REPORT

Draft Basic Assessment Report and Environmental Management Programme for the Proposed Development of Two Access Roads to the North Ventilation Shaft 3 and Merensky Ventilation Shaft at the Modikwa Platinum Mine, Burgersfort, Limpopo Province

Modikwa Platinum Mine - Joint venture between African Rainbow Minerals and Anglo-American Platinum

Submitted to:

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Draft

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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 APPLICANT: MODIKWA PLATINUM MINE (PTY) LTD
TEL NO: 013 230 2326
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FILE REFERENCE NUMBER SAMRAD: LP30/5/1/2/3/2/1/ (129) EM

1. IMPORTANT NOTICE

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

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

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

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

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

2. Objective of the basic assessment process

The objective of the basic assessment process is to, through a consultative process—

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

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine:

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

(ii) the degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be managed, avoided or mitigated;

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) identify and motivate a preferred site, activity and technology alternative;

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

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

PURPOSE OF THIS DOCUMENT

Modikwa Platinum Mine (MPM) is a Joint Venture between Rustenburg Platinum Mines (RPM) and is a wholly owned subsidiary of Anglo-American Platinum (Ltd) (AAP) and African Rainbow Minerals Mining Consortium Limited (ARM:MC), a subsidiary of African Rainbow Minerals (ARM) Limited.

The mine 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 Greater Sekhukhune District Municipality (GSDM) of the Limpopo Province.

The mining operations include underground mining activities which commenced in 2001 and open pit mining activities (for Upper Group 2 platinum ore) which commenced in June 2010. The Life of Mine (LoM) for MPM is valid up to November 2043.

A number of existing environmental related authorisations are in place for the Modikwa Platinum Mine and are outlined further in the report.

The mine currently requires further environmental related applications for additional activities (explained in detail within the report) that are required for optimisation of ongoing operations. These activities require an Environmental Authorisation (EA) as contemplated under Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) (as amended).

Golder Associates Africa (Pty) Ltd, now WSP Africa (Pty) Ltd (WSP|Golder), an independent environmental assessment practitioner, was appointed by Modikwa Platinum Mine to conduct the required environmental authorisation and water use licensing processes for the proposed project.

In terms of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) GN R.324 – GN R.327, Modikwa Platinum Mine must submit an application for EA to the Department of Mineral Resources and Energy (DMRE), supported by a Basic Assessment process, which entails the compilation of a Basic Assessment Report (BAR) and an Environmental Management Programme (EMPr), which describes how the environmental impacts of the proposed infrastructure and activities will be managed and mitigated.

The proposed infrastructure and activities will also require a Water Use Licence Application which (WULA) under the General Authorisation process, which will be submitted to the Department of Water and Sanitation (DWS).

The draft BAR is now available for public review, to provide interested and affected parties (I&APs) with an opportunity to comment on the proposed project.

The due date for comment on this draft BAR is **24 August 2022**. Comments received during the public review period will be acknowledged and recorded in the final BAR and EMPr, that will be submitted to the competent authority, the DMRE, for decision-making.

PUBLIC REVIEW OF THE DRAFT BASIC ASSESSMENT REPORT

The draft BAR is available for comment for a period of 30 days from **22 July 2022** until **24 August 2022** at the public places listed in the table below. The report can also be downloaded from WSP|Golder website: https://www.golder.com/global-locations/africa/south-africa-public-documents/.

Name of Public Place	Contact Number
Section 21 Office	Modikwa Platinum Mine
Visitors Entrance at Modikwa Mine Central Offices	Modikwa Platinum Mine
Sewing building near the Hwashi Difagate Offices	Modikwa Platinum Mine
Burgersfort Library	Burgersfort
WSP Africa, Maxwell Office Park, Magwa Crescent West, Waterfall City	Midrand; Website: https://www.golder.com/global-locations/africa/south-africa-public-documents/.

OPPORTUNITIES FOR PUBLIC REVIEW

Stakeholders who wish to comment on the draft BAR could do so in any of the following ways:

- Completing the comment sheet enclosed with this report.
- Additional written submissions.
- Comment by e-mail, fax or telephone.

THE DUE DATE FOR COMMENT ON THE DRAFT BASIC ASSESSMENT REPORT IS 24 AUGUST 2022.

Comments may be submitted to the WSP|Golder Public Participation Office for the duration of the Basic Assessment process:

Public Participation Office

WSP Group Africa (Pty) Ltd

PO Box 6001, Halfway House, 1685

Tel: (011) 254 4800;

Fax: (086) 582 1561

E-mail: gld.PP@wsp.com

Executive Summary

Modikwa Platinum Mine (MPM) is a Joint Venture between Rustenburg Platinum Mines (RPM) and is a wholly owned subsidiary of Anglo-American Platinum (Ltd) (AAP) and African Rainbow Minerals Mining Consortium Limited (ARM:MC), a subsidiary of African Rainbow Minerals (ARM) Limited. The mine 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 Greater Sekhukhune District Municipality (GSDM) of the Limpopo Province.

The mining operations include underground mining activities which commenced in 2001 and open pit mining activities (for Upper Group 2 platinum ore) which commenced in June 2010. The Life of Mine (LoM) for MPM is valid up to November 2043.

The mine operates under the following authorisations:

- A Mining Right (MR) granted by the Department of Mineral Resources and Energy (DMRE), the original Record of Decision (RoD) (Reference no.: 6/2/2/477 and LP129MC); approved in January 2001
- A Consolidated Environmental Management Program (CEMPr) Report, approved by the DMRE on 25 July 2018 (DMRE Reference 129MR; LP 30/5/1/2/3/2/1 (0129) EM); and
- Environmental Authorisations (EA) related to the construction of MPM's North Ventilation Shaft 3 and Merensky Ventilation Shaft. The EAs were subsequently granted in May 2017 for the North Ventilation Shaft 3 and on 25 July 2018 for the Merensky Shaft. SRK Consulting was responsible for both Applications.

Proposed Infrastructure Developments

MPM (the Applicant) proposes to construct two (2) access roads that link to the approved North Ventilation Shaft 3 and Merensky Ventilation Shaft at the MPM (the Project). Road 1 will provide access to the North Ventilation Shaft 3, and will be approximately 308 m in length, 6 m in width (3 m either side of the centre line) and requiring an area of approximately 2 464 m^2 to be cleared. Road 2 will provide access to the Merensky Shaft and will be approximately 198 m in length, 6 m in width (3 m either side of the centre line) and requiring an area of approximately 1586 m^2 to be cleared. Both roads will be untarred and will connect existing untarred roads to the ventilation shafts.

Authorisation Process

The proposed development triggers listed activities in terms of GN R. 324 Listing Notice 3 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) and requires an environmental authorisation (EA) by way of a Basic Assessment (BA) to be undertaken prior to the commencement of any activities. The application will be submitted to the Limpopo DMRE.

In addition, the proposed project will occur within 500 m of a watercourse, therefore, the Applicant also intends to submit an application for water use authorisation to the Department of Water and Sanitation (DWS) for water uses as specified in section 21(c) and (i) of the National Water Act, Act 36 of 1998 (NWA). The water use authorisation will follow a General Authorisation (GA) process under GN 509 of the NWA.

Summary of key findings of the Environmental Impact Assessment

The key findings of the impact assessment studies are as follows:

Air Quality

The degeneration of the ambient air quality due to increased nuisance dust and fine particulate levels is likely to occur as a result of land clearing and materials handling activities (tipping, loading and offloading) associated with the construction of the additional infrastructure. The construction phase impacts may be intense but will be short-lived and largely limited to the immediate vicinity of the activity.

Increased levels of fugitive dust will be emitted into the atmosphere when the access roads are utilised by mining vehicles during the operational phase. The overall impact on air quality during operational phases is anticipated to have a Low significance.

Terrestrial Biodiversity

The proposed north access road (Road 1) is located in Sekhukhune Plains Bushveld and the south access road is characterised by Sekhukhune Mountains Bushveld. Neither vegetation type is listed as threatened on the NEMBA Threatened Ecosystems (2011). However, Sekhukhune Plains Bushveld is considered Vulnerable at a provincial level.

The proposed access road to the North Ventilation Shaft 3 (Road 1) access road is located in an area designated Ecological Support Area 1 (ESA1), while the access road to the Merensky Shaft Access (Road 2) is located on land designated Critical Biodiversity Area 2 (CBA2).

There were several species of conservation concern (SCC) observed at the Project sites; and four (4) declared alien invasive species were recorded in and adjacent to the Project routes.

Two (2) mammal species was observed at Road 2, the Klipspringer (tracks) and a Red Rock Rabbit (*Pronolagus* sp.) (scat). In terms of birds, there are two (2) species are of conservation concern - the White-backed Vulture (*Gyps africana*) is listed as Vulnerable on the regional Red List of threatened birds, while Verreaux's Eagle (*Aquila verreauxii*) is listed as Critically Endangered.

Key impacts on biodiversity during the construction phase include the direct loss and disturbance of natural habitat and associated flora SCC, the establishment and spread of alien and invasive species, and the injury and mortality of faunal species of conservation concern.

Key impacts on biodiversity during the operational phase include the spread of alien and invasive species, the loss of Ecological Connectivity, injury and mortality of faunal species of conservation concern, and dust deposition into the environment.

The application of the recommended mitigation measures, for both construction and operational phases, reduces the risks associated with the impacts on terrestrial biodiversity and therefore resulting in the impacts having an overall Low significance.

Aquatic Biodiversity

No wetlands were identified within a 500 m buffer of the proposed development sites. Three ephemeral drainage lines associated with nonperennial streams - two in the north shaft access road site and one in the south access road sites – were identified on site. The proposed project is expected to have low impact significance for the majority of the impacts identified, with the exception of surface runoff and soil erosion impacts due to the fact that the proposed study area is highly eroded. These impacts can however be reduced to a low impact significant given that the recommended mitigation measures are strictly implemented during both the construction and operation phase of the access roads.

Key impacts on aquatic biodiversity during the construction phase include the direct loss of soils in footprint, loss and disturbance of indigenous vegetation and soil compaction, the contamination of soil and downstream

resources due to hydrocarbons and oil spillages, and the soil compaction, surface water runoff leading to increased soil erosion.

Key impacts on aquatic biodiversity during the operational phase include the contamination due to hydrocarbons and oil spillages from vehicle during operation; soil erosion and the spread of alien invasive species within the watercourse; the interruption/interference of hydrology as a result of blockage of culverts with debris; and the soil compaction, surface water runoff leading to increased soil erosion in catchment of watercourse.

The overall impact on downstream watercourses during the construction and operational phases is anticipated to be Low. With implementation of the recommended mitigation measures, potential impacts on the receiving environment can be further avoided/minimised.

Heritage and Palaeontological Resources

The fieldwork resulted in the identification of one heritage site consisting of a burial ground with ten (10) identifiable graves close to the northern access road (MPM05). However, no specialist palaeontological studies formed part of the current scope of work as the SAHRIS palaeontological sensitivity map for the Project area falls within an insignificant to Low sensitivity zone (PGS Heritage, 2022).

An overlay of the identified archaeological and heritage sites over the proposed development footprint areas was made, which was used to assess the impact of the proposed development on these identified archaeological and heritage sites. Both pre-mitigation and post-mitigation impact assessments were undertaken. The overall impact on potential heritage and palaeontological resources during the construction phase is anticipated to be Moderate. However, with the implementation of suitable mitigation measures, the impact significance can be reduced to Low.

Traffic

Key impacts on traffic during the construction phase include the increase in construction vehicles in the area and along the community access road; and the slow-moving construction vehicles on the surrounding roads may cause accidents.

Key impacts on traffic during the operational phase include the movement of vehicles in the project area will result in an increase in traffic on the roads.

The overall impact on traffic during the construction and operational phases is anticipated to be Low due to the infrequent travel of mining vehicles along the route. However, with the implementation of suitable mitigation measures (Table 20 and Table 21), the impact significance can be further reduced.

Socio-economic

The development of the access roads is critical to gain access to the north ventilation shaft 3 and the south (Merensky) ventilation shaft for purposes of maintaining a healthy ventilation system and aid in the underground mining operations. The ventilation shaft assists with creating a safe and healthy working environment for the underground employees and manages the temperature of the underground working area, by drawing fresh air from aboveground to the underground workings. Furthermore, job opportunities may be primarily created during the construction phase of the project. Increased productivity from the mine may benefit the local communities through an improved local economy. Although limited additional employment will be created during the operational phase of the proposed project, without the construction and upgrading of the roads, MPM will not be able to continue current production rates and social demands, resulting in unemployment. The negative impacts will include dust, noise and traffic to both the surrounding communities.

Noise

The key noise impacts associated with the construction phase include noise levels resulting from construction activities of the proposed roads due to the use of heavy machinery and vehicles, bulk earthworks and sourcing

of construction materials. Noise levels during the operational phase are expected to slightly increase as result of additional mining vehicles on the access roads however, these will be short-lived and fall within ambient noise levels within MPM.

The overall noise impact during the construction and operational phases is anticipated to be Low. However, with the implementation of suitable mitigation measures (Table 20 and Table 21), the impact significance can be further reduced.

Reasoned Opinion as to whether the Proposed Activity Should or Should not be Authorised

Provided that all the environmental management measures described in the EMPr are applied diligently, it is expected that the proposed development of the roads will not result in any significant environmental impacts that cannot be mitigated to acceptable levels.

An impact assessment was undertaken, supported by relevant specialist studies to determine the impact of the proposed roads on the environment. These studies have not identified any fatal flaws associated with the proposed project and no critical factors have been identified which would warrant the proposed activities not to proceed.

Not granting this authorisation will impact on Modikwa Platinum Mine's ability to ramp up the production at the mine and thereby improve the efficiency of the mine.

Accordingly, it is the opinion of the environmental assessment practitioner that the application for environmental authorisation, for the construction of the additional infrastructure and associated activities as described in this BA and EMPr report, should be granted, on the premise that:

- The project details in Section 3.2.2 remain unchanged.
- The commitments in this BA and EMPr report are implemented, adhered to and audited.

Aspects for Inclusion as Conditions of Authorisation

General Conditions

MPM must:

- Implement all aspects of the EMPr in Section 19.4 of this document.
- Comply with all relevant legislation at all times.
- Undertake annual internal auditing of environmental performance and annual reporting to the DMRE.
- The proponent must appoint a suitably experienced Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr.
- Undertake monthly external auditing of environmental performance during the construction phase and provide the DMRE with a copy of the audit report.

Site specific conditions

The following conditions must be complied with as per the EA:

- During construction, vegetation cleared should be limited to the direct project footprint, i.e., proposed road footprint. Where possible, available roads should be used to access the site and no vehicles should be permitted to indiscriminately drive over watercourses.

- Topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil and must be stored in a manner that it can be reused after construction.
- Any excavated soils should be offloaded at a designated stockpile area situated well away from the watercourse.
- Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.
- Construction activities should ideally be undertaken during the dry season (May to September), and completed as soon as possible – e.g., within 4-6 weeks.
- Limit the use of machinery within watercourses during road construction activities.
- Make use of existing mine facilities for the purpose of laydown areas and ablutions. If necessary, locate ablutions and laydown areas outside the regulated 500 m buffer of a watercourse.
- No maintenance of vehicles shall be undertaken within 500 m of the watercourse. The construction vehicles must be inspected for possible oil leaks prior to site access. The use of a drip tray under all stationary vehicles is mandatory within the regulated area.
- Annual monitoring inspections should identify target areas for clearing and subsequent rehabilitation/re-vegetation programmes.
- A search and rescue survey for all flora SCC (see Appendix C of the terrestrial biodiversity study – APPENDIX G of this report) should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC.
- An alien invasive species (AIS) control programme must be developed, or any existing AIS management programmes expanded, to include the active control of alien invasive species that may establish/spread as a result of proposed Project activities.
- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage the movement of the fauna SoCC. The ECO should be trained in inter alia, snake handling and species identification.
- A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons. A record of fauna mortalities/injury as a result of fauna crossing the proposed access roads should be kept on site and regularly reviewed to inform the need for implementation of any additional mitigation measures.
- A traffic management plan should be developed for the Project which details the requirement for traffic officers to manage traffic on the community road during the construction period; as well as quantify baseline traffic counts and livestock movements.
- MPM should provide two weeks notification to community road users and present to the community how traffic will be appropriately handled during the construction period.
- All drivers operating mining vehicles along the community access road should be adequately trained about pedestrian safety and travelling within the recommended speed limit.
- A closure and rehabilitation plan will be compiled and submitted for approval prior to closure of the MPM. Final rehabilitation and closure of the proposed access road forms part of such plan.

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FIGURES

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ABBREVIATIONS AND ACRONYMS

Abbreviation/ Acronym	Explanation
AAP	Anglo-American Platinum (Ltd)
AIS	Alien Invasive Species
ARM	African Rainbow Minerals
BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Letter
CBA	Critical Biodiversity Areas
CEMPr	Consolidated Environmental Management Program
COGHSTA	Cooperative Governance, Human Settlement and Traditional Affairs
CRR	Comments and Responses Report
dBA	Draft Basic Assessment t
DFFE	Department of Forestry, Fisheries and the Environment
dEMPr	Draft Environmental Management Programme
DMRE	Department of Mineral Resources and Energy
DRDLR	Department of Rural and Land Reform
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMS	Environmental Management System
FTLM	Fetakgomo Tubatse Local Municipality
FSA	Fish Support Area
GA	General Authorisation
GDP	Gross Domestic Product
GN	Government Notice
GSDM	Greater Sekhukhune District Municipality
IBA	Important Bird Area
I&APs	Interested and affected parties
IWWMP	Integrated Water and Waste Management Plan
Ktpm	Kilo tonnes per month
LED	Local Economic Development
LoM	Life of Mine
MPM	Modikwa Platinum Mine

Abbreviation/ Acronym	Explanation
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), as amended
MR	Mining Right
MRA	Mining Right Area
NAAQS	National Ambient Air Quality Standards
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
NEM:AQA	National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), as amended
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), as amended
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998), as amended
PAIA	Promotion of Access to Information Act
PPP	Public Participation Process
RoD	Record of Decision
RPM	Rustenburg Platinum Mines
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SCPE	Sekhukhuneland Centre of Plant Endemism
SoCC	Species of Conservation Concern
SCPE	Sekhukhuneland Centre of Plant Endemism
SLP	Service Labour Plan
SSSWD	South Shaft Storm Water Dam
SWQMO	SWater Quality Management Objective
UG2	Upper Group 2
WML	Waste Management Licence
WUL	Water Use Licence

PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1.0 INTRODUCTION, BACKGROUND AND SCOPE OF THE BASIC ASSESSMENT

Golder Associates Africa (Pty) Ltd, now WSP Africa (Pty) Ltd (WSP|Golder) has been appointed by Anglo-American Platinum as the independent environmental assessment practitioner (EAP) to undertake the Environmental Authorisation (EA) and Water Use Authorisation (WUA) process, by way of Basic Assessment (BA) and General Authorisation (GA), for the development of two (2) proposed access roads within Modikwa Platinum Mine (MPM), situated in Burgersfort, Limpopo Province.

MPM is a Joint Venture (JV) between Rustenburg Platinum Mines (RPM) and is a wholly owned subsidiary of Anglo-American Platinum (Ltd) (AAP) and African Rainbow Minerals Mining Consortium Limited (ARM:MC), a subsidiary of African Rainbow Minerals (ARM) Limited. ARM:MC holds 50% of MPM, with a 17% stake in ARM:MC being held by two (2) Section 21 companies representing communities around Modikwa.

The mine 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 Greater Sekhukhune District Municipality (GSDM) of the Limpopo Province as indicated in Figure 1. Access to the mining area is from the regional road (R37) from Burgersfort, with a tarred road to the mine.

MPM's mining area includes portions of the farms Maandagshoek 254 KT, Driekop 253 KT, Hendriksplaats 281 KT, Onverwacht 292 KT, Winterveld 293 KT and Doornbosch 294 KT. The mining operations include mining of Upper Group (UG2) Platinum ore, with underground mining activities commencing in 2001 and open pit operations commenced in June 2010. MPM has an installed plant capacity of 240 kilo tonnes per month (ktpm) with current production from the existing operational shafts (i.e. North 1, including Mid shaft, South 1, including Hill shaft and South 2 Shaft) averaging approximately 200 ktpm (SRK Consulting (Pty) Ltd, 2021).

The mine has been authorised through a Mining Right (MR) granted by the Department of Mineral Resources and Energy (DMRE) with reference number: LP30/5/1/2/3/2/1/ (129) EM, approved in January 2001. The Life of Mine (LoM) for MPM is valid up to November 2043 as stipulated in the MR (Ref: LP30/5/1/2/3/2/1/ (129) EM). MPM is operating under the Consolidated Environmental Management Program (CEMPr) Report which consolidated the original EMPr (approved in 2001) and subsequent amendments. The CEMPr was approved by the DMRE on 25 July 2018 (DMRE Reference 129MR; LP 30/5/1/2/3/2/1 (0129) EM).

MPM was subsequently granted EA for the construction of two ventilation shafts namely the North ventilation shaft 3 on May 2017and South ventilation (Merensky) shaft on 25 July 2018 and its amendment on the March 2022 (EA Ref: (EA Ref: LP 30/5/1/2/3/2/1 (129) EM).

Current application

MPM (the Applicant) proposes to construct two (2) access roads that link to the approved North Ventilation Shaft 3 and South (Merensky) Ventilation Shaft at the MPM (the Project). Road 1 will provide access to the North Ventilation Shaft 3, and will be approximately 308 m in length, 6 m in width (3 m either side of the centre line) and requiring an area of approximately 2 464 m^2 to be cleared. Road 2 will provide access to the Merensky Shaft) will be approximately 198 m in length, 6 m in width (3 m either side of the centre line) and requiring an area of approximately 1586 m^2 to be cleared. Both roads will be untarred and will connect existing untarred roads to the ventilation shafts.

In order to proceed with the Project, MPM is required to apply for an EA in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA). The proposed development triggers listed activities in terms of GN

R. 324 Listing Notice 3 of the Environmental Impact Assessment (EIA) Regulations (2014, as amended) and requires an environmental authorisation (EA) by way of a Basic Assessment (BA) to be undertaken prior to the commencement of any activities. The application will be submitted to the Limpopo DMRE.

In addition, the proposed project will occur within 500 m of a watercourse, therefore, the Applicant also intends to submit an application for water use authorisation to the Department of Water and Sanitation (DWS) for water uses as specified in section 21(c) and (i) of the National Water Act (Act 36 of 1998) (NWA). The water use authorisation will follow a General Authorisation (GA) process under GN 509 of the NWA.

2.0 DETAILS OF THE PROJECT APPLICANT AND ENVIRONMENTAL ASSESSMENT PRACTITIONER

The section below provides the qualifications of the EAP, summary of EAP past experience, applicant details, specialist details as well as municipal and provincial details for the Project.

2.1 Details of the EAP

The EAPs involved in the compilation of this Draft BA and Environmental Management Programme (EMPr) and their contact details are provided in Table 1.

Table 1: Contact details of the EAP

Company	Golder Associated Africa (Pty) Ltd (now WSP Africa (Pty) Ltd)
Physical address	Building 1, Magwa Crescent West, Maxwell Office Park, Waterfall City, Midrand, 1685
Postal address	P.O. Box 6001, Halfway House
Name of the EAP	Dalian Govender
Professional affiliation/registration	Registered EAP (2019/1617); Pr.Sci.Nat
Telephone	011 254 4800
Fax	086 582 1561
E-mail	Dalian.govender@wsp.com

2.1.1 Expertise of the EAP

2.1.1.1 The qualifications of the EAP

The qualifications of the EAPs are provided in Table 2 and copies of the qualifications are provided in Appendix A.

Table 2: EAP and Environmental Consultant's Qualifications

Name	Qualifications	Professional registration	Years' experience
Dalian Govender	BSc (Hons) Environmental Science	Registered EAP (2019/1617); Pr.Sci.Nat	6.5
Jashmika Maharaj	BSc (Hons) Environmental Management	-	7

2.1.2 Summary of the EAP's past experience

The EAPs' expertise is provided in Table 3. Detailed curriculum vitae (CV) of the EAP is provided in Appendix A.

Table 3: Expertise of the EAP and Environmental Consultant

EAP/ Environmental Consultant	Expertise
Dalian Govender (EAP)	Dalian is a registered professional scientist (Pr.Sci.Nat) with the South African Council for Natural Scientific Professions (SACNASP) and registered Environmental Assessment Practitioner (Reg. EAP) with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Dalian has been involved in a range of sectors including mining, power, renewables, oil and gas and bulk infrastructure developments. His key areas of expertise include Environmental Impact Assessments, Environmental and Social Impact Assessments, Environmental and Social Management Plans, Environmental Auditing, Water Use Licenses and Waste Licences. Dalian has served as both an Environmental Scientist and Environmental Manager as part of his work experience which also included managing a small team of consultants. He has undertaken work in several African countries as well as the Middle East and is currently based at Golder/WSP.
Jashmika Maharaj (Environmental Consultant)	Jashmika has been involved in environmental consulting since 2015 and her expertise include: ■ General environmental management ■ Environmental impact assessments ■ Environmental management programmes ■ Stakeholder consultation ■ Water Use License applications

2.2 Details of the applicant

The physical and postal address of the applicant (MPM), details of the responsible persons and contact person at MPM are presented in Table 4.

Table 4: Applicants details

Applicant	Details
Name of Applicant	Modikwa Platinum Mine (Pty) Ltd
Registration no (if any)	4310113883 RPM and 4270194493 ARM
Trading name (if any)	Modikwa Platinum Mine Joint Venture
Responsible Person, (e.g. Director, CEO, etc).:	Hendrik Johannes Kruger – Business Leader for the Modikwa operations
Contact person:	Avhashoni Mashamba
Physical address:	Modikwa Road, Burgersfort, Limpopo
Postal address:	Private Bag X9120, Driekop
Postal code:	1129
Telephone:	013 230 2282
E-mail:	shoni.mashamba@angloamerican.com
Mobile	066 197 8823
Fax	013 230 2036

3.0 PROJECT INFORMATION AND DESCRIPTION

The Project involves the proposed construction of two (2) access roads that link to the approved North and Merensky ventilation shafts at the MPM. Road 1 (north ventilation shaft 3) will be approximately 308 m in length, 6 m in width (3 m either side of the centre line) and requiring an area of approximately 2 464 m^2 to be cleared. Road 2 (Merensky ventilation shaft) will be approximately 198 m in length, 6 m in width (3 m either side of the centre line) and requiring an area of approximately 1586 m^2 to be cleared. Both roads will be untarred and will connect existing untarred roads to the ventilation shafts.

3.1 Location of the activity

The Project will be undertaken within MPM as detailed below and Table 5:

- The proposed north access road (Road 1) will connect to an existing community road (24°37'18.87"S; 30° 6'1.77"E), situated adjacent to the Mamphahlane community.
- The proposed south access (Road 2) will be located adjacent to the Merensky shaft operations (24°38'40.07"S; 30° 6'36.67"E), situated close to the Hwashi-Difigate community.

MPM is situated within the Limpopo Province approximately 20km west of Burgersfort, 18 km north of Steelpoort and 140 km southeast of Polokwane. The R37 is situated approximately 2.9 km northeast of the study area, while the R555 is situated approximately 9.3 km southeast (SRK Consulting (Pty) Ltd, 2021).The Project area falls under quaternary catchment B41J (Moopetsi and Tubatsane river catchments) within the Fetakgomo Tubatse Local Municipality (FTLM) and the Greater Sekhukhune District Municipality (GSDM).

Table 5: Coordinates for Road 1 and Road 2

Access Road	Start Coordinate	Middle Coordinate	End Coordinate
Road 1 - North ventilation shaft 3 access road	24°37'18.87"S; 30° 6'1.77"E	24°37'21.29"S; 30° 5'56.87"E	24°37'23.54"S; 30° 5'52.34"E
Road 2 – Merensky ventilation shaft access road	24°38'40.07"S; 30° 6'36.67"E	24°38'36.34"S; 30° 6'36.76"E	24°38'33.60"S; 30° 6'36.85"E

3.1.1 Magisterial District and relevant Local Authority

MPM is located in the jurisdiction of the FTLM and GSDM, in the Limpopo Province.

3.1.2 Description of the affected property

The Project will be situated within MPM's existing mining area on Hendriksplaats 281 KT Portion 1 (Road 1) and Onverwacht 292 KT (Road 2) (Table 6).

Table 6: Property details

Farm Name	Road 1: Hendriksplaats 281 KT Portion 281 Road 2: Onverwacht 292 KT Portion 1
Application area (Ha)	Hendriksplaats 281 KT Portion 281= 2910.0489Ha Onverwacht 292 KT Portion 1= 770.8788Ha
Magisterial district	Fetakgomo Tubatse Local Municipality Sekhukhune District Municipality
Distance and direction from nearest town	Modikwa Platinum Mine is located approximately: 8 km west of Burgersfort

Farm Name	Road 1: Hendriksplaats 281 KT Portion 281 Road 2: Onverwacht 292 KT Portion 1	
	18 km north of Steelpoort; and 140 km southeast of Polokwane.	
21-digit Surveyor General Code for each farm portion	Road 1: Hendriksplaats 281 KT Portion 281	T0KT00000000028100000
	Road 2: Onverwacht 292 KT Portion 1	T0KT00000000029200000

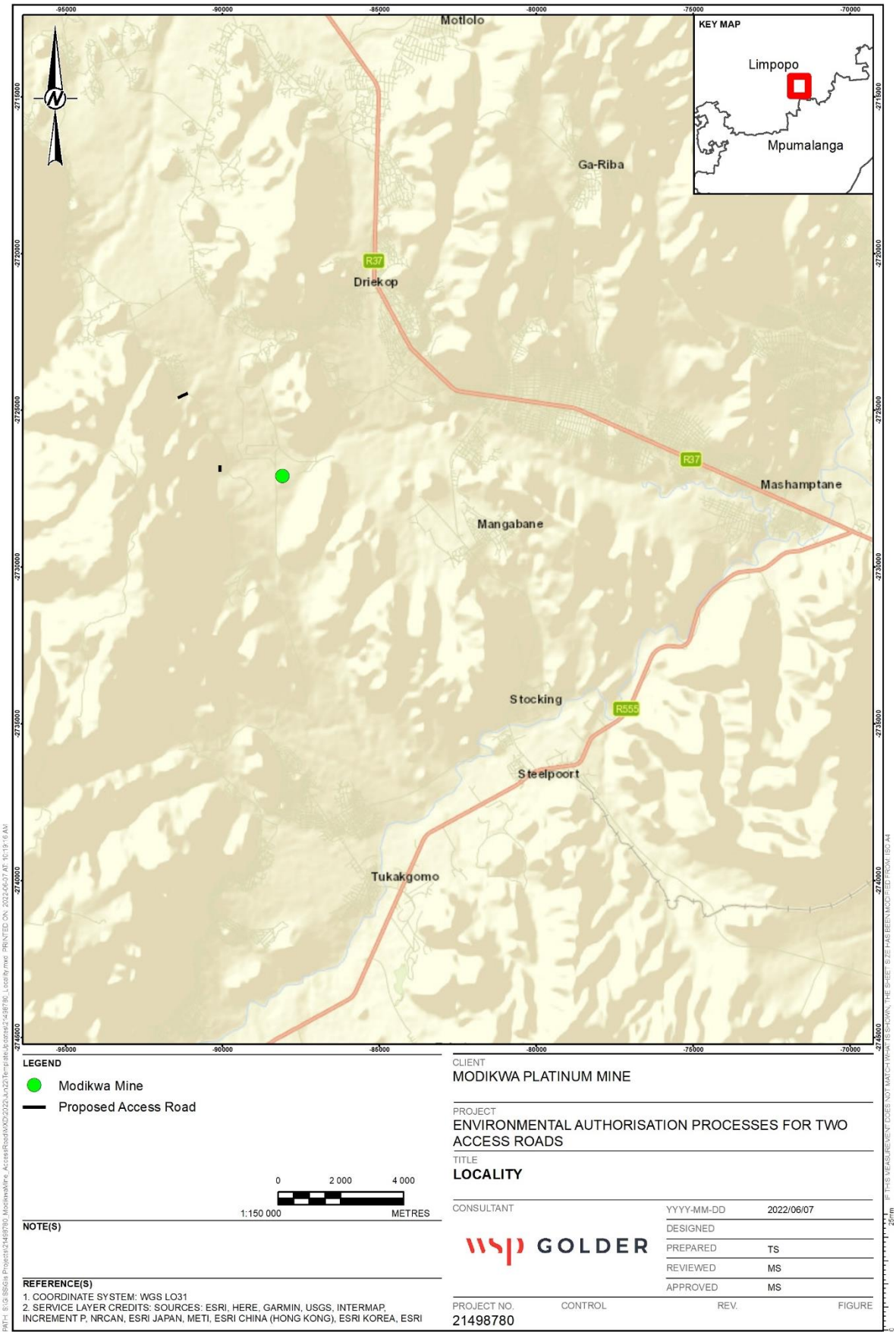

Figure 1: Location of the proposed access roads

Figure 2: Aerial view of the proposed access roads

3.2 Description of the scope of the proposed overall activity

This section provides an overview of the triggered listed activities, description of the activities to be undertaken and where infrastructure will be placed.

3.2.1 Listed and specific activities

The proposed activities associated with the Project will tigger listed activities in terms of GNR 324 of the EIA Regulations (2014, as amended) under the NEMA, 1998, and necessitate the application process, detailed below and in

Table 7: Listed activities

Name of activity	Aerial extent of activity Ha or m^2	Listed activity	Applicable Listing Notice	Waste management authorisation
Activity No.4 of Listing Notice 3: *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *e. Limpopo* *i. Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding disturbed areas;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act 1848and as adopted by the competent authority;* *(dd) Sites or areas identified in terms of an international convention;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ff) Core areas in biosphere reserves; or* *(gg) Areas within 10 kilometres form national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or form the core areas of a biosphere reserve, excluding disturbed areas; or* *ii. Inside urban areas:* *(aa) Areas zoned for use as public open spaces;* *(bb) Areas designed for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; or* *(cc) Areas within urban protected areas.*	3036 m^2	4	GN R. 324	Not required
Activity No.12 of Listing Notice 3:	Road 1: clearance of approximately 2464 m^2;	12	GN R. 324	Not required

Name of activity	Aerial extent of activity Ha or m^2	Listed activity	Applicable Listing Notice	Waste management authorisation
The clearance of an areas of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. *e. Limpopo* *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans; or* *iii. On land where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.*	Road 2: clearance of approximately 1586m^2			

3.2.2 Description of the activities to be undertaken

The main activities associated with the Project will consist of the construction and operation of two (2) new access roads (untarred roads) linking into the north (ventilation shaft) and south (Merensky) ventilation shafts at the mine. The site for the Project is located within the MPM Mining Right area ("MRA"). The following infrastructure and activities will be undertaken as part of the Project:

- Site establishment:
  - Preparation for site activities and construction works will commence (desktop level);
  - Transportation of workers and equipment to the site for daily operations will be scheduled. At the end of working day, worker and equipment (including TLB and excavators) will be transported to the central mine operational facilities; and
  - No site office will be established within the project site.
- Construction Phase:
  - Clearing of vegetation for each road up to a width of 7m;
  - Excavation activities for base preparation which will extend approximately 500mm deep;
  - Transportation and layering of the first layer of base material (Waste Dump Material) (+/- 200mm levelling and compacting);
  - Transportation and layering of the second layer of base material (Waste Dump Material) (+/- 200mm levelling and compacting);
  - Construction of v-drains for water control;
  - Layering of G5 benching and compacting for water control;
  - Final G2 levelling and compacting
- Operational Phase:
  - The access roads will be used for maintenance purposes to improve the ventilation systems;

4.0 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the policy and legislative context applicable to the Project. It identifies all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process, which may be applicable or have relevance to the Project. Table 8 outlines the legislation applicable to the proposed project.

Table 8: Applicable legislation and guidelines for the proposed project components

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to legislation and policy context
The Constitution of the Republic of South Africa (Act No. 108 of 1996)	Section 25 environmental right considered in impact assessment. Throughout the whole document.	An application for an EA will be submitted to the Limpopo DMRE on 8 July 2022. The Draft BA/EMPr will be submitted for the 30-day comment to Interested and Affected Parties and the comments, where applicable, will be

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to legislation and policy context
		incorporated into the Final BAR/EMPr for submission to the DMRE.
National Environmental Management Act, 1998 (Act 107 of 1998); Government Notice Regulation (GNR) 324 to 327 dated 7 April 2017: Environmental Impact Assessment Regulations 2014, as amended	Entire document	The BAR and EMPr is compiled in accordance with the NEMA as well as the Regulations thereunder.
National Heritage Resources Act, (Act No. 25 of 1999) (NHRA)	Section 7.12	A heritage and desktop palaeontology impact assessment were conducted for the project area and will be submitted to the South African Heritage Resources Agency (SAHRA).
National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM: WA)	EMPr in Part B of this report, Section 19.0 and environmental awareness plan in Section 22.0.	No listed waste activities are triggered by the Project. The impacts associated with waste are addressed in the impact assessment section and EMPr.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM: BA)	Section 7.8.1	Biodiversity related to the proposed access roads was assessed when sites were selected, and alternatives considered. No permits and/or licences in terms of National Environmental Management: Biodiversity (Act 10 of 2004, as amended) will be required for the proposed activities.
National Water Act, 1998 (Act No. 36 of 1998) (NWA)	Section 1.0	The proposed Road 1 and Road 2 are in close proximity to non-perennial rivers however, both roads do not traverse any watercourses or wetlands. In terms of the NWA, any activities undertaken within 500m of a wetland or within 100 m of a watercourse require a GA/WUL in terms of Section 21 (c) and (i) of the NWA . Should the impacts of the activities be of low significance, the activities may fall within the ambit of a GA Under GN509 of the NWA Therefore, a GA process is being undertaken for the water uses associated with the Project.
National Environmental Management Air Quality Act (Act No. 39 of 2004) (NEM: AQA)	Section 7.10	No air quality impacts requiring licensing are expected as part of this proposed project. The Project will not contribute directly to emissions released into the atmosphere except possible short-term dust emissions during the construction phase.

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to legislation and policy context
		Emissions generated will be in the form of dust, carbon dioxide and other vehicle emissions generated by diesel powered machinery and trucks during the construction process i.e., tip trucks, TLB"s, excavators and dust from the movement of the construction vehicles. These emissions will be composed primarily of CO_2 and will be of a low concentration.
The Greater Tubatse Local Municipality Integrated Development Plan (IDP)	Section 7.13	The proposed project is in line with the municipality's current IDP in terms of infrastructure development and improvement.
The Promotion of Access to Information Act, 2000 (Act No. 2 of 2000).	Throughout the whole document	Without access to information, a person may be unable to determine whether or not his or her right to just administrative action (or to an environment not harmful to human health or wellbeing or, for that matter, any other Constitutional right) has been infringed. The purpose of the Promotion of Access to Information Act ("PAIA") is to give effect to the Constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights, and to provide for matters connected therewith. In addition to providing access to information, cognisance should be taken that PAIA also makes provision for the refusal of access to information that is deemed to be of a sensitive, confidential or classified nature. This is captured under Chapter 4 of part 2 and 3 of PAIA.
GN 891 dated 2014: Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010	Section 4.1	The need and desirability is in line with the Project objectives.
GN 1314 dated 26 October 2016: Amendments to the Financial Provision Regulations, 2016	Section 17.0 of the BA, Part A and Section 20.0 of the BA, Part B.	Financial provisions for closure related activities including rehabilitation and post-closure aspects have been provided for the Project.
GNR 991 dated 21 September 2018: Amendments to the Financial Provision Regulations, 2015		
GNR 827 dated 1 November 2013: National Dust Control Regulations	Part B - EMPr: Section 19.5 and 21.0	The EMPR provides suitable mitigation measures to control and monitor the

Applicable legislation and guidelines used to compile the report	Reference where applied	How does this development comply with and respond to legislation and policy context
		emission of dust during the construction and operational phases.
Limpopo Environmental Management Act (2003), specifically Schedules 2, 3, 10, 11 and 12 concerning Specially Protected and Protected flora and fauna	Section 7.8.1	The BA provides an overview of the results from the terrestrial biodiversity study and indicates the protected flora and fauna species identified in proximity to the Project sites.
Guideline: National Freshwater Ecosystem Priority Areas (NFEPA)	Section 7.8	The NFEPA wetlands were mapped and analysed within the BA to determine the proximity to the Project site.
Limpopo Conservation Plan (V2)	Section 7.8.1	The BA provides an overview of the results from the terrestrial biodiversity study and is in line with the Limpopo Conservation Plan (V2).

4.1 Need and desirability of the proposed activities

As platinum group metals are sold globally, MPM is an earner of foreign exchange for South Africa. In addition, the mine also has a positive impact on the economic growth of the Limpopo Province, particularly in the communities around the mine. The expected LOM for MPM is up to November 2043 as stipulated in the Mining Right 129MR (SRK Consulting (Pty) Ltd, 2021).

The development of the access roads is critical to gain access to the north ventilation shaft 3 and the Merensky ventilation shaft for purposes of maintaining a healthy ventilation system and aid in the underground mining operations. The ventilation shaft assists with creating a safe and healthy working environment for the underground employees and manages the temperature of the underground working area, by drawing fresh air from aboveground to the underground workings.

If the required safety requirements cannot be met, the operation could be required to cease, with direct impact on the current and potential future employees at the north and south shafts. The cessation of the operation will have a significant impact on the future of MPM including the direct and indirect local employment, and taxable revenue to the State, which it provides (SRK Consulting (Pty) Ltd, 2021).

Furthermore, job opportunities may be primarily created during the construction phase of the project. Increased productivity from the mine may benefit the local communities through an improved local economy and the proposed project will contribute to the continued operations of the mine. The construction/upgrading and use of the proposed roads and the remining of the Merensky Shaft are proposed to benefit the local communities, through temporary employment and procurements of local services when the required skill set is available.

Although limited additional employment will be created during the operational phase of the proposed project, without the construction and upgrading of the roads, MPM will not be able to continue current production rates and social demands, resulting in unemployment. MPM currently employs approximately 4800 people, which are dependent on MPM operations for employment and income (SRK Consulting (Pty) Ltd, 2021).

5.0 MOTIVATION FOR OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

Based on a route investigation undertaken by MPM, minimal options were available for alternative route alignments for the proposed roads.

The MPM team including the surface Surveyor, Environmentalist, Engineering Manager, Project Manager, Social Performance Manager and General Manager visited both areas (Merensky and North Shaft) to determine the most viable access road. Two options were identified for the North shaft ventilation road (Road 1), the first access was adjacent to the village, even though this was the shortest route it posed two challenges, the first being the accessibility due to the community property and then secondly the road would pass through an area with excessive erosion (dongas). The second option was determined to be the preferred route, even though the road is longer, the route has free access and limited road building would be required. The route was further refined by MPM to avoid crossing the non-perennial/ ephemeral drainage line present on site.

The Merensky ventilation shaft access road (Road 2) only considered one option as no alternative access is available, this road will be accessed directly from the existing community road.

Due to the limitations associated with proposing alternative route alignments, MPM have proposed using untarred surfaces as a technology alternative for the Project. All feasible and viable alternatives have been described in the sections below.

5.1 Preferred site alternative

The nature of the Project precluded the selection and assessment of alternative sites. This is because the purpose of the Project is to provide an access route to the approved ventilation shafts in the north and south which prevents any other site selection.

No site alternatives have been investigated for the Project for the following reasons:

- The proposed access roads (Road 1 and Road 2) are restricted to the positioning of the approved north and Merensky south ventilation shafts and will solely serve the purpose of providing access to the ventilation shafts if approved;

Thus, only one site is available and deemed feasible and practicable for each of the proposed roads (refer to Figure 2).

5.2 Preferred alternative technology

The preferred technology alternative for the proposed access roads will be an untarred road surface (refer to Figure 3). The proposed roads will require clearance of existing topsoil and vegetation and thereafter shaping of the in-situ material to allow free drainage and levelling of surfaces. Refer to Section 3.2.2 or the full project activity description.

Figure 3: Typical untarred road surface

5.3 Alternative technology 1

The alternative technology option for the proposed access roads will be a paved road surface (refer to Figure 4). This option was not considered viable due to economic feasibility and maintenance requirements associated with paved surfaces given the nature and purpose of the road. Paved surfaces may also result in slightly higher impacts which could result in a further reduction in the biodiversity of the area.

Figure 4: Typical paved road surface

5.4 Design/ layout alternative

No design and/or layout alternatives for the Project have been proposed as no complicated surface infrastructure will be required. A summary of the design specifications is depicted in Table 9, and a typical layout of a cross section for the proposed access roads is depicted in Figure 5.

Table 9: Design specifications of Road 1 and Road 2

Preferred option (Proposed access road)	Design specifications
North access road (road 1)	308 m in length, 6 m in width (3 m either side of the center line)
South access road (road 2)	198m in length, 6m in width (3 m either side of the center line)

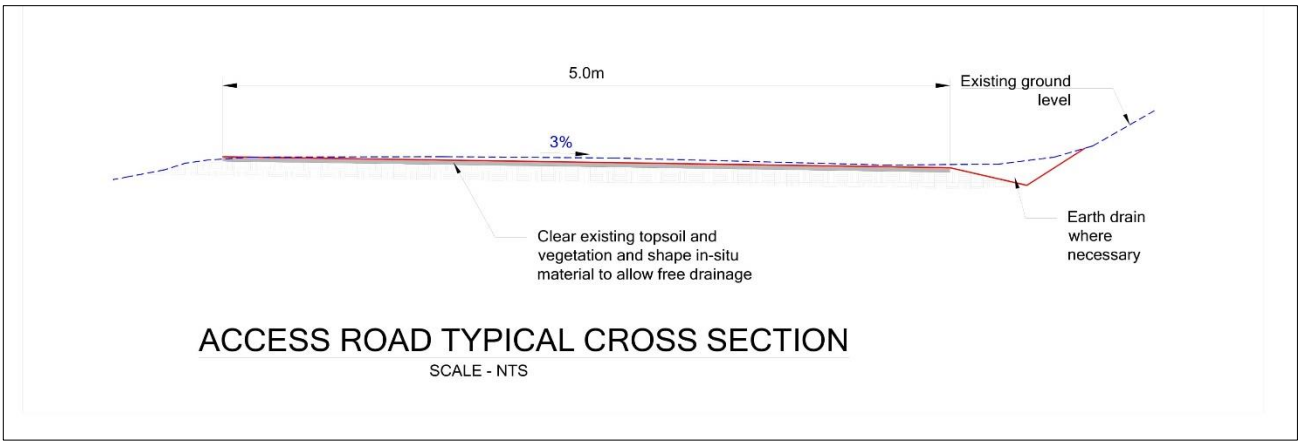

Figure 5: Typical cross section for an access road

5.5 No-Go option

The no-go activity has been considered and assumes that should the proposed activity not proceed then the status quo would remain. This includes no clearing of land, and no additional infrastructure on site and no decommissioning at the end of the project life cycle.

The no-go alternative will result in the north and Merensky south ventilation shafts being inaccessible. Therefore, the reserves will be less utilized, resulting in additional indirect impacts on the socio and environmental condition surrounding the mine. This will eventually result in a reduced revenue and the loss of potential job opportunities.

No permanent services in terms of water supply, electricity, and or sewage facilities will be required as part of the development of the roads. The nature of the activity allows for minimal alternative assessments as part of the operational phase.

6.0 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

This section provides an overview of the public participation process that will be undertaken as part of this BA.

6.1 Objectives of stakeholder engagement

The principles that determine communication with society at large are included in the principles of the National Environmental Management Act (NEMA) (Act 107of 1998, as amended) and are elaborated upon in General Notice 657, titled *"Guideline 4: Public Participation"* (Department of Environmental Affairs and Tourism, 19 May, 2006), which states that: *"Public participation process means a process in which potential interested and affected parties (I&APs) are given an opportunity to comment on, or raise issues relevant to, specific matters."*

Opportunities for Comment

Documents will be available during the BA process to provide stakeholders with information, further opportunities to identify issues of concern and suggestions for enhanced benefits and to verify that the issues raised have been considered.

Public participation is an essential and regulatory requirement for the BA and EMPr process and will be undertaken in terms of Chapter 6 of the EIA Regulations GN R.326. Public participation is a process that is intended to lead to a joint effort by stakeholders, technical specialists, the authorities and the proponent/developer who work together to produce better decisions than if they had acted independently.

The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner and enable them to:

- Raise issues of concern and make suggestions for enhanced benefits.
- Verify that their issues have been recorded.
- Assist in identifying reasonable alternatives.
- Contribute relevant local information and traditional knowledge to the environmental assessment.
- Comment on the findings of the environmental impact assessment and the mitigation measures proposed.
- Once the competent authority, the DMRE, has announced its decision, I&APs will be notified of the outcome and the appeal procedure.

6.2 Public Consultation Process for the BA

6.2.1 Identification of I&APs

A stakeholder database (refer to Appendix B) was developed for the project based on information supplied by MPM and additional I&APs which had been identified by the project team. These included regulatory authorities, local tribal authority leaders and others. The initial stakeholder database includes:

- Competent Authority: Limpopo DMRE
- National Government: such as the Department of Forestry, Fisheries and the Environment (DFFE) and Department of Water and Sanitation (DWS);
- Provincial Government: Limpopo Department of Rural and Land Reform (DRDLR), Limpopo Department of Economic Development, Environment and Tourism;
- Limpopo Department of Cooperative Governance, Human Settlement and Traditional Affairs (COGHSTA);
- Local and District Government: Fetakgomo-Tubatse Local Municipality (FTLM); Greater Sekhukhune District Municipality (GSDM),

- South African Heritage Resources Agency (SAHRA);
- Traditional Authorities:
  - Baroka ba Mamphahlane (Mamphahlane community);
  - Hwashi-Difagate community
- Landowner: Hwashi-Difigate community

6.2.2 Identification of landowners

The identification of landowners in the area is an important part of the stakeholder engagement process. A title deeds search to identify landowners directly affected, adjacent to and in the immediate surroundings of MPM. Refer to Table 10 and Appendix K (copy of the Windeed Property Information).

Table 10: Affected landowners

Farm	Portion	Title Deed	Owner	Directly affected/Immediate surroundings
Hendriksplaats 281 KT	0	T14449/2001PTA	Modikwa Platinum Mine Pty Ltd	Directly affected by Road 1
Onverwacht 292 KT	1	T88050/2011PTA	Hwashi-Difagate Community Trust	Directly affected by Road 2

6.2.3 Registration of I&APs

The NEMA Regulations distinguish between I&APs and registered I&APs.

I&APs, as contemplated 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:

"*An EAP managing an application must open and maintain a register which contains the names, contact details and addresses of*:

- All persons who; have submitted written comments or attended meetings with the applicant or EAP;
- All persons who; have requested the applicant or EAP managing the application, in writing, for their names to be placed on the register; and
- All organs of state which have jurisdiction in respect of the activity to which the application relates.

As per the EIA Regulations, future consultation during the impact assessment phase will take place with registered I&APs. Stakeholders were encouraged to register as I&APs and participate in the consultation processes by completing the Registration and Comment sheet and returning it to the Public Participation Office.

Stakeholders who were involved in the initial consultation have been added to the register. The I&AP register will be updated throughout the BA process.

6.2.4 Project announcement phase

The proposed project was announced on **2 June 2022**. Stakeholders were invited to participate in the BA process and public participation process and to pass on the information to friends/colleagues/neighbours who may be interested and to register as I&APs.

The proposed project was announced as follows

- Distribution of the background information document and a letter of invitation to participate to all I&APs on the database, accompanied by a registration, comment and reply sheet that was mailed/emailed to the entire stakeholder database and hand delivered, where possible (Appendix C)
- The above-mentioned documents were available at the public places listed below and posted to the Golder website: https://www.golder.com/global-locations/africa/south-africa-public-documents

Table 11: Public places

Place	Coordinates
Sewing building	24°39'58.02"S 30° 6'55.08"E
Merensky shaft	24°38'42.24"S 30° 6'38.27"E
Visitor Entrance	24°38'10.94"S 30° 7'19.65"E
ABET Training Centre	24°37'34.77"S 30° 9'5.36"E
Traditional Council	24°36'58.52"S 30° 5'41.33"E

- A newspaper advertisement was published in The Bosvelder on 8 July 2022 in both English and Sepedi (refer to APPENDIX D)
- Site notices were placed on the **2 June 2022** at the following public places and at visible places at the boundary of the property (refer to Appendix D):

Table 12: Site notice locations

Place	Coordinates
Sewing building	24°39'58.02"S 30° 6'55.08"E
Merensky shaft	24°38'42.24"S 30° 6'38.27"E
Visitor Entrance	24°38'10.94"S 30° 7'19.65"E
ABET Training Centre	24°37'34.77"S 30° 9'5.36"E
Traditional Council	24°36'58.52"S 30° 5'41.33"E

6.2.5 Draft BA and EMPr Report

This draft BAR (DBAR) and EMPr has been made available for public comment for a period of 30 days from 8 July 2022 to 8 August 2022.The availability of the DBAR was announced as follows:

- Distribution of a letters to registered I&APs, accompanied by a comment form (in English and Sepedi), inviting I&APs to comment on the DBAR;
- Notification to registered I&APs of the availability of the DBAR via SMS, email and letters;
- Posting the DBAR, notification letter and comment form on the WSP website; and

- The DBAR, with letters inviting comments on the DBAR and comment forms will be made available for public review at selected easily accessible places around the project area.

The DBAR and EMPr were available at the following public places listed below and posted to the WSP website: https://www.golder.com/global-locations/africa/south-africa-public-documents.

Table 13: Public places with printed copies of the DBAR and EMPr

Place	Location
Section 21 Office	Modikwa Platinum Mine
Visitors Entrance at Modikwa Mine Central Offices	Modikwa Platinum Mine
Sewing building near the Hwashi Difagate Offices	Modikwa Platinum Mine
Burgersfort Library	Burgersfort
WSP Africa, Maxwell Office Park, Magwa Crescent West, Waterfall City	Midrand

6.3 Comments and Responses Report

All comments and responses from registered I&APs during the 30-day comment period in respect of the circulation of the draft BAR and EMPr will be incorporated into the Comment and Responses Report (CRR) provided in Appendix E.

6.4 Final BA and EMPr Report

This draft BA and EMPr Report will be updated after the expiry of the public review period. All the issues, comments and suggestions raised during the comment period on the draft BAR and EMPr will be added to the CRR. The Final BAR and EMPr will thereafter be submitted to the DMRE.

On submission of the Final BA and EMPr report to the authorities, a notification letter will be sent to every registered I&AP to inform them of the submission and the opportunity to request copies of the final reports.

6.5 Notification of Decision

Once the DMRE has taken a decision about the proposed project, the Public Participation Office will notify I&APs of this decision and of the opportunity to appeal. This notification will be provided as follows:

- A letter will be sent, addressed to all registered I&APs, summarising the authority's decision and explaining how to lodge an appeal should they wish to

7.0 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE BASELINE ENVIRONMENT

This section of the report presents an overview of the environmental baseline and status quo of the project area at MPM. Information presented in this section is based on visual observations during the site reconnaissance visit, available desktop information, specialist studies and previous studies undertaken in the project area. Information was further obtained from the following specialist studies undertaken as part of this BA process:

- Heritage Impact Assessment (HIA) (PGS Heritage);
- Terrestrial Biodiversity Impact Assessment (WSP|Golder); and
- Aquatic Biodiversity Compliance Statement (WSP|Golder).

The section below includes a description of the physical environment (climate, topography, geology, air quality, noise, surface water, geochemical and ground water), biological environment (flora, fauna and wetlands) and

socio-economic environment (economic features, population structure, employment, land use, land ownership, land claims, cultural heritage).

7.1 Climate and meteorology

7.1.1 Regional climate, temperature and rainfall

Limpopo is one of the warmest regions in South Africa with an average daily high temperature of 26 °C. The region is subject to hot summers and cool, dry winters. Rainfall season can be expected between October to April with thunderstorms and rainfall events of short duration dominating the rainfall pattern. The month with the highest number of rainy days is December (11.97 days). The month with the lowest number of rainy days is June (0.67 days). According to Figure 6, Burgersfort is influenced by the local steppe climate. This location has an average temperature of 20 °C and 415 mm of rainfall per year. The difference in precipitation between the driest month and the wettest month is 76.2mm. The variation in temperatures throughout the year is 9.1 °C (Climate-data, 2021).

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	23.6 °C (74.5) °F	23.6 °C (74.5) °F	22.6 °C (72.6) °F	20.1 °C (68.1) °F	17.5 °C (63.5) °F	14.8 °C (58.6) °F	14.5 °C (58) °F	17 °C (62.6) °F	19.8 °C (67.6) °F	21.3 °C (70.3) °F	22.1 °C (71.7) °F	23.4 °C (74.1) °F
Min. Temperature °C (°F)	18.8 °C (65.9) °F	18.9 °C (66) °F	17.7 °C (63.8) °F	14.8 °C (58.6) °F	10.8 °C (51.4) °F	7.5 °C (45.4) °F	6.8 °C (44.3) °F	9.2 °C (48.6) °F	12.5 °C (54.4) °F	15 °C (59) °F	16.6 °C (62) °F	18.3 °C (65) °F
Max. Temperature °C (°F)	29 °C (84.2) °F	29.1 °C (84.4) °F	28.1 °C (82.5) °F	25.8 °C (78.5) °F	24.1 °C (75.5) °F	21.8 °C (71.2) °F	21.6 °C (70.8) °F	24.3 °C (75.8) °F	27 °C (80.6) °F	27.8 °C (82.1) °F	27.7 °C (81.9) °F	28.8 °C (83.9) °F
Precipitation / Rainfall mm (in)	80 (3)	57 (2)	49 (1)	25 (0)	9 (0)	2 (0)	4 (0)	6 (0)	11 (0)	37 (1)	65 (2)	70 (2)
Humidity(%)	62%	61%	62%	60%	52%	49%	47%	43%	44%	51%	59%	61%
Rainy days (d)	8	7	6	4	1	1	1	1	2	4	8	9
avg. Sun hours (hours)	8.6	8.6	8.3	7.9	8.6	8.5	8.6	9.0	9.1	8.7	8.4	8.8

Figure 6: Average temperature and rainfall in Burgersfort

7.2 Wind

The prevailing wind direction for the monitoring period in review comes from North, with winds predominantly in the range of 2.1 to 5.7 m/s (Skyside South Africa, 2022).

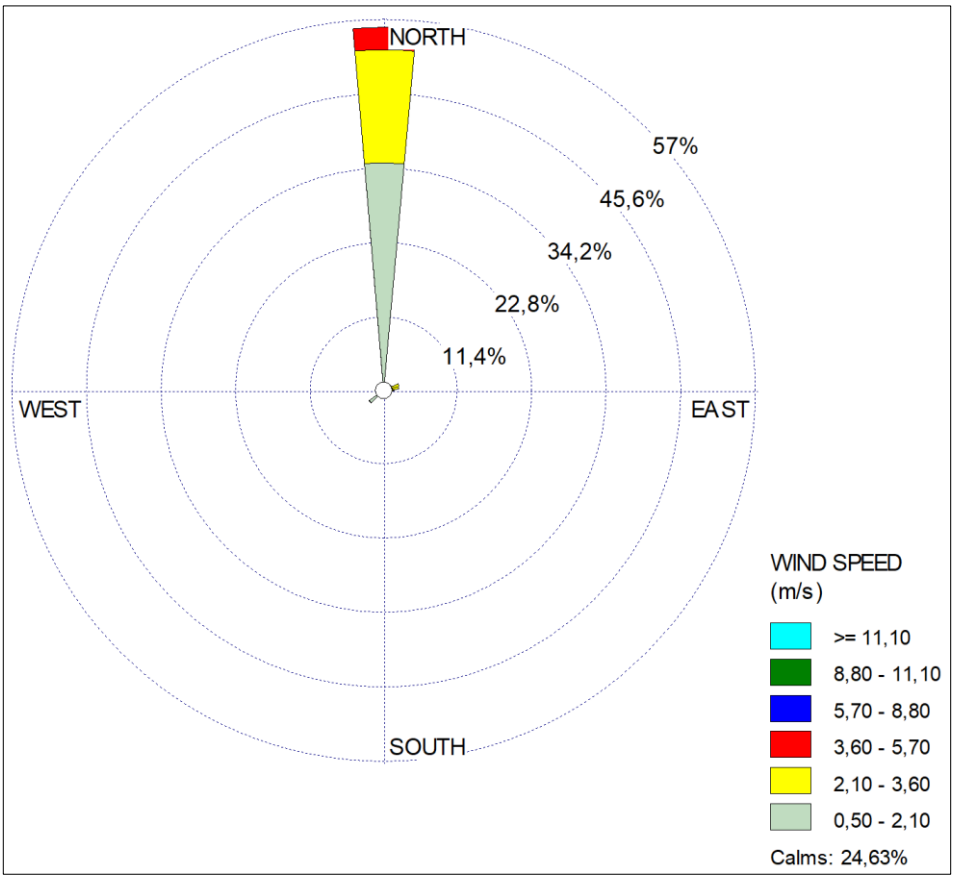

Figure 7: Modikwa Wind Data – February 2022

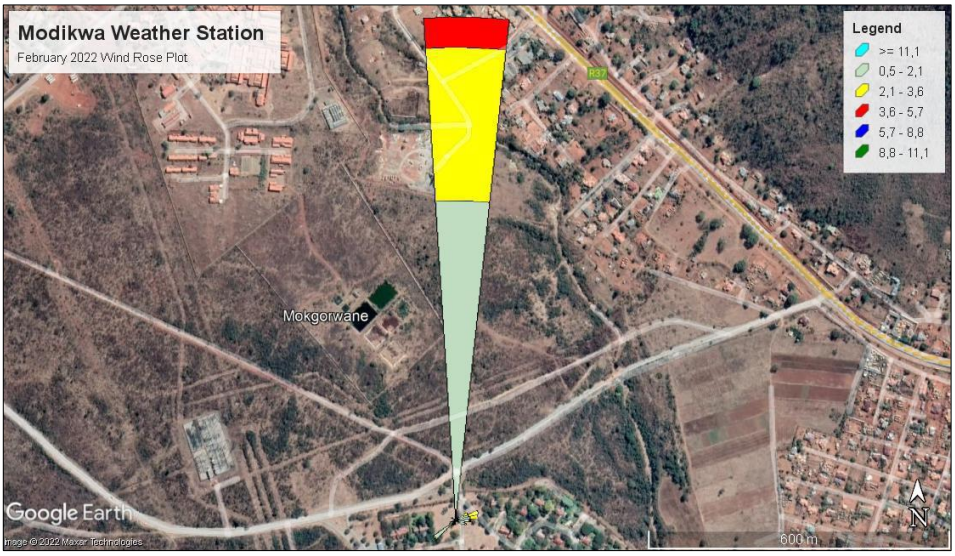

Figure 8: Modikwa Wind Rose Plot on Google Earth – February 2022

7.3 Geology

The underlying geological formations consist predominantly of rocks of the Bushveld Igneous Complex. The baseline elevated iron concentrations may be attributed to the magnetite (Fe_3O_4)-rich rocks of the region as well as potential oxidation/reduction reactions within the well column (GCS, 2022). The area encompasses intrusive igneous rocks, mainly norite and pyroxenite (SRK Consulting (Pty) Ltd, 2021). The lithology has mainly a south south-eastern strike and dips at an angle of ±10-15° in a westerly direction (SRK Consulting (Pty) Ltd, 2021).

7.4 Topography

The topography of the Sekhukhuneland region is diverse, but mostly characterised by mountains and flat to undulating valleys. The regions ultramafic rocks, which are exposed as surface outcrops, form part of the mineral rich Rustenburg Layered Suite. They derive soils comprising mainly red or black montmorillonitic clays that display high heavy metal concentrations (Siebert, *et al*., 2002). The mineral rich soils, coupled with local topography, geology and climate have resulted in the evolution of the Sekhukhuneland Centre of Plant Endemism (SCPE) unique serpentine-related flora assemblage, which consists of many endemic species (WSP|Golder, 2022)

7.5 Visual

7.5.1 Visual character

The major land use of the area in which MPM is located, is characterised by existing mining activities and rural settlements. Nearby residential communities include Mokorwane, which is located along the R37 arterial road located approximately 6 km to the east of the main mine complex, and Mamphahlane and Difagate villages, which are located 2.2 km to the north-west and 400 m to the west of Modikwa, respectively. The affected communities (Mamphahlane and Difagate) are visible in relation to MPM's infrastructure. The Ba Mamphahlane community is nearest to the authorised North ventilation shaft 3 and the Hwashi-Difagate community is nearest to the authorized South (Merensky) Ventilation Shaft (WSP|Golder , 2022).

7.5.2 Sense of place

The rural nature of the land surrounding MPM is considered to be the sense of place for the area. Many of the existing communities rely on subsistence farming and opportunities at the mine as their livelihoods and main source of income. Since the larger Burgersfort area is pristine, the mining activities blends in with the natural landscape and the sense of place is not lost amidst the mining infrastructure (PGS Heritage, 2022).

7.6 Soils

Soils in the area include those of the Hutton, Clovelly, Swartland, Valsrivier, Rensburg, Bonheim, Willowbrook, Mayo, Arcadia, Sepane, Westleigh, Kroonstad, Glencoe, Mispah and Katspruit Forms (SRK Consulting (Pty) Ltd, 2021). Erodibility of the soils range from Moderate to High, with Rensburg/Bonheim/Willowbrook and Rensburg/Arcadia scoring high. Soils were noted to be moderately deep to deep (800 - +1 500 mm) and are poorly drained, and highly structured with relatively small areas of well drained material (SRK Consulting (Pty) Ltd, 2021). The agricultural potential of these soils is limited and should be confined to natural grassland grazing with a low stocking ratio, or preferably managed as conservation areas (SRK Consulting (Pty) Ltd, 2021).

With specific reference to the project footprint, the proposed Road 1 (North access road) is characterised by a historically degraded area caused by high levels of livestock grazing and trampling occurring on clayey/mineral rich soils that are highly susceptible to erosion (WSP|Golder , 2022). The proposed Road 2 (South access road) has a steep gradient and is characterised by shallow stony soils with an abundance of large surface boulders (WSP|Golder , 2022).

7.6.1 Soil erosion

The proposed Road 1 (North ventilation shaft 3 access road) footprint and the surrounding land are characterised by severe gully and sheet erosion, which is also evident from aerial imagery that extensive areas of erosion are also present across the broader Modikwe landscape. The cause of the erosion is likely a combination of historic overgrazing and trampling by livestock along drainage areas that are dominated by highly erodible clay/mineral rich soils.

The proposed Road 2 (Merensky ventilation shaft access road) footprint was characterised by dense vegetation and surface boulders however, the susceptibility of the underlying soil could be expected to be moderate to high based on the surrounding land areas.

In severe cases, soil erosion and attendant nutrient depletion are significant drivers of ecosystem degradation, reducing land productivity and biodiversity. Considering their current condition and their position in the landscape, both road access sites are susceptible to further erosion. Erosion, fire and AIS Alien Invasive Colonisation are considered significant drivers of change at both proposed sites (WSP|Golder , 2022).

7.7 Landscape setting

The following notes summarise the key features and character of the landscape surrounding the two proposed access road sites and any existing ecological impacts and disturbances (WSP|Golder , 2022):

- Modikwa is located in a complex landscape matrix, characterised by several large modified and developed sites that are embedded within a broader network of mountain and valley-bottom savanna habitat, as well as non-perennial drainage lines and channels.
- Modified and developed sites in the immediate landscape include numerous small rural villages, larger residential communities (mostly along the R37 arterial road), various mine and mine-related facilities, old cultivated fields, and large eroded areas associated with drainage lines;
- The landscape is also fragmented by numerous formal and informal roads and access tracks. These are associated with both local mining operations and rural communities;
- Apart from livestock farming, which appears to be mostly cattle and goats, agricultural activities observed include small-scale subsistence cultivation in fertile bottom-land areas that are located adjacent to drainage features;
- It is expected that harvesting of natural resources and possibly subsistence hunting by members of local communities is taking places in the landscape;
- Road 1 (north access road) site borders on the southern boundary of Mamphahlane village. Mamphahlane is a fairly large village, and is characterised by numerous small residential dwellings, and apart from scattered trees, is largely denuded of vegetation. Much of the remaining land to the east of the proposed North Ventilation Shaft 3 Access Road site is undeveloped but degraded by severe soil erosion and the presence of a number old abandoned cultivated fields. Land to the west of the proposed Road 1 is undeveloped and comprises open, mountainous savanna and well-wooded drainage line habitat;
- The Merensky Shaft facility dominates land to the immediate south of the proposed Road 2 (Merensky ventilation shaft access road) footprint. Land to the east of this site is characterised by a mosaic of modified and developed areas associated with Modikwa mine facilities, residential villages, and natural savanna habitat displaying varying levels of disturbance. Land to the west of this site comprises natural, mountainous savanna; and
- Alien invasive plants species observed while traversing the landscape during the field visit where mostly recorded at developed or degraded sites (e.g., villages and road sides) and along drainage features (e.g., streams).

7.8 Wetland and river systems

According to the National Freshwater Ecosystem Priority Areas (NFEPA) mapping of sub-quaternary catchments, Modikwa is located in the Steelpoort Sub Water Management Area. Modikwa is not however, located within a Fish Support Area (FSA) (WSP|Golder , 2022). Figure 9 indicates that the Moopetsi River is the nearest perennial watercourse to the Project.

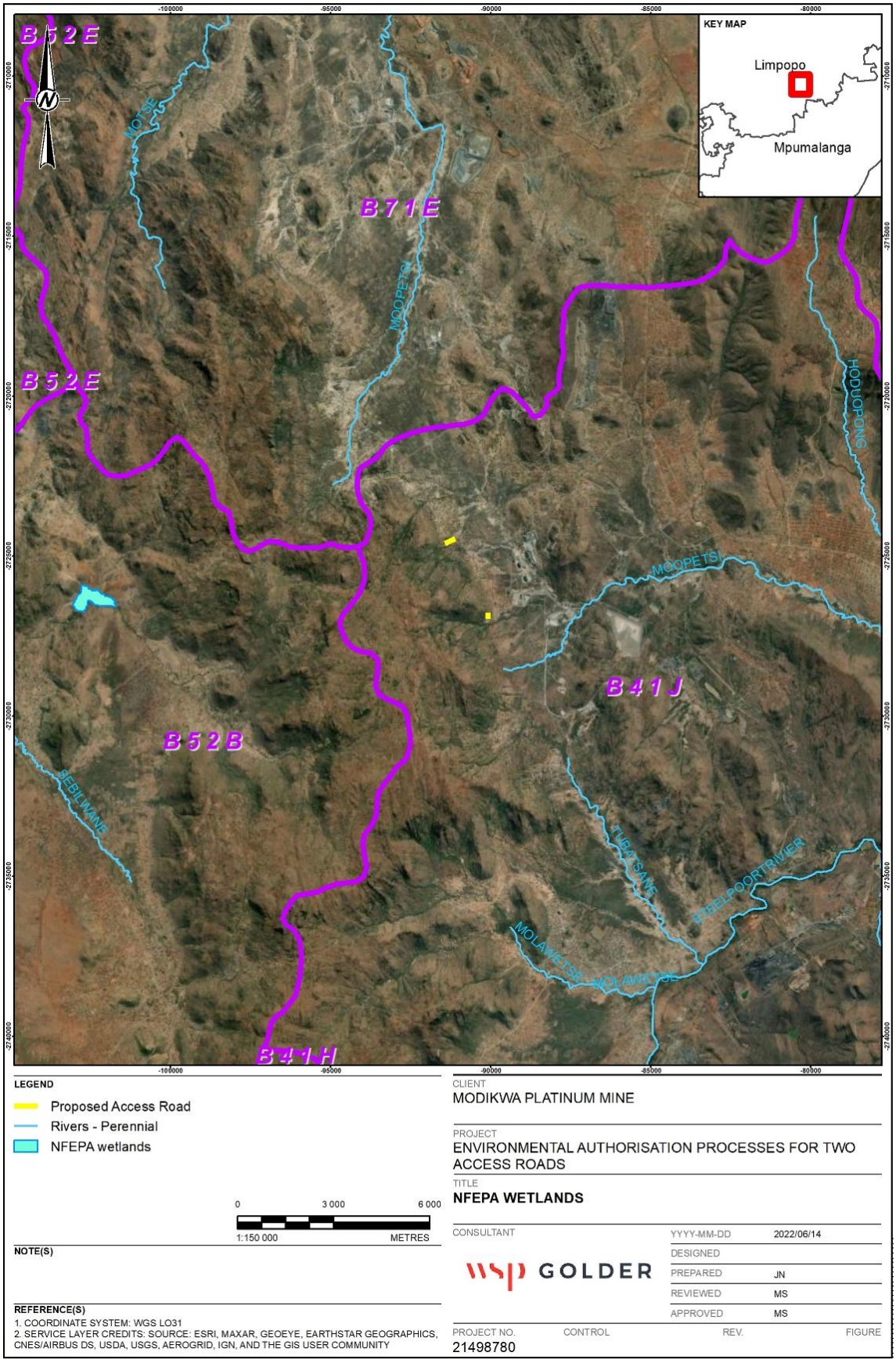

Figure 9: The NFEPA wetlands surrounding the proposed access roads

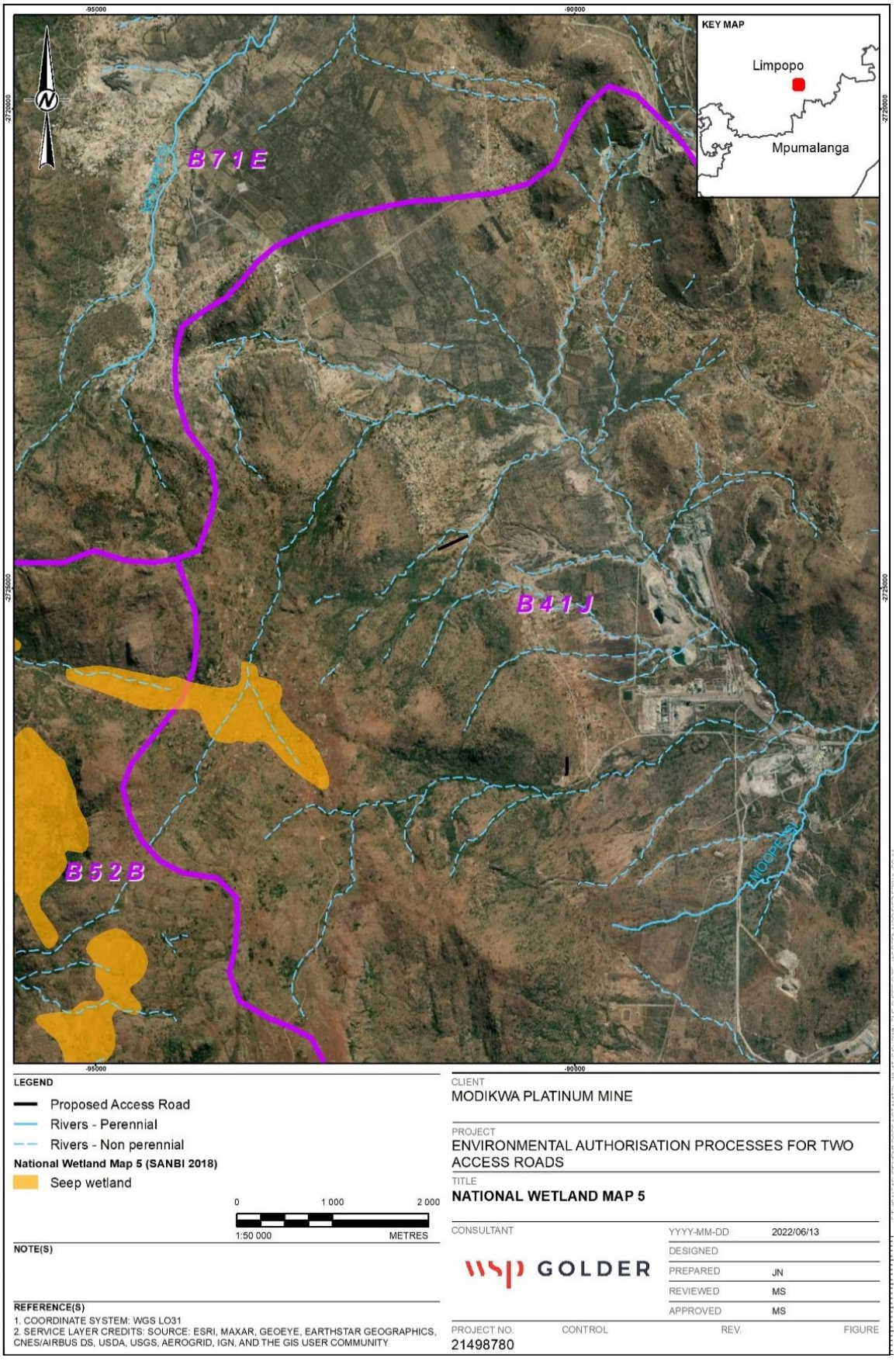

Figure 10: Depiction of the National Wetlands in relation to the proposed access roads (SANBI, 2018)

Figure 10 above, depicts the watercourses within 500m of the proposed site using SANBIs National Wetland Map 5 data. The map indicates that Road 1 and Road 2 are adjacent to several non-perennial watercourses and the nearest wetland within 500m is a seep wetland.

7.8.1 Surface and groundwater monitoring

Surface water monitoring is conducted monthly at MPM and is subdivided into two (2) categories:

- Stream-related surface water: monitoring of streams and tributaries.
- Process-related surface water. Monitoring of process water from the dirty water circuit

The surface water data shows that the highest nitrate concentrations were observed at the North Shaft Waste Rock Dump decant, which reports directly to the Moopetsi Mid-Stream point. The Tubatsana River, which is located in a separate sub catchment, displayed the third highest total average nitrate in 2021.

The drinking water sites indicated some impact on water quality when compared to the SANS guidelines and intervention, such as filtration and/or sterilisation, may be required to ensure that the water is safe for consumption.

The north shaft area is characterised by significantly fluctuating nitrate concentrations. Nitrate as N was elevated throughout the year (Figure 11), concentrations ranging from 92.8 mg/l to 152 mg/l. The data suggests salt loading as a result of mineral leaching from the waste rock dump. Furthermore, the boreholes MMB27 and MMB28, located to the west of the North Shaft area, are blocked and have been replaced by borehole MMB36, which is currently monitored in this area (GCS, 2022).

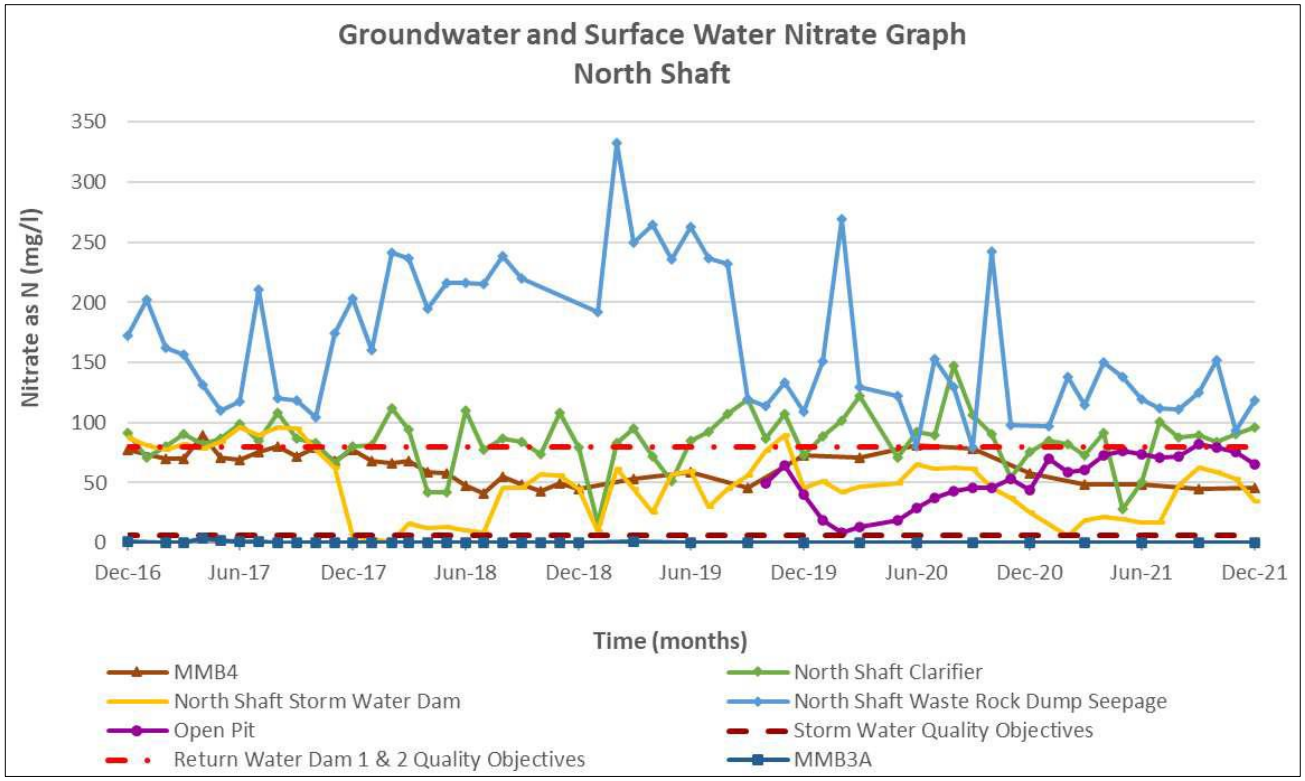

Figure 11: Groundwater and surface water nitrate trend graph for the North shaft

Boreholes M1A (down-gradient of the South Shaft Waste Rock Dump), MMB5 (down-gradient of the South Shaft), MMB6A (down-gradient of the South Shaft and Storm Water Control Dam), MMB20 (down-gradient of South Pit 1 Opencast), MMB23 (up-gradient of South Pit 1 Opencast) and MMB26 (down-gradient of the

underground workings) are all located within the south shaft area. South Shaft groundwater quality is classified as magnesium bicarbonate water indicating enriched water quality associated with water rock interaction. Borehole MMB6A indicated slightly impacted water quality with a progression towards a sodium chloride water type evident (GCS, 2022).

The water quality from the storm water dam within the south shaft area is compared to the IWUL 2017 Storm Water Quality Management Objective (WQMO) and the water quality from the South Shaft Clarifier is compared to the IWUL 2017 for RWD Objectives. A time series graph of the surface water nitrate concentrations was analysed. The following was noted:

- The South Shaft Storm Water Dam (SSSWD) was dry and could not be sampled. SSSWD has been dry since September 2016.
- The hydrochemical results for South Shaft Clarifier indicated non-compliant water quality: Calcium and total hardness concentrations exceeded the RWD 1 and 2 Quality Objectives during the first quarter of 2021.
- Total alkalinity and bicarbonate alkalinity exceeded the RWD 1 and 2 Quality Objectives during the May and November 2021 sampling events.
- In terms of metals, fluoride, aluminium, copper and manganese concentrations were elevated above the RWD 1 and 2 Quality Objectives intermittently during the first quarter of 2021.
- South Shaft Clarifier is characterised by fluctuating nitrate concentrations, which intermittently exceed the specified guideline. Nitrate as N ranged between 54.4 mg/l and 164.0 mg/l. Additionally, ammonium concentrations were intermittently elevated in the first quarter of 2021, ranging between 11.4 mg/l and 41.5 mg/l (GCS, 2022).

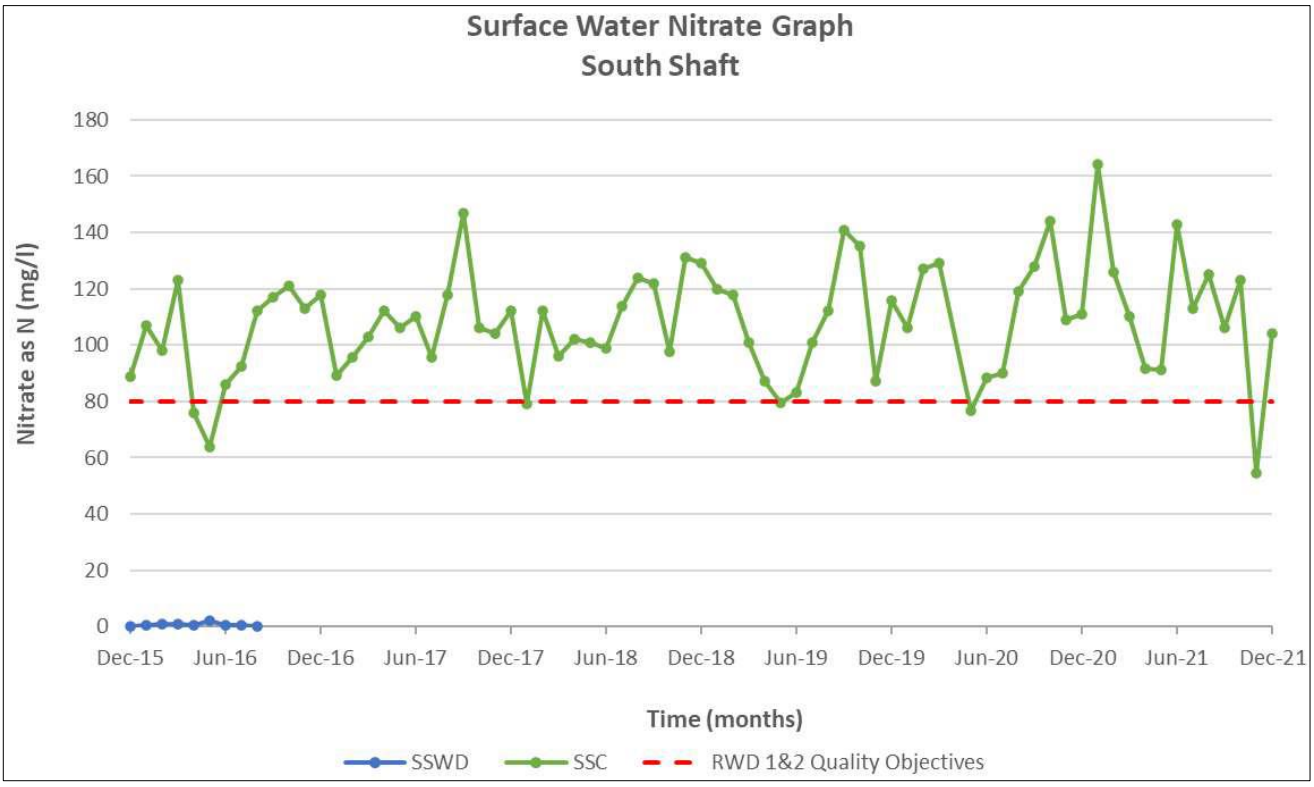

Figure 12: Surface water nitrate trend graph for the South Shaft area

The observations highlighted were made following the groundwater monitoring undertaken at MPM in 2021 (GCS, 2022).

- Groundwater levels at this site range between 0 and 30 meters below ground level (mbgl), with an average site wide water level of 11.46. mbgl.
- The historical data showed a consistent cyclical trend in almost all boreholes between 2012 and 2018, with increasing and decreasing water levels observed over approximately 9-month cycle periods.
- Groundwater level data previously showed a significant flux in water levels at MPM particularly between 2012 and 2018, but recently displayed more stable trends in most boreholes at the site.
- Recent data shows that boreholes MMB16, MMB24 and MMB30 exhibited the greatest flux (>9m) in water levels at the site in 2021, but most boreholes displayed an average change of <1.3 m.
- Based on average results collected for each groundwater monitoring site in 2021, the South 2 area contributes an average of 58% of the nitrate contamination at the site. North Pit 1 is the second highest contributor at 17%. Collectively these areas constitute approximately 75% of the total average site impact.

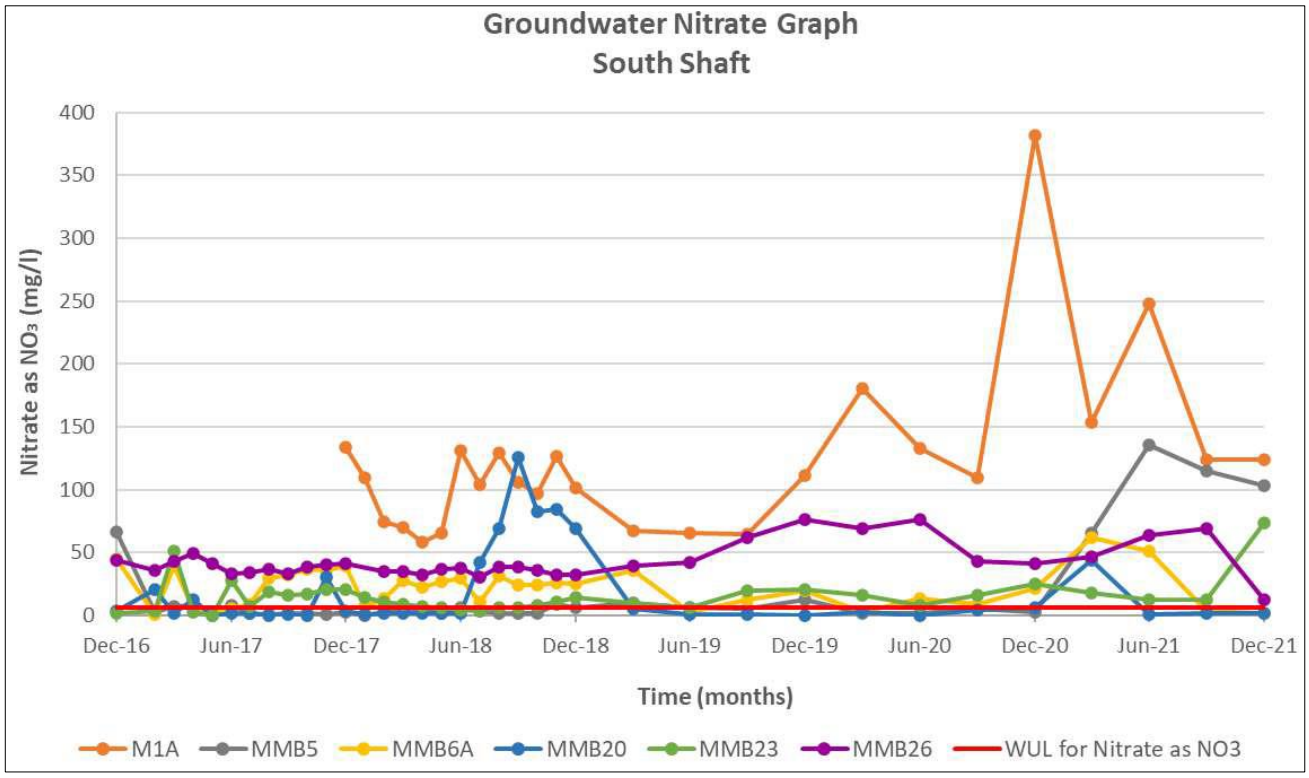

Figure 13: Groundwater nitrate trend graph for the South Shaft area

7.9 Biodiversity

This section is extracted from the biodiversity report included in APPENDIX G.

7.9.1 Vegetation

The proposed north access road (Road 1) is located in Sekhukhune Plains Bushveld and the south access road is characterised by Sekhukhune Mountains Bushveld. Neither vegetation type is listed as threatened on the NEMBA Threatened Ecosystems (2011). However, Sekhukhune Plains Bushveld is considered Vulnerable at a provincial level (WSP|Golder , 2022).

According to the regional vegetation map (Figure 10), the proposed Project site is located within the Sekhukhune Plains Bushveld vegetation type of the savanna biome. Sekhukhune Mountains Bushveld characterises the mountains to the immediate west of each proposed road. These vegetation types form part of a unique, serpentine-related floristic region known as the Sekhukhuneland Centre of Plant Endemism (WSP|Golder , 2022).

7.9.1.1 Savanna biome

The proposed sites are characterised by broad leafed savanna. These usually occur on nutrient poor soils and are dominated by macrophyllous woody species from the *Combretaceae* family.

7.9.1.2 Sekhukhune plains bushveld

The Sekhukhune Plains Bushveld vegetation type extends along the lowland areas of the Steelpoort River from Burgersfort in the south through to Jobskop and Legwareng in the north (refer to Figure 14). The complete list of important taxa associated with the Sekhukhune Plains Bushveld vegetation type is outlined in the terrestrial biodiversity report (APPENDIX G).

7.9.1.3 Sekhukhune mountain bushveld

The Sekhukhune Mountain Bushveld vegetation type dominates the hill and mountain regions of Mpumalanga and Limpopo Provinces. This vegetation is characterised by dry, open to closed-canopy fine- and broad-leafed savanna The complete list of important taxa associated with the Sekhukhune Mountain Bushveld type is outlined in the terrestrial biodiversity report (APPENDIX G).

7.9.1.4 Sekhukhuneland centre of plant endemism

The Sekhukhuneland Centre of Plant Endemism (SCPE) stretches from southern Limpopo Province into Mpumalanga Province and includes the towns of Steelpoort, Burgersfort, Roossenkal, Schoonoord Mecklenburg and Sekhukhune. SCPE has significant conservation value, therefore the destruction of the plant communities in the SCPE could potentially lead to the extinction of several plant species (WSP|Golder , 2022).

7.9.2 Nationally threatened ecosystems

The nearest recognised nationally threatened ecosystems to the MPM are the Sekhukhune Norite Bushveld ecosystem, which is listed as Endangered and is located in three large patches to the east of MPM (east of R37 arterial road). The Sekhukhune Mountainlands (MP 9) ecosystem is also listed as Endangered and is located in a large block across the high-lying norite mountainlands to the south of the site (south of the R555 arterial road) (WSP|Golder , 2022).

7.9.3 Limpopo conservation plan

The proposed North Shaft Access Road is located on land designated as Ecological Support Area 1 (ESA 1). In addition, the mountain chain to the immediate west of this site is designated as Critical Biodiversity Areas 2 (CBA 2) and extends southward to encompass the proposed South Shaft Access Road (refer to Figure 16).

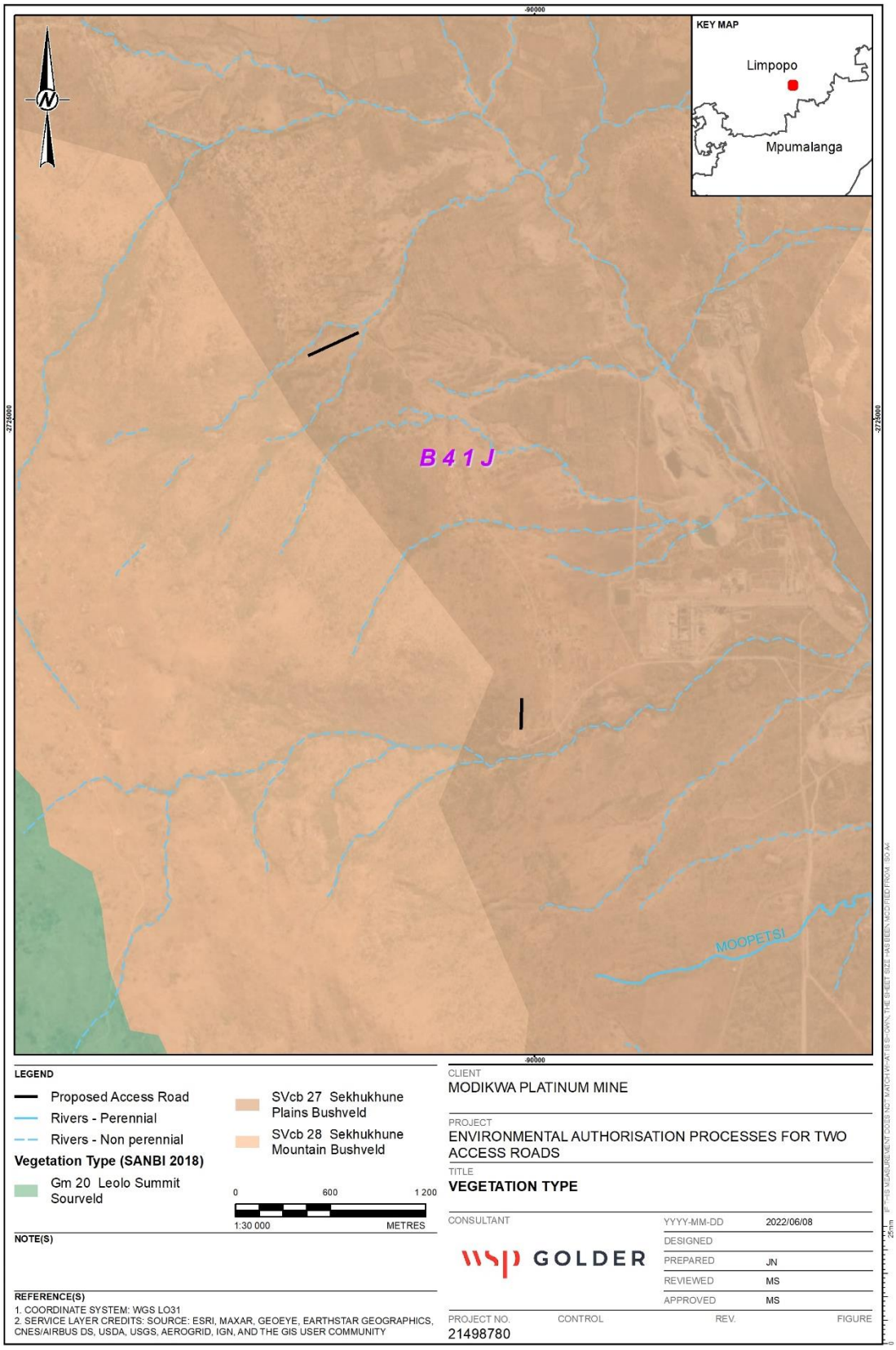

Figure 14: Vegetation type (SANBI, 2019)

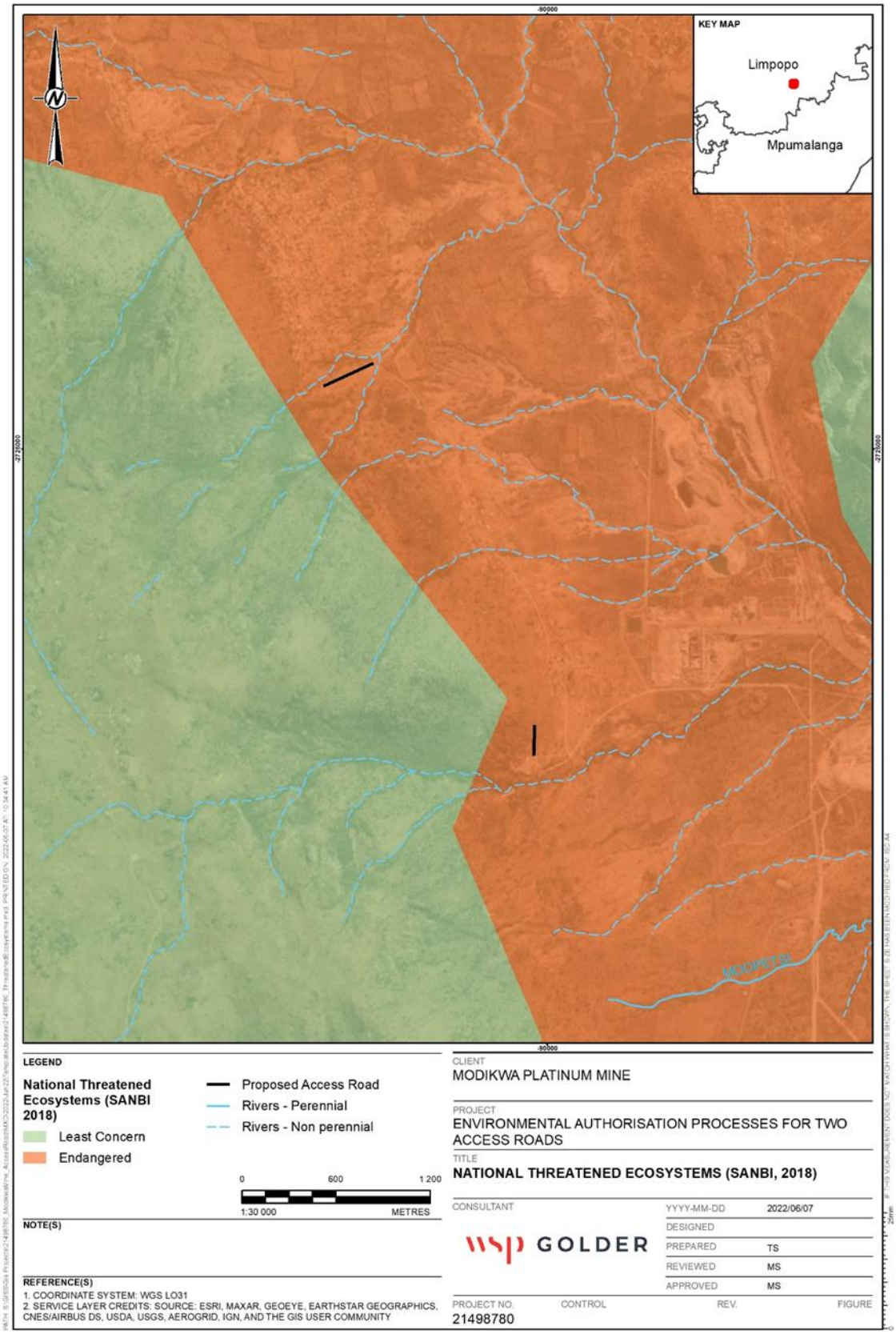

Figure 15: The proposed Project sites in relation to the National Threatened Ecosystems (SANBI, 2018)

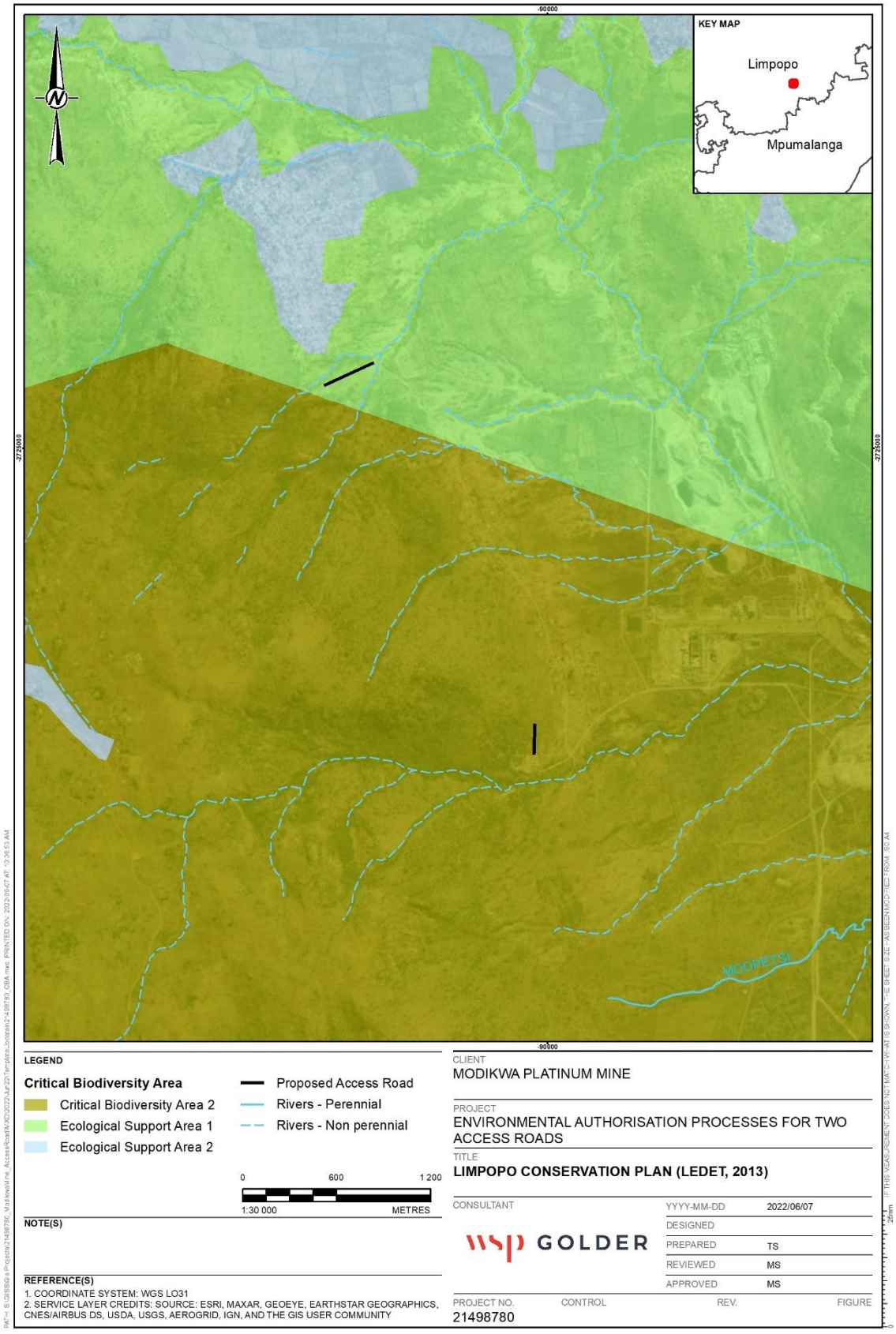

Figure 16: Limpopo Conservation Plan (2013).

7.9.4 Protected areas and conservation areas

The nearest formal protected area to MPM is the Apiesboosmen Private Nature Reserve, which was declared a protected site in 1962. The nature reserve is located to the south-east of MPM, approximately 6.6 km to the east of the proposed South access Road (Road 2) and 8.7 km, south-east of the proposed north access road (Road 1) (Figure 17). There are several nature reserves that border the Apiesboosmen Private Nature Reserve as well. It should be noted that MPM is not located within or near an Important Bird Area (IBA) (WSP|Golder , 2022).

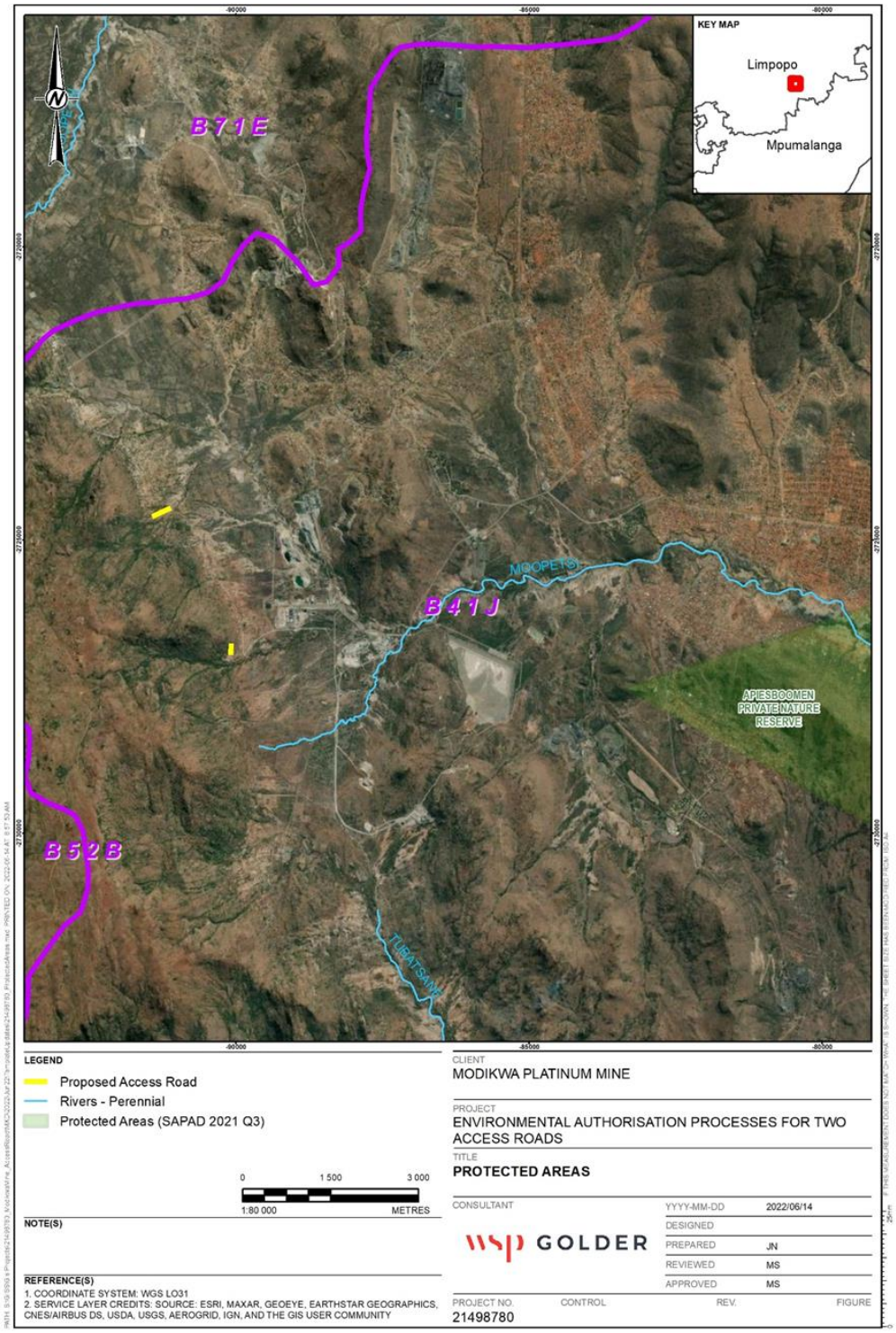

Figure 17: Protected Areas in the landscape surrounding Modikwa Platinum Mine

7.9.5 Vegetation and flora assessment

7.9.5.1 North ventilation shaft 3 access road

Th proposed routes for the Project were observed to be highly eroded and dominated by sparsely vegetated erosion gullies and broad areas of sheet erosion resulting from livestock grazing and trampling occurring on clayey/mineral rich soils over long periods of time.

The highly eroded Project site is characterised by short spare- to open shrubland, with both poorly developed woody- and herbaceous components. Fifty-nine (59) flora species were recorded along the proposed routes. *Euclea linearis* and *Searsia keetii* are the most dominant woody species.

Flora species of conservation concern recorded along Road 1, include *Aloe marlothii, Elephantorrhiza praetermissa, Jamesbrittenia macrantha, Lydenburgia cassinoides, Polygala sekhukhuniensis, Searsia sekhukhuniensis* and *Sclerocarya birrea* subsp. *caffra.*

Well-defined and vegetated nonperennial drainage lines are located to the north and south of Road 1. Vegetation along these drainage lines is both taller and denser than the adjacent upland areas. Woody vegetation is characterised by many of the same species recorded along the proposed development route, along with other larger woody taxa such as the abundant *Dodonaea angustifolia,* as well as *inter alia, Nuxia gracilis, Peltophorum africanum* and *Vachellia karroo.*

7.9.5.2 Merensky south access road

Vegetation immediately adjacent to the Merensky ventilation shaft has been disturbed and is dominated by alien vegetation, including the listed invasive species *Senna* occidentalis and *Xanthium spinosum*. Vegetation along the remainder of the Road 2 is characterised by natural well-wooded savanna habitat, that approximates Sekhukhune Mountain Bushveld.

In addition, the vegetation structure comprises low- to short, closed woodland. Broad-leaf woody species are dominant, with a sparsely- to moderately developed herbaceous layer that is grass dominated. The area is also composed of seventy-one (71) flora species which were recorded along Road 2.

The most dominant woody species are *Elephantorrhiza praetermissa, Hippobromus pauciflorus* and *Vitex obovata*. Other frequently noted woody taxa include *inter alia*; *Euclea crispa, Grewia vernicosa, Lydenburgia cassinoides, Peltophorum africana, Rhoicissus sekhukhuniensis, Senegalia caffra, Tinnea rhodesiana* and *Triaspis glaucophylla.*

The herbaceous layer is grass dominated, with *Aristida adscensionis*, *Aristida aequiglumis Enneapogon scoparius, Heteropogon contortus* and *Themeda triandra* commonly recorded. Other fairly common flora taxa recorded include *inter alia*; a maculata *Aloe* species, *Lantana rugosa* and *Pellaea calomelanos* var. *calomelanos.*

Several flora species of conservation concern were recorded along Road 2, including *Berchemia zeyheri, Elaeodendron transvaalense* and *Lydenburgia cassinoides,* which are both listed as Near Threatened on the national Red List, and *Searsia sekhukhuniensis* which is listed as Rare. A single *Sclerocarya birrea* subsp. *caffra* tree was also recorded.

7.9.6 Species of conservation concern

Lydenburgia cassinoides and Searsia sekhukhuniensis were noted at both Road 1 and Road 2, with *Lydenburgia cassinoides* particularly abundant at Road 2. *Jamesbrittenia macrantha* and *Polygala sekhukhuniensis* were only observed at Road 1, while *Berchemia zeyheri* and a single *Elaeodendron transvaalense* were observed at Road 2. Although not recorded in either proposed development footprint, *Searsia batophylla* was observed to be occuring along bottomland drainage features at MPM. An additional

nineteen (19) species of conservation importance are known from the region and potentially occur at MPM, are indicated in Table 14 below.

7.9.7 Alien invasive species

Four (4) declared alien invasive species were recorded in and adjacent to the Project sites, namely *Argemone ochroleuca* subsp. *ochroleuca*, *Ricinus communis*, *Senna occidentalis* and *Xanthium spinosum*. These are all listed as NEMBA Category 1b invasive species. Apart from *Senna occidentalis,* which was fairly abundant at the base of the Road 2 footprint, these taxa mostly occurred as scattered individual plants at disturbed sites (WSP|Golder , 2022).

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Table 14: Flora species of conservation concern recorded and potentially occurring at Modikwa Platinum Mine

Family	Species Name	National Red List Status (2020-1)	NEMBA ToPS Status (2007)	National Forest Act (1998)	Limpopo Protected Status	Sekhukhune Endemic	Habitat Preferences	Probability of Occurrence
Passifloraceae	*Adenia fruticosa subsp. fruticosa*	Near Threatened	-	-	-	Endemic	Arid woodland and rocky outcrops.	Probable – suitable habitat present at the South Shaft Access Road site.
Asphodelaceae	*Aloe marlothii*	Least Concern	-	-	Protected	-	Well drained gravel slopes.	Recorded - North Shaft Access Road site.
Asphodelaceae	*Aloe wickensii*	Near Threatened	-	-	-	-	Flat and gentle dolomite slopes in savanna.	Possible – suitable habitat present at both the South Shaft and North Shaft Access Road sites.
Commelinaceae	*Aneilema longirrhizum*	Near Threatened	-	-	-	Endemic	Well drained gravel slopes.	Probable – suitable habitat present at both the South Shaft and North Shaft Access Road sites.
Asparagaceae	*Asparagus fourei*	Vulnerable	-	-	-	Endemic	Mixed bushveld on rocky dolomite outcrops.	Probable – suitable habitat present at the South Shaft Access Road site.
Asparagaceae	*Asparagus sekukuniensis*	Endangered	-	-	-	Endemic	Bushveld on rocky slopes.	Probable – suitable habitat present at the South Shaft Access Road site.
Brassicaceae	*Boscia albitrunca*	Least Concern	-	Protected	-	-	Range of savanna types.	Possible – suitable habitat present at the South Shaft Access Road site.

Family	Species Name	National Red List Status (2020-1)	NEMBA ToPS Status (2007)	National Forest Act (1998)	Limpopo Protected Status	Sekhukhune Endemic	Habitat Preferences	Probability of Occurrence
Combretaceae	*Combretum petrophilum*	Rare	-	-	Protected	-	Rocky outcrops in mountain bushveld.	Probable – suitable habitat present at the South Shaft Access Road site.
Acanthaceae	*Dicliptera fruticosa*	Near Threatened	-	-	-	Endemic	Shady areas of rocky magnetite and dolomite slopes. In savanna	Possible – suitable habitat present at the South Shaft Access Road site.
Celastraceae	*Elaeodendron transvaalense*	Near Threatened	-	Protected	-	-	Range of savanna types – from open woodland to thickets.	Recorded - South Shaft Access Road site
Fabaceae	*Elephantorrhiza praetermissa*	Least Concern	-	-	Protected	Endemic		Recorded – North Shaft and South Shaft Access Road site.
Iridaceae	*Gladiolus sekukuniensis*	Vulnerable	-	-	-	Endemic	Banded ironstone in calcrete laden soils and on norite.	Probable – suitable habitat present at the South Shaft Access Road site.
Malvaceae	*Hibiscus barnardii*	Least Concern	-	-	Protected	Endemic	Course-grained soils amongst boulders on hillsides	Possible – suitable habitat present at the South Shaft Access Road site.
Scrophulariaceae	*Jamesbrittenia macrantha*	Near Threatened	-	-	-	Endemic	Grass slopes on norite.	Recorded - North Shaft Access Road site.
Celastraceae	*Lydenburgia cassinoides*	Near Threatened	-	Protected	-	Endemic	Exposed norite bedrock and dolomite.	Recorded - North and South Shaft Access Road sites.

Family	Species Name	National Red List Status (2020-1)	NEMBA ToPS Status (2007)	National Forest Act (1998)	Limpopo Protected Status	Sekhukhune Endemic	Habitat Preferences	Probability of Occurrence
Scrophylariaceae	*Nemesia zimbabwensis*	Endangered	-	-	-	-	Moist ledges of rocky outcrops in forest.	Unlikely – limited suitable habitat present.
Lamiaceae	*Plectranthus porcatus*	Vulnerable	-	-	-	Endemic	Dry savanna, among boulders on norite slopes.	Possible – suitable habitat present at the South Shaft Access Road site.
Lamiaceae	*Plectranthus venteri*	Vulnerable	-	-	-	Endemic	Norite boulders, in shallow soil and rock pockets.	Possible – suitable habitat present at the South Shaft Access Road site.
Polygalaceae	*Polygala sekhukhuniensis*	Vulnerable	-	-	-	Endemic	Sparsely vegetated lower slopes and valley bottoms on highly eroded soils.	Recorded – North Shaft Access Road site.
Anacardiaceae	*Sclerocarya birrea subsp. caffra*	Least Concern	-	Protected	-	-	Range of savanna types.	Recorded- North Shaft and South Shaft Access Road sites.
Anacardiaceae	*Searsia batophylla*	Vulnerable	-	-	Protected	Endemic	Dry bushveld, along water courses	Recorded - observed in drainage features adjacent to the proposed Project sites.
Anacardiaceae	*Searsia sekhukhuniensis*	Rare	-	-		Endemic	Rocky hillsides in savanna.	Recorded – North Shaft and South Shaft Access Road sites.
-	*Sensitive Species 1033*	Endangered	-	-	-	Endemic	Savanna and closed woodland on rocky	Possible – suitable habitat present at the

Family	Species Name	National Red List Status (2020-1)	NEMBA ToPS Status (2007)	National Forest Act (1998)	Limpopo Protected Status	Sekhukhune Endemic	Habitat Preferences	Probability of Occurrence
							slopes on norite outcrops.	South Shaft Access Road site.
-	*Sensitive Species 1252*	Vulnerable	-	-	-	-	Woodland, specifically moist bushveld areas.	Unlikely – limited suitable habitat present.
-	*Sensitive species 587*	Rare	-	-	-	Endemic	Wooded grassland and thicket in shallow norite soils.	Probable – suitable habitat present at the South Shaft Access Road site.
-	*Sensitive species 587*	Vulnerable	Vulnerable	-	-	Endemic	Grassland on norite outcrops and cliffs in Leolo Mountains.	Possible – suitable habitat present at the South Shaft Access Road site.
Fabaceae	*Vachellia ormocarpoides*	Near Threatened	-	-	-	Endemic	Sandy or loamy soils between norite boulders.	Probable – suitable habitat present at both the South Shaft and North Shaft Access Road sites.
Fabaceae	*Vachellia sekhukhuniensis*	Critically Endangered	-	-	-	Endemic	Open woodlands and grassland on quartzite ridges.	Unlikely – known from only one location to north of Bugersfort.
Araceae	*Zantedeschia pentlandii*	Vulnerable	-	-	-	Endemic	Rocky hillsides in montane bushveld and grassland.	Probable – suitable habitat present at the South Shaft Access Road site.

7.9.8 Fauna assessment

7.9.8.1 Mammals

Klipspringer (tracks) and a Red Rock Rabbit (*Pronolagus* sp.) (scat) were observed along Road 2. The Klipspringer species is considered to be of conservation concern. This species is not listed as threatened, but it is protected in the Limpopo Province, according to the Limpopo Environmental Management Act (Act No. 7 of 2003). The environmental screening report for the proposed Project highlighted the Robust Golden Mole (*Amblysomus villosus*), Maquassie Musk Shrew (*Crocidura maquassiensis*) and Robert's Marsh Rat (*Dasymys robertsii*) as sensitive features.

7.9.8.2 Birds

Thirty (30) bird species were recorded at MPM by (Scientific Aqautic Services CC, 2015), with an additional fifteen (15) species added to the species list based on observations made during the brief 2022 field visit. All recorded bird species are common and widespread in savanna habitats. There are two (2) species of conservation concern - the White-backed Vulture (*Gyps africana*) is listed as Vulnerable on the regional Red List of threatened birds, while Verreaux's Eagle (*Aquila verreauxii*) is listed as Critically Endangered.

7.9.8.3 Herpetofauna

No amphibians were recorded during the SAS (2015) study and during the 2022 field visit. However, it is expected that several amphibian species are likely to be present in suitable aquatic habitats at MPM.

Two (2) reptile species were observed during the site visit, namely the Limpopo Girdled Lizard (*Cordylus jonesii*) and Rough-scaled Lizard (*Ichnotropis* sp.), while a Skink species (*Trachylepis* sp.). However, none of the amphibian or reptile species are of conservation concern.

7.9.8.4 Arthropods

Several invertebrate species were observed, including six (6) Lepidoptera (butterflies), two (2) Orthoperta (grasshoppers, crickets & locusts), three (3) Hymenoptera & Isoptera (ants, bees, termites and wasps), five (5) Coleoptera (beetles), one (1) Phasmatodea (stick insect) and one (1) Spirostrepidea (millipede). No scorpions or Mygalomorph spider burrows were observed during the field work.

7.9.9 Habitat linkages and corridors

Due to the mountainous chains and drainage channels present at MPM, the connectivity across the landscape still remains high despite the development of the mine, nearby rural communities and presence of roads and fences.

7.10 Air quality

MPM undertakes monthly dust monitoring based on the ASTM International standard method for collection and analysis of dustfall (ASTM D1739), with certain modifications (Skyside South Africa, 2022).

7.10.1 Ambient air quality monitoring

A dust fallout monitoring programme has been established at MPM. The locations of these monitoring stations are shown in Table 15 below.

The National Dust Control Regulations (Gazette No. 3674 – GNR 827, 1 Nov 2013), defines two different area classifications as residential areas and non-residential areas. The sampling period was from 21 January to 23 February 2022. The samples were exposed for 33 days. This exposure period does comply with the recommended 30 ± 3 days (Skyside South Africa, 2022).

Table 15: Site Descriptions and GPS Coordinates of the single buckets at Modikwa Platinum Mine

Site description	Latitude	Longitude	Altitude
T Junction	24°38'11.8"S	30°07'45.4"E	± 899 m
South Shaft	24°38'26.5"S	30°08'03.4"E	± 882 m
South of South Shaft	24°39'09.8"S	30°07'43.1"E	± 910 m
Concentrate Plant	24°38'27.3"S	30°07'09.2"E	± 915 m
North Shaft Vent Shaft	24°37'20.6"S	30°06'56.0"E	± 928 m
Return Water Dam	24°38'38.7"S	30°09'52.0"E	± 849 m
Small Flood Dam	24°38'48.4"S	30°09'42.7"E	± 860 m
Clinic	24°37'40.7"S	30°09'00.8"E	± 868 m
Pump Station	24°37'55.1"S	30°09'18.5"E	---
Training Centre	24°38'09.6"S	30°07'19.8"E	± 920 m
Difagate Village	24°38'23.9"S	30°06'50.9"E	± 937 m
Dilokong Hospital	24°38'00.3"S	30°10'14.5"E	± 866 m
Montrose Village	24°37'00.8"S	30°08'40.8"E	± 896 m
Area Village	24°37'27.2"S	30°10'33.3"E	± 846 m
Merensky Open Pit	24°39'57.3"S	30° 7'38.3"E	± 924 m
South 2 Shaft EMS-03 (S)	24°40'52.3"S	30° 8'06.0"E	± 874 m
South 2 Shaft EMS-04 (SE)	24°40'39.1"S	30° 6'54.9"E	± 949 m

7.10.1.1 Residential sites

During the monitoring period in review, all monitoring sites recorded dustfall rates within the residential range. Site 13 (Dilokong Hospital) recorded the highest dustfall rate at 550 mg/m^2/day, whilst Site 14 (Montrose Village) recorded the lowest dustfall rate at 35 mg/m^2/day (Skyside South Africa, 2022).

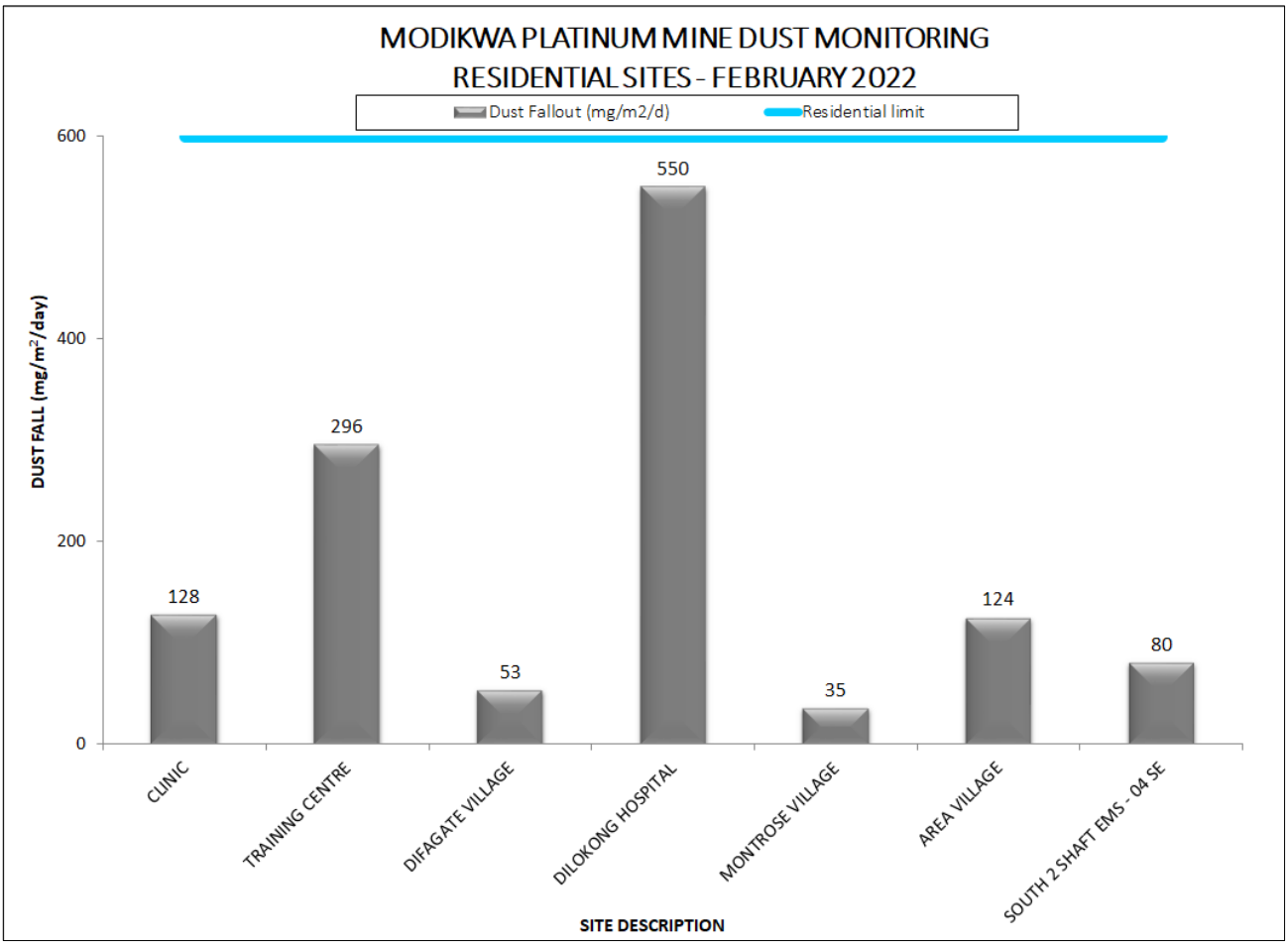

Figure 18: Dust Monitoring Results February 2022

7.10.1.2 Non-residential Sites

Site 08 (Small Flood Dam Area) recorded the highest dustfall rate at 637 mg/m^2/day, whilst Site 19 (South 2 Shaft EMS – 03 S) recorded the lowest dustfall rate at 46 mg/m^2/day (Skyside South Africa, 2022).

All other monitoring sites recorded dustfall rates are within the non-residential range.

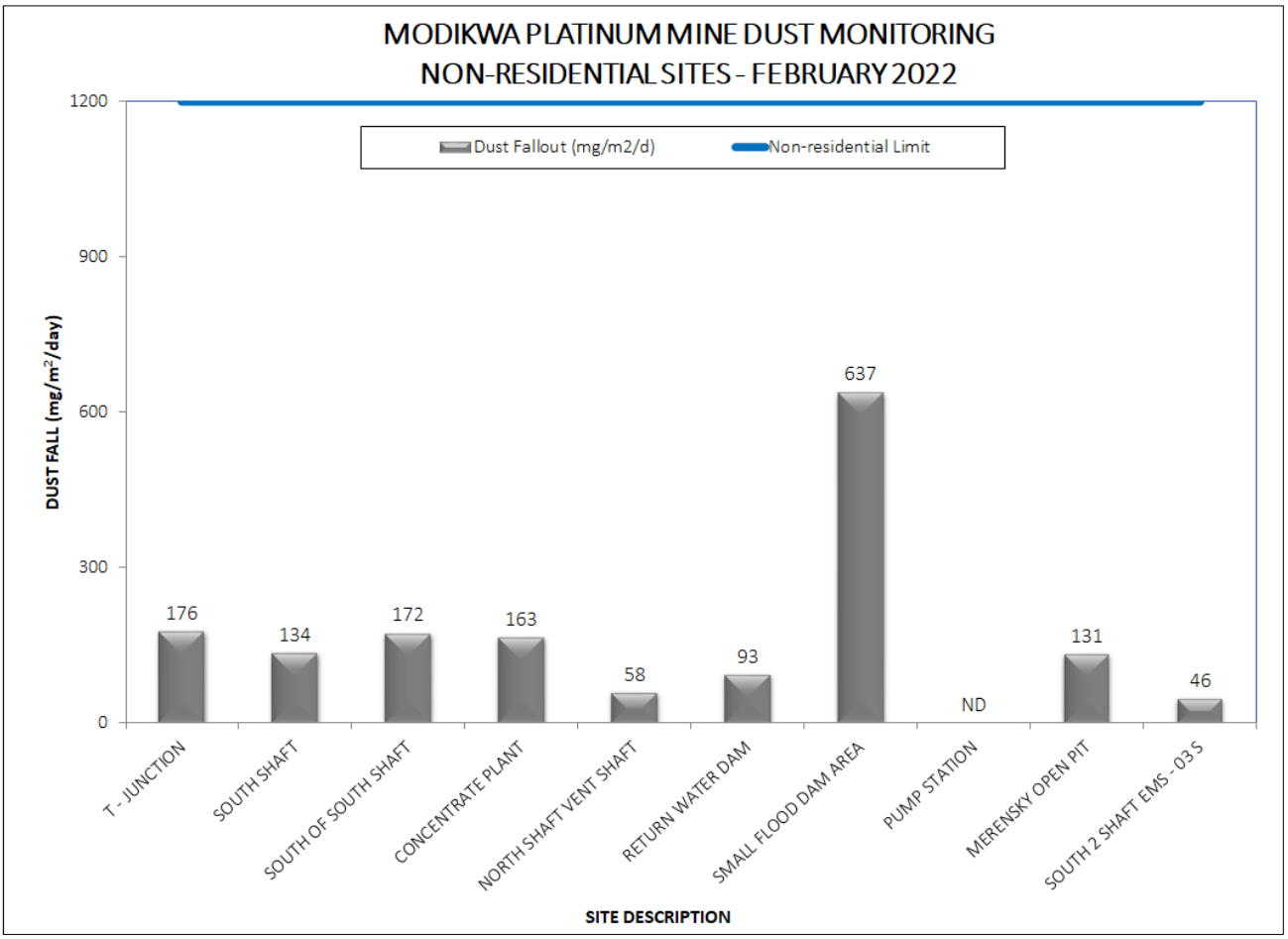

Figure 19: Dust Monitoring Results February 2022

7.11 Noise

Noise monitoring at MPM is undertaken on an annual basis and when specifically required during new projects or as a response to complaints (SRK Consulting (Pty) Ltd, 2021). No day-time noise levels and night-time noise levels were monitored for the Project.

7.12 Archaeological and cultural heritage

An archaeological and historical desktop study was undertaken by PGS Heritage (PGS) to provide the historical framework for the project area and surrounding landscape. The study was an update to the previous assessment undertaken for the study area in 2021. The assessment for the current application included a desktop review of existing information and a field survey.

According to South African Heritage Resources Agency (SAHRIS) palaeontological sensitivity map, the proposed project area falls within an insignificant to low sensitivity zone, therefore, no specialist palaeontological studies were undertaken (PGS Heritage, 2022). The details of the study are outlined below.

7.12.1 General desktop study

The desktop study indicated that platinum was discovered approximately 3km north of the study area between August and September 1924, therefore the site has a long history of the mining of platinum. Furthermore, the old pipe of the Onverwacht Platinum Mine is located approximately 5km south-east of the present study area. The immediate surroundings of this pipe would all have formed part of the historic Onverwacht Platinum Mine. The Onverwacht Chrome Mine was opened in 1931, following the closure of the Onverwacht Platinum Mine, where operated intermittently until 1979 (PGS Heritage, 2022).

7.12.2 Results of field survey

Intensive field surveys of the study area were undertaken on Thursday, 21 January 2021 and 12 May 2022. Photographs of the site are indicated below. This intensive field assessment resulted in the identification of four (4) archaeological and heritage sites.

Figure 20: View of the study site and an existing mine road

Figure 21: View of a mine adit from within the study area, that is reinforced with concrete and appears to be still in use today

The field survey resulted in the identification of one (1) heritage site and numbered MPM05 to ensure continuity with the numbering of other heritage sites previously identified in the greater Modikwa Mine area. Although other heritage and archaeological features were identified during previous studies, only those closer than 50 meters from the proposed access roads (Road 1 and Road 2) are discussed.

The results of the field survey are presented below:

- MPM 5: The site has a high cultural significance, and it is deemed to be of **Generally Protected A (GP. A) or High/Medium Significance (S24.62244; E30.09673) at the North ventilation shaft 3 access road** (Refer to Appendix H**).**
- No heritage sites were recorded within the current **Merensky ventilation south access road site** in the current field survey. However, a single historic black homestead was identified in the previous studies undertake for the site **(24°38'39.10"S; 30° 6'37.52"E).**

Refer to Appendix H for the full Heritage Impact Assessment and Desktop Paleontology Study.

7.12.3 Palaeontology

According to the PalaeoMap on the SAHRIS database, the Palaeontological Sensitivity of the proposed project footprint is of Low (Blue) to Insignificant (Grey) sensitivity (Refer to Appendix H). As a result, no additional palaeontological studies are required however a protocol for finds is required.

7.13 Socio-economic structure

7.13.1 Regional Characteristics

The MPM is situated in the Fetakgomo Tubatse Local Municipality which is one of four local municipalities under the Sekhukhune District Municipality in the Limpopo Province.

7.13.1.1 Fetakgomo Tubatse Local Municipality

The Fetakgomo Tubatse Local Municipality formed as a sequel to an amalgamation between the former Fetakgomo Local Municipality and the former Greater Tubatse Municipality, which municipalities were established and given a force of law in 2016. The Fetakgomo Tubatse Local Municipality is located north of N4 highway, from Middleburg, Belfast and Mbombela; and east of the N1 highway; from Groblersdal and Polokwane. The municipal area of jurisdiction covers approximately 4550 square kilometres or 45500 ha in size. The area is known as the Middelveld as it is located between the Highveld and Lowveld regions (Fetakgomo Tubatse Local Municipality, 2021).

The municipality has a total of 39 wards.. The municipality has a total of 77 councillors, of these, 39 are ward councillors while 38 were proportionally elected. The municipality comprises approximately 342 villages and is largely dominated by rural landscapes with only six (6) proclaimed townships. Like most rural municipalities in the Republic of South Africa, Fetakgomo Tubatse Local Municipality is characterised by weak economic base, inadequate infrastructure, major service backlogs, dispersed human settlements and high poverty levels (Fetakgomo Tubatse Local Municipality, 2021).

7.13.2 Population demographics

The population of the municipality was recorded as 490 381 people with 125 463 households in 2016 (StatsSA, 2016). The Municipality experienced growth in five years where the population of the municipality was recorded as 429 471 people with 106 050 households in 2011 (Figure 22). This indicates an increase of 14.18% in population and an increase of 18.31% in households within the period of five (5) years.

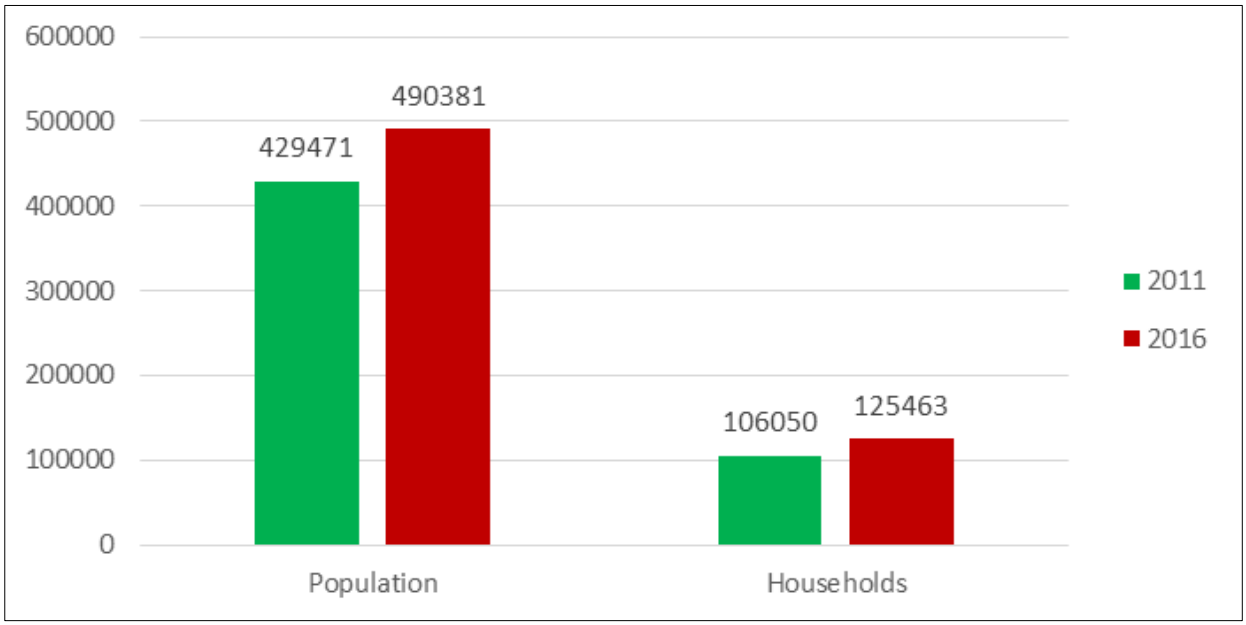

Figure 22: Population and household sizes in 2011 and 2016 (StatsSA, 2016)

7.13.3 Employment

The Fetakgomo Tubatse Local Municipality is economically the most marginal region of the Limpopo province. The area is solely dependent on government handouts and migrant labor income for survival.

The Limpopo development plan suggests programs that will improve the economic status of the Province like: integrated poverty reduction program, Building Material manufacturing Program, Co-operatives and the integration of the National Youth Agency Program into the provincial program.

7.13.4 Key economic activities

The municipality has developed a Local Economic Development (LED) Strategy in 2016 which is aligned to the Limpopo Growth and Development Strategy, Provincial Spatial Framework, National Spatial Development Perspectives. The strategy identifies the mining activities taking place in the area as the primary economic activity in the municipality and outlines key issues that have to be taped into to unlock the municipalities economic potential. The strategy also identified the agricultural sector as a key sector that has to support the mining industry in GTM with agricultural products. Tourism is one other key sector which has to be unlocked and a few sites were identified with key activities or milestone that has to be unlocked for tourism to flourish in the area.

8.0 IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS, INCLUDING THE DEGREE TO WHICH THESE IMPACTS

This section provides an overview of the impact assessment methodology and findings of the impact assessment phase which includes both positive and negative impacts identified for the various phases of the project (pre-construction, construction, operation and decommissioning and closure). Refer to Appendix L for the detailed impact assessment and management measures.

8.1 Impacts and risks identified

The detailed description of the impacts and risks identified is provided in Section 9.0 and summarised in Table 16 below.

Table 16: Potential environmental impacts investigated during the basic assessment process

Environmental Aspect	Potential Environmental Impact during the Construction Phase	Potential Environmental Impact during the Operational Phase
Terrestrial biodiversity	■ Direct loss and disturbance of natural habitat and associated flora SCC. ■ Establishment and spread of alien and invasive species. ■ Loss and fragmentation of fauna habitat.	■ Spread of alien and invasive species. ■ Loss of Ecological Connectivity habitat fragmentation. ■ Injury and mortality of faunal species of conservation concern. ■ Increased dust deposition into the environment.
Aquatic biodiversity	■ Direct loss of soils in footprint. Compaction of soils and increased surface water runoff during periods of high rainfall, leading to erosion of remnant soils in the watercourse catchment, and Interruption/ interference of hydrology (i.e., changes of surface water flows from catchment) resulting from the removal and levelling of topsoil in access road footprint; and ■ Loss and disturbance of indigenous vegetation, soil compaction resulting from the setup of temporary construction laydown area; ■ Contamination of soil and downstream resources due to hydrocarbons and oil spillages from vehicle during site preparation and the establishment and spread of Alien Invasive Species resulting from the transportation of construction material. ■ Soil compaction, surface water runoff leading to increased soil erosion resulting from the placement and compaction of fill material.	■ Contamination due to hydrocarbons and oil spillages from vehicle during operation, soil erosion, and the spread of alien invasive species within the watercourse. ■ Interruption/ interference of hydrology as a result of blockage of culverts with debris. ■ Soil compaction, surface water runoff leading to increased soil erosion in catchment of watercourse.

Environmental Aspect	Potential Environmental Impact during the Construction Phase	Potential Environmental Impact during the Operational Phase
Heritage and palaeontological resources	■ Damage to significant heritage structures (MPM 05).	■ N/a
Traffic	■ Increase in construction vehicles in the area; ■ Slow-moving construction vehicles on the surrounding roads may cause accidents.	■ The movement of vehicles in the project area will result in an increase in traffic on the roads.
Waste	■ There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g., oil, litter from personnel on-site, sewage from ablutions etc.); ■ Potential off-site pollution due to accidental spillages of petrochemicals or concrete; and ■ Waste generation could be created by the from solid waste i.e., plastics, metal, wood, concrete, stone, chemical waste- petrochemicals, resins and paints; and ■ Stockpiling material resulting in secondary pollution and contamination of the watercourses	■ N/a
Air quality	■ Degeneration of the ambient air quality due to increased nuisance dust and fine particulate levels	■ Increased levels of fugitive dust when utilising access roads.
Social	■ Generation of dust potentially resulting in a health and nuisance impact; ■ Impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly;	■ Positive impact on livelihoods; ■ Positive impact on general transportation; ■ Generation of dust potentially resulting in a health and nuisance impact; ■ Impact on safety and security as a result of theft, the occurrence of additional trucks on the roads,

Environmental Aspect	Potential Environmental Impact during the Construction Phase	Potential Environmental Impact during the Operational Phase
	■ Health and safety risk due to the movement of vehicles increasing the risk of accidents; ■ Positive impact on livelihoods; ■ Positive impact on general transportation;	uncontrolled lighting of fires on site, littering and driving irresponsibly; ■ Health and safety risk as a result of the movement of vehicles increasing the risk of accidents.
Noise	■ Noise levels along the road will increase during the construction activities due to the use of heavy machinery and vehicles ■ Bulk earthworks to achieve specified levels ■ Sourcing of construction materials	■ N/a

8.2 National Environmental Screening Tool

The Department of Environment, Forestry and Fisheries (DEFF) has developed a web based environmental screening tool that can be accessed at https://screening.environment.gov.za/screeningtool to generate a report that shows environmental features and sensitivities near the proposed project and identifies recommended specialist studies. The use of the tool during the environmental authorisation process became compulsory on 04 October 2019.

The Environmental Screening Report generated for this application process is attached as APPENDIX I .

The specialist studies identified in the screening report are listed in Table 17, together with comments on the applicability to the Project (as undertaken as part site verification process).

Table 17: Environmental Screening Tool results and EAP/specialist verification

Specialist assessment	Environmental Sensitivity	EAP/Specialist verification
Screening Tool		
Landscape / Visual Impact Assessment	Not stated	Not assessed as the proposed development is within an approved mining right area and is largely disturbed by infrastructure associated with the mining operation. In addition, the nature of the Project will not result in significant visual impacts which would modify the surrounding landscape or disturb visual receptors.
Archaeological and Cultural Heritage Impact Assessment	Very High	Included in this report under Section 7.12
Palaeontology Impact Assessment	High	Included in this report under Section 7.12
Terrestrial Biodiversity Impact Assessment	Very High	Included in this report under Section 7.8.1
Aquatic Biodiversity Impact Assessment	Low	The aquatic sensitivity was assessed. Refer to the Aquatic compliance statement in APPENDIX F of the report.
Plant Species Assessment	Medium	Assessed as part of the Terrestrial Biodiversity Impact Assessment. Refer to APPENDIX G.
Animal Species Assessment	Medium	Assessed as part of the Terrestrial Biodiversity Impact Assessment. Refer to APPENDIX G.

8.3 Impact Assessment Methodology

The significance of each identified impact was determined using the approach outlined below (terminology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998). This approach incorporates two aspects for assessing the potential significance of impacts, namely occurrence and severity, which are further sub-divided as follows:

Table 18: Impact Assessment Factors

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Scale/extent of impact	Magnitude of impact

To assess each of these factors for each impact, the following four ranking scales are used:

Table 19: Impact assessment scoring scales

Magnitude	Duration
10 - Very high / Unknown	5 – Permanent (post closure)
8 – High	4 - Long-term (impact ceases after site closure has been obtained)
6 – Moderate	3 - Medium-term (impact ceases after operational life of the activity)
4 – Low	2 - Short-term (impact ceases after the construction phase)
2 – Minor	1 – Immediate
Scale	**Probability**
5 – International	5 – Definite / Unknown
4 – National	4 - Highly Probable
3 – Regional	3 - Medium Probability
2 – Local	2 - Low Probability
1 - Site only	1 - Improbable
0 – None	0 – None

Once these factors are ranked for each impact, the significance of the two aspects, occurrence and severity, is assessed using the following formula:

Significance Points (SP) = (Magnitude + Duration + Scale) x Probability

The maximum value is 100 significance points (SP). The impact significance will then be rated as follows:

Points	Significance	Description
SP >60	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 60	Indicates moderate environmental significance	An impact or benefit which is sufficiently important to require management, and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences / effects.

For the methodology outlined above, the following definitions were used:

- *Magnitude* is a measure of the degree of change in a measurement or analysis (e.g., the severity of an impact on human health, well-being, and the environment), and is classified as none/negligible, low, moderate, high, or very high/unknown.
- *Scale/Geographic* extent refers to the area that could be affected by the impact and is classified as site, local, regional, national, or international.
- *Duration* refers to the length of time over which an environmental impact may occur i.e. immediate/transient, short-term, medium term, long-term, or permanent.
- *Probability* of occurrence is a description of the probability of the impact occurring as improbable (less than 5% chance), low probability (5% to 40% chance), medium probability (40% to 60% chance), highly probable (most likely, 60% to 90% chance) or definite (impact will definite occur).

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

The possible mitigation measures for the anticipated impacts are summarised in Section 9.0 and detailed in Section 19.5

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

Alternatives were considered and assessed for the layout / placement of infrastructure as described in Section 5.0., and the summary of the environmental impact assessment before and after mitigation is indicated in Table 20.

8.6 Motivation where no alternative sites were considered

See Section 5.0 of this report for a discussion on the alternatives considered.

8.7 Statement motivating the alternative development location within the overall site

The purpose of the Project is to provide access to the north ventilation shaft 3 and the south (Merensky) ventilation shaft for maintenance so fresh air flows to the authorised underground workings of the ventilation shafts and to regulate temperature whilst providing and maintaining a safe and healthy work environment to the employees working underground as per the requirements of the Safety Act (Act No. 29 of 1996) (MHSA). Therefore, the positioning of both access roads will be limited to the vicinity of the north and Merensky ventilation shafts. As mentioned in Section 5.0, an option analysis was undertaken for the proposed route of the access roads to limit environmental and social impacts.

The preferred route locations were determined to limit potential impacts on the receiving environment, operational and financial implications, as described in Section 5.0. The final layout plan is provided in Figure 2 and incorporates the preferred options.

8.8 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site

A list of potential impacts associated with the proposed mining development were identified during the BA process and are summarised in Section 9.0. A detailed description of the impact assessment and rating methodology is provided in Section 8.3. The following information sources were used in the assessment process:

- Observations made on site.
- Outcomes of specialist studies.
- Review of existing approved EMPRs, water use licences and environmental authorisations.
- Liaison with the MPM environmental and project teams.
- Discussions with specialists, where required, regarding assessment and ranking of impacts.

9.0 ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

The following section discusses the impacts and significant risks associated with the Project. The detailed impact assessment inclusive of mitigation measures is presented in Table 20 and Table 21 and should be read in conjunction with this section below.

9.1 Aquatic biodiversity

9.1.1 Construction phase

Development of the proposed infrastructure will lead to the following impacts on aquatic receptors and surrounding watercourses during the construction phase:

- Direct loss of soils in footprint. Compaction of soils and increased surface water runoff during periods of high rainfall, leading to erosion of remnant soils in the watercourse catchment, and Interruption/ interference of hydrology (i.e., changes of surface water flows from catchment) resulting from the removal and levelling of topsoil in access road footprint; and
- Loss and disturbance of indigenous vegetation, soil compaction resulting from the setup of temporary construction laydown area;
- Contamination of soil and downstream resources due to hydrocarbons and oil spillages from vehicles during site preparation and the establishment and spread of Alien Invasive Species resulting from the transportation of construction material.
- Soil compaction, surface water runoff leading to increased soil erosion resulting from the placement and compaction of fill material.

The overall impact on downstream watercourses during the construction phase is anticipated to be Low, except for the impact associated with the removal and levelling of topsoil in access road footprint which is anticipated to be Moderate. However, with the implementation of suitable mitigation measures (Table 20), such as limiting topsoil removal to the road footprint, the impact significance can be reduced to Low.

9.1.2 Operational phase

Presence and maintenance of the access roads near watercourse crossings will lead to the following impacts on aquatic receptors during the operational phase:

- Contamination due to hydrocarbons and oil spillages from vehicle during operation, soil erosion, and the spread of alien invasive species within the watercourse;
- Interruption/interference of hydrology as a result of blockage of culverts with debris; and
- Soil compaction, surface water runoff leading to increased soil erosion in catchment of watercourse.

The impact on watercourses is anticipated to be Low for all identified impacts during the operational phase. The implementation of mitigation measures detailed in Table 21 are recommended to ensure that potential impacts on the receiving environment are avoided/minimised.

9.2 Terrestrial biodiversity

9.2.1 Construction phase

Construction phase impacts largely arise as a result of direct impacts on the receiving environment due to clearing of land in advance of project development, and resultant loss of biodiversity. The earthworks and activities involved during the construction phase of the proposed additional infrastructure can potentially exert negative impacts on sensitive ecosystems, and flora and fauna species. Potential impacts primarily relate to vegetation clearing, direct loss/mortalities, sensory disturbance, and general anthropogenic influences associated with the construction of the proposed infrastructure and is discussed below:

9.2.1.1 Direct loss and disturbance of natural habitat and associated flora SCC

Although the Project area is highly fragmented, twenty-nine (29) flora species of conservation concern have been recorded to occur in the Modikwa area, with nine confirmed to occur in the Project area. The removal of vegetation during the construction of the access roads, will have a direct loss and disturbance of the available natural habitat as well as associated species of conservation concern (WSP|Golder , 2022).

- **North ventilation shaft 3 access road:**

Before mitigation, the magnitude of the potential impact is considered moderate, and having a permanent impact significance with a definite likelihood of occurrence. The spatial extent of the loss of flora SoCC due to construction activities is local. Prior to mitigation the loss and disturbance of natural habitat and associated SoCC within the North Shaft Access Road is assessed as having Moderate impact significance.

- **Merensky ventilation shaft access road:**

Before mitigation, the magnitude of the potential impact is considered low, considering that the site is degraded and located within the south (Merensky) ventilation shaft. The duration of this impact can be permanent, covering a local extent and resulting in an impact of Moderate significance.

With the implementation of the recommended active control and monitoring measures (Table 20) throughout the construction phase, the impact at both sites can be reduced to a low magnitude, the spatial extent will be reduced to the site only and the probability of the impact occurring as predicted would be reduced to low. Following successful mitigation, this impact is considered to be of Low significance.

9.2.1.2 Establishment and spread of alien and invasive species

Disturbances caused by vegetation clearing and earth works during construction will exacerbate the establishment and spread of alien invasive vegetation. Alien plant infestations can spread exponentially, suppressing, or replacing indigenous vegetation. This may result in a breakdown of ecosystem functioning and a loss of biodiversity (WSP|Golder , 2022).

- **North ventilation shaft 3 access road:**

Before mitigation, the magnitude of the potential impact is considered moderate and having a long-term impact duration. The spatial extent of the potential spread of alien invasive species due to construction activities is local, with a high likelihood of occurrence. Prior to mitigation, the establishment and spread of alien invasive species is rated as an impact of Moderate significance

- **Merensky ventilation shaft access road:**

Before mitigation, the magnitude of the potential impact is considered high, as the site is already highly infested by alien vegetation such as *Senna occidentalis* and *Xanthium spinosum.* The duration of this impact can be long term with a definite likelihood of occurrence. Alien invasive species can spread beyond the site footprint into local extent. Prior to mitigation the establishment and spread of alien invasive species will have a Moderate impact significance.

With the implementation of the recommended active control and monitoring measures (Table 20) throughout the construction phase, the impact at both sites can be reduced to a low magnitude, the spatial extent will be reduced to the site only and the probability of the impact occurring as predicted would be reduced to low. Following successful mitigation, this impact is considered to be of Low significance.

9.2.1.3 Injury and mortality of faunal species of conservation concern

Based on the Environmental National Web Based Screening Tool, the study area is of medium sensitivity in terms of animal species theme on account of potential presence of nine threatened fauna species. Although not identified during the field survey, there is likelihood of fauna species of conservation concern occurring on site. Therefore, the construction activities have the potential to injure/ kill faunal species of concern especially ground-dwelling and relatively slow moving herpetofauna (WSP|Golder , 2022).

- **North ventilation shaft 3 access road:**

The magnitude of the potential impact of site clearance activities and movement of construction vehicles/equipment on fauna SoCC, particularly herpetofauna, could potentially be moderate, with the impact occurring throughout the construction phase. The impact scale would be site based. Prior to mitigation the impact significance is considered Moderate.

- **Merensky ventilation shaft access road:**

The magnitude of the potential impact on fauna SoCC is expected to be low considering that the proposed access road is in close proximity to an active Modikwa operation the “Merensky Shaft”. The impact would occur throughout the construction phase, occur at a site level and is considered moderately probable, resulting in an impact of Low significance on fauna SCC, prior to mitigation.

The application of the recommended mitigation measures (Table 20) to avoid/minimise the loss of natural habitats, and limit site clearance to the project footprint reduces the potential magnitude and the probability of the impact occurring as predicted, resulting in a residual impact of Low significance for fauna SCC.

9.2.2 Operational phase

Operational phase impacts relate to the possible exacerbation of the current impacts of dust deposition on nearby habitats, ongoing risk of spread of the alien and invasive plant species that were present at baseline and may have been spread into new areas during the construction phase, loss of ecological connectivity/barrier to movement of fauna; and the risk of injury/mortality presented to fauna by vehicular traffic and infrastructure.

9.2.2.1 Spread of alien and invasive species

The potential establishment of alien invasive species in, and along the proposed access roads footprint will continue to be an impact of concern during the operational phase. Before mitigation, the impact magnitude is moderate, duration will be long-term, and the impact has a high probability of occurrence at a local extent. Prior to mitigation, the continued spread of alien invasive species throughout the operational phase is assessed to be of Moderate significance.

With the continued implementation of an active alien species control programme during the operational phase this impact can be reduced to a low magnitude, with a long-term duration. Spatial extent will be reduced to the site only, and the probability of the impact occurring will be reduced to low. The residual impact is considered to be of Low significance. The mitigation measures are outlined in Table 21.

9.2.2.2 Loss of Ecological Connectivity

Although the study area is fragmented, the landscape of the study area is characterised by mountains and drainage lines which make up a key feature for ecological connectivity. Loss of ecological connectivity is one of the likely impacts of the presence of an access road in an area. Disruption of ecological connectivity may adversely affect ground-moving herpetofauna SoCC. The presence of the two access roads may also cause some ground-moving species to change their movement patterns, which may increase their vulnerability to predation.

The magnitude of this impact on fauna SoCC is assessed as being moderate, as potential changes in their natural movement patterns as a result avoidance of the access roads is considered likely. The extent of impacts would be local, and Long-term, ceasing only after site closure. The impact prior to mitigation is therefore considered to be of Moderate significance. With the application of the recommended mitigation measures, the intensity and extent of the impact may be reduced, resulting in a residual impact of Low significance. The mitigation measures are outlined in Table 21.

9.2.2.3 Injury and mortality of faunal species of conservation concern

Increased vehicular traffic in the study area during the operation phase may pose a risk of injury and mortality of fauna species of conservation concern (and non SoCC). The magnitude of the potential impact on fauna during the operational phase is expected to be low given the existing movement of mine vehicles in the study area, particularly in the South Shaft Access Road location and the effect of the preceding construction works. The impact would occur throughout the operation phase, affect fauna at a local scale and is considered moderately probable, resulting in a Moderate impact significance prior to mitigation.

The application of the recommended mitigation measures reduces both the potential magnitude and the probability of the impact occurring as predicted, resulting in a residual impact of Low significance. The mitigation measures are outlined in Table 21.

9.2.2.4 Increased dust deposition into the environment

The operation of the two proposed access road relates to the effects of dust deposition on terrestrial ecosystems and biodiversity. The impact magnitude is assessed as moderate, considering the existing mining activities and the presence of gravel access roads in the study area that may be contributing the emission of dust in the study area. The duration of the impact can be long term in the absence of any mitigation and/or monitoring measures in place and may have an impact on a local scale resulting in a Moderate impact significance prior to mitigation measures.

With the implementation of mitigation measures such as the implementation of dust suppression methods, the impact significance can be reduced to a Low. The mitigation measures are outlined in Table 21.

9.3 Heritage and palaeontology

9.3.1 Construction and operational phases

The fieldwork resulted in the identification of one heritage site consisting of a burial ground with ten (10) identifiable graves close to the northern access road (MPM05). However, no specialist palaeontological studies formed part of the current scope of work as the SAHRIS palaeontological sensitivity map for the Project area falls within an insignificant to Low sensitivity zone (PGS Heritage, 2022).

An overlay of the identified archaeological and heritage sites over the proposed development footprint areas was made, which was used to assess the impact of the proposed development on these identified archaeological and heritage sites. Both pre-mitigation and post-mitigation impact assessments were undertaken. The overall impact on potential heritage and palaeontological resources during the construction phase is anticipated to be Moderate. However, with the implementation of suitable mitigation measures (Table 20 and Table 21), the impact significance can be reduced to Low.

9.4 Traffic

9.4.1 Construction phase

Construction related activities for the Project result in the following traffic impacts:

- Increase in construction vehicles in the area and along the community access road; and
- Slow-moving construction vehicles on the surrounding roads may cause accidents.

9.4.2 Operational phase

- The movement of vehicles in the project area will result in an increase in traffic on the roads.

The overall impact on traffic during the construction and operational phases is anticipated to be Low due to the infrequent travel of mining vehicles along the route. However, with the implementation of suitable mitigation measures (Table 20 and Table 21), the impact significance can be further reduced.

9.5 Waste

9.5.1 Construction phase

Based on the project activities, there is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g., oil, litter from personnel on-site, sewage from ablutions etc.). The following potential impacts could also result from construction activities:

- Potential off-site pollution as a result of accidental spillages of petrochemicals or concrete;
- Waste generation could be created by the solid waste i.e., plastics, metal, wood, concrete, stone; chemical waste- petrochemicals, resins and paints; and
- Stockpiling material resulting in secondary pollution and contamination of the watercourses.

The overall impact on waste during the construction phase is anticipated to be Low. However, with the implementation of suitable mitigation measures (Table 20), the impact significance can be further reduced.

9.6 Air quality

9.6.1 Construction phase

The degeneration of the ambient air quality due to increased nuisance dust and fine particulate levels is likely to occur as a result of land clearing and materials handling activities (tipping, loading and offloading) associated with the construction of the additional infrastructure. Daily dust emissions will vary according to the level of

activity, the type of operation and the meteorological conditions. The construction phase impacts may be intense but will be short-lived and largely limited to the immediate vicinity of the activity. Elevated ambient dust concentrations are generally considered to be a nuisance, however, health impacts such as allergic inflammatory reactions, nasal congestion, and respiratory problems may be triggered in vulnerable individuals.

The impact on air quality on sensitive receptors during the construction phase is anticipated to be moderate, however, with the implementation of suitable mitigation measures, such as dust suppression, impact significance can be reduced to low.

9.6.2 Operational phase

Increased levels of fugitive dust will be emitted into the atmosphere when the access roads are utilised by mining vehicles.

The overall impact on air quality during operational phases is anticipated to be Low. However, with the implementation of suitable mitigation measures (Table 20 and Table 21), the impact significance can be reduced an overall Low significance.

9.7 Socio-economic

With the proposed access roads being developed as part of the existing MPM, the socio-economic impacts will be centred around the continued economic and employment benefits to the existing MPM employees. The additional infrastructure project will not necessarily open up new job opportunities but will rather sustain current employment into the future. Nuisance impacts associated with dust and noise are likely to impact on residential sensitive receptors in the area, however, this is anticipated to be low. Impacts on general road safety and security has also been considered as a risk and likely to impact of surrounding residences and road users, however, this is anticipated to be low.

9.7.1 Construction phase

The construction phase will result in both positive and negative impacts. Positive impacts are associated with sustaining current employment into the future and increase economic revenue as the construction of the Project will contribute to reaching the LOM for MPM which is projected for November 2043.

The overall impact on socio-economic aspects during the construction phase, as a result of sustained employment and increased economic revenue, is anticipated to be Positive.

The nuisance impacts as a result of dust and noise to both the surrounding communities and MPM employees could have a negative impact, but this is anticipated to be low.

Due to additional mining vehicles accessing the proposed north access road via the existing community road, health and safety risks could potentially become a concern if there are an increased number of accidents, potential spillages from vehicles along the community road and lack of pedestrian and road user safety.

Therefore, impacts on socio-economic aspects associated with the construction phase is anticipated to have both positive Low impacts and negative Moderate impacts. However, mitigation measures are recommended (Table 20 and Table 21) to further increase the positive impacts and reduce/mitigate negative impacts associated with the Project activities.

9.7.2 Operational phase

As with the construction phase, both positive and negative impacts will occur during the operational phase. Positive impacts associated with retention of current employment into the future, skills transfer and development, community development and regional economic development will continue to benefit the employees and local residence in the local municipality.

The overall impact on socio-economic aspects during the operational phase, as a result of sustained employment and increased economic revenue, is anticipated to be positive.

The potential nuisance impacts relating to dust and noise to employees during the operational phase could have a negative impact, but this is anticipated to be low. Additional impacts to pedestrian safety and disruption of community livelihoods could also have a negative impact, but this is anticipated to be low considering the infrequent travel of mining vehicles along the community access road.

9.8 Noise

9.8.1 Construction phase

Noise levels will increase during the construction activities of the proposed roads due to the use of heavy machinery and vehicles, bulk earthworks and sourcing of construction materials. However, it is anticipated that the increase in noise will be short-lived and fall within ambient noise levels within MPM. Therefore, the overall impact on noise quality during the construction phase is anticipated to be Low. However, with the implementation of suitable mitigation measures (Table 20), the impact significance can be further reduced.

9.8.2 Operational phase

Noise levels during the operational phase are expected to slightly increase as result of additional mining vehicles on the access roads however, these will be short-lived and fall within ambient noise levels within MPM. Therefore, the overall impact on noise quality during the construction phase is anticipated to be Low. However, with the implementation of suitable mitigation measures (Table 26), the impact significance can be further reduced.

Table 20: Impact assessment associated with the construction phase

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
Terrestrial Ecology																	
North access Road:																	
Vegetation clearance	Direct loss and disturbance of natural habitat and associated flora for species of conservation concern (SoCC)	T errestrial habitat	Construction Phase	6	4	1	5	55	Moderate	4	3	1	3	24	Low	1.1	- Vegetation clearing should be restricted to the proposed Project footprints only, with no clearing permitted outside of these areas; - The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of this area; - A search and rescue survey for all flora SoCC (see Appendix C of the terrestrial biodiversity report) should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC; and - Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.
Vegetation clearance	Establishment and spread of alien and invasive species (AIS)	Terrestrial habitat	Construction Phase	6	4	2	4	48	Moderate	4	3	1	3	24	Low	1.2	- An alien invasive species control programme must be developed (or any existing AIS management programmes expanded),

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	to include the active control of alien invasive species that may establish/spread as a result of proposed Project activities. - Alien and invasive species management to be prioritised for the following alien and invasive species control areas: i. Areas where vegetation cover is disturbed; ii. Areas where soils imported from external sources are applied; iii. All rehabilitated areas; iv. Areas within the development area that are already invaded by alien species; v. Road fringes.
Vehicle and use of equipment/machinery	Injury and mortality of fauna SoCC	Terrestrial habitat	Construction Phase	6	3	1	3	30	Moderate	4	2	1	3	21	Low	1.3	- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage any necessary movement/relocations of fauna SoCC, should they be encountered. The ECO should be trained in inter alia, snake handling and species identification; - A low-speed limit (recommended 20 km/h in areas of highest risk e.g., where roads traverse woodland or riparian/wetland habitat) should be enforced on site to reduce wildlife collisions; - A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons; - The handling, poisoning or killing of on-site fauna by mine workers and contractors must be strictly prohibited; and - Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage.
South access Road:																	
Vegetation clearance	Direct loss and disturbance of natural habitat and associated flora SCC	Terrestrial habitat	Construction Phase	4	4	1	5	45	Moderate	4	3	1	3	24	Low	2.1	- Vegetation clearing should be restricted to the proposed Project footprints only, with no clearing permitted outside of these areas; - The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of this area; - A search and rescue survey for all flora SCC (see Appendix C of the terrestrial biodiversity report) should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC; and

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	- Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.
Vegetation clearance	Establishment and spread of alien and invasive species	Terrestrial habitat	Construction Phase	8	4	2	5	70	High	4	3	1	3	24	Low	2.2	- An alien invasive species control programme must be developed (or any existing AIS management programmes expanded), to include the active control of alien invasive species that may establish/ spread as a result of proposed Project activities. - Alien and invasive species management to be prioritised for the following alien and invasive species control areas: i. Areas where vegetation cover is disturbed; ii. Areas where soils imported from external sources are applied; iii. All rehabilitated areas; iv. Areas within the development area that are already invaded by alien species; v. Road fringes.
Vehicle and use of equipment/machinery	Injury and mortality of fauna SoCC	Terrestrial habitat	Construction Phase	4	3	2	3	27	Low	2	2	1	3	15	Low	2.3	- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage any necessary movement/relocations of fauna SoCC, should they be encountered. The ECO should be trained in inter alia, snake handling and species identification; - A low-speed limit (recommended 20 km/h in areas

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	of highest risk e.g., where roads traverse woodland or riparian/wetland habitat) should be enforced on site to reduce wildlife collisions; - A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons; - The handling, poisoning or killing of on-site fauna by mine workers and contractors must be strictly prohibited; and - Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage.
Heritage/ palaeontological resources																	

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
The potential to impact on local graves within the area and in particular unmarked graves associated with historic black homesteads	Some level of disturbance is expected to occur to site MPM 05 and MPM 03 during this phase	Heritage/ paleontological resources	Construction Phase	8	5	2	4	60	Moderate	4	3	3	2	20	Low	3.1	- A 50 meter no-development buffer, as per SAHRA guidelines, must be in place for the burial ground at **MPM 05**, - If this is not possible the cemetery must be relocated following a full grave relocation process that must include at a minimum the following: i. A grave relocation process must be undertaken; ii. A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation; iii. Bilingual site and newspaper notices indicating the intent of the relocation; iv. Permits from all the relevant and legally required authorities; v. An exhumation process that keeps the dignity of the remains and family intact; vi. An exhumation process that safeguards the legal rights of the families as well as that of the mining company; vii. The process must be done by a reputable company well versed in the mitigation of graves - Should the development footprints change or be altered in any way, these changes must be assessed in the field by a heritage specialist/archaeologist before construction commences; - In all cases where sites are located near existing tar roads,

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	and on the condition that the proposed construction work will in no way expand wider than the existing road surface in these areas, the mitigation measures recommended for the sites identified in this report will not be required. However, should the proposed construction expand anything wider than the existing road surface, the mitigation measures outlined in this report for these sites would be required; - Contractors and personnel involved in clearing and earthworks should be required to participate in training and awareness programs to ensure that they are aware of work stoppage and reporting procedures should archaeological sites or graves be exposed during development activities; - All employees and contractors are required to stop work and report any additional heritage or archaeological site discovered in the vicinity of the construction activity, to a heritage practitioner so that an investigation and evaluation of the findings can be made. No heritage artefacts or graves may be destroyed or moved without the necessary permits.
Aquatic Biodiversity																	

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
Clearing and disturbance of vegetation along road access footprint	Loss and disturbance of indigenous vegetation	Aquatic biodiversity	Construction Phase	4	4	1	3	27	Low	2	2	1	2	10	Low	4.1	- No maintenance of vehicles within 500m of regulated wetland boundary The construction vehicles must be inspected for possible oil leaks prior site access, during construction and when leaving site. The use of a drip tray under all stationary vehicles is mandatory within the regulated area.
Removal and levelling of topsoil in access road footprint	Direct loss of soils in footprint. Compaction of soils and increased surface water runoff during periods of high rainfall, leading to erosion of remnant soils in the watercourse catchment.	Aquatic biodiversity	Construction Phase	6	4	1	3	33	Moderate	4	2	1	2	14	Low	4.2	- Construction activities must be undertaken during the dry season (May to September) as far as possible. Control existing stands of AIS vegetation in the road construction footprint and along access routes prior to construction commencement. Limit the movement of vehicles in the construction footprint to limit the spread of alien invasive species
Removal and levelling of topsoil in access road footprint	Interruption/interference of hydrology (i.e. changes of surface water flows from catchment)	Aquatic biodiversity	Construction Phase	4	3	2	2	18	Low	2	2	1	2	10	Low	4.3	- Construction activities must be undertaken during the dry season (May to September) as far as possible. - Where possible, construction activities must be completed within one month.
Set up of temporary construction laydown area	Loss and disturbance of indigenous vegetation, soil compaction	Aquatic biodiversity	Construction Phase	4	2	1	2	14	Low	2	1	1	2	8	Low	4.4	- Construction activities must be undertaken during the dry season (May to September) as far as possible - Where possible, construction activities must be completed within one month. - Limit the use of machinery movement within watercourses

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	during road construction activities.
Transportation of construction material	Contamination of soil and downstream resources due to hydrocarbons and oil spillages from vehicle during site preparation	Aquatic biodiversity	Construction Phase	4	2	2	3	24	Low	2	1	1	2	8	Low	4.5	- Construction activities must be undertaken during the dry season (May to September)
Transportation of construction material	Establishment and spread of AIS	Aquatic biodiversity	Construction Phase	4	2	2	2	16	Low	2	1	1	2	8	Low	4.6	- Make use of light grading machinery while working in the watercourse to limit compaction and soil erosion. - Limit the use of equipment to one motor grader at a time. Grading activities must be undertaken during the dry season
Construction of crossings within the 500 m buffer of watercourses (drainage lines / non-perennial watercourses)	Interruption/interference of hydrology due to presence of culverts	Aquatic biodiversity	Construction Phase	4	2	2	2	16	Low	2	1	2	2	10	Low	4.7	- Construction activities must be undertaken during the dry season (May to September) as far as possible. - Topsoil replacement and revegetation must be limited to the affected footprint as possible. - Excavated soils will need to be replaced in the same order as removed, i.e. sub-soil must be replaced first and topsoil must be replaced last. This will maximize opportunity for swift re-vegetation of disturbed areas
Placement and compaction of fill material	Soil compaction, surface water runoff leading to increased soil erosion	Aquatic biodiversity	Construction Phase	6	4	2	3	36	Moderate	4	2	1	2	14	Low	4.8	- Similarly, topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil and must be stored in a manner that it can be reused after construction. - Any excavated soils should be

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	offloaded at designated stockpile area situated well away from the watercourse.
Replacement of topsoil and rehabilitation of disturbed areas within the watercourse	Sediment displacement	Aquatic biodiversity	Construction Phase	4	3	2	3	27	Low	2	2	1	2	10	Low	4.9	- Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.
Replacement of topsoil and rehabilitation of disturbed areas within the watercourse	Contamination due to hydrocarbons and oil spillages from vehicle during rehabilitation	Aquatic biodiversity	Construction Phase	4	2	1	3	21	Low	2	1	1	2	8	Low	4.10	- No maintenance of vehicles within 500m of regulated wetland boundary. - The vehicles must be inspected for possible oil leak prior site access, during rehabilitation and when leaving site. - The use of drip tray under all stationery vehicles is mandatory within regulated area; however, it is recommended that no vehicles are parked overnight at the construction area, and are rather moved to secure mine facilities for longer term storage.
Traffic																	
Construction of the activites for the project	- Increase in construction vehicles in the area; - Slow-moving construction vehicles on the surrounding roads may cause accidents.	Traffic	Construction Phase	4	2	1	3	21	Low	2	2	1	2	10	Low	5.1	- Speed limits will be reduced to 40 km/h to reduce dust and noise generation; - Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing other road users; - The number of construction vehicles and trips shall be kept to a minimum; - All the construction vehicles

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.
Waste																	
- Poor waste management will result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse; - Disposal of hazardous waste including hydrocarbon contaminated soils, rags etc. will result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse; - Stockpiling material resulting in secondary pollution and contamination of the watercourses.	- There is potential for the site and surrounding areas to become polluted if construction activities are not properly managed (e.g. oil / bitumen spills, litter from personnel on-site, sewage from ablutions etc.); - Potential off-site pollution as a result of accidental spillages of petrochemicals or concrete; and - Waste generation could be created by the following: - Solid waste - plastics, metal, wood, concrete, stone; - Chemical waste- petrochemicals, resins and paints; and - Stockpiling material resulting in secondary pollution and contamination of the watercourses	Waste	Construction Phase	6	3	1	3	30	Moderate	4	2	1	3	21	Low	6.1	- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported; - All solid waste should be disposed of at a registered landfill site and records maintained to confirm safe disposal; - Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site; - It must be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction; - Chemical waste must be stored in appropriate containers and disposed of at a licensed disposal facility; Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be adhered to. This applies to solvents and other chemicals possibly used during the construction process; - Portable sanitation facilities

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	must be erected for construction personnel. - Use of these facilities must be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities must also be monitored and serviced regularly so as to prevent contamination of the water resources. - The construction site must be inspected for litter on a daily basis. Extra care should be taken on windy days. - Precautions should be taken to avoid litter from entering the drainage line; - Soil that is contaminated with, e.g. cement, petrochemicals or paint, must be disposed of at a registered waste disposal site and is not to be deposited into the drainage line; and - Hazardous substance storage must not take place within 50m of a watercourse or within the 1:100 year floodline; and; - Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Municipality / DMRE etc.) and must be remediated as per the EMPr.
Air Quality																	

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
Construction and utilisation of the access road.	Impact on surrounding sensitive receptors due to increased dust and particulate matter.	Ambient air quality	Construction Phase	6	3	2	3	33	Moderate	4	2	1	3	21	Low	7.1	- Modifying or ceasing loading activities during dry and high wind conditions. - Avoid double handling of material, where possible. - Minimising the drop height of the material from truck loads/transfer points. A drop height policy should be maintained on-site and all equipment operators should be trained in the policy such that drop height reduction is implemented during materials handling activities. - Using water carts with boom sprayers or wet suppression systems. - The height of existing berms at stockpiles must be increased, reducing the impact of winds on the stockpile. - Maintaining the stockpile moisture level to avoid further entrainment of particles. - Dust suppression along the gravel road, and other disturbed areas. - Effective maintenance of diesel driven vehicles to manage the greenhouse gases.
Social																	

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
Construction activities	- Positive impact on livelihoods; - Positive impact on general transportation; - Generation of dust potentially resulting in a health and nuisance impact - Impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly; - Health and safety risk as a result of the movement of vehicles increasing the risk of accidents.	Socio-economic	Construction Phase	8	2	2	4	48	Moderate	8	2	2	5	60	Moderate	8.1	- MPM to increase the probability of retaining staff by implementing the MPM policy of upskilling employee skills where necessary and possible, and aligning with the MPM SLP; - MPM must inform companies it procures goods and services from of any procurement gaps during the development of project, so that affected companies can plan accordingly; - To increase magnitude of the impact, increase the probability of retaining staff by implementing the MPM policy of upskilling employees where necessary, and aligning with the MPM's SLP; - Reduce speed limits to 40 km/h. Speed humps may be constructed to help slow vehicles; - The number of vehicles on the roads shall be kept to a minimum.
Noise																	
Construction of the gravel road	- Noise levels along the road will increase during the construction activities due to the use of heavy machinery and vehicles - Bulk Earthworks to achieve specified levels - Sourcing of construction materials	Noise	Construction Phase	4	3	2	3	27	Low	2	2	1	2	10	Low	9.1	- During construction keep noise levels within acceptable limits in compliance with all relevant guidelines and regulations such as SANS 10103: 2008. - All equipment and vehicles must be regularly serviced to prevent excessive noise. - Vehicles and equipment generating excessive noise should be fitted with appropriate noise abatement measures.

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	- Personal Protective Equipment (“PPE”) must be worn at all times during construction of the proposed activities. PPE register to be kept

Table 21: Impact assessment associated with the operational phase

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
Air Quality																	
Operation of the north and south access roads	Increased levels of fugitive dust when utilising access roads	Ambient air quality	Operational Phase	6	3	1	3	30	Moderate	4	2	1	3	21	Low	10.1	- Dust suppression along the gravel road, and other disturbed areas. - Dust fallout monitoring plan must be developed and effectively implemented. - Effective maintenance of diesel driven vehicles to manage the greenhouse gases. - MPM must continue to monitor dust as per the MPM's dust monitoring programme.

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
Aqautic Biodiversity																	
Presence and maintenance of access road at watercourse crossings	Contamination due to hydrocarbons and oil spillages from vehicle during operation, soil erosion, and the spread of alien invasive species within the watercourse	Aquatic biodiversity	Operational Phase	4	4	2	2	20	Low	2	2	1	2	10	Low	11.1	- Culvert crossing must be maintained regularly, Mine vehicles must be inspected for possible oil leaks regularly.
Presence and maintenance of access road at watercourse crossings	Interruption/interference of hydrology as a result of blockage of culverts with debris	Aquatic biodiversity	Operational Phase	4	3	2	3	27	Low	4	1	1	2	12	Low	11.2	- Inspect culverts after periods of high rainfall and remove any accumulated debris to ensure flow is not affected.
Grading of access roads	Soil compaction, surface water runoff leading to increased soil erosion in catchment of watercourse	Aquatic biodiversity	Operational Phase	4	3	2	3	27	Low	4	1	1	2	12	Low	11.3	- Make use of light grading machinery while working in the watercourse to limit compaction and soil erosion. - Limit the use of equipment to one motor grader at a time. Grading activities must be undertaken during the dry season
Social																	
Operation of the north and south access roads	- Positive impact on livelihoods; - Positive impact on general transportation; - Generation of dust potentially resulting in a health and nuisance impact; - Impact on safety and security as a result of theft, the occurrence of additional trucks on the roads, uncontrolled lighting of fires on site, littering and driving irresponsibly; - Health and safety risk	Socio-economic	Operational phase	8	2	2	4	48	Moderate	5	2	2	3	27	Low	12.1	- MPM to increase the probability of retaining staff by implementing the MPM policy of upskilling employee skills where necessary and possible, and aligning with the MPM's Social and Labour Plan (SLP); - Reduce speed limits to 40 km/h. Speed humps may be constructed to help slow vehicles; - The number of vehicles on the roads shall be kept to a minimum.

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
	as a result of the movement of vehicles increasing the risk of accidents.																
Terrestrial biodiversity (North and South Access Roads)																	
Vehicle movement	Spread of AIS	Terrestrial habitat	Operational Phase	6	4	2	3	36	Moderate	4	2	1	3	21	Low	13.1	- Habitat restoration through active revegetation should be undertaken to restore habitat connectivity where possible; - Adopt reduced impact clearing and construction techniques and time; - Rehabilitation through planting of appropriate plant community will enhance connectivity and prevent potential invasion of pioneer invasive species; - Rehabilitation of such areas should emphasize the use of species of the characteristic flora community; and - Site clearing should be done in the winter months when it is less vulnerable.
On-site traffic	Injury and mortality of fauna SCC	Terrestrial habitat	Operational Phase	4	6	2	3	36	Moderate	2	6	1	2	18	Low	13.2	- An alien invasive species control programme must be developed (or any existing AIS management programmes expanded), to include the active control of alien invasive species that may establish/spread as a result of the Project activities; - Alien and invasive species management to be prioritised for the following alien and invasive species control areas: i. Areas where vegetation cover is

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																	disturbed. ii. Areas where soils imported from external sources are applied. iii. All rehabilitated areas. iv. Areas within the development area that are already invaded by alien species. v. Road fringes.
Presence the access road	Loss of Ecological connectivity	Terrestrial habitat	Operational Phase	6	5	2	3	39	Moderate	4	1	1	2	12	Low	13.3	- Habitat restoration through active revegetation should be undertaken to restore habitat connectivity where possible; - Adopt reduced impact clearing and construction techniques and time; - Rehabilitation through planting of appropriate plant community will enhance connectivity and prevent potential invasion of pioneer invasive species; - Rehabilitation of such areas should emphasize the use of species of the characteristic flora community; and - Site clearing should be done in the winter months when it is less vulnerable
Vehicle movement	Increased dust deposition	Terrestrial habitat	Operational Phase	6	4	2	4	48	Moderate	2	3	1	3	18	Low	13.4	- Excavation activities should be done during calm weather conditions. This will reduce the extent of spread of the particulate matter in the project footprint; - Dust suppression methods such as use of the water bowser should be implemented in and around the construction site regularly, particularly during the dry season; - Speed limits of < 20 km/hour should be communicated via appropriate signage and enforced

ACTIVITY ***whether listed or not listed.*** *(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).*	**POTENTIAL IMPACT** *(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)*	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** *(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)*	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance without Mitigation**	**Magnitude**	**Duration**	**Scale**	**Probability**	**Significance**	**Significance with Mitigation**	**EMPr Ref no.**	**Detailed Mitigation Measures**
																	on all access roads to proposed new infrastructure locations; - Avoid dust generating works during the most windy conditions; and - Frequent wetting of the access roads.
Traffic																	
Operation of the north and south access roads	- The movement of vehicles in the project area will result in an increase in traffic on the roads.	Traffic	Operational Phase	8	4	2	2	28	Low	6	4	1	2	22	Low	14.1	- Speed limits will be reduced to 40 km/h to reduce dust and noise generation; - The number of hauling trips shall be kept to a minimum; - All the hauling vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.

Table 22: Summary of significant environmental impacts (negative), after mitigation

Environmental Aspect	Significance Post Mitigation (Construction)	Significance Post Mitigation (Operational)
Aquatic biodiversity	Low (Negative)	Low (Negative)
Terrestrial biodiversity	Low (Negative)	Low (Negative)
Heritage and palaeontological resources	Low (Negative)	N/a
Traffic	Low (Negative)	Low (Negative)
Waste	Low (Negative)	N/a
Air quality	Low (Negative)	Low (Negative)
Socio-economic	Moderate (Positive)	Moderate (Positive)
Noise	Low (Negative)	N/a

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10.0 SUMMARY OF THE SPECIALIST REPORTS

For each identified specialist study undertaken in the sections above, recommendations have been provided in Table 23.

Table 23: Summary of specialist reports

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
Aquatic Biodiversity	Due to the low sensitivity of the study area and the degraded surrounding landscape, the proposed development of two access tracks is not expected to have significant impacts on aquatic biodiversity. The following impact mitigation and management measures are recommended to avoid/minimise potential impacts on the watercourse arising from the proposed North and South shaft access road: ■ During construction, vegetation cleared should be limited to the direct project footprint, i.e., proposed road footprint. Where possible, available roads should be used to access the site and no vehicles should be permitted to indiscriminately drive over watercourses. ■ Similarly, topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil and must be stored in a manner that it can be reused after construction. Any excavated soils should be offloaded at designated stockpile area situated well away from the watercourse. ■ Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete. ■ Existing roads/tracks should be utilized for access to the construction area where possible, and clearly defined access routes should be set out for contractors. ■ Construction activities should ideally be undertaken during the dry season (May to September), and completed as soon as possible – e.g., within 4-6 weeks. ■ Limit the use of machinery within watercourses during road construction activities.	EMPr Section 19.5

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	■ Make use of existing mine facilities for the purpose of laydown areas and ablutions. If necessary, locate ablutions and laydown areas outside the regulated 500 m buffer of a watercourse ■ No maintenance of vehicles shall be undertaken within 500 m of the watercourse. The construction vehicles must be inspected for possible oil leaks prior to site access. The use of a drip tray under all stationary vehicles is mandatory within the regulated area. ■ The existing culvert crossing located on the community access road must be inspected regularly throughout the operational period. Inspections should be conducted during/immediately after periods of high rainfall to ensure that structural integrity is maintained, and any blockages cleared out timeously. ■ The implementation of the recommended mitigation measures should be monitored on an at least annual basis, to audit their efficacy in addressing potential impacts, so that adaptive management actions can be timeously undertaken as necessary, to ensure that potential impacts on the receiving environment are avoided/minimised.	
Terrestrial Biodiversity	■ Loss and disturbance of natural habitat (Construction and operational phase): ▪ Vegetation clearing should be restricted to the proposed Project footprints only, with no clearing permitted outside of these areas; ▪ The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of this area; ▪ A search and rescue survey for all flora SCC (see Appendix C of the terrestrial biodiversity study – APPENDIX G of this report) should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC.	EMPr Section 19.5

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	▪ Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete; ▪ Avoid dust generating works during the most windy conditions; and ▪ Frequent wetting of the access roads. ■ Alien invasive species control (Construction and operational phase): ▪ An alien invasive species control programme must be developed, or any existing AIS management programmes expanded, to include the active control of alien invasive species that may establish/spread as a result of proposed Project activities ▪ Alien and invasive species management to be prioritised for the following alien and invasive species control areas: – Areas where vegetation cover is disturbed. – Areas where soils imported from external sources are applied. – All rehabilitated areas. – Areas within the development area that are already invaded by alien species. – Road fringes. ■ Injury and mortality of fauna species of concern (Construction and operational phase): ▪ An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage the movement of the fauna SoCC. The ECO should be trained in inter alia, snake handling and species identification. ▪ A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons.	

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	▪ The handling, poisoning or killing of on-site fauna by mine workers and contractors must be strictly prohibited; and ▪ Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage. ■ Loss of ecological connectivity: (Construction and operational phase): ▪ Habitat restoration through active revegetation should be undertaken to restore habitat connectivity where possible; ▪ Adopt reduced impact clearing and construction techniques and time ▪ Maintain, as far as possible, natural habitat corridors and connectivity; ▪ Rehabilitation through planting of appropriate plant community will enhance connectivity and prevent potential invasion of pioneer invasive species; ▪ Rehabilitation of such areas should emphasize the use of species of the characteristic flora community; and ▪ Site clearing should be done in the winter months when it is less vulnerable. ■ Dust deposition (Construction and operational phase): ▪ Excavation activities should be done during calm weather conditions. This will reduce the extent of spread of the particulate matter in the project footprint; ▪ Dust suppression methods such as use of the water bowser should be implemented in and around the construction site regularly, particularly during the dry season. ▪ Speed limits of < 20 km/hour should be communicated via appropriate signage and enforced on all access roads. ■ Monitoring requirements are proposed (operational phase): ▪ The presence of alien and invasive flora species should be documented prior to the commencement of the development of the infrastructure and rehabilitation activities, and	

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	the baseline case used as a benchmark against which the spread of these species can be monitored. Annual monitoring inspections should identify target areas for clearing and subsequent rehabilitation/re-vegetation programmes. ▪ A record of fauna mortalities/injury as a result of fauna crossing the proposed access roads should be kept on site and regularly reviewed to inform the need for implementation of any additional mitigation measures.	
Cultural Heritage (PGS Heritage, 2022)	▪ Heritage sites **MPM 01**, **MPM 02** and **MPM 04** have a low heritage significance and therefore do not require mitigation. ▪ Heritage sites **MPM 03** and **MPM 05**: ▪ Impacts associated with **MPM03** comprises stonewalling from a historic black homestead. The highest impact risk associated with this site is that of graves, including unmarked baby and infant graves, that may be buried here. While **MPM 05** is a burial ground consisting of at least ten (10) identifiable graves. ▪ The **MPM 03** and **MPM 05** sites are expected to be disturbed during the Construction Phase only. During preceding and subsequent phases, such as the Pre-Construction, Operational and Decommissioning Phases, no significant impacts are expected on sites **MPM 03** and **MPM 05** if the suggested mitigation measures are adhered to. ▪ Mitigation measures recommended for **MPM 05**: ▪ A 50 meter no-development buffer, as per SAHRA guidelines, must be in place for the burial ground at **MPM 05**. ▪ If this is not possible the cemetery must be relocated following a full grave relocation process that must include at a minimum the following:	EMPr Section 19.5

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	– A grave relocation process must be undertaken. – A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation. – Bilingual site and newspaper notices indicating the intent of the relocation. – Permits from all the relevant and legally required authorities. – An exhumation process that keeps the dignity of the remains and family intact. – An exhumation process that safeguards the legal rights of the families as well as that of the mining company. – The process must be done by a reputable company well versed in the mitigation of graves. ■ General Management Guidelines: 1) In the event that an additional heritage assessment is required, it is advisable to utilise a qualified heritage practitioner, preferably registered with the Cultural Resources Management Section (CRM) of the Association of Southern African Professional Archaeologists (ASAPA). This survey and evaluation must include: a) The identification and mapping of all heritage resources in the area affected; b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6 (2) or prescribed under section 7 of the National Heritage Resources Act; c) An assessment of the impact of the development on such heritage resources; d) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;	

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources; f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and g) Plans for mitigation of any adverse effects during and after the completion of the proposed development. 2) In the event that a possible find is discovered during construction, the following steps must be taken: a) All activities must be halted in the area of the discovery and a qualified archaeologist contacted; b) The archaeologist needs to evaluate the finds on site and make recommendations towards possible mitigation measures; c) If mitigation is necessary, an application for a rescue permit must be lodged with SAHRA; and d) After mitigation, an application must be lodged with SAHRA for a destruction permit. This application must be supported by the mitigation report generated during the rescue excavation. Only after the permit is issued may such a site be destroyed. 3) In the case where a grave is identified during construction, the following measures must be taken: a) Upon the accidental discovery of graves, a buffer of at least 20 meters should be implemented; b) If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find;	

List of Studies Undertaken	Recommendations of Specialist Reports	Reference to applicable section of report where specialist recommendations have been included.
	c) To remove the remains, a permit must be applied for from SAHRA and other relevant authorities. The local South African Police Services must immediately be notified of the find; and d) Where it is recommended that the graves be relocated, a full grave relocation process that includes a comprehensive social consultation must be followed. Such a grave relocation process must include the following: i) A detailed social consultation process that aims to trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length; ii) Site notices indicating the intent of the relocation; iii) Newspaper notices indicating the intent of the relocation; iv) Permits from the relevant permitting authorities, including the local authority; the Provincial Department of Health; the South African Heritage Resources Agency (SAHRA) (if the graves are older than 60 years or unidentified and thus presumed older than 60 years) etc. v) An exhumation process that keeps the dignity of the remains intact; vi) The whole process must be done by a reputable company that is well versed in relocations; and vii) The exhumation process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the mining company.	

11.0 ENVIRONMENTAL IMPACT STATEMENT

This BA and EMPr provides an analysis of the identified potential impacts related to the activities for the Project. The assessment of the impacts (pre-and post-mitigation scenarios) was undertaken in accordance with the applicable environmental legislation and suitable mitigation measures have been recommended to reduce these potential impacts for both the construction and operational phases (Table 20 and Table 21). The methodology utilised to undertake the impact assessment has incorporated, amongst other skills, experience, relevant literature and local knowledge of the site and surrounding area as outlined in the specialist studies.

The following key potential impacts were identified and assessed.

11.1 Aquatic Biodiversity

The Project study area is located in an area classified as having a low aquatic biodiversity sensitivity according to the National Web-based Environmental Screening. In addition, the NWM5 did not identify any wetlands within a 500 m buffer of the proposed development sites. Three ephemeral drainage lines associated with non-perennial streams - two in the north shaft access road site and one in the south access road sites - were identified on site. The proposed project is expected to have low impact significance for the majority of the impacts identified, with the exception of surface runoff and soil erosion impacts due to the fact that the proposed study area is highly eroded. These impacts can however be reduced to a low impact significance if the recommended mitigation measures are strictly implemented during both the construction and operation phase of the access roads (WSP|Golder, 2022).

11.2 Terrestrial Biodiversity

The results of the terrestrial biodiversity study indicate that neither of the identified vegetation types (Sekhukhune Plains Bushveld and Sekhukhune Mountain Bushveld) is listed as threatened on the NEMBA Threatened Ecosystems. However, the Sekhukhune Plains Bushveld is considered Vulnerable at a provincial level (WSP|Golder , 2022).

According to the Limpopo Conservation Plan (2013), Road 1 is located in an area designated as an Ecological Support Area 1 (ESA1), while Road 2 is located on land designated as a Critical Biodiversity Area 2 (CBA2). Based on this, the Terrestrial Biodiversity Theme for the project, as per the National Web-based Environmental Screening Tool is rated with a very high sensitivity – a rating that is supported by the findings of this study, which indicated that the traversed vegetation communities are of some importance in terms of support of flora SCC, although the site is highly modified by gully and sheet erosion.

Road 2 is set against a hillside, adjacent to the South (Merensky) ventilation shaft complex. Vegetation at this site is mostly undisturbed and also comprises mostly indigenous species, with several flora species of conservation concern present.

Although only a small number of fauna taxa have previously been recorded at MPM, considering the extent of undisturbed mountainous savanna habitat in close proximity to the Project sites, it is anticipated that fauna species richness is appreciably higher than that described in this report, and it is possible that a number of species of conservation concern may be present in the landscape.

The Project development footprints coincide with some areas of natural/indigenous vegetation that are considered to be of high sensitivity due to their support of species and habitats of conservation concern, and designation as CBAs. It is therefore important that measures are strictly implemented to avoid and minimise negative impacts on natural vegetation and flora species of conservation that may result as a consequence of the proposed Project activities.

Provided that the mitigation measures set out in Table 20 and Table 21 of this document are endorsed by the relevant authorities, and strictly implemented within the required timeframes, the Project may be authorised

from a Terrestrial Biodiversity perspective (WSP|Golder , 2022). The recommended mitigation and monitoring measures should be included as conditions to any authorisation and incorporated into the Project's authorised EMPr (WSP|Golder , 2022).Heritage and Palaeontology

Two (2) heritage structures were found in close proximity to the north access road (MPM03 and MPM05) while no heritage structures were identified near the south access road. MPM03 comprises of stonewalling from a historic black homestead while MPM 05 is a burial ground consisting of at least ten (10) identifiable graves.

While the unmitigated impact of the proposed development is expected to result in a moderate negative impact in terms of the identified archaeological and heritage sites located, these impacts can be suitably mitigated to acceptable levels by way of a range of mitigation measures outlined in this report. As a result, on the condition that the recommendations made in this report are adhered to, no heritage reasons can be given for the development not to continue (PGS Heritage, 2022).

11.3 Air quality, Noise and Waste

Noise, dust, waste, health and safety impacts are deemed to be of low significance provided that mitigation measures included in the EMPr are adhered to.

11.4 Socio-economic

The Project will have an overall moderate significant impact (positive) on the livelihoods of the local community through the continuation of employment during the construction phase. Through the implementation of the Service Labour Plan (SLP), the Project is anticipated to have an increased moderate significant impact.

12.0 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

12.1.1 General Conditions

MPM must:

- Implement all aspects of the EMPr in Section 19.4 of this document.
- Comply with all relevant legislation at all times.
- Undertake annual internal auditing of environmental performance and annual reporting to the DMRE.
- The proponent must appoint a suitably experienced Environmental Control Officer (ECO) for the construction phase of the development that will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr.
- Undertake monthly external auditing of environmental performance for the construction phase and provide the DMRE with a copy of the audit report.

12.1.2 Site specific conditions

The following conditions must be complied with as per the EA:

- During construction, vegetation cleared should be limited to the direct project footprint, i.e., proposed road footprint. Where possible, available roads should be used to access the site and no vehicles should be permitted to indiscriminately drive over watercourses.
- Topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil and must be stored in a manner that it can be reused after construction.
- Any excavated soils should be offloaded at designated stockpile area situated well away from the watercourse.

- Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.
- Construction activities should ideally be undertaken during the dry season (May to September), and completed as soon as possible – e.g., within 4-6 weeks.
- Limit the use of machinery within watercourses during road construction activities.
- Make use of existing mine facilities for the purpose of laydown areas and ablutions. If necessary, locate ablutions and laydown areas outside the regulated 500 m buffer of a watercourse
- No maintenance of vehicles shall be undertaken within 500 m of the watercourse. The construction vehicles must be inspected for possible oil leaks prior to site access. The use of a drip tray under all stationary vehicles is mandatory within the regulated area.
- Annual monitoring inspections should identify target areas for clearing and subsequent rehabilitation/re-vegetation programmes.
- A search and rescue survey for all flora SCC (see Appendix C of the terrestrial biodiversity study – APPENDIX G of this report) should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC.
- An alien invasive species control programme must be developed, or any existing AIS management programmes expanded, to include the active control of alien invasive species that may establish/spread as a result of proposed Project activities.
- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage the movement of the fauna SoCC. The ECO should be trained in inter alia, snake handling and species identification.
- A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons.A record of fauna mortalities/injury as a result of fauna crossing the proposed access roads should be kept on site and regularly reviewed to inform the need for implementation of any additional mitigation measures.
- A traffic management plan should be developed for the Project which details the requirement for traffic officers to manage traffic on the community road during the construction period; as well as quantify baseline traffic counts and livestock movements.
- MPM should provide two weeks notification to community road users and present to the community how traffic will be appropriately handled during the construction period.
- All drivers operating mining vehicles along the community access road should be adequately trained about pedestrian safety and travelling within the recommended speed limit.
- A closure and rehabilitation plan will be compiled and submitted for approval prior to closure of the MPM. Final rehabilitation and closure of the proposed access road forms part of such plan.

13.0 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

13.1 Terrestrial biodiversity

- Field work was conducted over a two-day period in March 2022 and focused specifically on the proposed access road development footprints. This period coincides with the end of the summer rainy season. It is thus possible that certain herbaceous taxa that are most readily visible or distinguishable when in leaf or flower during the early and mid- wet season, may have been overlooked during field visit;
- The absence or non-recording of a specific fauna species, at a particular time, does not necessarily indicate that 1) the species does not occur there; 2) the species does not utilise resources in that area; or 3) the area does not play an ecological support role in the ecology of that species.
- Given the limitations in fully sampling and characterising the abundance and distribution of flora and fauna species in the study area during the short period of time allocated to field work, the baseline descriptions were qualitative; and
- The delineation of habitat units was conducted using available Google Earth imagery and GPS-mapped observations made during the field visit, and as such is limited by, inter alia, the spatial and resolution accuracy of the imagery and hand-held GPS.

13.2 Heritage and palaeontology

- Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that the heritage resources located during the fieldwork do not necessarily represent all the possible heritage resources present within the area. Various factors account for this, including the subterranean nature of some archaeological sites, as well as the density of vegetation cover found in some areas. As such, should any heritage features and/or objects not included in the present study be located or observed, a heritage specialist must immediately be contacted. Such observed or located heritage features and/or objects may not be disturbed or removed in any way, until such time that the heritage specialist has been able to assess as to the significance of the site (or material) in question. This applies to graves and cemeteries as well. If any graves or burial places are identified or exposed during the development, the procedures and requirements pertaining to graves and burials will apply as set (Appendix A of the Heritage Impact Assessment report).
- The study area boundaries depicted in this report were provided by the client. As a result, these were the areas assessed during the fieldwork. Should any additional development footprints located outside of these study area boundaries be required, such additional areas will have to be assessed in the field by an experienced archaeologist/heritage specialist before construction can commence.

13.3 Aquatic

- The Aquatic Biodiversity Species Compliance statement was prepared on the basis of the site sensitivity verification process that was undertaken in response to the low aquatic sensitivity classification of the study area by the national web-based screening report. The site sensitivity verification was completed via desktop analysis of available national datasets, supplemented by the findings of the field assessment.
- The survey was conducted during March 2022 during which observations of the relevant ecosystems during a ‘high flow’ period, and existing pressures/driver of change, were made. These survey periods coincide with the wet season and as such maximise the opportunity for accurate description of the ephemeral aquatic ecosystem in this otherwise dry and arid region.

- It is therefore considered that there are no sampling or information limitations pertaining to this Aquatic Biodiversity Species Compliance Statement and the recommendations contained in this report (WSP|Golder, 2022).
- The aquatic biodiversity baseline description is qualitative and based on the available desktop information and findings of the March 2022 site visit. The recommended mitigation/management measures focus on the mitigation of potential impacts on aquatic ecosystem/species receptors that occur within 500 m of the proposed project infrastructure i.e., the ephemeral drainage lines within the within the study area.

14.0 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORIZED

Provided that all the environmental management measures, described in the EMPr are applied diligently, it is expected that the proposed roads will not result in any significant environmental impacts that cannot be mitigated to acceptable levels.

An impact assessment was undertaken, supported by relevant specialist studies to determine the impact of the proposed roads on the environment. These studies have not identified any fatal flows associated with the proposed project. Neither have any critical factors been identified which would warrant the proposed activities not to proceed.

Not granting this authorisation will impact on Modikwa Platinum Mine's ability to ramp up the production at the mine and thereby improve the efficiency of the mine.

Accordingly, it is the opinion of the environmental assessment practitioner that the application for environmental authorisation, for the construction of the additional infrastructure and associated activities as described in this BA and EMPr report, should be granted, on the premise that:

- The project details in Section 3.2.2 remain unchanged.
- The commitments in this BA and EMPr report are implemented, adhered to and audited.

15.0 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

MPM's Mining Right is valid until 2043. Therefore, the period for which EA is required is at least twenty-three (23) years (from the date of approval provided by the DMRE) to allow for rehabilitation activities to be undertaken.

16.0 UNDERTAKING

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the BA Report and the EMPr Report.

17.0 FINANCIAL PROVISION

The total estimated scheduled closure costs for MPM's proposed access roads, as of June 2022, amount to R84,205.22 (including P&Gs and contingencies and excluding VAT). These costs assume third-party contractor rates will be applied to decommissioning and rehabilitation of the road.

17.1 Explanation of how the financial provision amount was derived

17.2 Closure cost determination

The unit rates for general rehabilitation and closure measures/activities were obtained from Golder's existing closure costing database, which is regularly updated in consultation with demolition and earthworks contractors,

as well as with rehabilitation practitioners. Golder undertakes a thorough review of its unit rate database, as follows:

- Minor unit rates are adjusted with standard inflation at least once a year;
- Key rates for the dismantling of infrastructure are benchmarked at least annually by a specialised demolition contractor, to ensure that they remain market-related and take account of the latest dismantling and demolition techniques. It is noted that as these technologies improve, these rates in real terms are trending downwards;
- Earthworks rates are benchmarked against recent tenders available to Golder as well as benchmarking in discussion with contractors; and
- Aggregated rates dependent on base infrastructure or earthworks-related rates are recalculated given the latest base rates.

17.2.1 General costing assumptions

- The proposed access roads will be removed and rehabilitated at mine closure;
- General surface rehabilitation will involve the shaping and ripping of the surface topography, to allow for a free-draining uncompacted surface, followed by vegetation establishment;
- Rehabilitation monitoring and care and maintenance has been allowed for a period of ten years over the rehabilitated footprint area;
- Fixed ratios for preliminary and general costs (25%) and contingencies (10%) have been applied; and
- No financial discounting of longer terms activities, for example care and maintenance, have been applied.

17.2.2 Rehabilitation plan

- Site preparation;
- Demolition of infrastructure and clean-up of contamination (if required);
- Shaping and levelling to facilitate drainage; and
- Seeding and care and maintenance.

17.3 Confirmation that the amount can be provided for from operating expenditure

MPM confirmed that the financial provision, detailed in Section 17.0, will be provided by the MPM as part of its overall mine provision for the rehabilitation of mining disturbed areas.

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18.0 COMPLIANCE WITH THE PROVISIONS OF SECTION 24(4) (A) AND (B) READ WITH SECTION 24(3)(A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The impact on socio-economic conditions of any directly affected person has been addressed in Table 20 and Table 21. Impacts on any national estate referred to in Section 3(3) of the National Heritage Resources Act has been addressed in Section 9.3. and Section 0.

The land commissioner has been contacted to verify the status of land claims for the properties involved. It was confirmed that no land claims have been lodged in respect of the properties associated with the Modikwa Platinum Mine.

PART B: DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

19.0 ENVIRONMENTAL MANAGEMENT PROGRAMME

19.1 Details of the Environmental Assessment Practitioner

The required details have been supplied in PART A, section 2.1 of this report.

19.2 Description of the aspects of the activity

See section 3.2 of this document.

19.3 Composite map

The locality map for the project can be seen in Figure 1. The proposed additional infrastructure in relation to environmental sensitivities identified in the impact assessment is provided in Figure 16.

19.4 Description of Impact management objectives including management statements

By committing to the implementation of the management measures described in the EMPr and the conditions stipulated in the EA, Modikwa Platinum Mine intends to ensure that the local environmental quality are not adversely affected by the construction and operation of the proposed infrastructure project and that the positive impacts will be enhanced as far as practicable.

19.4.1 Determination of closure objectives

The closure objectives have been developed to be rehabilitated to a standard which will achieve a post closure land capability of wilderness. These measures have been developed to allow MPM to return the land capability of the impacted footprints to a state similar to that which existed prior to mining commencing. The closure objective that are developed for the project include:

- Adhere to all statutory and other legal requirements;
- 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;
- Minimise residual risks by ensuring that remaining structures are physically and chemically stable
- Ensure all rehabilitated land is safe and useable, for its intended post closure use;
- Rehabilitation is of high quality and sustainable into the predictable future;
- Proposed post-closure land uses are sustainable;
- Undertake stakeholder engagement and take their views into account in closure planning; and
- Authorities are satisfied with the extent of rehabilitation and closure criteria.

19.4.2 Volumes and rate of water use required for the operation

It is currently not envisaged that any additional water will be required in terms of the operational phase of the proposed project. Process water from existing sources at MPM may also be used for dust suppression.

19.4.3 Has a water use licence been applied for?

A water use authorisation is required in terms of section 39 of the NWA, published in Government Gazette 40229, Notice 509 of 2016 on 26 August 2016. The planned access roads will be located within this regulated

area of a watercourse. An aquatic compliance statement (inclusive of a risk assessment) has been undertaken to determine the potential impact of the proposed construction and operation of the access road, taking into consideration the regulatory restrictions, namely the General Authorisation (GA) of Section 21(c) and Section 21(i). Impacts to be mitigated in their respective phases. Refer to APPENDIX F for a copy of the aquatic compliance statement and risk assessment.

19.5 Impacts to be mitigated in their respective phases with management outcomes and actions

The potential impacts to be mitigated were described in detail in Section 8.0 and the mitigation measures associated are presented below in Table 24.

19.5.1 Construction Phase

The predicted impacts, recommended mitigation measures and expected outcomes are dealt with in Section 9.0 and Table 24.

19.5.2 Operational Phase

The predicted impacts, recommended mitigation measures and expected outcomes associated with this phase are dealt with in Section 9.0 and Table 25.

Table 24: Impacts to be mitigated during the construction phase with management outcomes and actions

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
Terrestrial Biodiversity						
1.1	- Clearing of vegetation must be limited to direct road footprint. Make use of existing roads to access the site - As far as possible, no vehicles are permitted to drive through the non-perennial river (watercourse).	Control through management	Construction phase	Guidelines as outlined in Section 4.0	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
1.2	- Topsoil removal must be limited to the road footprint. Topsoil must be stored separately from subsoil, and must be stored in a manner that it can be reused after construction. - Any excavated soils should be offloaded at designated stockpile area outside 500m of watercourse. - Revegetate exposed soils along the road servitude after construction. - Existing roads/tracks should be utilized for access to the construction area where possible, and clearly defined access routes should be set out for contractors.					
1.3	- Construction activities must be undertaken during the dry season (May to September) as far as possible. - Where possible, construction activities must be completed within one month. - Limit the use of machinery movement within watercourses during road construction activities.					
1.4	- Make use of existing mine facilities for the purpose of laydown areas and ablutions where possible. - Where necessary, locate ablutions and laydown areas outside the regulated 500m of a watercourse					
Terrestrial Ecology specifically for the North Access Road						

EMPr Ref no.	**Detailed Mitigation Measures**	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
2.1	- Vegetation clearing should be restricted to the proposed Project footprints only, with no clearing permitted outside of these areas; - The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of this area; - A search and rescue survey for all flora SCC (see Appendix C of the terrestrial biodiversity report) should then be conducted within these marked footprints prior to the commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC; and - Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.	Control through management and monitoring	When required	National Environmental Management: Biodiversity Act; Removal of trees in accordance with the requirements of DAFF	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
2.2	- An alien invasive species control programme must be developed (or any existing AIS management programmes expanded), to include the active control of alien invasive species that may establish/spread as a result of proposed Project activities. - Alien and invasive species management to be prioritised for the following alien and invasive species control areas: i. Areas where vegetation cover is disturbed; ii. Areas where soils imported from external sources are applied; iii. All rehabilitated areas; iv. Areas within the development area that are already invaded by alien species; v. Road fringes.					
2.3	- Vegetation clearing should be restricted to the proposed infrastructure footprints only, with no clearing permitted outside of this area; - Maintain, as far as possible, natural habitat corridors and connectivity; and - Movement across the Project area should be facilitated by providing suitably sized gaps					

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
	in fencing and/or culverts/passageways under conveyors and roads for fauna.					
2.4	- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage any necessary movement/relocations of fauna SoCC, should they be encountered. The ECO should be trained in inter alia, snake handling and species identification; - A low-speed limit (recommended 20 km/h in areas of highest risk e.g. where roads traverse woodland or riparian/wetland habitat) should be enforced on site to reduce wildlife collisions; - A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons; - The handling, poisoning or killing of on-site fauna by mine workers and contractors must be strictly prohibited; and - Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage.					
Terrestrial Ecology specifically for the South Access Road						
3.1	- Vegetation clearing should be restricted to the proposed Project footprints only, with no clearing permitted outside of these areas; - The footprints to be cleared should be clearly demarcated prior to construction to prevent unnecessary clearing outside of this area; - A search and rescue survey for all flora SCC (see Appendix C of the terrestrial biodiversity report) should then be conducted within these marked footprints prior to the	Control through management	When required	National Environmental Management: Biodiversity Act; Removal of trees in accordance with the requirements of DAFF	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
	commencement of construction to determine the number of potentially impacted plant species of conservation concern. Based on the findings of the survey, clearing and/or relocation permits should be obtained from the relevant authority to clear or rescue and relocate potentially impacted plant SCC; and - Exposed soils along the road servitude should be seeded with indigenous grasses, to promote revegetation of disturbed areas, once construction is complete.					
3.2	- An alien invasive species control programme must be developed (or any existing AIS management programmes expanded), to include the active control of alien invasive species that may establish/spread as a result of proposed Project activities. - Alien and invasive species management to be prioritised for the following alien and invasive species control areas: i. Areas where vegetation cover is disturbed; ii. Areas where soils imported from external sources are applied; iii. All rehabilitated areas; iv. Areas within the development area that are already invaded by alien species; v. Road fringes.					
3.3	- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage any necessary movement/relocations of fauna SoCC, should they be encountered. The ECO should be trained in inter alia, snake handling and species identification; - A low-speed limit (recommended 20 km/h in areas of highest risk e.g. where roads traverse woodland or riparian/wetland habitat) should be enforced on site to reduce wildlife collisions; - A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats.Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons;					

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
	- The handling, poisoning or killing of on-site fauna by mine workers and contractors must be strictly prohibited; and - Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage.					
Heritage/ palaeontological resources						
4.1	- A 50 meter no-development buffer, as per SAHRA guidelines, must be in place for the burial ground at **MPM 05**, - If this is not possible the cemetery must be relocated following a full grave relocation process that must include at a minimum the following: i. A grave relocation process must be undertaken; ii. A detailed social consultation process, at least 60 days in length, comprising the attempted identification of the next-of-kin in order to obtain their consent for the relocation; iii. Bilingual site and newspaper notices indicating the intent of the relocation; iv. Permits from all the relevant and legally required authorities; v. An exhumation process that keeps the dignity of the remains and family intact; vi. An exhumation process that safeguards the legal rights of the families as well as that of the mining company; vii. The process must be done by a reputable company well versed in the mitigation of graves - Should the development footprints change or be altered in any way, these changes must be assessed in the field by a heritage specialist/archaeologist before construction commences; - In all cases where sites are located near existing tar roads, and on the condition that	Control through management	Throughout establishment and construction phase	Cultural/heritage aspects must be managed in accordance with the: National Heritage Resources Act, 1999	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors Leader, Site Manager

EMPr Ref no.	Detailed Mitigation Measures	Mitigation Type (Modify, remedy, control or stop) *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	Time period for implementation *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	Standards to be Achieved *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	Compliance with Standards *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	Responsible person
	the proposed construction work will in no way expand wider than the existing road surface in these areas, the mitigation measures recommended for the sites identified in this report will not be required. However, should the proposed construction expand anything wider than the existing road surface, the mitigation measures outlined in this report for these sites would be required; - Contractors and personnel involved in clearing and earthworks should be required to participate in training and awareness programs to ensure that they are aware of work stoppage and reporting procedures should archaeological sites or graves be exposed during development activities; - All employees and contractors are required to stop work and report any additional heritage or archaeological site discovered in the vicinity of the construction activity, to a heritage practitioner so that an investigation and evaluation of the findings can be made. No heritage artefacts or graves may be destroyed or moved without the necessary permits.					
Watercourses						
5.1	- No maintenance of vehicles within 500m of regulated wetland boundary The construction vehicles must be inspected for possible oil leaks prior site access, during construction and when leaving site. The use of a drip tray under all stationary vehicles is mandatory within the regulated area.	Control through management	Throughout establishment and construction phase	Compliance with local legislation regulation guidelines, including NEMA, MPRDA and NWA	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
5.2	- Construction activities must be undertaken during the dry season (May to September) as far as possible. Control existing stands of AIS vegetation in the road construction footprint and along access routes prior to construction commencement. Limit the movement of vehicles in the construction footprint to limit the spread of alien invasive species					

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
5.3	- Construction activities must be undertaken during the dry season (May to September) as far as possible. - Where possible, construction activities must be completed within one month.					
5.4	- Construction activities must be undertaken during the dry season (May to September) as far as possible - Where possible, construction activities must be completed within one month. - Limit the use of machinery movement within watercourses during road construction activities.					
5.5	- Construction activities must be undertaken during the dry season (May to September)					
5.6	- Make use of light grading machinery while working in the watercourse to limit compaction and soil erosion. Limit the use of equipment to one motor grader at a time. Grading activities must be undertaken during the dry season					
5.7	- Construction activities must be undertaken during the dry season (May to September) as far as possible. - Topsoil replacement and revegetation must be limited to the affected footprint as possible. - Excavated soils will need to be replaced in the same order as removed, i.e. sub-soil must be replaced first and topsoil must be replaced last. This will maximize opportunity for swift re-vegetation of disturbed areas					
5.8	- No maintenance of vehicles within 500m of regulated wetland boundary. - The vehicles must be inspected for possible oil leak prior site access, during rehabilitation and when leaving site. - The use of drip tray under all stationery vehicles is mandatory within regulated area; however, it is recommended that no vehicles are parked overnight at the construction area, and are rather moved to secure mine facilities for longer term storage.					

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
Traffic						
6.1	- Speed limits will be reduced to 40 km/h to reduce dust and noise generation; - Where possible the transportation of construction materials and rubbish shall be undertaken outside traffic peak hours to minimise inconveniencing other road users; - The number of construction vehicles and trips shall be kept to a minimum; - All the construction vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	Control through management	Throughout establishment and construction phase	Compliance with MPM's traffic management plan	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
Waste						
7.1	- All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported; - All solid waste should be disposed of at a registered landfill site and records maintained to confirm safe disposal; - Adequate scavenger-proof refuse disposal containers must be supplied to control solid waste on-site; - It must be ensured that existing waste disposal facilities in the area are able to accommodate the increased waste generated from the proposed construction; - Chemical waste must be stored in appropriate containers and disposed of at a licensed disposal facility; Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be adhered to. This applies to solvents and other chemicals possibly used during the construction process; - Portable sanitation facilities must be erected for construction personnel. Use of these facilities must be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities must also be monitored and serviced regularly so as to prevent contamination of the water resources. - The construction site must be inspected for litter on a daily basis. Extra care should be	Control through management	All project phases	In compliance with principles contained in the MPRDA, 2002 and NEMA, 1998	With the recommended measures in place, compliance with the guidelines can be achieved	Site Manager to ensure compliance with the guidelines as stipulated in the EMPR. Compliance to be monitored by the Environmental Control Officer

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
	taken on windy days. - Precautions should be taken to avoid litter from entering the drainage line; - Soil that is contaminated with, e.g. cement, petrochemicals or paint, must be disposed of at a registered waste disposal site and is not to be deposited into the drainage line; and - Hazardous substance storage must not take place within 50m of a watercourse or within the 1:100 year floodline; and; - Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Municipality / DMRE etc.) and must be remediated as per the EMPr.					
Air Quality						
8.1	- Modifying or ceasing loading activities during dry and high wind conditions. - Avoid double handling of material, where possible. - Minimising the drop height of the material from truck loads/transfer points. A drop height policy should be maintained on-site and all equipment operators should be trained in the policy such that drop height reduction is implemented during materials handling activities. - Using water carts with boom sprayers or wet suppression systems. - The height of existing berms at stockpiles must be increased, reducing the impact of winds on the stockpile. - Maintaining the stockpile moisture level to avoid further entrainment of particles. - Dust suppression along the gravel road, and other disturbed areas. - Effective maintenance of diesel driven vehicles to manage the greenhouse gases.	Control: Dust suppression methods and proper housekeeping.	Throughout the site establishment and construction phase.	National Environmental Management: Air Quality Act, 2004; (Act No. 39 of 2004) National Dust Control Regulations: The dust deposition monitoring is based on the ASTM International standard method for collection and analysis of dust fall (ASTM D1739)	With the recommended measures in place, compliance with the guidelines can be achieved	Stakeholder Manger, MPM ECO, Appointed Contractors
Social						

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
9.1	- MPM to increase the probability of retaining staff by implementing the MPM policy of upskilling employee skills where necessary and possible, and aligning with the MPM SLP; - MPM must inform companies it procures goods and services from of any procurement gaps during the development of project, so that affected companies can plan accordingly; - To increase magnitude of the impact, increase the probability of retaining staff by implementing the MPM policy of upskilling employees where necessary, and aligning with the MPM's SLP; - Reduce speed limits to 40 km/h. Speed humps may be constructed to help slow vehicles; - The number of vehicles on the roads shall be kept to a minimum.	Control through management	When required	In compliance with MPM's SLP	With the recommended measures in place, compliance with the guidelines can be achieved	Stakeholder Manger, Human Resources, MPM ECO, Appointed Contractors
Noise						
10.1	- During construction keep noise levels within acceptable limits in compliance with all relevant guidelines and regulations such as SANS 10103: 2008. - All equipment and vehicles must be regularly serviced to prevent excessive noise. - Vehicles and equipment generating excessive noise should be fitted with appropriate noise abatement measures. - Personal Protective Equipment (“PPE”) must be worn at all times during construction of the proposed activities. PPE register to be kept	Control: Noise suppression methods and proper housekeeping	Throughout the site establishment and construction phase.	Noise generation must be managed in accordance with the: - NEM:AQA. 2004 Regulation 6(1); - NRTA, 1996; - SANS 10103 - Acceptable Ambient Noise Levels	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors

Table 25: Impacts to be mitigated during the operational phase with management outcomes and actions

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
Air Quality						
11.1	- Dust suppression along the gravel road, and other disturbed areas. - Dust fallout monitoring plan must be developed and effectively implemented. - Effective maintenance of diesel driven vehicles to manage the greenhouse gases. - MPM must continue to monitor dust as per the MPM's dust monitoring programme.	Control through management	Ongoing	National Environmental Management: Air Quality Act, 2004; (Act No. 39 of 2004) National Dust Control Regulations: The dust deposition monitoring is based on the ASTM International standard method for collection and analysis of dustfall (ASTM D1739)	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
Watercourses						
12.1	- Culvert crossing must be maintained regularly, Mine vehicles must be inspected for possible oil leaks regularly.	Control through management	Ongoing	Compliance with local legislation regulation guidelines, including NEMA, MPRDA and NWA	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
12.2	- Inspect culverts after periods of high rainfall and remove any accumulated debris to ensure flow is not affected.					
12.3	- Make use of light grading machinery while working in the watercourse to limit compaction and soil erosion. - Limit the use of equipment to one motor grader at a time. Grading activities must be undertaken during the dry season					
Social						
13.1	- MPM to increase the probability of retaining staff by implementing the MPM policy of upskilling employee skills where necessary and possible, and aligning with the MPM's Social and Labour Plan (SLP); - Reduce speed limits to 40 km/h. Speed humps may be constructed to help slow vehicles; - The number of vehicles on the roads shall be kept to a minimum.	Control through management	Ongoing	In compliance with MPM's SLP	With the recommended measures in place, compliance with the guidelines can be achieved	Stakeholder Manger, Human Resources, MPM ECO, Appointed Contractors
Terrestrial biodiversity						

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
14.1	- Habitat restoration through active revegetation should be undertaken to restore habitat connectivity where possible; - Adopt reduced impact clearing and construction techniques and time; - Rehabilitation through planting of appropriate plant community will enhance connectivity and prevent potential invasion of pioneer invasive species; - Rehabilitation of such areas should emphasize the use of species of the characteristic flora community; and - Site clearing should be done in the winter months when it is less vulnerable.	Control through management	As required	National Environmental Management: Biodiversity Act; Removal of trees in accordance with the requirements of DAFF	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors
14.2	- An alien invasive species control programme must be developed (or any existing AIS management programmes expanded), to include the active control of alien invasive species that may establish/spread as a result of the Project activities; - Alien and invasive species management to be prioritised for the following alien and invasive species control areas: i. Areas where vegetation cover is disturbed. ii. Areas where soils imported from external sources are applied. iii. All rehabilitated areas. iv. Areas within the development area that are already invaded by alien species. v. Road fringes.	Control through management	Ongoing			
14.3	- Excavation activities should be done during calm weather conditions. This will reduce the extent of spread of the particulate matter in the project footprint; - Dust suppression methods such as use of the water bowser should be implemented in and around the construction site regularly, particularly during the dry season; - Speed limits of < 20 km/hour should be communicated via appropriate signage and enforced on all access roads to proposed new infrastructure locations; - Avoid dust generating works during the most windy conditions; and - Frequent wetting of the access roads.	Control through management	Ongoing			

EMPr Ref no.	Detailed Mitigation Measures	**Mitigation Type (Modify, remedy, control or stop)** *e.g. Modify through alternative method; Control through noise control; Control through management and monitoring; Remedy through rehabilitation*	**Time period for implementation** *(time period when the measures in the environmental management programme must be implemented Measures must be implemented when required)*	**Standards to be Achieved** *(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives etc)*	**Compliance with Standards** *(A description of how each of the recommendations made, will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)*	**Responsible person**
14.4	- An ECO should be on-site during vegetation clearing to monitor and manage any necessary movement/relocations of fauna SoCC, should they be encountered. The ECO should be trained in inter alia, snake handling and species identification; - A low-speed limit (recommended 20 km/h in areas of highest risk e.g. where roads traverse woodland or riparian/wetland habitat) should be enforced on site to reduce wildlife collisions; - A search and rescue survey for herpetofauna species should be done immediately in advance of site clearance activities. Any observed individuals should be relocated to nearby areas of natural habitats. Where snakes require relocation, this should be done by a certified snake handler for health and safety reasons; - The handling, poisoning or killing of on-site fauna by mine workers and contractors must be strictly prohibited; and - Employees and contractors should be made aware of the presence of, and rules regarding fauna through suitable induction training and on-site signage.	Control through management	Ongoing			
Traffic						
15.1	- Speed limits will be reduced to 40 km/h to reduce dust and noise generation; - The number of hauling trips shall be kept to a minimum; - All the hauling vehicles shall undergo maintenance on a regular basis to ensure the combustion engine vehicle efficiency.	Control through management	Ongoing	Compliance with MPM's traffic management plan	With the recommended measures in place, compliance with the guidelines can be achieved	MPM Environmental Leader, ECO, Appointed Contractors

20.0 FINANCIAL PROVISION

20.1 Rehabilitation objectives

The key rehabilitation objectives for the proposed access roads are as follows:

- **Physical stability:** to rehabilitate the proposed access roads and integrate these with the surrounding topography so that all landforms are stable and are able to accommodate a 1:50 year flood event
- **Environmental quality:** to ensure that local environmental quality is not adversely affected by possible physical impacts
- **Health and safety:** to limit the possible health and safety threats to humans and animals using the rehabilitated site
- **Land capability/land-use:** to establish land capability of grazing and wilderness over the site as far as possible, by limiting the loss of soil resources during earthworks and contamination/spillage clean-up (if required)
- **Landscape viability and biodiversity:** to create a grassland and/or pasture that is largely self-sustaining post-closure
- **Aesthetic quality:** to leave behind a rehabilitated site that, in general, is not only neat and tidy, giving an appropriate overall aesthetic appearance, but which in terms of this attribute is also aligned to the end land use
- **Socio-economic:** to engage with communities with respect to the end land use of the rehabilitated site, agreeing on long term land management practices in order to limit possible degradation of the site to ensure sustainability of resources provided over the long term.

20.2 Rehabilitation plan

- Site preparation
- Demolition of infrastructure and clean-up of contamination (if required)
- Shaping and levelling to facilitate drainage
- Seeding and care and maintenance

Rehabilitation performance objectives, rehabilitation measures, assignment of responsibilities and scheduling for the above rehabilitation components are provided in Table 26.

Rehabilitation performance monitoring and associated care and maintenance (aftercare/corrective action) are provided in the detailed closure report.

Table 26: Performance objectives and associated measures

Rehabilitation performance objectives	Measures/actions	Responsibility	Scheduling
Site preparation			
■ Unauthorised access to the site restricted during rehabilitation and post rehabilitation	**Site preparation** Following tender letting and award, the elected rehabilitation contractor will establish and take-over responsibility of the site. The specific requirements for site establishment would be prescribed by the tender contract, but would address at least the following aspects: ■ Erect a stock fence with an access gate along the dirt road to prevent the area from being accessed while vegetation is being established, and also to prevent uncontrolled access to the rehabilitated site ■ If a temporary laydown or equipment storage area is required for contractor use, restrict the storage area to redundant portions of the access road ■ The contractor is to supply electricity and water reticulation, if required, at its own cost	Contractor	Winter
Demolition of infrastructure and removal of contamination			
In terms of structures and localised contaminated areas attaining the following: ■ No substantive visible general waste and remnant concrete rubble ■ Appropriate handling and disposal of wastes	**Proposed access roads** ■ Rip and shape footprint area to be free-draining, aligned to site-wide runoff routing ■ Establish vegetation by applying suitable seed mix	Contractor	Winter
Shaping and levelling			
Site shaping and levelling will be conducted to attain the following:	**Existing stormwater drains**	Contractor	Ideally the ripping will be done in autumn, as the

Rehabilitation performance objectives	Measures/actions	Responsibility	Scheduling
■ No ponding over the shaped and levelled surface ■ Stormwater system able to accommodate 1:50 year flood events without significant erosion	■ Shape and profile the disturbed areas from which plant and related infrastructure have been removed to a maximum slope of 1:7 and to be free draining ■ Rip the site before vegetation establishment to approximately 500 mm depth to alleviate compaction		summer rains would have softened the soil profile to allow effective ripping, without excessive soil moisture content. Alternatively, shaping and levelling can be done during winter or early spring
Seeding and maintenance			
Re-vegetating the disturbed and re-profiled portions of the site, to achieve the following: ■ A seedbed suitable for grass seeds to germinate ■ Selected vegetation species to combat erosion ■ Seed mix suitable to withstand well drained as well as seasonally wet conditions ■ Control invasive/exotic species	**Seeding** ■ Use a standard agricultural seed drill (preferable) or seed spreader to sow the seed mix on all the prepared areas. Where a spreader is used the seeded areas should be lightly rolled to improve the contact between the soil and seed, and also to prevent seed loss (usually by wind, rain, insects or birds) ■ Conduct a visual inspection to confirm seed (nurse crop) establishment has been successful and any germination or establishment failures (through poor seed quality, seed application, drought etc.) are noted	Contractor	After spring rains that sufficiently dampened the upper profile of the soil layers so that the measured soil moisture content is 6% - 10% at 500 mm depth

20.3 Closure cost summary

The scheduled closure costs for the Project, as at June 2022,are summarised in Table 27 below:

Table 27: Detailed closure cost

	Closure component	Real Financial Closure Obligation	
1	**Infrastructural Aspects**	R	38,741.54
2	**Mining Areas**	R	-
3	**General Surface Rehabilitation**	R	10,400.90
4	**Surface Runoff Measures**	R	2,881.45
	Sub-Total 1	**R**	**52,023.88**
5	**Post-closure Aspects**		
5.1	**Monitoring and aftercare**		
	Surface water Monitoring (5/yr)	R	-
	Groundwater Monitoring (5/yr)	R	-
	Rehabilitation monitoring (10yr)	R	2,126.74
	Care and maintenance - low intensity (10/yr)	R	11,846.25
	Sub-Total 2	**R**	**13,972.99**
7	**Post-Closure Aspects**		
7.1	**Post Closure Aspects**		
	Additional studies	R	-
7.2	**Water Treatment (NVP)**	R	-
	Sub-Total 3	**R**	**-**
	Total (Excl. P&Gs) Excl. VAT. (Sub-total 1 + 2 + 3)	**R**	**65,996.87**
6	**P&Gs, Contingencies and Additional Allowances**		
6.1	**Preliminary and General (25%)**	R	13,005.97
6.2	**Contingencies (10%)**	R	5,202.39
6.3	**Provisional amount for Closure Related Social Aspects (2%)**	R	-
	Sub-Total 4	**R**	**18,208.36**
	Total (Incl. P&Gs) Excl. VAT. (Sub-total 1 + 2 + 3 + 4)	**R**	**84,205.22**
	Grand Total Incl. VAT. @ 15% (Sub-total 1 + 2 + 3 + 4)	**R**	**96,836.01**

21.0 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME

Monitoring of the surface and groundwater is proposed continue according to MPM's existing monitoring programme. The additional monitoring requirements resulting from the current application is indicated in Table 28.

Table 28: Monitoring plan

EMPr Ref no.	Source Activity	Impacts Rating Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities (For the execution of the monitoring programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions.
1.1	- Site Clearance and removal of vegetation; - Stockpiling material from site clearance; - Transporting of material; - Excavation.	Soil Erosion	- Daily inspection of signs of erosion on the access road (including roadsides), excavation area, stockpiles, turning and parking areas. As well as rehabilitation site post mining; - Management and monitoring of soil stockpiles. Soils must be stored properly and revegetated to prevent erosion and to enable re-use during rehabilitation; - Stockpiles must be visually inspected daily to ensure that no erosion is taking place.	MPM's Environmental Leader, Site Manager	Daily Monitoring and Monthly Reporting
1.2		Loss of indigenous plant species	- An Environmental Control Officer (ECO) should be on-site during vegetation clearing to monitor and manage any necessary movement/relocations of fauna SoCC, should they be encountered. The ECO should be trained in inter alia, snake handling and species identification;	MPM's Environmental Leader, Site Manager, ECO	Monthly Reporting
1.3		Faunal habitat loss			Weekly monitoring
1.4		Establishment of alien invasive species	- The presence of alien and invasive flora species should be documented prior to the commencement of the development of the infrastructure and rehabilitation activities, and the baseline case used as a benchmark against which the spread of these species can be monitored. - A record of fauna mortalities/injury as a result of fauna crossing the proposed access roads should be kept on site and regularly reviewed	MPM's Environmental Leader, Site Manager	Monthly Reporting

EMPr Ref no.	Source Activity	Impacts Rating Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities (For the execution of the monitoring programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions.
			to inform the need for implementation of any additional mitigation measures.		
1.5	Dust generated from the construction of the proposed activities.	Air quality	- Dust fallout monitoring must continue as per the Air quality monitoring plan	MPM's Environmental Leader to ensure that monitoring on site is conducted by the specialist	Dust monitoring (monthly)
1.6	- Spillages of hazardous chemicals or oil spills from vehicles or equipment; - Construction vehicles accessing the site, turning, offloading materials could influence hydrocarbon spills.	Soil and groundwater contamination	- A spills incident register must be kept by the contractor on site; - In the event of a spill, the MPM's environmental leader must be informed of such.	MPM's Environmental Leader, Site Manager	Weekly inspections
1.8	Spillage of contaminants leading to water quality impacts on downstream watercourses	Surface water contamination	- Surface water monitoring must continue as per the water quality monitoring plan	MPM's Environmental Leader, Site Manager	Monthly Reporting

EMPr Ref no.	Source Activity	Impacts Rating Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities (For the execution of the monitoring programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions.
1.9	- Earthworks; - Site clearance and vegetation removal; - Demolition and/or removal of temporary infrastructure/equipment; - Rehabilitation and restoration of disturbed areas	Destruction of graves and cultural resources	- No activities to impact graves and sites of heritage or cultural importance	MPM's Environmental Leader, Site Manager	Monthly Reporting
1.10	- Site Clearance and removal of vegetation; - Stockpiling material from site clearance; - Transporting of material; - Excavation; - Rehabilitation and restoration of disturbed areas	Soil disturbance resulting in the spread of alien	Alien invasive vegetation monitoring and control through Alien Invasive Management Plan	MPM's Environmental Leader, Site Manager	Monthly monitoring and reporting
1.11	- Site Clearance and removal of vegetation; - Stockpiling material from site clearance; - Transporting of material; - Excavation.	Nuisance noise	- Measure noise levels routinely to ensure the noise levels are being kept within the acceptable ISO standards.	MPM's Environmental Leader, Site Manager	Monthly monitoring and reporting

EMPr Ref no.	Source Activity	Impacts Rating Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities (For the execution of the monitoring programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions.
1.12	Structural risk associated with the construction and operation of the proposed activities.	Health and safety of personnel	- SHE inspections must be undertaken by the SHE officer to ensure road stability during the construction and operation of the proposed project.	MPM's Environmental Leader, Site Manager	Weekly monitoring
1.13	Construction and operation activities	Waste management	- Closed containers for the storage of general of hazardous waste until waste is removed to the appropriate landfill site; - Secondary containment required for all dangerous goods; - Drip trays must be in place under parked earth moving equipment and under the power screen's motor and fuel tank; - Hydrocarbon spill kits to enable sufficient clean-up of contaminated areas; - Vehicles must be regularly serviced/maintained to prevent leaks (servicing not to be done on site)- Staff trained on waste correct management; - Hydrocarbon spills need to be cleaned immediately; - Site needs to be cleared of litter daily; - Bins need to be emptied regularly; - Audits to be conducted by an independent environmental expert; - Further training to be provided for staff if waste is not being managed as per EMPr.	MPM's Environmental Leader, Site Manager	Daily Monitoring

EMPr Ref no.	Source Activity	Impacts Rating Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities (For the execution of the monitoring programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions.
1.14	Invasive Alien Plants (IAPs)	Rehabilitation	- Monitoring of the following: i. Basal Cover; ii. Arial Cover; iii. Species diversity; iv. IAP control plan.	MPM's Environmental Leader, Site Manager	- Rehabilitation will be undertaken throughout all the project phases; - The final rehabilitation will be undertaken when the prospecting activities have been finalised; - The ECO shall inspect the affected areas 6 month after finalisation of rehabilitation to assess the success of the rehabilitation.

22.0 ENVIRONMENTAL AWARENESS PLAN

MPM has an existing standard operating procedure (SOP) in place for the environmental awareness and training. The purpose of the SOP is to illustrate how environmental competence, training and awareness will be conducted and managed at the mine. This includes increasing environmental awareness as well as to identify environmental training needs for employees and business partners to ensure that employees, whose work impacts on the environment, receive training relevant to their level of responsibility. The Environmental Department is responsible to provide or have training provided to employees and business partners on as per the awareness plan.

The MPM Environmental Competence, Training and and Awareness SOP has been appended in APPENDIX Q.

22.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

The following Environmental Awareness Training should be implemented by MPM in order to inform employees and contractors of the environmental risk that may result from their work, or the risk of their interaction with the sensitive environment. The training will be conducted as part of the induction process for all new employees (including contractors) that will perform work in terms of the Project using the following forums:

- Toolbox Talks (Daily)
- Environmental Awareness Courses (Ad hoc)
- EMPr Awareness (as and when required)

The above-mentioned awareness activities will be used to share information and to ensure that all personnel are aware of the environment in which they operate and what environmental aspects require attention during their daily operations / activities / tasks. Additionally, personnel awareness training will be undertaken if and when required to strengthen the personnel's understanding of environmental issues.

The method and medium of communication during the environmental meetings will be determined by the Designated Environmental Officer facilitating the meetings. The topics discussed in meetings will be recorded, with all employees present signing an attendance register. As potential environmental impacts differ in each department of the operation, the environmental topics selected for discussion can either be:

- General topics that are applicable to the entire activity;
- Activity specific topics as identified in the impacts on the receiving environment;
- Topics that can be "taken home" and implemented off-site.

22.1.1 General Topics

There are a number of environmental impacts resulting from the proposed project. General topics include, but are not limited to, the following:

- Topsoil and soil management;
- Dust generation impacts;

- Noise generation;
- Domestic waste minimisation and recycling;
- Practical training regarding the clean-up of major and minor hydrocarbon spills / use of spill management kit;
- Practical training on using a fire extinguisher;
- Alien vegetation identification and removal, and the importance of indigenous vegetation.

22.1.2 Activity Specific Topics

Some activities may have environmental impacts that are unique to each area. These must be addressed in the SHEQ meetings. Area specific topics include (and some of these topics may be a repeat of those covered under general topics):

- Stormwater management and protection of water resources;
- Potential for groundwater pollution; • Identification and management of erosion;
- Vehicle emissions and related impacts;
- Practical training regarding the clean-up of major and minor hydrocarbon spills;
- The importance of the waste management system and implementing good housekeeping;
- Dust generation and why and how to reduce dust; and
- Biodiversity interaction (flora and faunal) awareness.

22.1.3 Take Home Topics

Environmental awareness should not stop at the workplace. Many of the concepts learned at work can be applied to employees' lifestyle at home. Topics that can be covered under "take home topics" include, but are not limited to:

- Water consumption and conservation; and
- Domestic waste minimisation and recycling - "Reduce, Reuse and Recycle".

22.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Refer to the Impact Assessment attached as APPENDIX M.

23.0 UNDERTAKING

The EAP herewith confirms

- The correctness of the information provided in the reports
- The inclusion of comments and inputs from stakeholders and I&AP's
- the inclusion of inputs and recommendations from the specialist reports where relevant; and

- that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected. parties are correctly reflected herein.

Golder Associates Africa (Pty) Ltd.

Dalian Govender
Environmental Assessment Practitioner

Nosipho Mosito
Environmental Assessment Practitioner

DG/NM/Nbh

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APPENDIX A

EAP Curriculum Vitae

APPENDIX B

Database of Potentially Interested and Affected Parties

APPENDIX C

Stakeholder letter, Registration and Comment Sheet

APPENDIX D

Advertisement and Site Notice

APPENDIX E

Comment and Response Report

APPENDIX F

Aquatic Compliance Statement

APPENDIX G

Terrestrial Biodiversity Impact Assessment

APPENDIX H

Heritage Impact Assessment and Desktop Paleontology Study

APPENDIX I

Environmental Screening Report

APPENDIX J

Modikwa Platinum Mine Environmental Awareness Plan

APPENDIX K

Property Details

APPENDIX L

Closure Planning and Costing Report

APPENDIX M

Impact Assessment

APPENDIX N

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