • Loss of Instream Flow, Aquatic Refugia and Flow Dependent Taxa. • Localized impacts on Water Quality Affecting Aquatic Ecology; • Localized loss of Aquatic Habitat; and • Localized loss of Aquatic Biodiversity and Sensitive Taxa.	5	5	2	6	**65 High**	• Limit the footprint area of the project to what is absolutely essential in order to minimize the loss of clean water runoff areas and the concomitant recharge of streams in the area. • Ensure that as far as possible all infrastructure is placed outside of riparian features and streams. • The minimum buffer of 100 m around all riparian features which should be maintained in line with the requirements of regulation GN704 of the National Water Act. • Pollution control dams should be off stream structures and not within the natural drainage system of the area, thereby minimizing impacts loss of instream flow and downstream recharge. • No dumping of waste should take place within the riparian zones. • Implement the surface water monitoring programme as described in the Surface Water Monitoring Plan. • Ongoing biomonitoring of aquatic resources in the vicinity of the study area must takeplace at points located upstream and downstream of the mining activities near the Tubatsane and Mofafa River and tributaries as long as there is sufficient habitat to do so. • Biannual (twice a year) biomonitoring should be undertaken and include the following methods: SASS5, IHHAS and MIRAI indices.	3	3	2	4	**27 Low**
	Site clearing and grubbing of the footprint area associated with the contractor's laydown area, may lead to: • Loss of Instream Flow, Aquatic Refugia and Flow DependentTaxa; • Localized impacts on Water Quality Affecting Aquatic Ecology; • Localized loss of Aquatic Habitat; and Localized loss of Aquatic Biodiversity and Sensitive Taxa	5	4	2	4	**50 Moderate**		3	2	1	2	**15 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							• Should any deviation of the normal trend be identified, measured to minimize or prevent any significant negative impacts should be implemented. • Toxicity testing should be undertaken concurrently with the biomonitoring programme in order to monitor the toxicological risk of the process water systems. Toxicity testing will be undertaken in accordance to the DEEEP Protocol, should it become evident that process water discharge or decant of underground water will occur.					
Surface Water	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the opencast and associated infrastructures.	4	2	1	4	**28 Low**	• Adequate protection measures at river crossings will be included in the engineering designs of the Surface Water Report for project specific storm water management measures • Any backup behind the road will result in higher velocities downstream of the road as the water flows over the road. • Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste. • Ensure areas used as construction laydown and vehicle maintenance areas are clearly indicate and is adequately bunded for the storage of chemicals and hazardousmaterials. • Ensure that routine maintenance on all vehicles is undertaken as per maintained schedule and records are	2	2	1	2	**10 Low**
	Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the footprint area associated with the service/access roads.	3	2	2	8	**36 Moderate**		2	2	1	6	**18 Low**
	Deterioration in water quality due to the potential accidental spillages of hazardous substances from heavy duty vehicles during site clearing and grubbing of footprint areas associated with the additional infrastructure.	4	2	2	6	**40 Moderate**		3	2	1	4	**21 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							kept. • Routine surface water quality monitoring up and down stream of clearing activities and position of infrastructure and activities associated with the South 3 opencast will be undertaken on a monthly basis as detailed in the Surface Water Report.					
	Loss of mean annual runoff (MAR) due to site clearing and grubbing of the footprint area associated with the WRD.	5	5	1	4	**50 Moderate**	• Loss of Mean Annual Runoff will be minimized through an appropriately placed clean water diversion canal around the WRD. • The clean water diversion will be designed to accommodate the 1:50 year storm event. • Loss of MAR to the Tubatsane and Mofafa River catchment due to containment of dirty water at the proposed infrastructure is considered insignificant at less than 0.25% of the Olifants catchment MAR. • Construction will take place during low flow periods (dry season) to minimize the potential for interruption of the flow regime.	3	5	1	2	**24 Low**
Groundwater	Potential contamination of groundwater resources due to potential accidental spillages of hazardous substances from the vehicles and equipment used for pre-construction activities.	4	2	2	6	**40 Moderate**	• All spillages will need to be cleaned up as soon as practically possible. • Proper management of stormwater drainage infrastructure should be ensured. • Implement specific management measures as and implement the monitoring programme as detailed in the Geohydrological Impact	1	1	1	2	**4 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							Assessment Report.					
Noise	During the pre-construction phase, a slight increase in the ambient noise levels is anticipated due to the movement of vehicles and pre-construction activities undertaken.	3	2	2	6	**30 Moderate**	• Develop a mechanism to record and respond to complaints during the pre-construction phase. • Machinery and/or vehicles with low noise levels to be used. • Machinery will be fitted with silencers and regular monitoring will be undertaken to ensure compliance to noise levels. • Implement monitoring programme as detailed in the Environmental Noise Impact Assessment Report.	3	2	2	4	**24 Low**
Heritage	The proposed development of the South 3 opencast project is likely to materially affect or be affected by the identified heritage sites and graves.	3	2	2	6	**30 Moderate**	• Care should be taken that, when development commences, if any archaeological and/or historical sites are discovered a qualified archaeologist be called in to investigate the occurrence. • Implement management measures as detailed in the Heritage Impact Assessment Report	3	2	2	4	**24 Low**
Visual	Indirect visual impact due to dust generation during site preparation activities.	5	2	2	4	**40 Moderate**	• The relevant exposed construction site areas and access gravel roads will be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff. • Ensure harvesting of plants from this area and preserve in the nursery for rehabilitation purposes, where practical. • The on-site nursery must be developed and maintained by the mine if possible, during the Life of Mine to assist with the mitigation	4	2	2	2	**24 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							and progressive rehabilitation phases. • Natural vegetation, wherever practical, must be retained on and around the pre- construction sites. • Litter and dust management measures should be in place at all times. • The sites should be kept neat and tidy at all times. • All lights used for illumination (except for lighting associated with security) should be faced inwards and shielded to avoid light escaping above the horizon. • Pre-construction activities will be limited to be undertaken between 6am and 6pm.					
Socio-economic	Potential employment opportunities in terms of the activities to be undertaken during the pre-construction phase.	5	2	3	2	**35 Moderate**	• Use local labor as far as possible. • MPM and their appointed contractors should adhere to the MPM policies on local procurement in terms of additional labor opportunities.	5	2	3	2	**35 Moderate**
Cumulative Impact	In terms of the site clearing and grubbing of the footprint areas associated with the WRD, open pit, office areas, and all proposed access roads it is anticipated that the significance of the cumulative impact will be MODERATE, due to the impact occurring on site and over a short duration of time although the activity may affect the local	5	2	2	4	**40 Moderate**	• Through the implementation of all the above-mentioned mitigation measures, the overall significance of the activity's impact can be lowered to LOW.	3	2	1	1	**12 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	areas' biodiversity and has a likely potential of occurring.											

12.2 Construction Phase

During the construction phase, the following activities will take place:

- Construction of the alterations and crossings associated with the haul road, offices WRD, Pollution control dam, including all stormwater and water management infrastructure
- Construction of the open pit and associated access road

12.2.1 Construction of the alterations and crossings associated with the haul road, offices WRD, Pollution control dam, including all stormwater and water management infrastructure.

Activities:

- Alterations and crossings on the unnamed tributaries associated with the haul road
- Construction of the Pollution Control Dam
- Construction of all required stormwater management infrastructure.

Actions:

- The unnamed tributaries of the Tubatsane River will be crossed as a result of the haul road construction
- The construction of all project related and required stormwater management infrastructures associated with the WRD, river crossings and the pollution control dam.

Potential impacts and mitigation measures during the construction phase are indicated in **Table 12.3** below.

Table 12.3: Potential impacts and mitigation measures associated with the construction of the open pit area, alterations and crossings associated with the haul road, including all stormwater and water management infrastructure

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Geology	The activities are unlikely to materially affect or be affected by the local geology. No material impact anticipated.						No mitigation measures are required as no material impact is anticipated.					
Topography	The construction of the open pit area, pollution control dams, alterations and crossings associated with the haul road, including all stormwater and water management infrastructure is unlikely to materially affect or be affected by the local topography. No material impacts are anticipated.						No mitigation measures are required as no material impact is anticipated.					
Air quality	Increase in fugitive dust due to an increase in light construction vehicle activity.	5	2	1	4	**35 Moderate**	• The relevant exposed construction site areas and access gravel roads will be irrigated on a regular basis, with just enough moisture to keep the dust down without creating undue runoff. • Construction material and debris will be kept wet with just enough moisture to keep the dust down without creating undue runoff. • Where resident moisture content is not adequate to control dust and dispersion of particulates during transportation, dust raising materials will be transported in closed body vehicles and/or material will be covered with a tarpaulin. • Transportation of dust raising material without covering must be restricted to an appropriate speed level (roughly 40 km/h) if dispersion of particulates and fugitive dust are observed leaving the transportation vehicles.	4	2	3	2	**28 Low**
	Increase in fugitive dust due to construction work and movement of material					**70 High**		3	4	1	4	**27 Low**
	Increase it the quantity of noxious vehicle exhaust fumes	5	4	2	8	**70 High**		4	4	1	2	**28 Low**
	Increased levels of ambient air pollutants; i.e. carbon monoxide (CO), nitrogen dioxide (NO_2) and Sulphur dioxide (SO_2): • The expected increase in the CO, NO_2 and SO_2 ambient air pollutant concentrations can be considered negligible to low in terms of the current ambient air quality, and therefore no additional mitigation measures specific to the reduction of	5	1	2	2	**25 Low**		5	1	2	2	**25 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	these ambient air pollutants are recommended at this stage. Refer to results of the ambient air dispersion model in the Air Quality specialist report.						• Engine idle speeds during operating times should be reduced. • All vehicles and equipment used during the construction phase will be serviced and maintained on a regular basis.					
	Increased levels of ambient air pollutants; i.e. particulate matter (PM10): • During the construction phase it can be anticipated that the PM10 ambient air concentration may increase in the immediate vicinity of the project area as a result of the combined effect of the construction and construction activities. Refer to results *of the ambient air dispersion model in the Air Quality specialist report.*	5	2	1	4	**35** **Moderate**	• A dust monitoring programme must be implemented that effectively monitors dust related impacts from the project area.	5	1	2	2	**25** **Low**
Soils, Land Use and Land Capability	• Localized loss of soil utilization potential. • Localized loss of vegetative cover and topsoil protection • Possible erosion and impact of sedimentary load on streams and river systems. • Localized loss of soil resource and utilization potential due to contamination by reagents	5	5	2	4	**55** **Moderate**	• Minimize the footprint area of impact by conducting site clearing activities associated with the construction of the required infrastructure on a footprint as small as practically possible. • Strip soils with vegetative cover in tacked, and stockpile utilizable soils in accordance to the Soil Utilization Plan. • Protect the existing topsoil stockpile area from impacts of erosion, compaction and contamination.	4	3	1	2	**24** **Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	and hydrocarbons spills and/or dirty water. • Localized loss of resource and its utilization potential due to compaction over unprotected ground/soil. • Localized loss of soil and land capability due to reduction in nutrient status. • De-nutrification and leaching due to soil stripping from infrastructure (WRD and open pit area) footprint areas						• If necessary, vegetate and/or cover with appropriate and suitable indigenous grass species. • If deemed necessary, erosion berms can be installed to prevent gully formation. • Restrict vehicle movement to areas of need. • All vehicles should be serviced on a regular basis at the specific demarcated areas. • Any spillage from vehicles should be cleaned up immediately once occur. • Rehabilitate areas once usefulness is completed. • All soils compacted as a result of the construction activities falling outside the infrastructure footprint areas should be ripped and profiled.					
Flora	The construction of the crossings associated haul road, the WRD, PCD including all stormwater and water management infrastructure may lead to: • Localized loss of floral habitat within areas of ecological sensitivity; • Localized loss of floral species diversity; and • Localized loss of medicinal, protected and potential RDL floral species.	5	5	2	8	**75** **High**	• The proposed development footprint areas should remain as small as possible. • A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. • It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed	4	3	1	4	**32** **Moderate**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							development should remain as small as possible and should not encroach unnecessarily into the surrounding sensitive areas and the associated buffer zones. • The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • Sensitive flora species are to be handled with care and the relocation of sensitive plant species is to be overseen by a botanist. • Where existing road crossings over riparian features are situated that may require upgrading in terms of the proposed project, upgrading should be undertaken in such a manner as to ensure that hydrological connectivity upstream and downstream of the crossings are maintained. • Informal fires in the vicinity of mining activities should be prohibited throughout the life of mine. • Any spillage from vehicles should be cleaned up immediately once occur.					
	Potential spreading of alien invasive species	5	5	2	8	**75 High**	An alien invasive eradication plan should be developed and include, but not be limited to the following:	2	4	1	6	**22 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							• Care should be taken with the choice of herbicide to ensure that no additional impact or loss of indigenous plant species occur due to the use of the herbicides. • Footprint areas should be kept as small as possible when removing alien plant species. • No vehicles should be allowed to drive through riparian areas during the eradication of alien and weed species. • Removal of alien and weed species must take place in accordance with existing legislation process and procedures.					
Fauna	The construction of the river crossings, open pit area alterations associated with the WRD, including all stormwater and water management infrastructure may lead to: • Localized loss of faunal habitat within areas of ecological sensitivity; • Localized loss of faunal species diversity; and • Localized loss of protected and potential RDL faunal species.	5	5	2	6	**65** **High**	• A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. • It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach onto surrounding sensitive areas and the associated buffer zones.	3	4	1	4	**27** **Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							• The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • No trapping or hunting of fauna is to take place. • It must be ensured that migratory connectivity between sensitive areas is maintained where possible. • It is recommended that a speed limit of 40 km/h is implemented on all roads running through the project area in order to minimize risk to fauna species from vehicles. Speed humps may be constructed to help slow vehicles and help mitigate collision with faunal species. • During induction of all personnel and contractors, awareness training in terms of faunal species is recommended to increase awareness, respect and responsibility towards the environment. • All informal fires in the vicinity of the mining operations and new construction areas should be prohibited					

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Riparian Areas	The construction of the river diversions, alterations and crossings associated with the WRD and conveyor belt, including all stormwater and water management infrastructure may lead to: • Localized changes to riparian features' ecological and socio-cultural service provision; • Localized changes to riparian features' hydrological function; and • Localized loss of riparian habitat and ecological structure.	5	5	2	8	**75** **High**	• The proposed development footprint areas should remain as small as possible. • A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. • It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach onto surrounding sensitive areas and the associated buffer zones. • The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • All sensitive areas outside the construction area must be kept off-limits to construction vehicles and personnel. • It must be ensured that migratory connectivity between sensitive areas is maintained where possible. • The infrastructure footprints associated with the proposed project should fall outside the	3	4	1	4	**27** **Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							1:100-year floodline of the riparian features or 100 m from the edge of the feature, which ever distance is the greatest unless exemption from Regulation 704 is applied for and obtained. • All project affected riparian features should be visually inspected and monitored for erosion and incision on a monthly basis, and immediately after heavy rainfall events. • A riparian feature inspection programme and reporting system should be developed and implemented during the life of mine. • Where existing road crossings over riparian features are situated that may require upgrading in terms of the proposed project, upgrading should be undertaken in such a manner as to ensure that hydrological connectivity upstream and downstream of the crossings are maintained. • Future mine planning should ensure that mining activities do not lead to a reduction of stream flow or dewatering of any riparian features and connectivity of the riparian features in the vicinity of the mining activities should be maintained.					
	• The construction of the south3 open pit and	5	4	2	6	**60**	• Limit the footprint area of the construction activity to what is	3	4	1	4	**27**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Aquatic Environment	associated infrastructures, may lead to: • Loss of Instream Flow, Aquatic Refugia and Flow Dependent Taxa; • Localized impacts on Water Quality Affecting Aquatic Ecology; • Localized loss of Aquatic Habitat; and • Localized loss of Aquatic Biodiversity and Sensitive Taxa.					**High**	absolutely essential in order to minimize the loss of clean water runoff areas and the concomitant recharge of streams in the area. • During construction phase, all areas outside the construction areas will be kept off limits. • Ensure that as far as possible all infrastructure is placed outside of riparian features and streams. In particular mention is made the minimum buffer of 100 m around all riparian features which should be maintained in line with the requirements of regulation GN704 of the National Water Act. • As far as possible all crossings should take place at right angles or other acute angles to the riparian features affected to minimize the footprint area of impact within and immediately adjacent to the affected riparian features. • Ensure that hydraulic connectivity of the riparian areas is maintained between the areas upstream and downstream of the crossing. • Ensure that no incision and canalization of the riparian features takes place as a result of the construction of the crossings. • During construction, the necessary and appropriate erosion control measures will be implemented at erodible areas to minimize erosion.					**Low**
	The construction of stormwater and water management infrastructure, may lead to: • Loss of Instream Flow, Aquatic Refugia and Flow Dependent Taxa; • Localized impacts on Water Quality Affecting Aquatic Ecology; • Localized loss of Aquatic Habitat; and • Localized loss of Aquatic Biodiversity and Sensitive Taxa.	5	4	2	6	**60** **High**		3	4	1	4	**27** **Low**
	The construction of the open pit and associated infrastructures may lead to: • Loss of Instream Flow, Aquatic Refugia and Flow Dependent Taxa;	5	4	3	4	**55** **Moderate**		3	4	1	4	**27** **Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	• Impacts on Water Quality Affecting Aquatic Ecology; • Localized loss of Aquatic Habitat; and • Localized loss of Aquatic Biodiversity and Sensitive Taxa.						• During the construction phase, no unauthorized vehicles will be allowed to indiscriminately drive through the riparian features and all vehicles used must remain on designated roadways. • No dumping of waste should take place within the riparian feature zones. • Throughout the life of mine measures to control alien vegetation must be implemented and specific attention given to riparian features. • Implement the surface water monitoring programme as described in the Surface Water Monitoring Plan.					
Surface Water	Increase in silt load in runoff due to the construction of the river diversion and associated infrastructure	4	2	2	4	**32 Moderate**	The following will be done as part of the construction phase before constructions commences: Stormwater runoff will be directed towards natural watercourses. • During construction activities clean water diversion berms upstream of the site clearance area will be constructed prior to clearing areas for new infrastructure development. • Routine surface water quality monitoring up and down stream of construction activities and position of infrastructure and activities associated with the South 3 opencast Project will be undertaken on a monthly basis as	3	2	1	2	**15 Low**
	Increase in silt load in runoff due to the construction of the plinths and service road associated and subsequent downstream migration of silt in the river	4	2	2	4	**32 Moderate**		3	2	1	2	**15 Low**
	Deterioration in water quality due to the accidental spillages of hazardous substances from heavy duty vehicles during construction	4	2	2	6	**40 Moderate**		2	2	1	4	

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							detailed in the Hydrological Report. • Paddocks will be constructed downstream of the construction activities to minimize uncontrolled runoff from the site. • Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste. • Ensure areas used as construction laydown and vehicle maintenance areas are clearly indicated and is adequately bunded for the storage of chemicals and hazardous, materials. • Ensure that routine maintenance on all vehicles is undertaken as per maintenance schedule and records are kept.					
Groundwater	Potential contamination of groundwater resources due to potential accidental spillages of hazardous substances from the vehicles and equipment used for construction activities.	4	2	2	6	**40** **Moderate**	• All spillages will need to be cleaned up as soon as practically possible. • Proper management of stormwater drainage infrastructure should be ensured. • Implement specific management measures as detailed in the Groundwater Impact Assessment Report.	1	1	1	2	**4** **Low**
Noise	During the construction phase, a slight increase in the ambient noise levels is anticipated due to the movement of vehicles and	3	2	2	6	**30** **Moderate**	• Machinery and/or vehicles with low noise levels to be used.	3	2	2	4	**24** **Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	construction activities undertaken.						• Adhere to the speed limit of 40 km/h for all vehicles within the construction areas. • The reverse signal of the earthmoving equipment and the trucks to be monitored not to create a noise disturbance and/or noise nuisance. • Machinery will be fitted with silencers and regular monitoring will be undertaken to ensure compliance to noise levels. • Limit the construction working hours from 6am to 6pm. • Develop a mechanism to record and respond to complaints relating to noise levels. • Implement monitoring programme as detailed in Noise Impact Assessment Report					
Heritage	The proposed development of the South 3 opencast project is less likely to materially affect or be affected by the heritage sites and graves since this would have been addressed in the pre-construction phase. No material impacts are anticipated.	2	2	2	6	**20** **Low**	• Care should be taken that, when development commences, if any archaeological and/or historical sites are discovered a qualified archaeologist be called in to investigate the occurrence. • Implement management measures as detailed in the Heritage Impact Assessment Report	2	2	2	4	**16** **Low**
Visual	Indirect visual impact due to dust generation during construction activities.	5	2	2	4	**40** **Moderate**	• The relevant exposed construction site areas and access gravel roads will be irrigated on a regular basis, with just enough moisture to keep the	4	2	2	2	**24** **Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							dust down without creating undue runoff. • Ensure harvesting of plants from this area and preserve in the nursery for rehabilitation purposes, where practical. Any revegetation of affected area to be rehabilitated after construction should be done in consultation with the Botanical Specialist. • The on-site nursery must be expanded and maintained by the mine if possible, during the Life of Mine to assist with the mitigation and progressive rehabilitation phases. • Natural vegetation, wherever practical, must be retained on and around the construction sites. • Litter and dust management measures should be in place at all times. • The sites should be kept neat and tidy at all times. • All lights used for illumination (except for lighting associated with security) should be faced inwards and shielded to avoid light escaping above the horizon. • Construction activities will be limited to be undertaken between 6am and 6pm.					
Socio-Economic	Potential positive Impact on Livelihoods - Potential increase in employment opportunities	5	2	2	6	**50**	• Use local labor as far as possible.	5	2	2	3	**30**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
						Moderate	• MPM and their appointed contractors should adhere to the MPM policies on local procurement in terms of additional labor opportunities.					**Moderate**
	Potential negative impact on Sense of Place due to the alteration of the current landscape	3	2	2	4	**24 Low**	• Contractors to provide adequate accommodation for non-local contractors.	2	2	2	2	**12 Low**
	Potential negative impact on Health in terms of potential dust pollution	3	5	2	8	**45 Moderate**	• Develop a mechanism to record and respond to complaints during the construction phase. • Ensure that the mine's Health and Safety policy are implemented.	2	5	2	4	**22 Low**
	Potential negative impact on Health from spread of HIV/AIDS	3	5	3	8	**48 Moderate**	• MPM to provide necessary and appropriate health and safety training including for HIV/AIDs to all personnel and contractors, and information to surrounding communities. This could be a coordinated response with partners including the provincial departments of health and education and the Greater Tubatse Local Municipality.	2	5	2	8	**30 Moderate**
Cumulative Impact	In terms of the site clearing and grubbing of the footprint areas associated with the WRD, open pit, office areas, and all proposed access roads it is anticipated that the significance of the cumulative impact will be MODERATE, due to the impact	5	2	2	4	**40 Moderate**	• Through the implementation of all the above-mentioned mitigation measures, the overall significance of the activity's impact can be lowered to LOW.	3	2	1	1	**12 Low**

Potential Impact Description in terms of each Environmental Aspect		Potential Impact Rating					Mitigation/management measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	occurring on site and over a short duration of time although the activity may affect the local areas' biodiversity and has a likely potential of occurring.											

12.2.2 Operation, management and maintenance of the open pit, WRD and associated access road

Activity: Operation, management and maintenance of the open pit, PCD, WRD and associated access road.

Actions:

- Utilisation of the access haul road by heavy load vehicles for the transport of waste rock materials to the WRD area.
- The use of the haul road from South3 to the South3 area.
- The continuous placement of waste rock material onto the demarcated WRD area that has beenprepared and stripped of topsoil and vegetation during the pre-construction phase.

Potential impacts and mitigation measures**:** Refer to **Table 12.4.**

Table 12.4: Potential impacts and mitigation measures associated with the operation, management and maintenance of the open pit WRD and associated access road

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Potential impacts and mitigation measures associated with the operation, management and maintenance of the WRD and associated access road												
Geology	The continuous placement of waste rock material onto the demarcated WRD area is unlikely tomaterially affect or be affected by the local geology. No material impact anticipated.						No mitigation measures are required as no material impact is anticipated.					
Topography	The continuous placement of waste rock material onto the demarcated WRD area will modify the local topography of the site-specific area.	5	5	1	4	**50 Moderate**	• Progressively shape the WRD. • If feasible, larger indigenous shrubby vegetation can be planted between the WRD and the visually impacted Community.	3	4	1	4	**27 Low**
Air quality	Increase in fugitive dust due to an increase in light constructionvehicle activity.	5	4	2	6	**60 Moderate**	• Waste rock material and debris will be kept wet with just enough moisture to keep the dustdown without creating undue runoff. • Where resident moisture content is not adequate to control dust and dispersion of particulates during transportation, dust raising materials will be transported in closed body vehicles and/or material will be covered with a tarpaulin. • Transportation of dust raising material without covering must be restricted to an appropriate speed level (roughly 30 km/h) if dispersion of particulates and fugitive dust are observed leaving the transportation vehicles. • Engine idle speeds during operating times should be reduced. • All vehicles and equipment used during the construction phase will be serviced and maintained on a regular basis. • A dust monitoring programme must be implemented that effectively monitors dust related impacts from the project area.	3	4	1	4	**27 Low**
	Increase in fugitive dust due to an increase in movement ofvehicles transporting waste rock material.	5	2	1	4	**35 Moderate**		4	2	3	2	**28 Low**
	Increase it the quantity of noxious vehicle exhaust fumes	5	4	2	6	**60 Moderate**		4	4	1	2	**28 Low**

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Soils, Land Use and Land Capability	Localized loss of soil resources and utilization potential due tothe potential impact of increase soil erosion that may occur around the toe of the WRD areas.	5	5	2	4	**55 Moderate**	• Restrict area of impact to as small an area as practical and manage WRD for erosion bywind and water. • The implementation of adequate stormwater controls to reduce water velocity will mitigate erosion. These controls could include: o earth berms, bunds and/or channels; o energy dissipaters such as gabions; o introduce vegetation; etc. • limit mine vehicles and personnel movement to project specific dedicated access roads;and • ensure that the soils conservation plan is adhered to.	4	3	1	2	**24 Low**
	Localized loss of soil utilization due to potential contamination from spillage of raw product, reagents and hydrocarbons from vehicles	5	5	2	4	**55 Moderate**	• Restrict vehicle movement to areas of need. • All vehicles should be serviced on a regular basis at the specific demarcated areas. • Any spillage from vehicles should be cleaned up immediately once occur. • Training and awareness regarding the management of hydrocarbons is included in the induction programme	3	3	1	2	**18 Low**
Flora	**Impact on habitat for floral species:** • Ongoing disturbance of soils with general operationalactivities leading to altered floral habitat • Increased introduction and proliferation of alien plant species and further transformation of natural habitat due todisturbance during operations • Discharge and	5	5	2	8	**75 High**	• A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. It is recommended that this sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach unnecessarily into the surrounding sensitive areas and the associated buffer zones • The boundaries of the development footprint areas are to be clearly defined and it should be ensured	4	3	1	4	**32 Moderate**

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	contamination from operational facilities may pollute receiving environment • Seepage affecting soils and the groundwater regime • Runoff and seepage from operational facilities may lead tohabitat loss • Ongoing disturbance may lead to erosion and sedimentation						that all activities remain within defined footprint areas. • Mine to expand, manage and maintain the on-site nursery during the Life of Mine to assist with the mitigation and progressive rehabilitation phases. • Informal fires in the vicinity of mining activities should be prohibited throughout the life of mine. • Any spillage from vehicles should be cleaned up immediately once occur.					
	Impact on floral diversity: • A potential increase in alien plant species leading to altered plant community structure and composition. • Potential erosion and sedimentation as a result of operational activities leading to a loss of floral species diversity. • Increased vehicular and pedestrian movement may lead to loss of floral species. • Potential increase in informal fire frequency and intensity, aswell as uncontrolled fires during mining operations due to increased human activity impacting on floral communities.	5	5	2	8	**75 High**	An alien invasive eradication plan should be developed and include, but not be limited to thefollowing: • Care should be taken with the choice of herbicide to ensure that no additional impact orloss of indigenous plant species occur due to the use of the herbicide; • Footprint areas should be kept as small as possible when removing alien plant species; and • No vehicles should be allowed to drive through riparian areas during the eradication ofalien and weed species. • Removal of alien and weed species must take place in accordance with existing legislation process and procedures. • During induction of all personnel and contractors, awareness training in terms of flora species is recommended to increase awareness, respect and responsibility towards theenvironment.	3	3	1	4	**24 Low**

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Fauna	**Impact on habitat for faunal species:** • Ongoing disturbance of soils with general operationalactivities leading to altered faunal habitat • Increased introduction and proliferation of alien plant species and further transformation of natural habitat due todisturbance during operations • Discharge and contamination from operational facilities may pollute receiving environment • Seepage affecting soils and the groundwater regime • Runoff and seepage from operational facilities may lead tohabitat loss • Ongoing disturbance may lead to erosion and sedimentation	5	5	2	6	**65 High**	• A sensitivity map has been developed for the study area, indicating areas which are considered to be of increased ecological importance. It is recommended that the sensitivity map be considered during all development phases to aid in the conservation of floral diversity within the study area. • All development footprint areas and areas affected by the proposed development should remain as small as possible and should not encroach onto surrounding sensitive areas and the associated buffer zones. • The boundaries of the development footprint areas are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. • No trapping or hunting of fauna is to take place. • It must be ensured that migratory connectivity between sensitive areas is maintained where possible. • It is recommended that a speed limit of 40 km/h is implemented on all roads running through the project area in order to minimize risk to fauna species from vehicles. Speed humps may be constructed to help slow vehicles and help mitigate collision with faunal species. • During induction of all personnel and contractors, awareness training in terms of faunal species is recommended to increase awareness, respect and responsibility towards the environment. • All informal fires in the vicinity of the mining operations and new construction areas should be prohibited	3	3	1	4	**24 Low**

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
Riparian Areas	Potential soil erosion and subsequent siltation of the riparian areas may lead to a loss of the ecological service provided bythese systems.	4	2	3	4	**36 Moderate**	• Ensure that the project specific related waste and runoff do not affect the riparian featuresand associated buffer zones (Figure 9.8).	2	2	2	2	**12 Low**
Aquatic Environment	The operation of the WRD and associated access road includingthe utilization of the existing topsoil dump, may lead to: • Loss of Instream Flow, Aquatic Refugia and Flow Dependent Taxa; • Impacts on Water Quality Affecting Aquatic Ecology; • Localized loss of Aquatic Habitat; and • Localized loss of Aquatic Biodiversity and Sensitive Taxa	5	5	2	6	**65 High**	• Very clear and well managed clean and dirty water separation must take place in line withthe requirements of regulation GN704 of the National Water Act. • All pollution control facilities must be managed in such a way as to ensure that storageand surge capacity is available if a rainfall event occurs. • Ensure all spills are cleaned up immediately. • Implement the surface water monitoring programme. • Ongoing biomonitoring of aquatic resources in the vicinity of the study area must takeplace at points located upstream and downstream of the mining activities near the Tubatsane River and tributaries as long as there is sufficient habitat to do so. • Biannual (twice a year) biomonitoring should be undertaken and include the following methods: SASS5, IHHAS and MIRAI indices. • Should any deviation of the normal trend be identified, measured to minimize or prevent any significant negative impacts should be implemented.	3	3	2	2	**21 Low**
Surface Water	Increase in silt laden runoff from the WRD due to silt in the waste material.	5	5	2	4	**55 Moderate**	• Stormwater runoff will be handled on surface and directed towards natural watercourses. • Stormwater culverts and clean water diversions will be designed and constructed to accommodate the 1:50 year storm event. • Adequate protection measures at river crossings	3	5	1	2	**24 Low**
	Increase in erosion due to diversion of stormwater around the	4	5	1	6	**48**		3	5	1	2	**24**

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
							will be included in the relevant designs.					
	WRD					Moderate	• Ensure that project specific clean water diversions continue to route the water towards the local water course. Refer to Section 6.2 of the Surface Water Report for project specific storm water management measures. • Develop and implement controls to pick up oil/diesel leaks and spillages of any designated hazardous waste. • Ensure that routine maintenance on all vehicles is undertaken as per maintained schedule and records are kept. • Routine water quality monitoring proposed up and down stream of the operational area should be undertaken. • Implement the surface water monitoring programme.					Low
	Potential deterioration in water quality in the Tubatsane River due to potential contaminants in the runoff from the WRD entering the surface watercourse	4	5	2	6	52 Moderate		3	5	1	2	24 Low
	Potential deterioration in water quality due to the accidental spillages of hazardous substances from heavy duty vehiclesduring operational phase.	4	4	1	8	52 Moderate		3	4	1	4	27 Low
Groundwater	Due to the absence of acid generating minerals like pyrite and the abundance of silicate minerals that may to some extent provide Neutralizing Potential to counteract Acid Potential that may be produced. It can be concluded that metal mobilization is unlikely; however, the dominant salts that will become enriched within the seepage are Ca, Na, Mg, Cl and HCO_3. Nitrate originate from the residue of explosives used within the mining process can also become enriched within the seepage that will leach from the WRD. The consequence is that the	4	4	3	8	60 High	• Compaction of the WRD area before storage activities begins to reduce seepage into underlying aquifers. • Other mitigation measures will include up gradient surface water diversion to ensure the containment of runoff and subsequent seepage into underlying aquifers and the installation of down gradient paddocks. • The requirements for appropriate practical management measures for the protection of the groundwater resource will be discusses with DWS. • Implement the groundwater monitoring programme during the life of the project.	1	1	2	4	7 Low

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	leachate can recharge into the underlying groundwater environment.											
Noise	Hauling activities along the haul road during operational activities.	3	5	2	8	**45 Moderate**	• Develop a mechanism to record and respond to complaints during the operational phase. • Machinery and/or vehicles with low noise levels to be used. • Machinery will be fitted with silencers and regular monitoring will be undertaken to ensure compliance to noise levels. • Adhere to the speed limit of 40 km/h for all vehicles within the operational areas. • The reverse signal of the earthmoving equipment and the trucks to be monitored not tocreate a noise disturbance and/or noise nuisance. • Limit the operational working hours from 6am to 6pm, where practically possible.	2	5	2	6	**26 Low**
	Dumping of waste rock and top soil on waste rock dump and existing top soil dump	3	5	2	8	**45 Moderate**		2	5	2	6	**26 Low**
Visual	The continuous placement of waste rock material onto the demarcated WRD area	5	5	1	6	**60 High**	• Progressively shape the WRD. • If feasible, larger indigenous shrubby vegetation can be planted between the WRD and the Matimatjatji Community, as this is the only community that could be visually impacted by the WRD.	3	4	1	4	**27 Low**
Socio-Economic	Positive Impact on Livelihoods	3	4	3	8	**45 Moderate**	MPM to increase the probability of retaining staff by implementing the MPM policy of upskillingemployee skills where necessary and possible, and aligning with the MPM Social and Labor Plan.	5	5	2	3	**50 Moderate**
	Positive Impact on Local Livelihoods and Local EconomicDevelopment	1	4	1	2	**7 Low**	MPM must inform companies it procures goods and services from of any procurement gapsduring the development of South 3 opencast, so that affected companies can plan accordingly.	3	4	2	6	**36 Moderate**

Potential Impact Description in terms of Environmental Aspects:		Potential Impact Rating					Mitigation / Management Measures	Potential Impact Rating				
		Pr	Du	Ex	Ma	Significance		Pr	Du	Ex	Ma	Significance
	Positive Impact on Economic Development	3	4	2	6	**36 Moderate**	To increase magnitude of the impact, increase the probability of retaining staff by implementingthe MPM policy of upskilling employees where necessary, and aligning with the MPM Social and Labor Plan.	4	4	2	6	**48 Moderate**

12.3 Closure/Rehabilitation Phase

The main activity that will take place during this phase of the project is the demolition and removal of mining related infrastructure. The potential impacts associated with demolition activities are similar to the anticipated impacts to occur during the construction phase. The impacts and mitigation measures have been dealt with during the discussions of the construction activities and will not be recaptured in this section, only references will be made where applicable.

12.3.1 Demolition of Project Related Infrastructure

The following activities will be associated with the demolition of majority of the Project Related Infrastructure:

- Demolish and remove all infrastructure not required during post-closure.

Potential Impacts and Mitigation Measures

It is anticipated that the potential impacts of this activity in the rehabilitation phase will be the same as the anticipated impacts listed in the construction phase for the construction. It is therefore recommended that the mitigation/management measures applicable to the construction phase are implemented.

The following additional mitigation measures, as listed below, can be applied during the closure/rehabilitation phase in terms of the demolition of the project related infrastructure:

Environmental Aspect	Additional Mitigation Measure
Soils, land use and land capability	• During rehabilitation, preliminary soil quality monitoring should be carried out to accurately determine the fertilizer requirements that will be needed. • Replacement of nutrient and organic carbon needs and requirements at time of rehabilitation, landscaping of the topographic slope, cultivation of soils and replacementof vegetative cover as soon after replacement of materials as possible. • Monitoring of vegetative growth until self-sustaining.
Fauna and flora	• All soils compacted as a result of closure activities should be ripped and profiled. • Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all development including decommissioning phases to prevent loss of faunal habitat. • All project related disturbed habitat areas must be rehabilitated and planted with indigenous floral species as soon as possible to ensure that faunal habitat is re-instated. • It must be ensured that mining related waste or spillage and effluent do not affect the sensitive habitat boundaries and associated buffer zones after closure. • Post closure groundwater management will need to be very carefully managed to ensure that no impact on the wetland areas and riparian resources in the area takes place after mine closure has taken place. • Utilize species propagated in the nursery for rehabilitation.

Surface water	• Demolition activities will be undertaken during the dry season, where possible to minimize the potential for stormwater runoff. • During closure and rehabilitation activities clean water diversion berms upstream of thearea will be constructed • Routine surface water quality monitoring up and down stream of closure and rehabilitation activities will be undertaken as per the surface water monitoring programme.
Groundwater	• Implement the groundwater monitoring programme during the closure and rehabilitationphase.

12.3.2 Post Closure Phase

This is a period of maintenance and monitoring of the areas that would have been associated with the various project related structures and infrastructure. The activities are limited to monitoring activities and limited erosion and vegetation repair if necessary. It is not anticipated that any significant impacts will arise during this period.

13. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

MPM is authorized for mining and the proposed area has been disturbed by adjacent illegal mining activities, the nearby local community, limited agricultural activities and intensive grazing practices. Taking the above-mentioned into account as well as the relatively low nature of the potential impacts (with the implementation of management measures), as discussed throughout this document, it is clear that the proposed opencast mining method, as proposed by the applicant, will be the most suitable future land use for the site in terms of environmental and economic cost-benefit.

The findings of the specialist studies undertaken within this EIA report provide an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed project. The findings conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental fatal flaws that post the provided mitigation, should prevent the proposed project from proceeding.

PART B:
ENVIRONMENATAL MANAGEMENT PROGRAMME– MODIKWA PLATINUM MINE

ENVIRONMENTAL MANAGEMENT PROGRAMME IN COMPLIANCE WITH SECTION 39(3)(D) OF THE MPRDA ACT, READ TOGETHER WITH REGULATION 50(E), (F) AND (I) AND REGULATION 51(B)(I) AND (II) AND SECTION 39(4)(A)(III) OF THE MPRDA ACT

EMPR AMENDMENT FOR MODIKWA PLATINUM MINE

THE PROPOSED SOUTH 3 OPENCAST MINING PROJECT ON FARM WINTERVELD 293 KT SITUATED WITHIN THE SEKHUKHUNE DISTRICT MUNICIPALITY, LIMPOPO PROVINCE

14. BACKGROUND OF THE EMPR

Modikwa Platinum Mine (hereafter referred to as 'MPM') has mining rights on the farms: Maandagshoek 254 KT, Driekop 253 KT, Hendriksplaats 281 KT, Onverwacht 292 KT and Winterveld 293 KT in the Fetakgomo-Tubatse Local Municipality (FTLM) within the Sekhukhune District Municipality (SDM). MPM has both underground and opencast mining operations and they propose to add an opencast mining method at portion 0 of farm Winterfeld 293 KT. MPM has appointed Segope Water and Environmental Services to amend the approved Environmental Authorizations (EA), Environmental Management Programme (EMPR) and the Water Use Licence (WUL) required for the proposed opencast mining method. **Part B** of this report is considered to be the first draft of the EMPR and is subject to the approval by the DMRE. Once approved, the EMPR must be finalized as a legally binding document that is to be read in conjunction with the EA.

14.1 Purpose of the EMPR

Part B of this report presents the EMPR for the MPM South 3 Project, which has been compiled in accordance with Appendix 4 of the NEMA 2014 EIA Regulations, as amended (GNR 982) as well as the requirements of an EMPR report template issued by the DMR for listed activities associated with mining right and/or bulk sampling activities. A summary of the requirements of an EMPR report is provided in **Table 14.1** including cross- references to sections in this report where the legislated requirements have been addressed.

Table 14.1: Contents of an EMPR

EMPr REQUIREMENTS ACCORDING TO APPENDIX 4 OF GNR 982 OF 2014, AS AMENDED IN GNR 326 OF 2017	SECTION OF REPORT
An EMPr must comply with section 24N of the Act and include a. Details of: i. the EAP who prepared the EMPr; and	Section 2.2 of Part A
ii. the expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Appendix A
b. A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2.6 of part A
c. A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Appendix D
d. A description management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the EIA process for all phases of the development including- i. Planning and design	Section 15

ii. Pre-construction activities iii. Construction activities iv. rehabilitation of the environment after construction and where applicable post closure; and v. where relevant, operation activities;	
e. Description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to – i. avoid, modify, remedy, control or stop any action, ii. activity or process which causes pollution or environmental degradation; iii. comply with any prescribed environmental management standards or practices; iv. comply with any applicable provisions of the Act regarding closure, where applicable; and v. comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 12
f. The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 11
g. The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 15 and 16
h. An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 16
i. The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 16
j. The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 6
k. A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 6
l. An environmental awareness plan describing the manner in which- i. the applicant intends to inform his or her employees of any environmental risk which may result from their work; and ii. risks must be dealt with in order to avoid pollution or iii. the degradation of the environment; and	Section 17

m. any specific information that may be required by the competent authority.	Not specified at this stage

The purpose of amending and compiling an EMPR for the proposed MPM South 3 project is to include the proposed opencast mining method and additional infrastructures which were not part of the originally approved EMPR. The EMPR aims to provide the necessary protection of potentially sensitive areas and provide environmental responsibility and a management framework, within which all future construction, operation and closure phase will occur.

During the site visit and with the specialist engagement, various impacts were identified, and mitigation and management measures were designed and proposed for these impacts. These mitigation measures have been organized and co-ordinated into the EMPR, which will remain in force during the lifespan of the project and will be a subject of regular audits as well as updates. The EMPR will guide the pre-construction, construction, operation and closure phases of the MPM mining project. It is a dynamic guideline document that will be updated regularly as the project proceeds, once approval has been granted. The mitigation and management measures described in the EMPR will be incorporated into the contract agreements with the contractors to ensure their environmental compliance.

14.2 Details of the EAP

Refer to **Section 2.2** of **Part A** of this report for the details of the EAP.

14.3 Description of the aspects of the activity

Refer to **Section 5** of **Part A** of this report, which detailed the aspects related to the activity.

14.4 Composite map

Layout plan, locality and sensitivity maps are attached as **Appendix C**, the maps are according to the required scale which details the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffer zones.

14.5 Environmental Management Programme approach

The EMPR in essence will be adopting the approach of the internationally recognised ISO 14001 Environmental Management System (EMS) standard that is essentially based on the Deming Cycle rationale which is a simplified continuous improvement model consisting of four main iterative steps. These steps are described as follows:

- **Plan** – Establish objectives and processes necessary to deliver results in accordance with the developed organisational environmental policy.
- **Do** – Implement the process.
- **Check** – Monitor and measure processes against environmental policy, objectives, legal and other requirements and report the results.
- **Act** – Take action to continually improve environmental performance.

Continual improvement is achieved by periodically monitoring and reviewing the EMPR and implementing corrective actions when required. Therefore, this document should be considered as a

living document which must be continuously updated and possibly improved. This approach taken in the development of the EMPR is in line with the requirements stipulated in GNR. 982 (2014 EIA regulations).

Legislative compliance: Throughout the development of management measures all legislative and other requirements associated to the proposed MPM additional activities were considered and highlighted.

Specialist recommendations: A number of specialist investigations formed part of the EIA process and resulted in a number of findings and recommendations, **Part A, Section 9** summarises the findings and recommendations of the EIA. The specialist studies provided specific mitigation and management measures as a recommendation. These findings have been considered throughout the development of the EMPR.

15. DESCRIPTION OF MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

A number of possible environmental and social impacts/risks have been identified in the **PART A** of this report. The sections to follow provides the management approach related to each potential impact/risk by defining management and outcome-based objectives.

The preliminary objectives have been developed against the background of the Mine location in the Sekhukhune Region of Limpopo, particularly that the region is disturbed by mining activities and land available for non-mining has become more limited. The objectives indicated below are therefore designed largely to manage residual risks and provide land that can be utilised after rehabilitation.

Rehabilitation will be done concurrently, with additional rehabilitation still being required in years 1-6 provides a breakdown of the annual rehabilitation as well as the total post closure expenditure to be incurred by the operation.

15.1 Determination of closure objectives

The closure objectives are based on an extensive environmental database and baseline information gathered during the LoM so far, as well as the baseline studies undertaken as part of the specialist investigations. The closure vision for MPM is intended to inform the closure objectives. The vision for the mine is to progressively re-instate an area that is safe, stable and non-polluting with the final landform not adversely affecting water resources. This will be achieved by amongst others creating a free draining post mining landscape that has been returned to a productive post mining land use. The land use is likely to be primarily wilderness with the potential for arable agriculture and livestock grazing. All existing infrastructures will be removed, and no new fixed infrastructures will be established on closure. The closure objective regarding groundwater is zero discharge of contaminated water to the environment. MPM will develop detailed closure plan at least two years before cessation of mining detailing how they plan to finalise closure of the site.

The closure objectives which have been developed to support the closure vision are:

- To adhere to all statutory and other legal requirements.
- To develop landforms supporting stable and functioning ecosystems that are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.
- Ensure safety and health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks.

- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders.
- Physically and chemically stabilise remaining structures to minimise residual risks.
- Promote biodiversity and biological sustainability to the maximum extent practicable.
- Utilize closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.
- To achieve agreed quality targets set by the Catchment Management Authority (CMA) and the DWS as far as practical relative to impacts and reasonability to achieve.

15.2 Project specific mitigation and management commitments

Please refer to **Section 12** of the EIA/EMPR Report (Part A) for all relevant mitigation and management comment as prescribed by the various specialists in accordance to the specific activity that will be undertaken during the different phases of the South 3 opencast project.

15.3 MPM South 3 opencast specific design Management Measures

The following section provides the surface and groundwater management measures relating to the design criteria which will be implemented during the preparation, pre-construction, construction and operational phases specifically.

15.3.1 Surface Water

As part of the proposed South 3 opencast Project the new infrastructure will require specific water management infrastructure to enable clear separation of clean and dirty water areas in line with the requirements of Regulation 704.

The following is a brief summary of the Surface Water Management Plan (SWMP) infrastructure proposed for the MPM South3 project. Special design developments were conducted covering the overall scope for the SWMP that will be submitted in support of the Water Use Licence (WUL) application. *The SWMP is attached as **Appendix H14** in this report.*

The General Layout Plans is shown as **Appendix C.**

The following can be reported:

- The drawing is done to a scale of 1: 25 000 showing the terrain contours (major 5m intervals & minor contours 1m interval).
- The clean vs dirty water canals are clearly shown within the three (3) mining areas.
- The Dirty Water System comprise the following:
  - Infrastructure Area: The infrastructure area comprises of a ROM stockpile from where the ore is loaded and transported to MPM South2 via the new haul road. The Plant area also comprises of two (2) workshops, offices and change houses.
  - Waste Rock Dump: The Waste Rock Dump (WRD) is regarded as a dirty water footprint and a special site selection process was used to confirm the best location as this is shown in the G-01 plan. Special seepage drains will be installed as part of the Class C barrier design where this impacted water will gravitate to the PCD.
  - Groundwater Inflows: The groundwater inflows in the various opencast pits will be diverted

to in-pit sumps from where it will be pumped to the PCD to ensure that mining can continue.
    - New dirty water canals: New lined dirty water canals (red) will be utilized to route the water to the relevant dirty water structures. The canals will either be HDPE or concrete lined.
- The Clean Water System is the remainder of the mining area where the clean-water areas in-between are diverted with grass covered canals and berms away from the impacted mining areas. The following is of importance for the clean water system:
    - Clean water diversion canals/ berms have been placed strategically throughout the mining area (light blue) where the clean water is diverted away from the impacted areas to the natural environment.
- Scientific Buffers: The hydropedology buffers have been provided by the specialist and these have been delineated at maximum 50m from the center of the on the impacted streams. These scientific buffers all fall within the 100m stream offset as per GN704 and are therefore not a limiting factor.
- Stream Crossings: There are thirty-six (36 stream crossings that impact the haul road to the existing MPM South2 shaft. These crossings have been identified and the associated culvert crossings were confirmed for the 1:20 year flood event.
- Floodline Study: A detailed floodline study was undertaken for the project. The 1:100 flood event is shown on the General Layout Plan. All infrastructure and mining developments have been shifted outside these floodlines and limiting buffers.
- Clean Water Storm Water Discharge from the bigger mining areas have been allowed for in a series of clean water diversion canals and berms. No flood attenuation will be required for the clean water.

15.3.2 Ground water management measures associated with the WRD

- Compaction of the area before storage activities begins to reduce seepage into underlying aquifers.
- Other mitigation measures will include up-gradient surface water diversion to ensure the containment of runoff and subsequent seepage into underlying aquifers.
- The installation of down-gradient paddocks.
- Groundwater inflow volumes must be recorded in order to update predictions.
- Numerical groundwater model must be updated and recalibrated every year to properly quantify and characterize the impacts.

15.3.3 Archaeological and cultural heritage

- The grave sites are of high importance.
- These graves must be fenced in and have a management plan drafted for the sustainable preservation thereof.
- In cases where graves cannot be fenced due to the potential negatively impact by mining activities (e.g. graves located on the proposed open pit area), a procedure must be followed to relocate these graves.

- However, the mine should ensure that no direct impacts to these graves are experienced.

15.3.4 Biodiversity specific actions:

The following biodiversity specific management measures will be implemented during all phases of the mine. Removal of alien and invasive species within and surrounding mining activities to increase biodiversity value by the rehabilitation of disturbed areas.

- Prevent damages to sensitive habitat from general mining and stockpiling activities.
- Ensure that exposed soils and steep slopes are stable and not eroding.
- Ensure that dust associated with mining activities has minimal impact upon the regional ecology.
- Ensure that soil contamination does not impact on the ecological integrity of the area.
- Ensure that all future developments take biodiversity management issues into consideration.
- Ensure that surface water resources of all major watercourses are monitored for changes during all phases of the mine.
- Ensure that groundwater resources feeding surrounding watercourses are not contaminated by seepage or discharge.
- Greening of facility grounds with indigenous species to improve aesthetic qualities of the facility, maintain and increase species diversity of the area and create a green consciousness among staff.
- Species utilized in the greening of facility areas can be cultivated in the nursery operated by the MPM. This is also a viable long-term option as the nursery can be used to produce floral species, which will be utilized in the closure and rehabilitation of the mining areas.

The following biodiversity specific management measures will be applied during the rehabilitation and post-closure phase of the proposed project:

- Ensure that rehabilitation and closure activities are at a suitable level to ensure that no latent impacts on the receiving environment occur and the Present Ecological State of the system is maintained wherever possible.
- Ensure that potential post-closure seepage from mining infrastructure such as the WRD is prevented as far as possible.
- All disturbed riparian features should be rehabilitated upon decommissioning to ensure that the functions of the riparian features are re-instated and all disturbed riparian features up and downstream of the mining development should be rehabilitated with indigenous flora species.
- Post-closure edge effects of activities undertaken during the rehabilitation phase, including erosion and alien/weed controls, need to be strictly managed in the disturbed areas.
- Post-closure groundwater management will need to be very carefully managed to ensure that no impacts on the identified riparian features located within the project area takes place after mine closure has taken place.

Factors that will need to be considered with respect to implementation of these plans include the following:

- Integration into existing group policy and management systems, including the existing Closure Plans and Environmental Management Programme;
- Alignment with the applicable emergency action plans e.g. spillage management procedure and fire prevention plan, and the rehabilitation plan and/or rehabilitation strategy and implementation programme, a standard requirement of WUL;
- Identification and liaison with stakeholders and neighboring properties especially with respect to weed/invader and erosion control action plans;
- Post closure land use; and
- Available budget and manpower for implementation, management and maintenance.
- The conditions of the Licence will be adhered to and the specific nursery implementation and management plan will be implemented.

15.3.5 Soils, Land Use and Land Capability management measures associated with the South 3 opencast.

The following soil utilisation guidelines (albeit that they are generic) should be adhered to wherever possible:

- Over areas of deep excavation where the majority or all of the soil profile is to be impacted, strip all usable soil as defined (700 mm) in terms of the soil classification and stockpile as berms or low (< 1.5 m) terraced dumps. Alluvial soils should be stockpiled separately from the colluvial (shallower) and in-situ derived materials, which in turn should be stored separately from any calcrete material, while the soft overburden is stored as a separate unit, as a defined dump of less than 15 m in height where possible.
- Protect from contamination and erosion by rock cladding or vegetation cover and adequate drainage of surface runoff.
- At rehabilitation replace the soft overburden followed by the calcrete, compact in situ followed by the soil to appropriate soil depths, and cover areas to achieve an appropriate topographic aspect and attitude to achieve a free draining landscape as close as possible the pre-mining/construction land capability rating.
- Over areas planned for less invasive structures and any material stockpile or storage, strip the top 500 mm of usable soil over all affected areas including terraces, and strip remaining usable soil and calcrete (if present in profile) where founding conditions require further soil removal.
- Store the soil in stockpiles or berms of not more than 1.5 m around infrastructure area ready for closure rehabilitation purposes. Stockpile hydromorphic (wet) soils separately from the dry materials, and the “calcrete” separately from all other materials.
- Protect all stockpiles from water and wind erosion (loss of materials) and contamination by dust and runoff water. Clad stockpiles with larger rock or vegetate the stored materials.

- Over areas of WRD and all Heavy Vehicle Haulage Roads and Major Access Routes, strip usable soil to a depth of 750 mm where possible and/or in areas of arable soils, and between 300 mm and 500 mm in areas of soils with grazing land capability. Stockpile hydromorphic soils separately from the dry and friable materials.
- Before rehabilitation remove all gravel and other rocky material and recycle as construction material or place in open voids. Remove foundations to a maximum depth of 1 m. Replace soil to appropriate soil depths and in appropriate topographic position so as to achieve pre-mining land capability. Protect the stored materials from erosion and contamination using vegetation or rock cladding.
- Over areas to be utilized for General Access Roads (light delivery vehicles), Laydown Pads and any Conveyancing Servitudes (Above ground pipelines and power line servitudes) strip the top 150 mm of usable soil over all affected areas and stockpile in longitudinal stockpile or berms upslope of the facilities. Protect from erosion and contamination.

Soils Conservation and Utilisation Plan

Construction Phase

The construction methods and final end land use are important in deciding if the utilisable soils need to be stripped and retained, and ultimately how much of the materials will be needed for the rehabilitation (stripping volumes). The construction phase soil utilization plan is detailed in the **Table 15.1** below.

Table 15.1: Construction Phase – Soil Utilization Plan

Phase	Step	Factors to consider	Comments
Construction	Delineation of areas to be stripped		Stripping will only occur where soils are to be disturbed by activities that are described in the design report, and where a clearly defined end rehabilitation use for the stripped soil has been identified.
	Reference to biodiversity action plan		It is recommended that all vegetation is stripped and stored as part of the utilizable soil. However, the requirements for moving and preserving fauna and flora according to the biodiversity action plan should be consulted.
	Stripping and handling of soils	Handling	If practical soils will be handled in dry weather conditions so as to cause as little compaction as possible. Utilizable soil (Topsoil and upper portion of subsoil B2/1) must be removed and stockpiled separately from the lower "B" horizon, with the calcrete and/or any Ferricrete layer being separated from the soft/decomposed rock, and wet based soils separated from the dry soils if they are to be impacted.
		Stripping	The "Utilizable" soil will be stripped to a depth of 750 mm or until hard rock/calcrete and/or Ferricrete is encountered. These soils will be stockpiled together with any vegetation coverpresent (only large vegetation to be removed prior to stripping). The total stripped depth should be 750 mm, wherever possible.

	Delineation of stockpiling areas	Location	Stockpiling areas will be identified in close proximity to the source of the soil to limithandling and to promote reuse of soils in the correct areas.
		Designation of Areas	Soils stockpiles will be demarcated, and clearly marked to identify both the soil type andthe intended area of rehabilitation.

This "Soil Utilization Plan" is intimately linked to the "development plan", and it should be understood that if the plan of construction changes, these recommendations will probably have to change as well.

Operational Phase

Maintenance and care of the soil and land resources will be the main management activity and objective required during the operational phase. Management of material loss, compact and contamination are the main issues of consideration. Operational phase soil conservation plan is described in **Table 15.2** below.

Table 15.2:Operational Phase – Soil Conservation Plan

Phase	Step	Factors to consider	Comments
Operation	Stockpile management	Vegetation establishment and erosion control	Enhanced growth of vegetation on the soil stockpiles and berms will be promoted (e.g. by means of watering and/or fertilization), or a system of rock cladding will be employed. The purpose of this exercise will be to protect the soils and combat erosion by water and wind.
		Storm water control	Stockpiles will be established/engineered with storm water diversion berms in place to preventrun off erosion.
		Stockpile height and Slope Stability	Soil stockpiles and berms height will be restricted where possible to <1.5 m so as to avoid compaction and damage to the soil seed pool. Where stockpiles higher than 1.5m cannot be avoided, these will be benched to a maximum height of 15m. Each bench should ideally be 1.5 m high and 2 m wide. For storage periods greater than 3 years, vegetative or rock cover will be essential, and should be encouraged using fertilization and induced seeding with water and/or the placement of waste rock. The stockpile side slope should be stabilized at a slope of 1 in 6. This will promote vegetation growth and reduce run-off related erosion.
		Waste	Only inert waste rock material will be placed on the soil stockpiles if the vegetative growth is impractical or not viable (due to lack of water for irrigation etc.). This will aid in protecting the stockpiles from wind and water erosion until the natural vegetative cover can take effect.
		Vehicles	Equipment, human and animal movement on the soil stockpiles will be limited to avoid topsoilcompaction and subsequent damage to the soils and seedbank.

Decommissioning and closure

The decommissioning and closure phase will see:

- The removal of all infrastructure;
- The demolishing of all concrete slabs/plinths and the ripping of any hard/compacted surfaces;
- The backfilling of all voids and deep foundations and the reconstruction of the required barrier layer (compaction of calcrete/Ferricrete and clay rich materials) wherever feasible and possible;
- Topdressing of the disturbed and backfilled areas with the stored "utilisable" soil ready for re-vegetation;
- Fertilisation and stabilisation of the backfilled materials and final cover materials (soil and vegetation) and
- The landscaping of the replaced soils to be free draining.

There will be a positive impact on the soil and land capability environments as the area of disturbance is reduced, and the soils are returned to a state that can support low intensity wildlife grazing or sustainable conservation. **Table 15.3** describes the decommissioning and closure phase soil conservation plan.

Table 15.3:Decommissioning and Closure Phase – Soil Conservation Plan

Phase	Step	Factors to consider	Comments
Decommissioning & Closure	Rehabilitation of disturbed land & restoration of soilutilization	Placement of soils	Stockpiled soil will be used to rehabilitate disturbed sites either ongoing as disturbed areas become available for rehabilitation and/or closure. The utilizable soil (500 mm to 750 mm) removed during the construction phase, must be redistributed in a manner that achieves an approximate uniform stable thickness consistent with the approved post development end land use (conservation land capability and/or low intensity grazing), and will attain a free draining surface profile. A minimum layer of 300 mm of soil will be replaced.
		Fertilization	A representative sampling of the stripped and stockpiled soils will be analyzed to determine the nutrient status and chemistry of the utilizable materials. As a minimum the following elements will be tested for: EC, CEC, pH, Ca, Mg, K, Na, P, Zn, Clay % and organic carbon. These elements provide the basis for determining the fertility of soil. Based on the analysis, fertilizers will be applied if necessary.
		Erosion control	Erosion control measures will be implemented to ensure that the soil is not washed awayand that erosion gulleys do not develop prior to vegetation establishment.
	Pollution of soil	In-situ remediation	If soil 9whether stockpiled or in its undisturbed natural state) is polluted, the first management priority is to treat the pollution by means of in situ bioremediation. The acceptability of this option

			must be verified by an appropriate soils' expert and by the local water authority on a case-by-case basis, before it is implemented.
		Offsite disposal of soils	If in situ treatment is not possible or acceptable then the polluted soil must be classified according to the minimum requirements for the handling, classification and disposal of hazardous waste DWS and disposed of at an appropriate, permitted, off-site waste facility.

16. MONITORING AND PERFORMANCE ASSESSMENT (INFULFILMENT OF MPRDA REGULATION 50(H) AND REGULATION 51(B)(IV))

The on-going monitoring of groundwater, surface water, air quality and noise will be conducted at the MPM. In addition, the monitoring of the implementation of the South 3 opencast EMP will be undertaken. A formal audit of the performance assessment of the EMPR will take place every two years as stipulated in Regulation 55 (2)(b) of the MPRDA, or at any period as required by the Minister.

16.1 Monitoring Requirements

16.1.1 Rainfall monitoring

During the construction phase a weather station should be installed on site to be a permanent fixture that will continue to operate during the operational phase. As a minimum the parameters measured should include temperature, humidity, rainfall, wind speed and wind direction. Meteorological data will be used in the interpretation of other monitoring results.

16.1.2 Surface Water

Surface Water Monitoring will be undertaken according to South African National Standards (SANS) and DWS requirements on a monthly basis. The proposed monitoring plan is provided in below.

Table 16.1: Proposed Surface Water Monitoring Plan

Source activity/ element	Required monitoring	Functional requirement	Responsible	Frequency
Tubatsane and Mofafa River	surface water quality	Nearby upstream and downstream water quality monitoring	Environmental Leader	Monthly during operational phases when there is a floe.
Tubatsane and Mofafa River	Sedimentation	Nearby upstream and downstream water quality monitoring	Environmental Leader	Monthly during Construction
Earth works, WRDs, PCDs and dams	Sedimentation, spills, leaks, overflows and surface water contamination	Assess area for erosion and spillages.	Environmental Leader	Monthly during high rainfall periods until construction and decommissioning are complete.
Operations	Contamination to the stormwater management system	Monitor and maintain stormwater containment systems; Clean and dispose in accordance with legislation. Take samples as necessary if stormwater is to be discharged and analyses for hydrocarbons and metals to assess level of contamination.	Environmental Leader	Monthly inspection during high rainfall periods.
Water quality	Ensure surface water and groundwater quality monitoring as per sampled and proposed monitoring locations. Parameters should include but not limited to pH; Electrical Conductivity; Sulphate; major cations (K, Ca, Mg & Na); trace metals (Al, Fe, Zn, Cu, Mn, Co, Se, Mo, Cd, Ni, Cr (VI), Pb, Hg & As); Anions (NO_3, NO_2, NH_4, Cl, F, PO_4); Total Dissolved Solids; Total Suspended solids.	Water quality monitoring within the mine water dams or water containment facilities to determine the concentration levels in case of an overflow or need for discharge.	Environmental Leader	Monthly monitoring during construction, operation, decommissioning and for at least three (3) years after closure, or until rehabilitation has reached a sustainable state with no further changes

Water quality data should be assessed against the applicable limits and subjected to trend analysis and waste load calculation

16.1.3 Groundwater

Monitoring: Groundwater

Groundwater monitoring will be undertaken to establish the following according to the programme stipulated in **Table 16.2** below.

Table 16.2: Groundwater monitoring programme

Monitoringposition	Sampling interval	Analysis	Water Quality Standards
Construction, Operational and Decommissioning Phases			
All monitoring boreholes	Monthly: measuring the depth of groundwater levels	No analysis required	
Collecting of groundwater samples at inflow points or collecting points underground	Bi-annually	Macro elements and full ICP-OES scan for trace elements.	SANS: 2015 Drinking Water Groundwater Quality Management Objective for MPM.
All monitoring boreholes	Bi-annually	Macro elements and full ICP-OES scan for traceelements Groundwater level	SANS: 2015 Drinking Water Groundwater Quality Management Objective for MPM.
Rainfall	Monthly	No analysis required	
Post-closure phase for 2 to 5 years after mining ceases			
All monitoring boreholes	Annually	Macro elements and full ICP-OES scan for trace elements Groundwater level	SANS: 2015 Drinking Water Groundwater Quality Management Objective for MPM.

Laboratory analysis techniques will comply with SANS guidelines. The groundwater monitoring database will be updated on a monthly basis as information becomes available. The database will be used to analyses the information and evaluate trends noted.

16.1.4 Water Reporting Requirements

Reporting requirements are proposed as follows:

- Water quality monitoring results are to be recorded in a format that allows a clear and concise review and comparison with baseline and historical data for the project. In the event that an exceedance is recorded then the contingency plan will be enacted to attempt to manage the factors contributing to the water quality impact.
- Environmental performance will be reported in accordance with the WUL and included in the Annual Water Report to DWS.

- Any incidents that cause water or environmental pollution or have the potential to water or environmental pollution will be reported to DWS as soon as possible as per the relevant WUL condition.
- Data from water quality and flow monitoring will be assessed against the applicable limits in and subjected to trend analysis and waste load calculations.
- During decommissioning and closure, water level data will be collected to assess groundwater rebound post closure. It is recommended that monitoring be continued for at least three years after closure of the WRD.
- Should any concerning trends become evident, measures to minimize the impact should be investigated and implemented as appropriate.
- Solid waste monitoring in the form of recorded disposal volumes, all waste removal documents, waste manifests and certificates of safe disposal will be kept for audit purposes for at least the life of mine or as required by legislation.

16.1.5 Noise Monitoring

It is recommended that noise levels will be measured at points associated with the proposed South 3 opencast Project as indicated during the construction and operational phase of the proposed project, to ensure the noise levels does not exceed the recommended noise levels as tabulated in **Table 16.3.**

Table 16.3: Recommended noise levels for specific noise areas (SANS 10103 of 2008)

Type of District	Equivalent continuous rating level ($L_{Req.T}$) for noise dBA		
	Day/Night $L_{Req.dn}$	Daytime* $L_{Req.d}$	Night-time** $L_{Req.n}$
a) Rural districts	45	45	35
b) Suburban districts with little road traffic	50	50	40
c) Urban districts	55	55	45
d) Urban districts with one or more of the following: workshop; business premises; and main roads	60	60	50
e) Central business districts	65	65	55
f) Industrial districts	70	70	60

To monitor noise on site the following must be taken into account:

- Measurements should be made using the equivalent continuous A-weighted sound pressure level, $L_{AEQ,I,}$ in accordance with the South African Bureau of Standards (SABS) code of practice for noise measurement and assessment, SANS 10103:2008.
- The number of complaints with regards to noise must be logged, including the name of the receptor, the location, nature of sound and the time when the noise was were experienced.

- Bi-annual noise monitoring should take place at the location of the two closest receptors.
- It is recommended that noise levels are measured twice during the construction phase.
- It will only be required to take noise measurements during the daytime (between 6 am and 6 pm) as it is recommended that construction activities only take place during these times.
- During the operational phase, noise monitoring is recommended to occur on a bi-annual basis, at there commended points.

16.1.6 Soils Monitoring

Monitoring and maintenance

During the rehabilitation exercise preliminary soil quality monitoring should be carried out to accurately determine the fertilizer requirements that will be needed. Additional soil sampling should also be carried out until the levels of nutrients, specifically magnesium, phosphorus and potassium, are at the required levels for sustainable growth.

If growth problems develop, ad hoc, sampling should be carried out to determine the problem. Monitoring should always be carried out at the same time of the year and at least six weeks after the last application of fertilizer.

The following maintenance during closure and rehabilitation is recommended:

- The area must be fenced, and all animals kept off the area until the vegetation is self-sustaining;
- Newly seeded/planted areas must be protected against compaction and erosion;
- Traffic should be limited were possible while the vegetation is establishing itself;
- Plants should be watered and weeded as required on a regular and managed basis were possible and practical;

16.1.7 Air Quality

The dust monitoring programme should continue on a monthly basis during the construction, operational and decommissioning phase.

16.1.8 Biodiversity

Floral, Faunal and Riparian Data Capturing

Monitoring should occur on an annual basis in the summer growing season. In order to ensure that temporal comparisons can be made assessments should take place at the same time each year.

Aquatic Biomonitoring and toxicological

Biomonitoring and toxicological testing should be undertaken twice a year during dry and wet

seasons at the points indicated in the baseline biodiversity description.

16.1.9 Post rehabilitation monitoring and maintenance

The objective of the monitoring program is to track the recovery of the site towards the long-term post-closure land use goals, in accordance with the overall closure objectives. The monitoring program is designed to collect information to demonstrate that the Relinquishment criteria have been achieved. The anticipated monitoring will include:

- **Surface Water** – Quality monitoring against parameters as required by the WUL. Sampled bi-annually for a three-year post-closure period;
- **Groundwater** – Quality monitoring of both the shallow and deep aquifers against the parameters required by the WUL. Sampled annually for a three-year post-closure period;
- **Erosion monitoring**-This will take the form of developing a representative reference site on both footprints and undertaking visual and topographic assessments to determine erosion rate, using standard erosion monitoring techniques. This will be undertaken once a year at the end of the wet season for a three-year post-closure period;
- **Vegetation establishment**- Vegetation will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference analogue site established in a similar ecotype, for a three-year post-closure period; and
- Photographic records should be maintained together with findings, follow up actions and close out records as part of the MPM Environmental Management System.

17. ENVIRONMENTAL OBJECTIVES AND GOALS (IN FULFILMENT OF MPRDA REGULATION 51(A))

The sections below provide details relating to the Environmental Objectives and Goals associated with the proposed South 3 opencast Project.

17.1 Environmental Goals

Environmental impacts will be mitigated and managed through the implementation of the management and mitigation measures as stipulated in **Section 12.**

The EMPR aims to:

- achieve compliance with the relevant environmental legislation;
- managing identified impacts; and
- provide a reference by which future audits can be assessed.

MPM strive to prevent incidents and to minimize their impact on the environment through a total integrated SHE Management approach.

Specifically with regard to environmental aims, the following is noted:

- Promote environmental awareness amongst all employees, contractors and partners through appropriate training and ongoing awareness programmed so as to achieve the agreed objectives and targets;
- Design, construct and operate our facilities in such a manner as to mitigate and manage environmental impacts;
- Minimize and manage the generation of waste and recycle waste products wherever technically and economically feasible;
- Optimize water utilization;
- Prevention of pollution in all areas through the use of the best available technology not entailing excessive cost;
- Comply with all applicable legislation and other requirements; and
- Conduct periodic audits and reviews to ensure continuous improvement in performance.

17.2 Environmental Impact Management

Identified negative environmental impacts will be managed and mitigated whilst positive impacts will be enhanced through the implementation of the EMPR. MPM is responsible for ensuring that all environmental obligations are met. The implementation of the EMPR and meeting the environmental objectives and targets is also a responsibility of MPM.

The implementation of the environmental mitigation and management measures is monitored through the EMPR Performance Assessment process, which is reported on to the DMRE.

17.3 Socio-economic Objectives

MPM indicates that it strives to maintain a positive impact on the socio-economic environment during the life of mine. The mine indicates that it is actively involved in the community whereby funds are made available for the development of local infrastructure and social upliftment.

17.4 Principles of Operation

The following principles will be implemented with respect to operation:

- The environmental coordinator of MPM will be on site to monitor the operation activities; and
- Environmental specifications will be included in the contract specifications and induction processshould contractors be used.

17.5 Closure Objectives

The closure objectives which will drive the closure criteria and which have been developed tosupport the closure vision are:

- Adhere to all statutory and other legal requirements;
- Ensure safety & health of all stakeholders during closure and post closure and that communitiesusing the site after closure are not exposed to unacceptable risks;
- Ensure that closure supports productive uses considering pre-mining conditions and are inagreement with commitments to stakeholders;
- Physically and chemically stabilize remaining structures to minimize residual risks; and
- Promote bio-diversity and biological sustainability to the maximum extent practicable.

17.6 Waste management protocol

Waste (other than mine residues) will be stored, handled, transported and disposed of in accordancewith the mine's waste management strategy, procedures and protocols. The protocols address:

- the compilation and maintenance of a waste inventory detailing the volumes, types andclassification of wastes generated, stored and disposed of;
- where and how wastes are stored;
- criteria for handling, transporting and disposing of wastes;
- what monitoring is required;
- the health and safety requirements;
- monitoring of water quality for storm flow and seepage; and
- reporting requirements.

17.7 Submission of Information

Information which is required to be submitted to the relevant authorities is done on a planned basis in order to ensure that environmental management requirements are met. When and if needed the necessary updating of reports are undertaken and submitted to the relevant authorities.

18. CLOSURE PLAN (IN FULFILMENT OF MPRDA REGULATION 51(B)(V))

The closure plan has been developed for the entire South 3 opencast and the quantum for financial provision has been calculated for infrastructure and activities associated with the

proposed South 3 project. The financial provision is attached as ***Appendix H15.***

The various EMPR(s) that have been developed for authorisation purposes have contained commitments relating to closure. This is mainly focused on the mitigation of the risks that the mine faces at the end of LOM and these commitments do not necessarily relate to rehabilitation activities such as would be required on the footprint where dumping has encroached on the 100m buffer zone.However, the commitments indicate the principles and actions that the mine would adopt at closure, with the rehabilitation activities within the zone required to comply with these principals. Although there are no specific commitments relating to either the open pit, WRD or the overburden dump in the EMPR, the Rehabilitation Strategy and Implementation Programme (RSIP), developed in compliance to the WUL requirements discusses the closure requirements of these infrastructures. The RSIP indicates that:

- *"Waste rock and overburden not used in backfilling of the open pits may be used to rehabilitate the concentrator plant site and repair eroded drainage channels in the local area.*
- *Specific commitments have not been made in the EMPR as to the method of rehabilitating the WRD's as it is not clear what volume of waste rock will remain at closure.*

The RSIP also indicates that the remediation activities of all areas post-construction and at closure should follow the following steps:

- Level or grade disturbed areas to a slope not greater than 1:5 wherever the natural topography allows. This excludes the residue dumps which are currently 1:2.
- Rip compacted areas to a depth of 20 cm and apply fertilizer if required.
- Re-vegetate with indigenous species appropriate for the area and that are consistent with post mining land use and controlling erosion. In areas where topography requires a slope steeper than 1:5 the EMPR recommends Vetiver grass to stabilize the slopes and minimize erosion. Vetiver grass is not specified in the Biodiversity Action Plan (BAP) but implementation and monitoring of the BAP will indicate the suitability of Vetiver grass and the plant species mix most suitable for the various sites to be rehabilitated.
- Vegetation establishment will be monitored by a specialist and corrective measures, for exampleremoval of alien vegetation and noxious weeds, fertilizer application, reseeding, additional erosion control measures etc. will be applied according to the BAP.
- Maintenance of rehabilitated areas, including any additional erosion control measures, willcontinue until the vegetation cover has been established and can be shown to be self-sustaining.

The strategy previously recommended in the RSIP for preventive and management measures

on the identified impacts and the proposed action plans for the life cycle of the mine is presented in **Table 18.1**, with this being a subset of the commitments contained in the RSIP. The subset reproduced below are those that are pertinent to the footprint exposed by the reclamation ofmaterial to move the WRD and overburden dump out of the 100 m buffer zone.

Table 18.1: Rehabilitation strategy and Action Plan as RSIP

Updated and Consolidated Measure (preventative, management, corrective)	**Outline of the Implementation Programme Action Plans**
R1: In accordance with this Rehabilitation Strategy MPM will: • ensure vegetation protection, rescue, relocations, revegetation practices and alien and noxious weed eradication according to the BAP (SAS, 2009); • ensure soil stripping, stockpiling (top and subsoil separated where possible), management, rescue and remediation; • ensure land conservation and reinstatement of inherent capabilities and uses; • progressive actions will include demolition of temporary infrastructure (such as during construction of projects prior to being commissioned and handed over to the mine), profiling of the WRDs and revegetation until self-sustaining covers are established.	The Implementation Programme will detail action plans for all the measures described in the Rehabilitation Strategy, including identifying current available areas for rehabilitation, areas requiring alien flora eradication, etc.
R2: In accordance with this Rehabilitation Strategy MPM will: • minimize the area of clearing to the minimum area safe forconstruction and operation; • conserve and maintain the integrity of topsoil; • ensure ongoing rehabilitation of all contaminated and/ordegraded land as soon as a disturbing activity has ceased or as soon as a mining component (aspect), no longerrequired for the mine's operation, is removed; • implement and monitor all required rehabilitation phases (depending on the degree of degradation to the land) including demolition (progressive and at final closure), remediation (land, surface water and groundwater, improving the condition of these media through, for example, ripping of soils, improving soil fertility through addition of fertilizers, bioremediation, or pumping of contaminated groundwater), soil replacement andrevegetation; • ongoing monitoring of air and water quality and water resources post-closure as agreed with authorities.	MPM is continuously looking at different options for rehabilitation of its mining footprint. As more research is being done and as more sustainable methods of rehabilitation and closure are identified so MPM will re-look at its RSIP. A monitoring program has been defined in the BAP that includes rehabilitated areas to ensure that the adequacy and effectiveness of all rehabilitation efforts are accurately quantified.

R3: In accordance with this Rehabilitation Strategy MPM will: • ensure the rehabilitation of all disturbed land, as far as practicable, to its natural state or predetermined and agreed standards or land uses that conform with the concept of sustainable development; • backfill all unsafe trenches and holes and landscape to ensure that, as far as is practicable, no slopes exceed a gradient of 1:5; • ensure final closure and rehabilitation activities include the demolition of all remaining infrastructure (except those identified to remain for use by communities post-closure), breaking of foundations, removal of all equipment and facilities from the mine footprint, remediation, ripping, levelling, soil replacement, fertilization and re-vegetation of all disturbed/exposed areas, final profiling of any remaining WRD's, reinstatement of natural drainage patterns, removal/control of residual hazardous materials, meeting alllegal requirements (closure certificate), mitigation of residual impacts to the satisfaction of the authorities, including ensuring the long-term stability and safety of the entire mine footprint, as well as its capacity to withstand long-term wind and water erosion.	The Implementation Programme will detail action plans to ensure the objectives (Section 1.2) of the Rehabilitation Strategy are fulfilled, namely to ensure the mine's surface is reinstated during the LOM and during closure to acceptable standards, which will sustain natural ecosystems or predetermined land uses without being degraded. The key focus will be concurrent rehabilitation of the open pits to ensure that the disturbed open pit areais kept to a minimum at all times.

18.1 South African Good Practice

Due to the fact that the post-closure impacts associated with mining operations very often include significant impacts on the water resource, the DWS have a particular interest in the water management aspects associated with mine closure. Recognizing the potential mining impact on water the Department commissioned a series of BPG to assist with aspects of DWAF's water management hierarchy. Included in this series of guidelines is BPG5: Water Management Aspects for Mine Closure. While the rehabilitation of the open pit and associated infrastructure would not necessarily be considered a mine closure activity, there are principles in the BPG5 that are appropriate to this rehabilitation activity. Those that are appropriate and that have been used to formulate the rehabilitation strategy are:

- Management measures at closure should primarily be of a passive nature with minimal long-term maintenance and operating costs.
- The final landform must be sustainable, must be free-draining, must minimize erosion and avoid ponding.
- Concurrent rehabilitation must be undertaken in a manner that supports the final closure landform in order to ensure/avoid that rehabilitation does not need to be redone at a later stage.
- Land use plan which is directly interlinked with water management issues insofar as water is required to support the intended land use and the land use itself may have an impact on the water resource.

- Biodiversity plan will address issues that are interrelated with the mine water management plan, particularly with regard to the environmental water balance and the effects that mining may have thereon.

18.2 Closure Objectives

The closure objectives which will drive the closure criteria and which have been developed to support the closure vision are:

- Adhere to all statutory and other legal requirements;
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks;
- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders;
- Physically and chemically stabilize remaining structures to minimize residual risks; and
- Promote bio-diversity and biological sustainability to the maximum extent practicable.

18.2.1 Post closure land use

Given that the area experiences low rainfall, and the pre-mining land capability of the site is likely predominantly wilderness as per the Chamber of Mines definition, the rehabilitation strategy will be toestablish a post closure land capability of wilderness, with post closure land use, being limited by thehealth and safety aspects associated with the remaining terrace and WRD. Areas where infrastructure can be decommissioned and the footprints rehabilitated will be returned to a final land use of wilderness.

18.2.2 Assumptions used to support closure costing

The liability assessment has been developed based on available information including environmentaldata and design documents. Some of the information currently available is preliminary therefore, a number of assumptions were made about general conditions and closure and rehabilitation of the facilities at the site in order to develop the proposed closure liability. As additional information is collected during operations, these assumptions will be reviewed and revised as appropriate.

- Segope Consulting assumes that sufficient closure materials will be available for the various facilities requiring covers and these covers will be sourced from existing soil stockpiles constructed during development of the mine;
- Closure water quality compliance criteria will be the same as for the operational period;
- Water management will be required to limit sediment load releases from the WRD and the open pit terrace until such time as the vegetation is established and limits erosion potential on the dumps;

- The cover material on the slopes is sufficiently cohesive so that an interbank slope on the WRD will be sustainable;
- Material for the backfilling of the open pit, once all entrances have been sealed with concrete seals, will be obtained from the WRD;
- No third-party use of infrastructure will be available at closure and all infrastructure will require decommissioning;
- No provision is included for water treatment as Segope Consulting assumes that feasibility investigations around treatment will be undertaken at the appropriate time as the mine approaches closure;
- No rehabilitation work will be required at the river crossing following the closure of the road structure as the banks of the river are not expected to be disturbed. All plinths beneath the road will however, be demolished as per the actions required for concrete structures;
- Segope Consulting assumes that all demolition debris is non-hazardous and can be placed at the base of the open pit, after the establishment of the concrete seal, but prior to the backfilling of the open pit with waste rock; and
- The placement of a soil cover on the WRD and the establishment of vegetation on this cover will limit the sediment load eroded from the facility. The efficacy of the cover in limiting vegetation will be monitored during the post closure monitoring period following which the toe paddocks will be removed.

18.2.3 Rehabilitation action plan

The actions that the mine intends to undertake at the end of the life of project are described below. These actions are designed to comply with the requirements of this rehabilitation plans objectives, as well as the requirements of BPG5. The actions described relates to all infrastructure associated with South Shaft 3 and is not limited to the infrastructure associated with the proposed amendment. This approach has been adopted to ensure that the closure approach and actions for the infrastructure associated with the proposed amendment is consistent with that for the already approved infrastructure at South 3 opencast.

18.2.4 Infrastructure

All infrastructure for which there is no approved third-party post closure use will be decommissioned and the footprints reclaimed for the establishment of pre-construction land use. Infrastructure where there is a third-party use will be legally transferred to the relevant parties.

The hydrocarbons inventories will be managed near the end of operations to minimize any surplus materials at closure.

Where practical, equipment and materials with value will be sold and removed from the site. All other equipment will be demolished and disposed of off-site. Equipment with scrap or salvage value will be removed from the shaft and stored in a temporary area designated for this purpose during the closure period. A soil contamination investigation will be conducted on completion of demolition activities, particularly in excavations remaining open following decommissioning. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measuresto ensure that the soil closure criteria are obtained.

Excavations remaining following demolition and foundation and slab removal and those wherecontamination remediation has been undertaken will be filled with soil to a depth required to establishthe post closure land capability.

Closure actions will include:

- All power and water services to be disconnected and certified as safe prior to commencement of any demolition works;
- Salvageable equipment will be removed and transported offsite prior to the commencement of demolition;
- All fittings, fixtures and equipment within buildings will be dismantled and removed to a designated temporary disposal yard;
- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains;
- All above ground electrical, water and other service infrastructure and equipment to be removed and disposed of as general waste or if they have a salvage value removed to a designated temporary salvage yard;
- All liners to be removed from dams and water storage facilities. These will require testing to determine whether there are secondary precipitate adhering to the liner surface, which may render these liners as hazardous. Liners to be disposed of in commercial facilities as either general or hazardous waste depending on the outcomes of the testing;
- Electrical, water and other services that are more than 700 mm below ground surface will remain, all others at a shallower depth will be excavated and disposed of;
- Concrete slabs and footings will be broken and disposed of as general waste; and
- All conveyor belting will be removed and cut up prior to disposal.

18.2.5 Fuel Storage and dispensing

Closure of these facilities will focus on physical closure and investigation of potential subsurface contamination from petroleum products. Closure of these facilities will include:

- Removing remaining fuel inventory;
- Decontaminating equipment including tanks, piping, and dispensing equipment, as needed;

- Removing equipment;
- Demolishing all storage tanks and buildings;
- Removing any appurtenances including piping and electrical;
- Breaking walls and foundations to grade;
- Hauling non-hazardous demolition debris to pit;
- Sampling soils beneath and surrounding the facility;
- Classifying and removing any contaminated soils identified and treating them on site to acceptable standards or to a licensed facility if hazardous; and
- Regarding the footprints in line with adjacent yard footprints.

A portion of the fuel inventory will be used during closure. Near the end of the closure period, after the primary earthwork is complete, the fuel storage and dispensing facilities will be decommissioned.

18.2.6 Waste Rock Dump

The WRD and open pit terrace activities will result in a stable landform capable of supporting a vegetation community analogous with surrounding grasslands, where the generation of contact wateris limited by the incorporation of appropriate covers in the closure design. Closure activities will be implemented for all facilities where there is limited potential that the contained waste would ever be utilized as aggregate in construction activities. Where the potential use as aggregate exists as determined by the physical and geochemical characteristics of the waste rock, the waste rock facilities will remain open for processing by third parties. Closure actions will include:

- Slopes steeper than 18°, will be reshaped to 18° on condition that the extended footprint remains within the permitted boundary;
- Growth medium likely consisting of recovered soils, will be placed to form an average of 300 mm of cover on the dumps; and
- Vegetation will be established to limit the wind and water erosion of the dump, to limit dust generation and to improve the aesthetic appearance of the dump in the landscape.

The efficacy of the growth medium and vegetation cover will be monitored during the closure periodto assess the sediment release from the cover.

18.2.7 Roads

Roads will be closed once access to the South 2 Shaft and infrastructure associated with theproposed project is no longer required. Closure actions will include:

- Removal of all signage, fencing, shade structures, traffic barriers, etc.;
- All ‘hard top’ surfaces to be ripped and bitumen removed along with any culverts and

concrete structures;

- All concrete lined drainage channels and sumps to be broken up and removed;
- All potentially contaminated soils are to be identified and demarcated for later remediation; and
- All areas treated with saline dust suppression water needs to be treated as "sealed" roads with the upper surface ripped and removed to designated contaminant disposal areas.

18.2.8 Footprints

Following demolition of infrastructure and the ripping of road surfaces, the remaining footprints willbe returned to a land use as far as reasonably and practically possible similar to that which existed prior to construction. This will be achieved by implementing the following closure actions:

- Re-graded to topography consistent with the surrounds to control storm water runoff and erosion;
- Deep ripping with a tine of at least 500mm will be undertaken. Where space allows, cross ripping to be undertaken, with the final rip to be parallel to contours;
- Placement of soil stockpiled ahead of construction. The soils depths to be placed are dependent on the final land use, with the following the minimum utilizable soil depth – utilizable soils depth includes underlying substrate and does not necessary specify placed growth medium thickness:
    - Wilderness area: 250mm
    - Grazing areas: 500mm
    - Arable: 750mm
- Soil ameliorants will be added dependent on soil fertility analyses after placement;
- Footprints to be ploughed parallel to the contours after soils and ameliorants placed to mitigate compaction which may have occurred during soil placement; and

18.3 Relinquishment criteria

Following the implementation of the Action Plan, it is necessary to have measurable criteria against which to assess the effectiveness of the plan and its implementation. These criteria will assist MPM in identifying when the standard of closure achieved is sufficient to relinquish responsibility for a specific area. The site-specific relinquishment criteria for the open pit are documented **Table** 18.2 **19.2**. Also included in the table are the indicators required to demonstrate achievement with the relinquishment criteria and the reporting requirements. The reporting requirements are those that are expected to fulfil the monitoring requirements set out by legislation.

Table 18.2: Relinquishment criteria

Category	Closure criteria	Indicators	Reporting requirements
Ground & Surface Water	Compliance with the WUL	Downstream/gradient water quality monitoring	Monitoring report
Air	Compliance with the standards as per the National Environmental Management: Air Quality (Act 39 of2004)	Records of air quality measurementsfor PM10 and PM2.5	Monitoring report
Soil quality	Soil quality as assessed against the Norms and Standards to support Chapter 8 of NEM: WA	Soil quality in areas where contamination identified	Results of soil quality and risk assessment
Land productivity	Land capability and productivity similar to thatwhich existed prior to mining	Land capability and productivity	Comparison to analogue areas and pre-mining aerial photographs
			Socioeconomic survey
Erosion	Implementation or construction of erosion control measures	Establishment of vegetation	See Vegetation below
Safety / stability	The site is safe for use by humans and animals, including in the foreseeable future in compliance with Occupational Health and Safety Act 85 of 1993and relevant Regulations	Geotechnical and hydrological studiesof existing structures - outer batter slopes of WRDs & terraces	Evidence in rehabilitation report that appropriate risk assessment has been undertaken and control measures are inplace
Vegetation	Establishment of self-sustaining vegetation population which stabilizes soils and is not invasive.	Species cover and composition	Monitoring report

18.4 Post rehabilitation monitoring and maintenance

The objective of the monitoring program will be to track the recovery of the site towards the long-termpost-closure land use goals, in accordance with the overall closure objectives. The monitoring program will be designed to collect information to demonstrate that the Relinquishment criteria have been achieved. The anticipated monitoring will include:

- *Surface Water* – Quality monitoring against parameters as required by the WUL. Sampled bi-annually for a three-year post-closure period;
- *Groundwater* – Quality monitoring of both the shallow and deep aquifers against the parameters required by the WUL. Sampled annually for a three-year post-closure period;
- *Erosion monitoring* - This will take the form of developing a representative reference site on both footprints and undertaking visual and topographic assessments to determine erosion rate, using standard erosion monitoring techniques. This will be undertaken once a year at the end of the wet season for a

three-year post-closure period;

- *Vegetation establishment*: Vegetation will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference analogue site established in a similar ecotype, for a three-year post-closure period;
- Photographic records should be maintained together with findings, follow up actions and close out records as part of the MPM Environmental Management System.

18.5 Costing

The methodology for calculating the quantum of the financial provision for the project has been developed using the methodology described in the DME (now known as DMRE) 2005 Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine". Rates that have been used are those published in the guideline, but inflated at the Consumer Price Index (CPI) published by Stats SA. Quantities used in the assessment were obtained from drawings provided to Segope Consulting. As a closure provision has already been raised for the infrastructure previously approved at MPM, the provision in this report is for the infrastructure associated with the proposed South3 opencast project.

19. ENVIRONMENTAL MONITORING AND AUDITING

Monitoring and auditing are an essential environmental management tool that is used to assess, evaluate, and manage environmental and sustainability issues:

- In order to ensure that the objectives of sustainable development and integrated environmental management are met and to obtain data, which can inform continuous improvement of environmental practices at the site (adaptive management), monitoring and reporting will be an essential component of the proposed operations.
- Monitoring and management actions associated with the project are contained in this report.
- The appointment of a suitably qualified on-site ECO is essential to the successful implementation of this project, although this role can be fulfilled by the SHE Representative. The ECO will be responsible for the implementation of the EMPR, applicable environmental legislation and any stipulations/conditions set by the relevant competent authorities (including but not limited to the DMRE and DWS). The Environmental officer will conduct formal monthly site inspections during construction phase and conduct an internal and external annual audit during the construction and operational phase.
- The Independent ECO should monitor the success and effective implementation of the environmental management measures stipulated by applicable legislation, the EIA/EMPR, and any conditions set by the competent authorities. Following each site visit, the ECO should submit a report to the DMRE documenting the success/failure of the implementation of the management measures at the operations.

19.1 Specific Monitoring Requirements

Monitoring of the proposed development (both on site and where appropriate in the surrounding environments) should be considered a high priority and should be conducted in accordance with the relevant specialist recommendations as summarized below:

- Monitoring Protocol: It is essential that during the construction and operational phase of the proposed development, the monitoring of certain elements is carried out to ensure compliance with regulatory bodies. A monitoring protocol for both the construction phase and the operational phase will be required. The monitoring only includes those activities identified in the EMPR and excludes any monitoring that should take place according to the water use license.
- Monitoring requirements and record keeping: To ensure that the procedures outlined throughout the EMPR are implemented effectively it will be necessary to monitor the implementation of the EMPR and evaluate the success of achieving the objectives listed in the EMPR. To ensure that all personnel on site are aware of their obligation to protect the environment, induction training will also include environmental awareness. Records for all audits and compliance status should be filed in the Environmental Management System File.

19.2 Proposed rehabilitation

The MPM Rehabilitation Closure and Liability plan has been developed according to NEMA regulations. The purpose of these regulations is to regulate the determination and making of financial provision as contemplated in NEMA for the cost associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting and mining operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future and to ensure rehabilitation is implemented.

The final land use for the mining area is recommended to be comparable, as far as practical, to the land use and biodiversity that was present before the mining activities on the property commenced i.e. grazing, agriculture and wilderness. Landforms are to support stable and functioning ecosystems that are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.

20. IDENTIFIED KNOWLEDGE GAPS (IN FULFILMENT OF MPRDAREGULATION 50(G))

During the Impact Assessment Phase of the South 3 Opencast Project, all specialists conducted their individual specialist assessment and compiled the relevant specialist's reports. However, during the compilation and assessment of their studies, some specialists have identified gaps within the data they worked with, or highlighted some assumptions made during their discussion of their results or discussed some limitations to their studies. All the specialist's gaps, assumptions and limitations are summarized in the sections below.

Soils, Land Use and Land Capability

It has been assumed that the total area of possible disturbance was included in the area of study, that the mining plan as tabled has documented and catered for all actions and activities (existing andcumulative) that could potentially have an impact on the soils and land capability, and that the recommendations made and impact ratings tabled will be re-assessed if the development plan changes.

Limitations to the accuracy of the pedological mapping (as recognized within the pedological industry) are accepted at between 50% (reconnaissance mapping) and 80% (detailed mapping), while the degree of certainty for the soils physical and chemical (analytical data) results has been based on "composite" samples taken from the dominant soil types mapped in the study area. The area in question has been mapped on a comprehensive reconnaissance base, the degree and intensity of mapping and geochemical sampling being considered and measured based on the complexity of the soils noted in field during the field mapping, and the interplay of geomorphological aspects (ground roughness, slope, aspect and geology etc.).

Heritage

The following conditions and assumptions have a direct bearing on the survey and the resulting report:

- Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity. These include all sites, structure and artefacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included in this.
- The significance of the sites, structures and artefacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects.
- Cultural significance is site-specific and relates to the content and context of the site. Sites regarded as having medium cultural significance have already been recorded in full and require no further mitigation. Sites with medium cultural significance may or may not require mitigation depending on other factors such as the significance of impact on the site. Sites with a high cultural significance require further mitigation.
- The latitude and longitude of any archaeological or historical site or feature, is to be treated as sensitive information by the developer and should not be disclosed to members of the public.
- All recommendations are made with full cognizance of the relevant legislation.
- It has to be mentioned that it is almost impossible to locate all the cultural resources in a given area, as it will be very time consuming. Developers should however note that the report should make it clear how to handle any other finds that might occur. In this case

there were certain areas where the vegetation cover was very dense which had a negative effect on archaeological visibility.

Ground Water

The following conditions typically need to be described in a model:

- Known geological and hydrogeological features.
- Boundary conditions of the study area (based on the geology and hydrogeology).
- Static water levels of the study area.
- The processes governing groundwater flow.
- Assumptions on which the numerical code selected and development of the model is based on.

Field data is essential in solving the assumptions. Specific assumptions related to the available fielddata include:

- The top of the aquifer is represented by the surface topography and available surface elevations are used to construct a representative spatial extent.
- The current geological information is sufficient to describe the extent of the different aquifers.
- The aquifer parameters calculated are representative of the aquifers beyond the area, where data is not available.

Limitations of models result from generalizations, interpretations and assumptions made in attempting to simulate the natural environment. The following limitations are true for followingnumerical groundwater model:

- The complexities of fractured rock aquifers imply that the model can only be used as a guide to determine the order of magnitude of dewatering and contaminant transport.
- The interpretation of modelled results should be based on the assumptions the model was built on, and actual results will vary as unknown aquifer conditions and parameters vary in the natural system.
- Time series graphs of water level data were available for calibration purposes but poor record keeping of dewatering volumes over the same time period complicated accurate calibration of the flow model.
- Mine plan can change and the rate of mining can also change with time, which will have an effect on the predicted inflow volumes.

Biodiversity – General

- The ecological assessment is confined to the study area and does not include the neighboring and adjacent properties; these were however considered as part of the desktop assessment.
- Due to the nature and habits of most faunal taxa it is unlikely that all species would have been observed during a site assessment of limited duration. Therefore, site observations are compared with literature studies where necessary.
- With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal and floral communities have been accurately assessed and considered.
- Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa on the study area may therefore been missed during the assessment.
- Due to current and active mining activity and access restrictions, some areas were inaccessible during the time of assessment.
- The wetland assessment is confined to the study area, as well as areas of relevance immediately adjacent to the study area and does not include the neighboring and adjacent properties. The general surroundings were however considered in the desktop assessment of the study area.
- The wetland delineation as presented in this report is regarded as a best estimate of the wetland boundary based on the site condition present at the time of the assessment and limitations in the accuracy of the delineation due to disturbances created by grazing, existing development and anthropogenic disturbances are deemed possible.
- Wetland and terrestrial areas form transitional areas where an ecozone is formed as vegetation species change from terrestrial species to facultative and obligate wetland species. Within the transition zone some variation of opinion on the wetland boundary may occur, however if the DWS 2005 method is followed, all assessors should get largely similar results.

Aquatic

- **Reference conditions are unknown:** The composition of aquatic biota surrounding the study area, prior to major disturbance, is unknown. For this reason, reference conditions are hypothetical, and are based on professional judgement and/or inferred from limited data available.
- **Temporal variability:** The effects of natural seasonal and long-term variation in the ecological conditions and aquatic biota found in the streams are unknown.
- **Ecological assessment timing**: Aquatic and terrestrial ecosystems are dynamic and complex. It is likely that aspects, some of which may be important, could have been overlooked. A more reliable assessment of the biota would require seasonal sampling, with sampling being undertaken under both low flow and high flow conditions.

Surface Water

- Fissure water volumes used in the water balance are estimates and reduce the confidence of the water balance.
- This area is highly erodible and the contours near the rivers are continually changing. Updated floodlines should be undertaken every five years based on new survey data.
- Impacts are constrained to those impacts on the receiving environment as a result of aspects of the project interacting with the surface environment. Potential groundwater impacts on the environment are considered in the groundwater specialist report.

21. CONCLUSION

Segope Consulting has undertaken the EIA and EMPR for the proposed South 3 opencast Project in accordance with the requirements of the MPRDA and NEMA. This has included a comprehensive public participation process which has sought to identify stakeholders, provide these parties with an adequate opportunity to participate in the project process and guide technical investigations that have taken place as part of the impact assessment phase of this study. Extensive specialist input has been sought for all key environmental aspects.

- To date, there are no serious flaws that have been identified for the proposed south 3 opencast Project. However, certain of the identified, potential impacts require careful mitigation and monitoring.
- An EMPR has been developed as part of this EIA to ensure the mitigation of these impacts as far as practically possible. It is anticipated that it will be possible to successfully mitigate the majority of the environmental impacts to acceptable levels and the implementation will be monitored and audited to determine the effectiveness of the measures implemented.
- It is recommended that the proposed South 3 opencast Project is allowed to proceed, given the relatively small potential contribution of the project to cumulative impacts (given appropriate environmental management) and also considering the positive social impacts associated with the project.

MPM should, however, continue to examine its existing management measures for their entire operations and should put initiatives in place to reduce its contribution to the existing environmental condition in the MPM area

22.UNDERTAKING

22.1 REGARDING CORRECTNESS OF INFORMATION

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

_____

Signature of the EAP

_____

Date

22.2 REGARDING LEVEL OF AGREEMENT

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

_____

Signature of the EAP

_____

Date

APPENDICES

Appendix A: EAP Team detailed CVs

Appendix B: Land Ownership

Appendix B1: Windeed

Appendix B2: Lease Agreement

Appendix C: Locality Map

Appendix D: Site Layout

Appendix E: Environmental Maps

Appendix F: EA, MR and existing WUL

Appendix G: Stakeholder engagement

Appendix G1: List of registered I&AP

Appendix G2: Proof of stakeholders' engagements

Appendix G3: BID

Appendix G4: Newspaper Advert

Appendix G5: Attendants Register

Appendix G6: Comments and Responses Report

Appendix H: Specialist Studies

Appendix H1: Geohydrological study

Appendix H2: Visual Impact Assessment

Appendix H3: Soil and Land Capability Study

Appendix H4: Biodiversity Study

Appendix H5: Wetland Delineation Study

Appendix H6: Blasting Impact Assessment

Appendix H8: Environmental Screening

Appendix H9: Environmental Noise Impact Assessment

Appendix H10: Heritage Impact Assessment

Appendix H11: Traffic Impact Assessment

Appendix H12: Socio-Economic Study

Appendix H13: Hydropedology Report

Appendix H14: Surface Water Management Plan

Appendix I: DMRE Correspondences

Appendix J: Proof of WULA Submission

Appendix K: EAP Declaration