# PROPOSED CHANGES TO THE APPROVED LAYOUT AT THE MARULA PLATINUM MINE: BASIC ASSESSMENT REPORT (BAR) AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EMPR)

**Marula Platinum Mine**

Prepared for: Marula Platinum (Pty) Ltd

Authority References: TBC

MARULA
Member of the Implats Group

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# REPORT SIGN OFF AND APPROVALS

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**(Project Director and EAP)**

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**Rob Hounsome**
**(Reviewer)**

# BASIS OF REPORT

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# EXECUTIVE SUMMARY

## INTRODUCTION

Marula Platinum (Pty) Ltd, an existing platinum producer and a subsidiary of Impala Platinum Holdings Limited, owns and operates the Marula Platinum Mine (Marula) in the Greater Tubatse Local Municipality and Sekhukhune District Municipality in the Limpopo Province. The mine is situated along the R37, approximately 30 km to the north-west of the town Burgersfort and has been operational since 2001. Refer to Figure 1 and Figure 2 for the regional and local setting.

The mine holds the following environmental authorizations:

- Converted Mining Right 42/2008 (DMR Ref.: LP 30/5/1/2/2/61 MR), issued by the Department of Minerals and Energy (currently known as the Department of Mineral Resources and Energy (DMRE)) in January 2008.
- Converted Mining Right 23/2008 (DMR Ref: LP 30/5/1/2/2/63 MR), held under Cession 32/2008, issued by the Department of Mineral Resources (currently the DMRE) in January 2008.
- An Environmental Authorisation (Ref No.: 16/1/7/2-GS29) issued by the Department of Economic Development, Environment and Tourism (Limpopo Provincial Government) on 16 September 2008 and an approved amended Environmental Management Programme (EMPr) (Ref No.: 6/2/2/649EM) issued by the Department of Minerals and Energy (currently the DMRE) on 24 January 2008 for the extension of the Merensky operations.
- An amended EMPr (Ref No.: LP30/5/1/3/2/1(61) EM and LP30/5/1/3/2/1(63) EM) issued by the Department of Mineral Resources (currently the DMRE) on 10 June 2014 for the proposed tailings scavenger plant, two additional ventilation shafts and the extension of underground mining activities.
- An Integrated Water Use Licence (IWUL) (Ref No.: 06/B71E/GACIJ/8841) issued by the Department of Water and Sanitation (DWS) (currently the Department of Human Settlement, Water and Sanitation (DHSWS) on 29 March 2019.

Marula is proposing to change their layout by establishing additional surface infrastructure and which will require an amendment to their approved EMPr. The proposed additional surface infrastructure comprises the following:

- The establishment of two additional ventilation shafts.
- The upgrade to refrigeration and ventilation infrastructure at existing ventilation shafts.
- The establishment of additional water pipelines to support the additional ventilation shafts.
- The expansion and establishment of additional power supply and distribution infrastructure in support of the establishment of additional ventilation shaft and upgrades to existing ventilation shafts).
- The establishment of a product stockpile within the existing footprint of the Concentrator Plant.
- The establishment of an additional pipeline to the approved Tailings Storage Facility (TSF).

- Structural upgrades of the existing change house and compressed airline at the Clapham Shaft Complex.
- Implementation of monitoring and remediation measures to assist with the management of the UG Tailings pollution plume.

SLR Consulting (Africa) (Pty) Ltd (SLR), an independent firm of Environmental Assessment Practitioners (EAPs), has been appointed by Marula to manage the environmental authorisation processes for the proposed project.

## SUMMARY OF AUTHORISATION REQUIREMENTS

The proposed project comprises of activities which trigger listed activities in terms of the National Environmental Management Act (107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (Government Notice Regulation (GNR) 982 of 2014, as amended). The proposed project also comprises of activities which do not trigger listed activities. Therefore, an integrated environmental authorisation process was undertaken to fulfil the requirements of:

- Regulation 19 (*Basic Assessment Process*) to cater for listed activities in terms of the EIA Regulations (GNR 982 of 2014, as amended).
- An amended EMPr approved by DMRE in terms of Section 102 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002, MPRDA) (as amended).

An amendment to the existing IWUL for water uses listed under Section 21 of National Water Act (36 of 1998) (NWA) is also required from the competent authority, which in this case is the Limpopo (Polokwane) Regional Province of the Department of Water and Sanitation (DWS). This amendment is being undertaken as a separate process by Marula Mine.

## IMPACTS

This section provides a summary of the assessment of the potential impacts of the project and provides measures to prevent and/or mitigate the impacts. The potential impacts associated with the proposed project can be categorised into those that have low, medium and/or high significance in the unmitigated scenario. All three categories of impacts require a measure of management actions which, if successfully implemented will reduce and or enhance the significance of the impacts.

| Aspect | Potential impact | Cumulative impact significance of the impact (The ratings are negative unless otherwise specified) | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| Topography | Hazardous excavations and infrastructure resulting in safety to third parties and animals | High (incremental and cumulative) | Very Low (incremental)<br>High (cumulative) |
| Soil and land capability | Loss of Soil Resources and Land Capability Through Contamination | Medium (incrementally)<br>High (cumulative) | Low (incrementally and cumulatively) |
| | Loss of Soil Resources and Land Capability Through Physical Disturbance | Medium (incrementally)<br>High (cumulative) | Very low (incrementally)<br>Low (cumulative) |
| Biodiversity | Physical destruction of terrestrial biodiversity, affecting habitat, species diversity and SCC - New ventilation shafts | Medium (high for cumulative) | Low (medium for cumulative)<br>Very Low (closure for incremental) |
| | Physical destruction of terrestrial biodiversity, affecting habitat, species | Medium (High for cumulative) | Low (Medium for cumulative) |

| Aspect | Potential impact | Cumulative impact significance of the impact (The ratings are negative unless otherwise specified) | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| | diversity and SCC - Proposed water pipelines, powerlines and TSF pipeline | | Very Low (closure for incremental) |
| | General disturbance of biodiversity | Low (high cumulative) | Very low (medium cumulative) |
| | Destruction and disturbance of aquatic biodiversity | Low (Medium cumulative) | Very low (Low cumulative) |
| Surface water resources | Alteration of Natural Drainage Patterns through the location within watercourses | Low (high cumulative) | Insignificant (low cumulative) |
| | Contamination of Surface Water Resources | Low (High for cumulative) | Very Low (Medium for cumulative) |
| Groundwater | Contamination of Groundwater Resources | High (High cumulative) | Low (Medium cumulative) |
| Air Quality | Air Pollution | Low – Medium | Low |
| Noise | Increase in disturbing noise levels | Medium (construction and decommissioning)<br>High (operation)<br>High (cumulative) | Very Low (construction and decommissioning)<br>Medium (operation)<br>Medium (cumulative) |
| Visual | Visual Impacts | Medium | Very Low |
| Traffic | Road Disturbance and Traffic Safety | High (incremental and cumulative) | Medium (incremental and cumulative) |
| Cultural/heritage and palaeontological resources | Loss of heritage and palaeontological resources | N/A | N/A |
| Socio-economic | Economic impacts | Medium + (incremental and cumulative) | Medium + (incremental and cumulative) |
| Land use | Change in land uses | Medium (incremental)<br>High (cumulative) | Low (incremental)<br>Medium (cumulative) |

## IMPACT STATEMENT

The assessment of the proposed project presents the potential for negative impacts to occur (in the unmitigated scenario in particular) on the biophysical, cultural, and socio-economic environments both on the project site and in the surrounding area. With management actions these potential impacts can be prevented or reduced to acceptable levels. It follows that provided the EMPr is effectively implemented there is no biophysical, social or economic reason why the project should not proceed.

## OPPORTUNITY TO COMMENT

This BAR will be distributed for a 30-day period from **08 February 2022 to 10 March 2022** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the BA process. Copies of the full report are available on the SLR website (https://slrconsulting.com/public-documents) and the SLR data free website (https://www.slrconsulting.com/en/public-documents). Electronic copies (compact disk) of the report are available on request from SLR at the contact details provided below.

**SLR Consulting (Africa) (Pty) Ltd**
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# ACRONYMS AND ABBREVIATIONS

| Acronym / Abbreviation | Definition |
|---|---|
| ABA | Acid base accounting |
| AEL | Air Emissions Licence |
| As | Arsenic |
| BA | Basic Assessment |
| BAR | Basic Assessment Report |
| B | Boron |
| BID | Background Information Document |
| Ca | Calcium |
| CBA | Critical Biodiversity Area |
| $CH_4$ | methane |
| Cl | Chloride |
| CI | Conservation Important |
| CO | carbon monoxide |
| $CO_2$ | Carbon dioxide |
| $CO_3$ | Carbonate |
| COC | Chemicals of concern |
| CV | Curriculum Vitae |
| DEA | Department of Environmental Affairs |
| DENC | Department of Environment and Nature Conservation |
| DME | Department of Minerals and Energy |
| DMR | Department of Mineral Resources |
| DWS | Department of Water and Sanitation |
| EAP | Environmental Assessment Practitioner |
| EMP | Environmental Management Programme |
| ESA | Ecological Support Area |
| F | Fluoride |
| Fe | Iron |
| GN | Government Notice |
| GNR | Government Notice Regulation |
| ha | Hectare |
| HCs | hydrocarbons |
| $HCO_3$ | Bicarbonate |
| I&AP | Interested and Affected Party |

| Acronym / Abbreviation | Definition |
|---|---|
| IBA | Important Bird Areas |
| ICP | Inter Coupled Plasma Scan |
| IDP | Integrated Development Framework |
| K | Potassium |
| km | Kilometre |
| LO | Likelihood of occurrence |
| m | Meter |
| MRA | Mining Right Area |
| $m^3$ | Cubic metres |
| mamsl | Metres above mean sea level |
| Mg | Magnesium |
| mm | Millimetres |
| Mn | Manganese |
| MS | Mass Spectrometry |
| MPRDA | Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) |
| Na | Sodium |
| N | Nitrate |
| $NO_2$ | nitrogen dioxide |
| NOx | oxides of nitrogen |
| NCPSPF | Northern Cape Provincial Spatial Development Framework 2012 |
| NEM:BA | National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004) |
| NFEPA | National Freshwater Ecosystem Priority Areas 2011 |
| NEMA | National Environmental Management Act, 1998 (No. 107 of 1998) |
| NEM:WA | National Environmental Management: Waste Act, 2008 (No 59 of 2008) |
| NPAES | National Protected Areas Expansion Strategy 2008 |
| NWA | National Water Act, 1998 NWA, 1998 (No. 36 of 1998) |
| TDS | Total Dissolved Solids |
| RoM | Run-of-mine |
| RQO | Resource Quality Objectives |
| SACNASP | South African Council for Natural Scientific Professionals |
| SAPAD | South African Protected Areas Database |
| SAHRA | South African Heritage Resource Agency |
| SANS | South African National Standards |
| SDF | Spatial Development Framework |

| Acronym / Abbreviation | Definition |
|---|---|
| SLR | SLR Consulting (Africa) (Pty) Ltd |
| SLP | Social and Labour Plan |
| $SO_2$ | Sulphur dioxide |
| $SO_4$ | Sulphate |
| VU | Vulnerable |
| WRD | Waste rock dump |

# PROPOSED CHANGES TO THE APPROVED LAYOUT AT THE MARULA PLATINUM MINE: BASIC ASSESSMENT REPORT (BAR) AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EMPr)

## INTRODUCTION

### PROJECT BACKGROUND

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## PURPOSE OF THIS REPORT

This Basic Assessment Report (BAR) has been compiled and distributed for public review and comment as part of a Basic Assessment (BA) process that is being undertaken for the proposed project. This BAR provides a description of the proposed project and the affected environment; summarises the BA process followed to date; identifies and assesses the key project impacts and presents management and mitigation measures that are recommended to enhance positive and limit negative impacts of the proposed project. Interested and Affected Parties (I&APs) are asked to comment on this draft BAR for a period of one calendar month. During this time, all comments and/or concerns will be captured and addressed by the project team. The document will then be updated into a final report, giving due consideration to all comments received. The BAR will be submitted to the DMRE for decision-making purposes.

## SUMMARY OF AUTHORISATION REQUIREMENTS

The proposed project comprises of activities which trigger listed activities in terms of the National Environmental Management Act (107 of 1998) (NEMA) Environmental Impact Assessment (EIA) Regulations (Government Notice Regulation (GNR) 982 of 2014, as amended). The proposed project also comprises of activities which do not trigger listed activities. Therefore, an integrated environmental authorisation process was undertaken to fulfil the requirements of:

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## TERMS OF REFERENCE

SLR (as the independent EAP) was appointed to undertake the required environmental authorisation process including the required public participation process. The terms of reference for the environmental regulatory process are to ensure the following:

- Make an application for Environmental Authorisation of the proposed project in terms of NEMA.
- Ensure that the BA process is undertaken in accordance with the requirements of the NEMA EIA Regulations (2014, as amended) and MPRDA.
- Ensure that the BA process is undertaken in an open, participatory manner to ensure that all potential issues of concern and their associated impacts are identified.

- Undertake a formal public participation process, which includes the distribution of information to I&APs and provides the opportunity for I&APs to raise any concerns and/or issues, as well as an opportunity to comment on all BA documentation.
- Integrate all the information, including the findings of the specialist studies and other relevant information, into a BAR to allow an informed decision to be taken on the proposed project by the relevant authorities.

Further to this and in accordance with Appendix 1 of the EIA Regulations (2014, as amended) and the DMRE reporting requirements, the key objectives of this BA process are to:

- 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.
- Identify and assess possible activity, location, and technology alternatives.
- Describe the need and desirability of the proposed alternatives.
- Undertake 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 the sites and the risk of impact of the proposed activity and technology alternatives on these aspects in order to determine the following:
    - The nature, significance, consequence, extent, duration, and probability of the impacts occurring.
    - The degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed, or mitigated.
    - Possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity using site sensitivities ranking to:
        - Identify and motivate a preferred site, activity, and technology alternative.
        - Identify suitable measures to avoid, manage or mitigate identified impacts.
        - Identify residual risks that need to be managed and monitored.

## STRUCTURE OF THIS REPORT

This document has been prepared in accordance with the DMRE BAR template and also complies with the requirements of Appendix 1 and Appendix 4 of the NEMA EIA Regulations (2014, as amended). Table 1 provides a summary of the requirements, with cross references to the report sections where these requirements have been addressed.

**Table 1: Structure of the BAR**

| BAR requirements as per the DMRE template | BAR requirements as per the EIA Regulations, 2014 (as amended) | Reference in the report |
|---|---|---|
| **Part A of DMRE report template** | **Appendix 1 of the NEMA regulations (2014, as amended)** | **Section/Appendix** |
| Details of the EAP. | Details of the EAP who prepared the report. | Section 1.1. |
| Expertise of the EAP. | Details of the expertise of the EAP, including curriculum vitae. | Section 1.2 and Appendix B: EAP curriculum vitae and registration. |

| BAR requirements as per the DMRE template | BAR requirements as per the EIA Regulations, 2014 (as amended) | Reference in the report |
|---|---|---|
| Location of overall activity. | The location of the activity, including - the 21-digit Surveyor General code of each cadastral land parcel. Where available the physical address and farm name. Where the required information is not available, the coordinates of the boundary of the property or properties. | Section 2. |
| Locality plan. | A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or on land where the property has not been defined, the coordinates within which the activity is to be undertaken. | Section 2. |
| Description of the scope of the proposed overall activity. | A description of the scope of the proposed activity, including all listed and specified activities triggered. A description of the activities to be undertaken, including associated structure and infrastructure. | Section 3. |
| Policy and legislative context. | A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context. | Section 4. |
| Need and desirability of the proposed activity. | A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location. | Section 5. |
| Motivation for the overall preferred site, activities, and technology alternative. | A motivation of the preferred development footprint within the approved site including. | Section 6. |
| A full description of the process followed to reach the proposed development footprint within the site. | A full description of the process followed to reach the proposed development footprint within the approved site. | Section 7 |
| Details of the development footprint alternatives considered. | Details of all the alternatives considered. | Section 7.1.2 |
| Details of the public participation process followed. | Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs. | Section 7.2 |
| Summary of issues raised by I&APs. | A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them. | Section 7.2.3. |

| BAR requirements as per the DMRE template | BAR requirements as per the EIA Regulations, 2014 (as amended) | Reference in the report |
|---|---|---|
| Environmental attributes associated with the alternatives. | The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects. | Section 7.3. |
| Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts including the degree of the impacts. | The impacts and risks identified, including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed and mitigated. | Section 7.6. |
| Methodology used in determining the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks. | The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks. | Section 7.5. |
| The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected. | Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects. | Section 7.6. |
| The possible management actions that could be applied and the level of risk. | The possible management actions that could be applied and level of residual risk. | Section 1.1. |
| Motivation where no alternative sites were considered. | The outcome of the site selection matrix. If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such. | Section 1.1. |
| Statement motivating the alternative development location within the overall site. | A concluding statement indicating the preferred alternatives, including preferred location within the approved site. | Section 7.9. |
| Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (in respect of the final site layout) through the life of the activity. | A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structure and infrastructure will impose on the preferred location through the life of the activity including a description of all environmental issues and risks that were identified during the environmental impact assessment process and an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of management actions. | Section 8. |

| BAR requirements as per the DMRE template | BAR requirements as per the EIA Regulations, 2014 (as amended) | Reference in the report |
|---|---|---|
| Assessment of each identified potentially significant impact and risk. | An assessment of each identified potentially significant impact and risk including cumulative impacts, the nature, significant and consequence of the impact and risk, the extent and duration of the impact and risk, the probability of the impact and risk occurring, the degree to which the impact can be reversed, the degree to which the impact and risk may cause irreplaceable loss of a resources and the degree to which the impact and risk can be mitigated. | Section 9 and APPENDIX D: DETAILED ASSESSMENT OF POTENTIAL IMPACTS. |
| Summary of specialist reports. | Where applicable the summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report. | Section 10 |
| Environmental impact statement. | An environmental impact statement which contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives. | Section 11 |
| Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr. | Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr. | Section 12.1 |
| Aspects for inclusion as conditions of authorisation. | Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation. | Section 13. |
| Description of any assumptions, uncertainties and gaps in knowledge. | A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and management actions proposed. | Section 14 |
| Reasoned opinion as to whether the proposed activity should or should not be authorised. | Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation. | Section 15. |
| Period for which environmental authorisation is required. | Where the proposed activity does not include operational aspects, the period for which the | Section 16. |

| BAR requirements as per the DMRE template | BAR requirements as per the EIA Regulations, 2014 (as amended) | Reference in the report |
|---|---|---|
| | environmental authorisation is required and the date on which the activity will be concluded, and the post construction monitoring requirements finalised. | |
| Undertaking. | An undertaking under oath or affirmation by the EAP in relation to the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&APs, the inclusion of inputs and recommendations from the specialist reports where relevant and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties. | Section 17. |
| Financial provision. | Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts. | Section 18. |
| Specific information required by the competent authority. | Any specific information required by the competent authority. | Section 19. |
| Other matter required in terms of section 24(4)(a) and (b) of the Act. | Any other matter required in terms of section 24(4)(a) and (b) of the Act. | Section 20. |
| **Part B of the DMRE report template** | **Appendix 4 of the NEMA regulations** | **Section/Appendix** |
| Details of EAP. | Details of the EAP who prepared the EMPr and the expertise of that EAP to prepare the EMPr, including curriculum vitae. | Section 1. |
| Description of the aspects of the activity. | A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description. | Section 24. |
| Composite map. | A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers. | Section 23. |
| Description of impact management objectives including management statements. | A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including planning and design, pre-construction activities, construction activities, rehabilitation of the environment after construction and where | Section 24. |
| | | Section 24.1 |

| BAR requirements as per the DMRE template | BAR requirements as per the EIA Regulations, 2014 (as amended) | Reference in the report |
|---|---|---|
| | applicable post closure; and where relevant, operation activities. | |
| Impacts to be mitigated in their respective phases. | - | Section 24.4. |
| Impact management outcomes. | A description and identification of impact management outcomes required for the aspects contemplated in paragraph. | Section 25. |
| Impact management actions. | A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes be achieved, and must, where applicable, include actions to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure, where applicable comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable. | Section 26. |
| Financial provision. | | Section 27. |
| Mechanism for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon. | The method of monitoring the implementation of the impact management actions. | Section 28. |
| | The frequency of monitoring the implementation of the impact management actions. | |
| | An indication of the persons who will be responsible for the implementation of the impact management actions. | |
| | The time periods within which the impact management actions must be implemented. | |
| | The mechanism for monitoring compliance with the impact management actions. | |
| | A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations. | |
| Environmental Awareness Plan. | An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment. | Section 29. |
| Specific information required by the competent authority. | Any specific information that may be required by the competent authority. | Section 30. |
| Undertaking. | - | Section 31. |

## OPPORTUNITY TO COMMENT

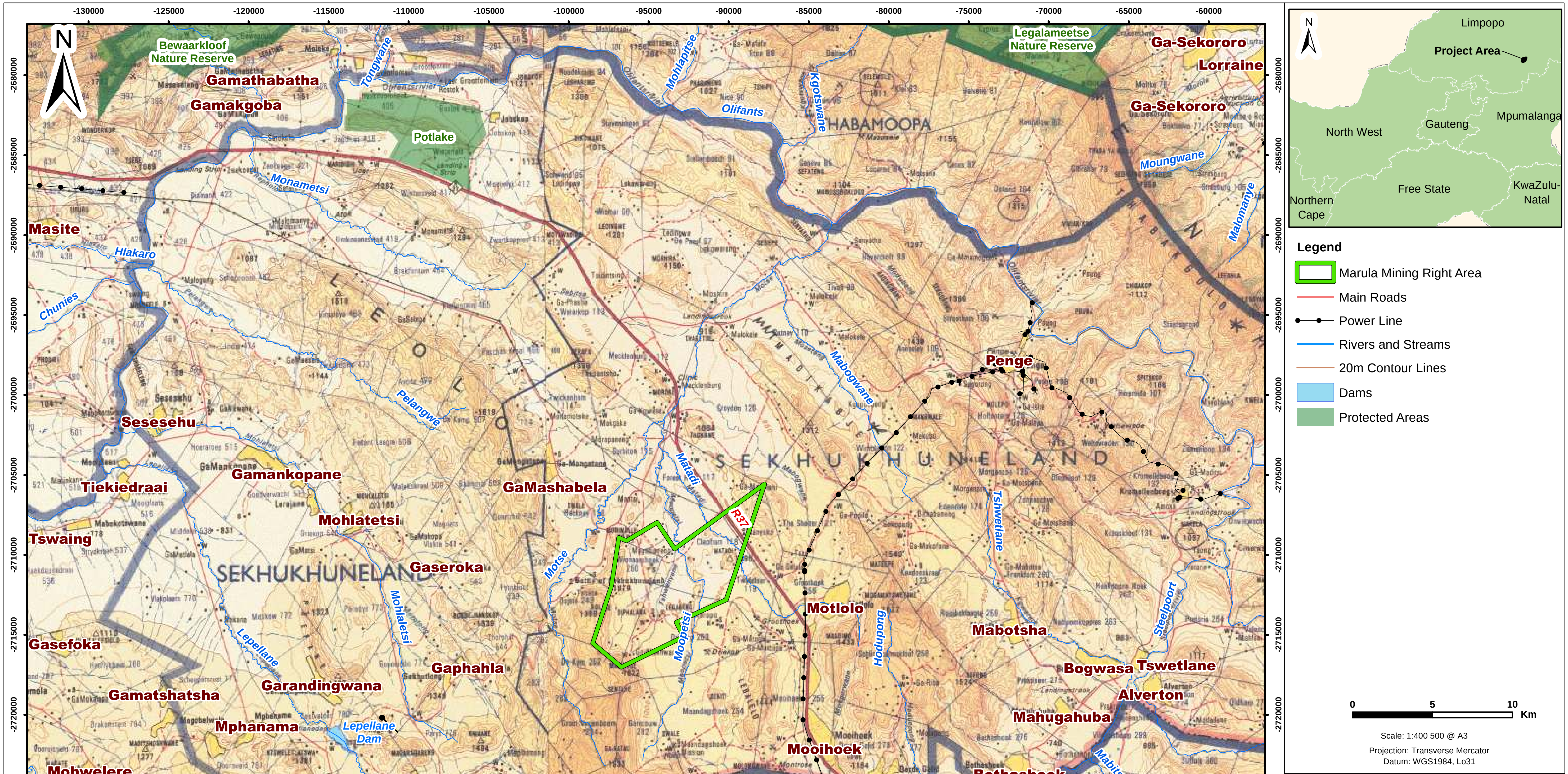
This BAR will be distributed for a 30-day period from **08 February 2022 to 10 March 2022** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the BA process. Copies of the full report are available on the SLR website (https://slrconsulting.com/public-documents) and the SLR data free website (https://www.slrconsulting.com/en/public-documents). Electronic copies (compact disk) of the report are available on request from SLR at the contact details provided below.

**SLR Consulting (Africa) (Pty) Ltd**
Attention: Mavisha Nariansamy

PO Box 1596, Cramerview 2060
(if using post please call SLR to notify us of your submission)

Tel: (011) 467 0945
E-mail: **mnariansamy@slrconsulting.com**

All comments received during the review process will be addressed in the BAR. Issues and concerns raised to-date, including responses, are provided in Section 7.2.3.




**Legend**

- Marula Mining Right Area
- Main Roads
- Power Line
- Rivers and Streams
- 20m Contour Lines
- Dams
- Protected Areas

Scale: 1:400 500 @ A3
Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 1**

**Regional Setting**

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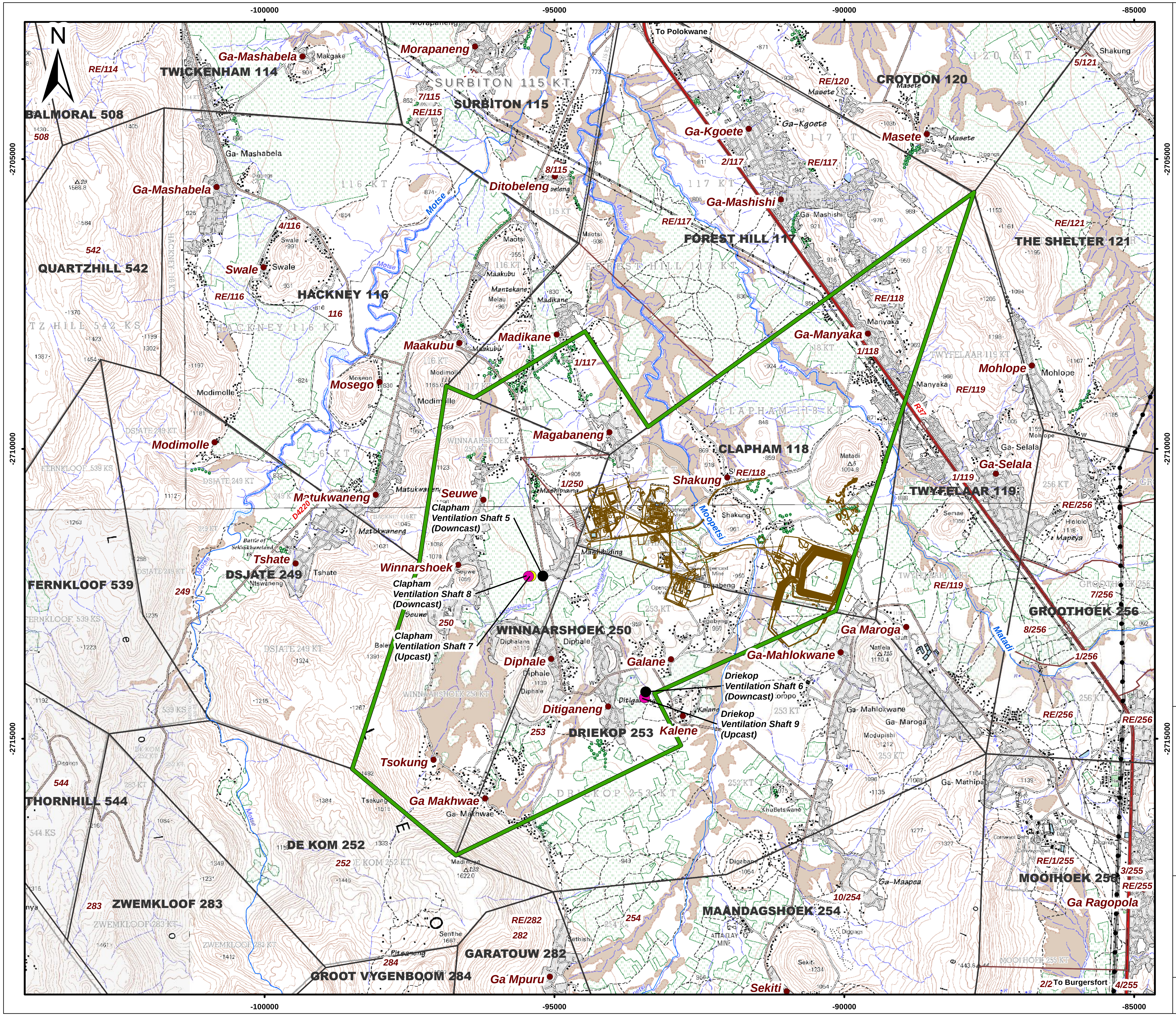



**Legend**

- Villages / Towns
- Main Roads
- Power Line
- Rivers and Streams
- 20m Contour Lines
- Farms
- Farm Portions
- Marula Mining Right Area
- Existing Infrastructure
- Existing Ventilation Shafts
- Approved Ventilation Shaft
- Proposed Ventilation Shafts

Marula Platinum Mines

**Figure 2**

**Local Setting**

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710.09002.00016 | 2021/09/21

# PART A - SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

# 1. DETAILS OF THE EAP

## 1.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

The details of the EAPs that were involved in the preparation of this BAR are provided in Table 2 below.

**Table 2: Details of the EAP**

| General | | |
|---|---|---|
| Organisation | SLR Consulting (Africa) (Pty) Ltd | |
| Postal Address | PO Box 1596, Cramerview, 2060 | |
| Tel. No. | (011) 467 2075 | |
| **Name** | **Tasks and roles** | **Email Address** |
| Rob Hounsome | Document and process review, quality control | - |
| Natasha Smyth | Project Director | nsmyth@slrconsulting.com |
| Mavisha Nariansamy | Project Manager, management of the Basic Assessment process, including public consultation and report compilation | mnariansamy@slrconsulting.com |

SLR does not have any interest in the proposed project other than fair payment for consulting services rendered as part of the EIA process. An undertaking by SLR is provided in Section 17.

## 1.2 EXPERTISE OF THE EAP

**Mavisha Nariansamy** a hold a post graduate diploma in Environmental Engineering and an Honours degree in Environmental Monitoring and Modelling. She has more than 7.5 years of experience in the environmental consulting field gaining experience in the mining, power, linear infrastructure, and water sectors. Her experience includes the management and execution of Environmental Authorisation processes and compliance auditing. Mavisha is a registered Professional Natural Scientist (Environmental Science) with the South African Council for Natural Scientific Professions (SACNASP) (Environmental Science) and is a member of the International Association of Impact Assessment South Africa (IAIAsa).

**Natasha Smyth** holds an Honours degree in Geography and Environmental Management and has approximately 12 years of relevant experience. Natasha has managed and assisted in a wide range of projects for major and small-scale minerals developments throughout South Africa, as well as in Namibia and Zambia. Her areas of expertise include EIAs, Environmental Compliance and Monitoring and Environmental Due Diligence. She is a member of the IAIAsa. She is also a Registered EAP with the EAPASA.

**Rob Hounsome** is the Managing Director of the SLR Group of Companies in Africa. holds a MSc in Environmental Geochemistry and has approximately 29 years relevant experience. Rob has managed or served as a project director undertaking more than 200 Environmental Social Impact Assessments and Environmental and Social Due Diligence services in nearly 40 countries in accordance with requirements of national governments, industry associations, and various funding agencies including all the major International Finance Institutes, Equator Principle Banks, and/or legal firms, including both Due Diligence Assessments for project financing and advisory on Lender expectations (and associated project financing negotiations).

Curricula vitae and proof of registrations are attached in Appendix A.

# 2. LOCATION OF ACTIVITY

## 2.1 LOCATION OF OVERALL ACTIVITY

A description of the properties on which the proposed project is located is provided in Table 3 below.

**Table 3: Description of the property**

<table>
<tr><th>Description</th><th>Details</th></tr>
<tr><td>Farm Names<br>(Marula Platinum Mine)</td><td>• Driekop 253 KT.<br>• Clapham 118 KT.<br>• Forest Hill 117 KT.<br>• Winnarshoek 250 KT.</td></tr>
<tr><td>Physical address</td><td>Stand: 118 Winnarshoek, Driekop 1129</td></tr>
<tr><td>Magisterial district</td><td>The proposed project is located in the Burgersfort Magisterial District and the Sekhukhune District Municipality.</td></tr>
<tr><td>Distance and direction from nearest town</td><td>Marula is situated along the R37, approximately 30 km to the north-west of the town Burgersfort.</td></tr>
<tr><td>Location of the proposed activity/activities</td><td>
<table>
<tr><th>Proposed activity/project component</th><th>Farm name</th></tr>
<tr><td colspan="2">Ventilation shafts and refrigeration</td></tr>
<tr><td>Driekop Ventilation Shafts 6 and 9</td><td>Driekop 253 KT (Portion 0)</td></tr>
<tr><td>Clapham Ventilation Shafts 5, 7 and 8</td><td>Winnarshoek 250 KT (Portion 0)</td></tr>
<tr><td colspan="2">Power supply and distribution</td></tr>
<tr><td>Eskom Yard capacity upgrade to 40 MVA</td><td>Clapham 118 KT (Portion 0)</td></tr>
<tr><td>Physical extension of Eskom Yard footprint.</td><td>Clapham 118 KT (Portion 0)</td></tr>
<tr><td>Establishment of 33 kV Overhead Transmission Lines (OHT) – Clapham OHT</td><td>Clapham 118 KT (Portion 0)<br>Winnarshoek 250 KT (Portion 0)</td></tr>
<tr><td>Establishment of 33 kV Overhead Transmission Lines (OHT) – Driekop OHT</td><td>Driekop 253 KT (Portion 0)</td></tr>
<tr><td colspan="2">Water supply and distribution</td></tr>
<tr><td>Expansion of water pipelines</td><td>Driekop 253 KT (Portion 0)<br>Winnarshoek 250 KT (Portion 0)<br>Clapham 118 KT (Portion 0)</td></tr>
<tr><td colspan="2">Product stockpile</td></tr>
<tr><td>Establishment of a product stockpile</td><td>Clapham 118 KT (Portion 0)</td></tr>
<tr><td>Additional TSF pipeline</td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>Description</th><th colspan="2">Details</th></tr>
<tr><td rowspan="7"></td><td>Establishment of an additional pipeline to the Phase 2 TSF (follows approved and existing pipeline route)</td><td>Clapham 118 KT (Portion 0)</td></tr>
<tr><td colspan="2">Structural upgrades to Clapham Shaft Complex</td></tr>
<tr><td>Structural upgrade of the existing change house at Clapham Shaft Complex</td><td>Clapham 118 KT (Portion 0)</td></tr>
<tr><td>Upgrade of the existing compressed airline at Clapham Shaft Complex area</td><td>Clapham 118 KT (Portion 0)</td></tr>
<tr><td colspan="2">Monitoring and remediation of TSF Plume</td></tr>
<tr><td>Monitoring and remediation of TSF plume</td><td>Driekop 253 KT (Portion 0)<br>Clapham 118 KT (Portion 0)</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>21-digit Surveyor General (SG) Code</td><td><u>Farm name</u><br>Driekop 253 KT<br>Clapham 118 KT<br>Winnarshoek 250 KT</td><td><u>(SG) Code</u><br>T0KT00000000025300000<br>T0KT00000000011800000<br>T0KT00000000025000000</td></tr>
<tr><td>Application area (ha)</td><td colspan="2">• The Marula Mine Mining Right Area (MRA) is approximately 5 532 ha.<br>• The proposed establishment of additional infrastructure will require an approximate area of 4.169 ha.<br>• The proposed Clapham and Driekop OHT will be approximately 7.1 km for both OHT lines.</td></tr>
<tr><td>Water catchment and management area</td><td colspan="2">• Quaternary Catchment B71E.<br>• Olifants Water Management Area.</td></tr>
</table>

## 2.2 LOCALITY MAP

The regional and local settings are illustrated in Figure 1 and Figure 2 respectively.

# 3. DESCRIPTION OF THE PROPOSED OVERALL ACTIVITY

## 3.1 OVERVIEW OF EXISTING OPERATIONS

Marula Platinum (Pty) Ltd, an existing platinum producer and a subsidiary of Impala Platinum Holdings Limited, owns and operates Marula Platinum Mine (Marula) in the Greater Tubatse Local Municipality and Sekhukhune District Municipality in the Limpopo Province. Marula is an existing underground platinum mining operation whose operations include mineral processing. Marula is currently exploiting the UG2 reef via the existing Clapham and Driekop Shaft Complexes. Marula has operated under an approved 2001 EMPr (Pulles Howard & de Lange Inc., 2001), which was later amended in 2007 (Metago, 2007) and consolidated in 2012 (Metago, 2012).

Changes to current mining operations and subsequent compliance to health and safety measures require that the underground ventilation be improved. To do this, Marula proposes to make changes to their existing and approved surface layout by the addition of surface infrastructure. This proposed expansion will extend the current life of mine (LOM) by 17 years. To provide a context to the proposed project, this chapter begins with an overview of the existing mining operations and services. Thereafter information on the listed and specified activities triggered in terms of the NEMA EIA Regulations (2014, as amended) and a description of the activities comprising the proposed project is detailed. The information detailed in this section was provided by the project team, and was obtained from the following sources:

- Approved EMPR Impala Platinum Limited (Pulles Howard & de Lange Incorporated, 2001).
- Approved EIA and EMP (Metago, 2007).
- Approved EIA and EMPr Report (Metago, October 2012).
- Integrated Water and Waste Management Plan (SRK, November 2019).

The technical design, project details and engineering input of the proposed activities were obtained from the Marula project team.

### 3.1.1 APPROVED MINING ACTIVITIES

The information contained in this section was sourced from the approved 2012 EMPr (Metago, 2012) for the Marula operations. It is important to note that the proposed project activities are not anticipated to change the approved mining and processing methods. An overview of the mining activities is shown in Table 4 below.

**Table 4: Overview of mining activities**

| Activity | Description |
|---|---|
| Resource exploitation | The approved mining activities comprises conventional underground mining methods. Marula identified the UG2 and Merensky reefs as economically viable resources to be mined. The depth of mining varied from surface to over 600 mbgl. The Merensky reef is located parallel and approximately 400 m above the UG2 reef. The target reef is drilled and blasted underground. Currently the mine is exploiting the UG2 reef, and the Merensky Reef will be mined in future using conventional underground breast mining methods. |
| Access to resources | Marula has two shaft complexes as part of their existing surface infrastructure. These are the Clapham Shaft Complex and the Driekop Shaft Complex, which are located on the farms Clapham 118 KT and Driekop 253 KT respectively. Currently access to the UG2 Reef is gained through these shaft complexes. A Merensky Shaft Complex has been approved but not yet constructed. Once exploitation of the Merensky Reef begins, access will be gained through the Merensky Shaft Complex. |
| Removal and storage of ore | The ore from the current UG2 operations is transported via a conveyor belt to the run-of-mine silo located at each shaft (1 500 ton capacity). Under normal operating conditions, the ore is conveyed from the silo to the primary crusher. In the event that the processing plant is offline, the ore is conveyed to a 20 000 tonne emergency run- of-mine stockpile area located near to the primary crusher.<br>Once constructed, the approved Merensky Shaft Complex will have approximately 600 000 tons of ore temporarily stockpiled at the shaft for the first 18 months of operation, after which it will be fed to the Merensky Plant (once commissioned) over a period of 4 months. Ore will be transported to the reef stockpile via tipper trucks. Ore from the reef stockpile will be transported to the primary crusher using front end loaders and tipper trucks. The reef stockpile will have a final footprint area of 1.6 ha and a height of 15 m. Once the Merensky Plant is operational, ore from underground will be conveyed to a run-of-mine silo (1 600 ton capacity) located at the Merensky Shaft Complex. Under normal operating conditions, the ore will be conveyed from the silo to a primary crusher located at the shaft complex. In the event that the Merensky plant is offline, the ore will be conveyed and tipped onto the 20 000 tonne emergency run-of-mine stockpile area. |
| Removal and storage of waste rock | Waste conveyed from underground is deposited on the designated waste rock dump (WRD) areas located at the Clapham and Driekop Shaft Complexes. A waste WRD has been approved for the Merensky Shaft Complex (not yet constructed). Waste rock is crushed by dedicated crushers located at each shaft complex. |
| Life of Mine | Marula has a life of mine of approximately 40 years. The current Marula operations have 11 years remaining (inclusive of FY22). |

### 3.1.2 APPROVED MINERAL PROCESSING

In general terms, the processing activities at Marula comprise; crushing, milling, screening, floatation and tailing disposal. A description of the mineral processing activities at Marula is provided in Table 5 and a conceptual flow diagram is provided in Figure 3.

**Table 5: Summary of mineral processing activities**

| Activity | Description |
|---|---|
| Crushing, screening and hauling | The ore is processed at the UG2 Concentrator Plant at an average rate of 162 500 tpm. Under normal operating conditions, run-of-mine from the silos is fed via a conveyor to a primary crusher located at each shaft. If ore has been stockpiled on the emergency stockpile, then ore from the stockpile is loaded into the primary crusher via a front-end loader. Crushed ore is then conveyed from the primary crusher to two 10 000 ton silos located at the plant. |
| Concentrator Plant | There is currently one mineral processing plant at the mine, namely the UG2 Concentrator Plant used for processing UG2 Reef mined from the Driekop and Clapham shafts. The plant has a MF1 (mill-float) configuration and was designed to treat 200 000 tonnes run of mine per month. The plant occupies an area of approximately 42 ha. The main elements of the UG2 plant include crushing and screening, dense media separation (DMS), milling and flotation, dewatering circuit. The Merensky plant, when constructed, will have a similar configuration to the UG2 plant i.e., the plant will have a MF1 (mill-float) configuration. The plant will be designed to treat 200 000 tonnes Merensky ore per month. |
| Chrome plant | Tailings from the UG2 plant, is dewatered to produce a thickened slurry before being deposited on the tailings dam. The plant processes between 165 000 and 200 000 dry UG2 tailings tonnes per month and produces approximately 20 000 to 30 000 tonnes of chrome concentrate per month. The target concentrate grade is 44% $Cr_2O_3$ by mass. The only raw materials used in the plant are UG2 tailings and water. Water is recycled in the process. No other wastes are generated by the chrome plant. As part of the Merensky project, a spiral gravity scavenger plant is planned to recover chrome from the UG2 tailings stream before it is deposited on the tailings dam. The chrome recovered from the tailings is sold to a third party. |
| Tailings scavenger plant | A Tailings scavenger plant was approved on the farm Clapham 118KT, immediately adjacent to the existing tailings booster pump station. The tailings scavenger plant will be constructed and operated to optimise platinum group metals (PGM) extraction after the chrome plant but prior to disposal of the tailings to the tailings dam. A flotation circuit will be utilised to recover the PGMs at the plant. This flotation circuit operates in a similar manner to that of the UG2 and Merensky plants. In this regard in the flotation process, the minerals that the platinum group metals are associated with, attach to bubbles of air and are thus separated from the slurry. The concentrate collected on the bubbles is then upgraded through a series of flotation steps. Chemical reagents (copper sulphate, Dow 200 frother, KU5 depressant, flocculent, sodium iso-butyl xanthate) for the flotation process will be added to the slurry to assist with the separation process. The recovered PGMs will then be collected in a tank within the plant and will be transported on a weekly basis via truck/tanker to Rustenburg for further processing. Tailings from the tailings scavenger plant will be pumped to the existing TSF as per the current operations. |
| Process tailings disposal | There is a designated and approved Tailings Storage Facility (TSF) with extension (approved as part of the Merensky operations). The waste from the processing plant, after chrome removal, is pumped to the TSF and deposited on an ongoing basis. |
| Final product handling | The mine product is platinum concentrate (filter cake) containing the platinum group metals, together with metals and minerals found in mineralogical association. The final product is trucked to Rustenburg for further refinement. |

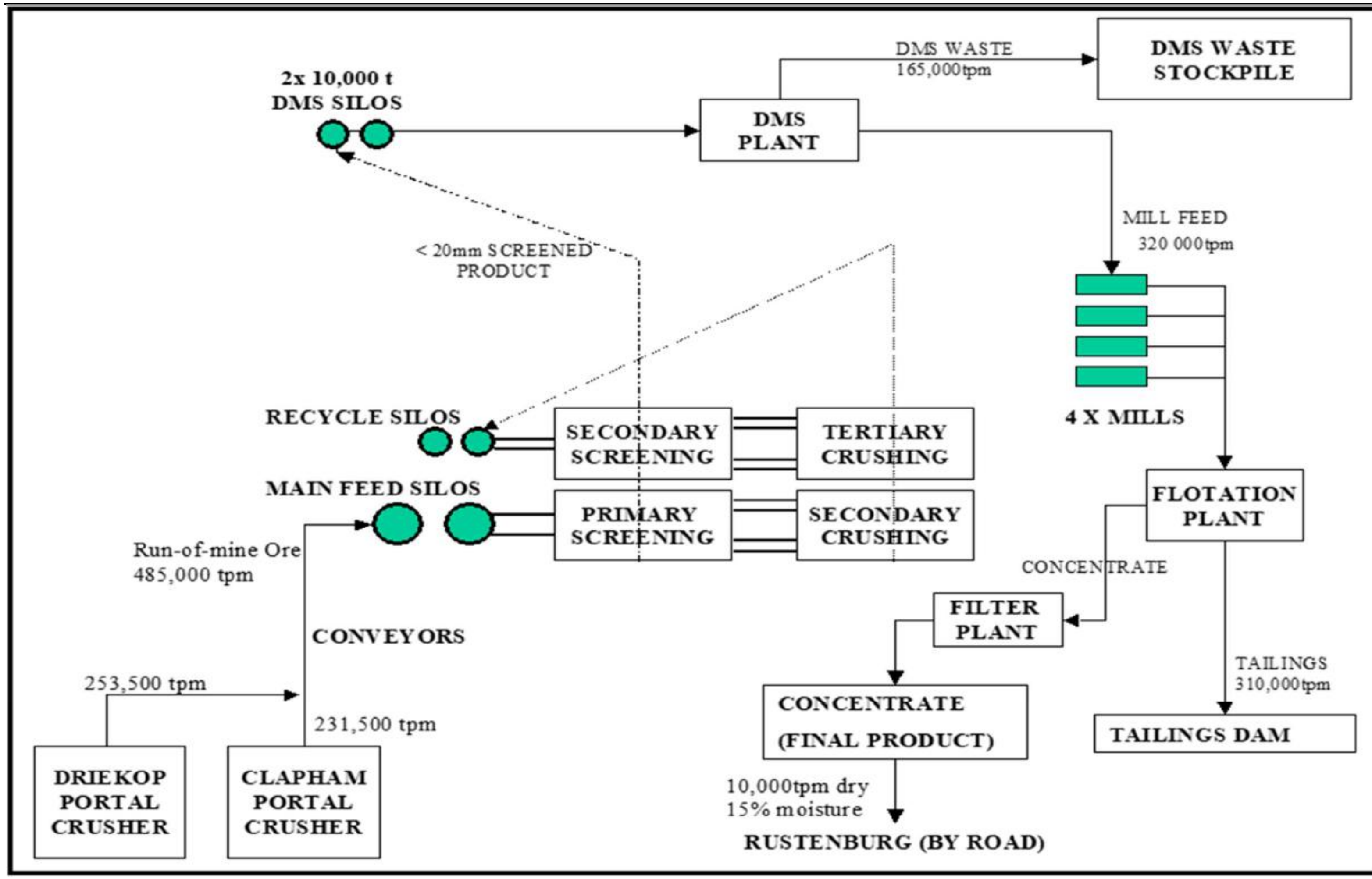


**Figure 3: Schematic of mineral processing at Marula**

### 3.1.3 APPROVED MINE INFRASTRUCTURE AND SUPPORT SERVICES

The approved surface infrastructure is summarised in Table 6. The proposed project is not anticipated to change the approved mining method are anticipated approved processing method. The approved surface layout is shown in Figure 4.

**Table 6: Overview of approved infrastructure**

| | |
|---|---|
| *Shaft complexes* | |
| Clapham Shaft Complex | Driekop Shaft Complex |
| Merensky Shaft Complex (approved but not yet constructed) | |
| *Ventilation shafts* | |
| Ventilation Shaft 5 | Ventilation Shaft 6 |
| Ventilation Shaft 7 (approved but not constructed) | |
| *Mining and related processing infrastructure* | |
| Tailings Scavenger Plant | UG2 Concentrator Plant |
| UG2 tailings dam (Phase 1 and 2) with associated pipelines (tailings, return water) | Return water dam |
| DMS waste site and conveyor system | DMS plant (not currently in use) |
| Topsoil stockpiles | Water management facilities (clean and dirty stormwater control measures, pollution control dams, stormwater dams and process water dams) |
| Product stockpiles and product storage silos | |
| *Water Supply facilities* | |
| Main water supply facilities comprising the Lebalelo Water User Association (LWUA) pipeline | Raw water dam |
| Internal potable and process water supply pipelines | Potable water treatment plant. |
| Sewage treatment plant at Clapham | |
| *Support infrastructure* | |
| Workshops, wash bays, laydown and storage areas | Handling areas for raw materials |
| Salvage yards | Fuel and lubrication storage and handling system |
| Compressor house/s | Explosives storage magazine, destruction area and explosives delivery points |
| Change houses with ablution facilities | Lamp houses and waiting rooms |
| Security control | Laboratory |
| Bus/taxi off- loading and loading areas | Clinic facility and first aid offices |
| Training centre, trade union meeting area and main office/admin block and secondary offices | Mine camp |
| Main mine access road and smaller mine service and haul roads | |


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Marula Mining Right Area
- Approved Infrastructure
- Existing Ventilation Shafts
- Approved Ventilation Shaft

0 400 800 Meters

Scale: 1:23 500 @ A3
Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 4**

**Approved Site Layout**

SLR

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| | |
|---|---|
| 710.09002.00016 | 2022/01/21 |

#### 3.1.3.1 Mineralised waste management

*Waste Rock*

The mining operations involve the excavation of targeted underground mineral reserves. The excavation produces mineralised waste in the form of waste rock. Waste rock associated with the Clapham Shaft is stored on the Clapham Waste Rock Dump (WRD). The Clapham Shaft WRD is located within 100 m of a watercourse, however the WRD is located outside of the 1:100-year flood line. The waste rock associated with platinum mining at similar operations has been characterised as having a low pollution potential as the rock is non-acid generating. The waste rock is currently being reclaimed and re-processed for use in the construction of the started wall of the new TSF. However, a waste characterisation was undertaken by Golder and Associates in 2015. Three composite samples of waste rock produced by Marula was assessed in accordance to Regulation 635 of the National Norms and Standards for the assessment of Waste for Landfill Disposal. The results indicated that that the two of the three samples were classified as Type 4 and one sample was classified as Type 3 due to copper concentrations. However, the study concluded that constituents of concern were below leachable concentrations indicating minimal risks to groundwater resources. More detail on the waste rock geochemistry is provided in Section 7.3.1. Due to remining of waste rock for reuse including construction of the new TSF, expansion of the Clapham shaft waste rock dump footprint is not planned. To date no WRD has been established for the Driekop Shaft.

*Tailings*

The waste from the processing plant, after chrome removal is stored on the designated TSF facility. The tailings are transported via a pipeline and booster station. The TSF facility is composed of the original TSF, the new TSF, associated return water dam (RWD) and stormwater dam. The mine is currently constructing a new TSF, because the existing TSF has reached capacity. The return water is stored in the HDPE lined RWD. The stormwater dam contains any overflow from the RWD. The monthly tonnage deposited on the TSF during 2018 was 1 731 691 tonnes/ month.

*Dense Media Separator (DMS) waste*

Marula has allocated an area of 120 ha for the DMS waste site. The DMS waste site was approved by the DMRE but is not yet constructed. Once constructed, the DMS waste will be transported from the plant to the dump via a conveyor belt and will be deposited directly onto the dump. The conveyor belt will be fenced off at 10 metres on either side to create a safety area.

#### 3.1.3.2 Non-mineralised waste management

Types of wastes generated by Marula include the following:

- Domestic wastes (such as office waste, food waste and detergents);
- Sewage wastes; and
- Industrial wastes (such as building rubble, electrical and plastic material, oils and grease, paints and solvents, scrap metal).

In general, all domestic solid waste is collected and removed to the municipal landfill. Hazardous wastes such as hydrocarbon material (motor oils, contaminated grease) are collected in designated containers and collection sumps at various locations around the site. These hazardous wastes are removed by contractor for recycling or disposal as appropriate. Contaminated soils are removed, and the areas are remediated on a as needed basis. The salvage yard contains recyclable wastes which have been sorted and stored. The recyclable wastes are removed by appointed contractors. Marula has existing waste management and disposal practices for their domestic and industrial wastes, these practises are detailed in Appendix D.

### 3.1.4 ROAD AND TRANSPORT NETWORK

Marula is an operational mine with established road infrastructure which provides access to the mine. The mine is situated alongside the provincial R37, which links the towns of Burgersfort and Polokwane. The mine's Access Road is located just off the R37 and is surfaced with one lane per direction. In addition to servicing the mine, the Access Road also services surrounding residential communities. Within the mining area, there are smaller access roads which provide access to various parts of the operations. The smaller access roads are between 4 - 5m wide and comprise of gravel material. The smaller access roads are purposed for low traffic volumes. Plant equipment such as tipper trucks and front loaders are utilized for transportation of material for mine processes. Smaller vehicles are also utilized by personnel to access the various operations.

### 3.1.5 POWER SUPPLY

Power at the mine is supplied by Eskom. There is an existing Eskom yard located at the Concentrator Plant on farm Clapham 118 KT. The current maximum power demand is estimated at 32 MW for the remaining life of mine. The current power supply consists of the Eskom yard and transmission powerlines. In addition, there are registered power servitudes within the MRA.

- Eskom consumer substation (Eskom yard): Infrastructure at the Eskom yard comprises of 2 X 40 MVA transformers.
- Transmission and distribution lines: A 132 kV line enters the mine from east and feeds into the existing Eskom yard located north of the existing Concentrator Plant. From the Eskom yard, power to the various operations is distributed via 11 kV lines. The main power lines service the Clapham shaft, the Driekop shaft and the Tailings Storage Facility (TSF) area. The approved Merensky Shaft will obtain power from the Eskom Yard. A 132 kV line will be established and connected to a 132/11 kV substation at the Merensky Shaft Complex.
- Existing registered and unregistered power servitudes are located as follows:
    - Powerline servitude on Clapham 118 KT (Servitude No. K1921/2005 S – SG Diagram 13542/1997);
    - Powerline servitude on Forrest Hill 117 KT (Servitude No. K1918/2005 S – SG Diagram 13540/1997);
    - Outspan servitude on remaining extent of Winnarshoek 250 KT (SG Diagram D.B. 109/18 - it is not clear from neither the diagram where this outspan servitude area is located); and
    - Outspan servitudes (two) and Eskom Holdings servitude on Driekop 253 KT (No. A 6769/1950 – SG Diagrams 3494-9/2005 – no diagrams found at deeds office).

### 3.1.6 WATER SUPPLY, USE AND MANAGEMENT

A brief overview of the water supply, water use and water management measures currently in place in given in Table 7.

**Table 7: Water supply, water use and water management**

<table>
<tr><th>Aspect</th><th colspan="2">Description of activity</th></tr>
<tr><td>Raw water supply</td><td colspan="2">Water for the mine is sourced from the Lebalelo Water User Association (LWUA) via an underground pipeline. The pipeline follows the R37 from where the mine has a take-offline. Water from LWUA is pumped to a Raw Water Dam located near to the Concentrator Plant. The raw water dam is operated and managed by the LWUA and has a capacity of 24 500 m³. Marula utilises a closed water circuit where raw water is reticulated around the mine for process use. The raw water is stored in the Plant Dam. Due to the continued use of recycled water, Marula only sources make-up water from the Lebalelo Water Association via an off-take pipeline to the Plant Dam when there is a water shortfall.</td></tr>
<tr><td>Potable water supply</td><td colspan="2">Potable water is obtained from the treatment of raw water in a purification plant (filtration and disinfection). This water is used for domestic purposes and is stored in steel storage tanks at the potable water plant.</td></tr>
<tr><td>Sewage treatment facility</td><td colspan="2">There is a bio-disc sewage effluent plant located approximately 150 m north-west of the Clapham Shaft Complex to treat sewage effluent. The capacity of the plant is 433 m³/day. The sludge drying beds are no longer in use. Sludge is removed by a contractor (Steelpoort Sewerage Services) from the tanks via honeysucker and transferred to the Burgersfort municipal sewage plant.</td></tr>
<tr><td rowspan="3">Process water supply</td><td colspan="2">Process water streams currently originating from the mine operations include the following:<br>• Tailings Storage Facility (TSF) return water.<br>• Stormwater runoff.<br>• Water removed from underground.<br>• TSF scavenger borehole system.<br>• Treated final sewage effluent reused in the process.<br>• Make up water from the Lebalelo Supply.<br><br>The management of the mine process water storage is described below.</td></tr>
<tr><td>TSF Return Water Dam (RWD)</td><td>The TSF has an existing return water dam (RWD), which was constructed as an earth embankment water dam. The RWD has two compartments. The operational compartment has a capacity of 35 866 and comprises of a three-layer HDPE lining with leak detection. This compartment contains water from the TSF (80%) and excess fissure water (20%) from the shafts. The stormwater compartment has an existing capacity of 55 000 m3 and a future capacity of 152 954 m³. This component is maintained empty under normal operating conditions. When the future dam is line, it will form part of the operational return water system.</td></tr>
<tr><td>Driekop Shaft process water</td><td>The Driekop Shaft has three dams to manage process water as follows:<br>• Settling dam;<br>• Erichsen dam; and<br>• Pollution Control dam.<br>The settling dam has two compartments (a primary and secondary earth lined dam). The capacity of the primary compartment is 264 m3 and the secondary compartment is 3 051 m³. This dam receives water from the underground mine workings for settling out</td></tr>
</table>

| Aspect | Description of activity | |
|---|---|---|
| | | the suspended solid matter. Water from this dam is transferred to the Erichsen dam. The Erichsen dam has a capacity of 208 m$^3$, the water received from the settling dam is re-used underground and excess water is transferred to the pollution control dam at the Clapham Shaft. The pollution control dam at Driekop receives runoff from the shaft area and has a designed capacity of 1 414 m$^3$ (primary compartment) and 1 535 m$^3$ (secondary compartment) and capacity of 2 949 m$^3$. However, the dams are significantly silted which reduces their operational capacity. The dam is connected to the reticulation network to return the water to the settling dams for reuse. |
| | Clapham Shaft process water | The Clapham Shaft has five dams to manage the process water, as follows:<br>• Pollution control dam;<br>• Emergency dam;<br>• Service water dam;<br>• Settling dam; and<br>• Erichsen dam.<br>The pollution control dam receives the run-off water from the Clapham Shaft Complex. Occasional wash water from the change house, seepage form the waste rock dump and emergency overflow form the Erichsen dam. This concrete lined dam has a capacity of 4 713 m$^3$. Water is pumped to the settling dams for reuse in the shaft.<br>The emergency dam is an unlined dam with a capacity of 1 722 m3. This dam is not licenced and is kept empty until it is licensed and lined in the future. The overflow from the settling and service water dams will flow into the emergency dam. Water is returned to the service water dam as soon as possible to ensure that the dam is empty.<br>The service water dam is a concrete dam with a capacity pf 1 071 m$^3$. Water is received from the settling dams and treated sewage effluent/ Water is then re-used underground and excess water is transferred to the plant.<br>The settling dam is a two-compartment concrete line dam with capacity of 1 343 m$^3$ and 1 421 m$^3$ in the primary and secondary compartments respectively. This dam receives service water mad underground fissure water. Similarly, to the Driekop settling dams, suspended solids are settled out. The water is channelled to the service water dam. The Erichsen dam is a concrete dam with a capacity of 248 m$^3$ which used for storage of fire water. |
| | Concentrator Plant | There is a pollution control dam and process water dam at the Concentrator Plant. The Pollution control dam is an unlined dam with a capacity of 6 712 m$^3$ and an operating capacity of 3 187 m$^3$. This dam collects run-off from the plant footprint.<br>The Process water dam is a HDPE lined dam with a capacity of 3 042m$^3$. Water from the TSF and water from the plant stormwater dam is stored in the process water dam before it is re-used in the plant. |

<table>
<tr><th>Aspect</th><th colspan="2">Description of activity</th></tr>
<tr><td></td><td>Underground dewatering</td><td>Dewatering is being undertaken from both shafts to ensure safe underground workings and transferred to the shaft settling dams. The settled water is transferred to the shaft Erichsen dams for reuse underground. In future, water will be settled underground at Driekop shaft and reuse will occur directly from the underground dewatering facilities. Excess water is transferred from the Clapham Shaft directly to the plant for reuse and from the Driekop Shaft to the RWD for reuse in the plant.</td></tr>
<tr><td>Stormwater management</td><td colspan="2"><ul>
<li>Marula operates and maintains stormwater management infrastructure, which caters for clean stormwater runoff and dirty water management. Dirty water is generated from runoff from potentially contaminating infrastructure, wash-down water, leaks, accidental spillages, and contaminated groundwater seepage. Specific infrastructure in place at the Marula mine includes; clean water diversion channels or berms; gabions and dirty stormwater drainage and dirty water dams.</li>
<li>Clean water diversion berms are in place at the potable water treatment plant, sewage works and at the Clapham Shaft. Stormwater diversions at the Concentrator Plant is being maintained. Stormwater channels have been installed inside Driekop Shaft to divert clean water away from working areas, and hardstanding has been extended at the Driekop Shaft.</li>
<li>An upgrade of the salvage yard, which includes the installation of dirty water drains, has been completed. A separator that pumps water to the Clapham Shaft settling dams instead of the pollution control dam has been installed.</li>
<li>Gabions are constructed in areas which require reinforcement and protection of structural integrity, such as downstream from the Clapham WRD and Clapham pollution control dam and crossings of the sewer pipeline.</li>
<li>Maintaining adequate free board at all process dams and ensuring sufficient capacity to handle 1:50 year storm events at the Clapham shaft and TSF facilitates stormwater management. The new TSF will have a clean water diversion design which includes a stilling basin.</li>
<li>Despite the above measures, on-going management of bunded areas, is required at all operational areas to ensure separation of dirty and clean water.</li>
</ul></td></tr>
</table>

### 3.1.7 OPERATING HOURS

The mining operations which include underground mining activities (drilling, blasting, hauling) take place 24 hours per day and 7 days per week. 365 days per year.

### 3.1.8 LIFE OF MINE

Marula has a life of mine of approximately 40 years. The current Marula operations have 11 years remaining (inclusive of FY22).

## 3.2 OVERVIEW OF THE PROPOSED PROJECT ACTIVITIES

Marula proposes to make changes to their existing and approved surface layout. These changes include the establishment of additional ventilation shafts and associated refrigeration infrastructure. In addition, water pipelines and powerlines (associated infrastructure) are required to accommodate the new ventilation shafts. In addition, Marula also proposes to establish an additional Product Stockpile to accommodate for temporary ore storage, establish an additional pipeline to the Phase 2 TSF (follows approved and existing pipeline route), as well as undertake a structural upgrade of existing infrastructure (change house and compressed airline) at the Clapham Shaft Complex footprint. Marula also proposes to make changes to their existing approved EMPr to accommodate remediation measures for the TSF plume. The detail of these project components is provided in Section 3.2.3.

### 3.2.1 LISTED AND SPECIFIED ACTIVITIES

The proposed project triggers various activities for which authorisation is required in terms of the NEMA EIA Regulations and the National Water Act (NWA) (No. 36 of 1998). The associated listed or specified activities are summarised below.

#### 3.2.1.1 NEMA EIA REGULATIONS (2014, AS AMENDED)

The EIA Regulations promulgated in terms of Chapter 5 of the National Environmental Management Act (107 of 1998) (as amended) (NEMA) provide for control over certain listed activities. These listed activities are detailed in Listing Notice 1 of 2014 (as amended), Listing Notice 2 of 2014 (as amended) and Listing Notice 3 of 2014 (as amended). The undertaking of activities specified in these Listing Notices is prohibited until Environmental Authorisation (EA) has been obtained from the competent authority. Such EA, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations. The NEMA EIA Regulations are being applied to this project. The NEMA EIA Regulations set out the procedures and documentation that need to be complied with when applying for an EA. Where a development triggers activities listed in Listing Notice 1, a BA process must be followed. The proposed project triggers activities specified in Listing Notice 1 as detailed in the table below.

**Table 8: Listed activities relevant to the proposed project (activities and/or infrastructure)**

| Name of Activity | Aerial Extent of The Activity (Ha or m²) | Listed activity | Applicable Listing Notice |
|---|---|---|---|
| **Ventilation shafts** | | | |
| Establishment of the Driekop VS 9 | • No extension beyond current approved footprint of Driekop Shaft 6. | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The proposed upgrades to the ventilation and refrigeration infrastructure will require an application in terms of section 102 of the MPRDA.* |
| Establishment of the Clapham VS 8 and a bulk air cooler, and refrigeration plant and condensing cooling towers | • An approximate application area of 0.5 Ha. | | |
| Driekop VS 6 - Establishment of a new bulk air cooler, refrigeration plant and condensing cooling towers | • Within the existing, approved footprint of the Driekop VS 6 shaft area. | | |
| Clapham VS 5 – Establishment of new bulk air cooler | • Within the existing, approved footprint of the Clapham VS 5 shaft area. | | |
| Clapham VS 7 (Approved not yet constructed) - Establishment of surface main fans and electrical rooms. | • An approximate application area of 1.8 Ha. | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The changes to the approved ventilation and refrigeration infrastructure at Clapham Shaft 7 will require an application in terms of Section 102 of the MPRDA.* |
| | | | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 27**: The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for - (i) the undertaking of a linear activity; |

| Name of Activity | Aerial Extent of The Activity (Ha or m²) | Listed activity | Applicable Listing Notice |
|---|---|---|---|
| | | | or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.<br>***Relevance***: *The establishment of the proposed ventilation shafts will require the removal of more than 1 ha of indigenous vegetation.* |
| **Power supply and transmission** | | | |
| Upgrade the capacity of existing Eskom substation to 54 MVA | • Additional 40 MVA. Within the existing Eskom Yard footprint. | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The expansion of the power supply and transmission will require an application in terms of Section 102 of the MPRDA.* |
| Establishment of 33 kV Overhead Transmission Line (OHT) to Driekop Ventilation Shaft 9 | • 3.3 km | X | **NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 48**<br>The expansion of - (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or where such expansion occurs - (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.<br>**Relevance**: *The establishment of the Clapham and Driekop water supply infrastructure will cross a non-perennial watercourse.* |
| | | | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The expansion of the power supply and transmission will require an application in terms of Section 102 of the MPRDA.* |
| Establishment of 33 kV Overhead Transmission Line (OHT) to Clapham Ventilation Shaft 8 | • 3.8 km | X | **NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 48**<br>The expansion of - (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or where such expansion occurs - (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. |

| Name of Activity | Aerial Extent of The Activity (Ha or m²) | Listed activity | Applicable Listing Notice |
|---|---|---|---|
| | | | **Relevance**: *The establishment of the Clapham and Driekop water supply infrastructure will cross a non-perennial watercourse.* |
| | | | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The expansion of the power supply and transmission infrastructure will require an application in terms of Section 102 of the MPRDA.* |
| **Water supply and distribution** | | | |
| Establishment of a proposed Clapham water supply pipeline | • Area of disturbance = 13 000 $m^2$ / 1.3 Ha | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The upgrade of water supply and distribution will require an application in terms of Section 102 of the MPRDA.* |
| | | | **NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 48:** The expansion of -<br>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or where such expansion occurs -<br>(a) within a watercourse;<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.<br>***Relevance****: The establishment of the Clapham and Driekop water supply infrastructure will cross watercourses.* |
| Establishment of the proposed Driekop water supply pipeline | • Area of disturbance = 5 250 $m^2$/ 0.525 Ha. | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The upgrade of water supply and distribution will require an application in terms of Section 102 of the MPRDA.* |

| Name of Activity | Aerial Extent of The Activity (Ha or m²) | Listed activity | Applicable Listing Notice |
|---|---|---|---|
| | | | **NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 48:** The expansion of -<br>(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or where such expansion occurs -<br>(a) within a watercourse;<br>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.<br>***Relevance****: The establishment of the Clapham and Driekop water supply infrastructure will cross watercourses.* |
| Establishment of a product stockpile | | | |
| Establishment of an additional product stockpile | • Within the existing footprint of the Concentrator Plant | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance****: The establishment of an additional product stockpile will require an application in terms of Section 102 of the MPRDA.* |
| **Additional pipeline to the approved TSF** | | | |
| Establishment of an additional TSF pipeline | • Length = 4 km<br>• No additional disturbance is expected. | | **NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 10:** The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where - (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.<br>**Relevance**: *The establishment of an additional pipeline to the Phase 2 TSF.* |
| | | | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment. |

| Name of Activity | Aerial Extent of The Activity (Ha or $m^2$) | Listed activity | Applicable Listing Notice |
|---|---|---|---|
| | | | ***Relevance**: The additional pipeline to the approved TSF will require an application in terms of Section 102 of the MPRDA.* |
| **Upgrade to existing change house (including lamp room) and compressed airline** | | | |
| Upgrades to the Clapham change house | • 440 $m^2$ within the approved footprint of the Clapham Shaft Complex. | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance**: The additional pipeline to the approved TSF will require an application in terms of Section 102 of the MPRDA.* |
| Upgrades to the compressed air pipeline at the Clapham Shaft Complex. | • Not applicable.<br>• Within the already approved footprint of the Clapham Shaft Complex. | X | |
| **TSF contamination plume rehabilitation** | | | |
| Amendment of the EMPr to include remediation measures | • Not applicable. | X | **NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D**<br>Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of Section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment.<br>***Relevance**: The additional pipeline to the approved TSF will require an application in terms of Section 102 of the MPRDA.* |

### 3.2.2 WATER ACT (NWA) (NO 36 OF 1998)

An amendment to the existing IWUL for water uses listed under Section 21 of National Water Act (36 of 1998) (NWA) is also required from the competent authority, which in this case is the Limpopo (Polokwane) Regional Province of the Department of Water and Sanitation (DWS). This amendment will be undertaken as a separate process by Marula Mine.

### 3.2.3 OVERVIEW OF THE PROPOSED ACTIVITIES /INFRASTRUCTURE

#### 3.2.3.1 The establishment of ventilation shafts and upgrades to refrigeration infrastructure

Marula proposes to establish two new additional ventilation shafts within their existing MRA. An upcast and downcast shaft is proposed. The downcast shafts are used to draw clean air into the underground mine workings, whilst the upcast shaft will vent the "dirty/used" air to the surface. There are also existing ventilation shafts on Driekop 253 KT (Ventilation Shaft 6) and Winnarshoek 250 KT (Ventilation Shaft 5). Ventilation Shaft 7 (located on Winnarshoek 250 KT) was approved as part of the Merensky Reef project but is not constructed to date. An overview of these activities is summarised in Table 9 and Table 10 below. A conceptual layout of the proposed site layout of the ventilation shafts and refrigeration infrastructure is illustrated in Figure 5 and Figure 6.

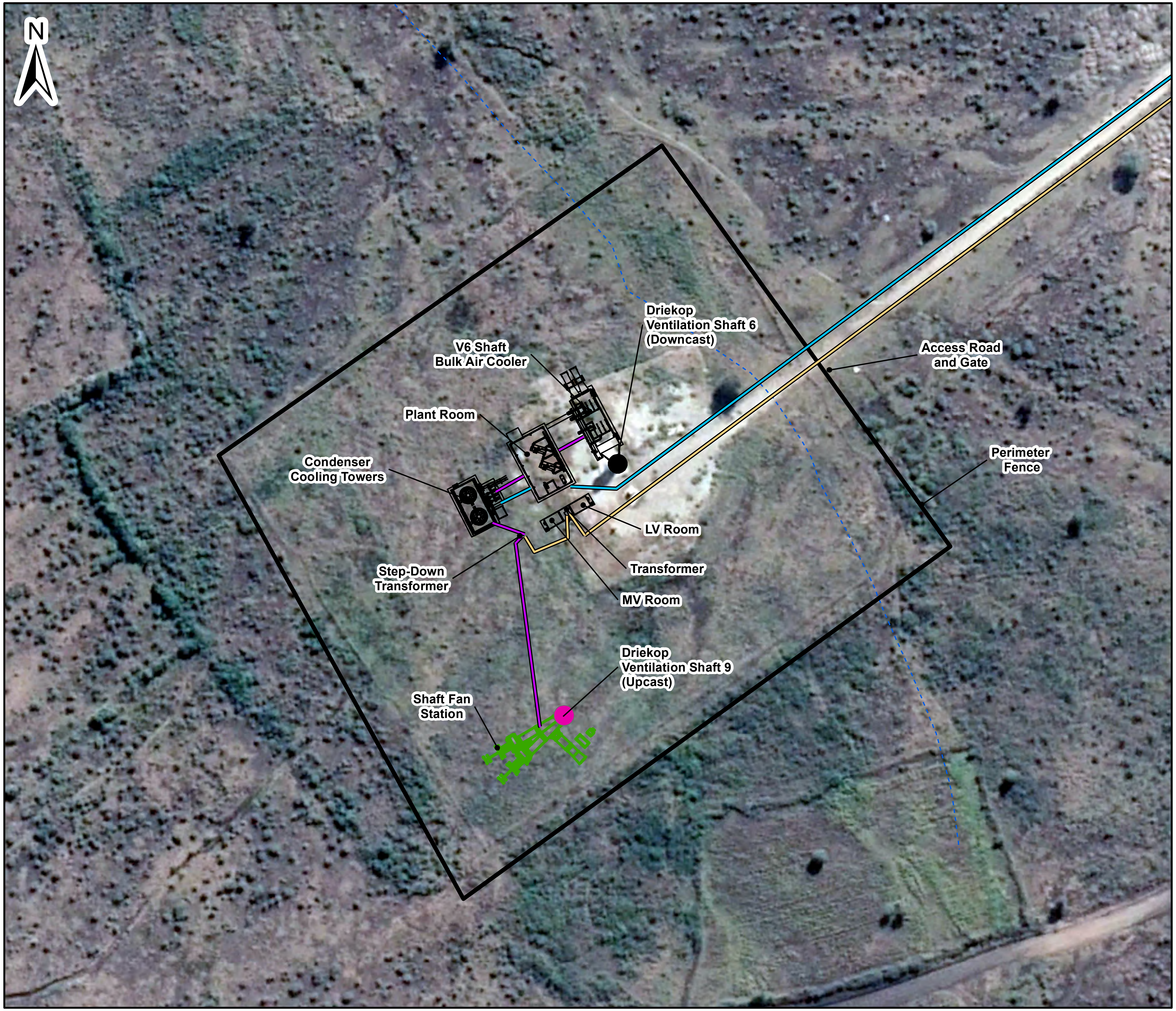
**Table 9: Proposed ventilation infrastructure**

| Aspect | Detail | |
|---|---|---|
| Proposed establishment of new ventilation shafts - Driekop Shaft | Name | Ventilation Shaft 9. |
| | Location | Driekop 253 KT (Portion 0) |
| | Footprint | Within approved footprint of Driekop Shaft 6. |
| | Technology | Upcast shaft. |
| | Refrigeration or ventilation infrastructure | Establishment of a new ventilation shaft with surface main fans and electrical rooms. |
| Proposed establishment of new ventilation shafts - Clapham Shaft | Name | Ventilation Shaft 8. |
| | Location | Winnarshoek 250 KT (Portion 0) |
| | Footprint | Approximately 0.5 ha. |
| | Technology | Downcast shaft. |
| | Refrigeration or ventilation infrastructure | • Establishment of a new bulk air cooler.<br>• Establishment of refrigeration plant and condenser cooling towers. |

**Table 10: Proposed upgrades of ventilation and refrigeration infrastructure**

| Aspect | Detail | |
|---|---|---|
| Proposed changes and upgrades at existing infrastructure - Driekop Shaft | Name | Ventilation Shaft 6 |
| | Refrigeration or ventilation infrastructure | • Establishment of a new bulk air cooler.<br>• Establishment of a refrigeration plant and condenser cooling towers. |
| | Location of infrastructure | Driekop 253 KT (Portion 0) |

| Aspect | Detail | |
|---|---|---|
| | Footprint | Within the existing, approved footprint of the Driekop VS 6 shaft area. |
| Proposed changes and upgrades at existing infrastructure - Clapham Shaft | Name | Ventilation Shaft 5 |
| | Refrigeration or ventilation infrastructure | Establishment of a new bulk air cooler. |
| | Location of infrastructure | Winnarshoek 250 KT (Portion 0) |
| | Footprint | Within the existing, approved footprint of the Clapham VS 5 shaft area. |
| | Name | Ventilation Shaft 7<br>(Approved but not constructed) |
| | Refrigeration or ventilation infrastructure | Establishment of surface main fans and electrical rooms. |
| | Location of infrastructure | Winnarshoek 250 KT (Portion 0) |
| | Footprint | Approximately 1.8 ha. |




**Legend**

- Non-Perennial Rivers
- Existing Ventilation Shaft 6 (Downcast)
- Proposed Ventilation Shaft 9 (Upcast)
- Proposed Refrigeration and Ventilation Infrastructure
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

0 30 60 Meters

Scale: 1:20 000 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

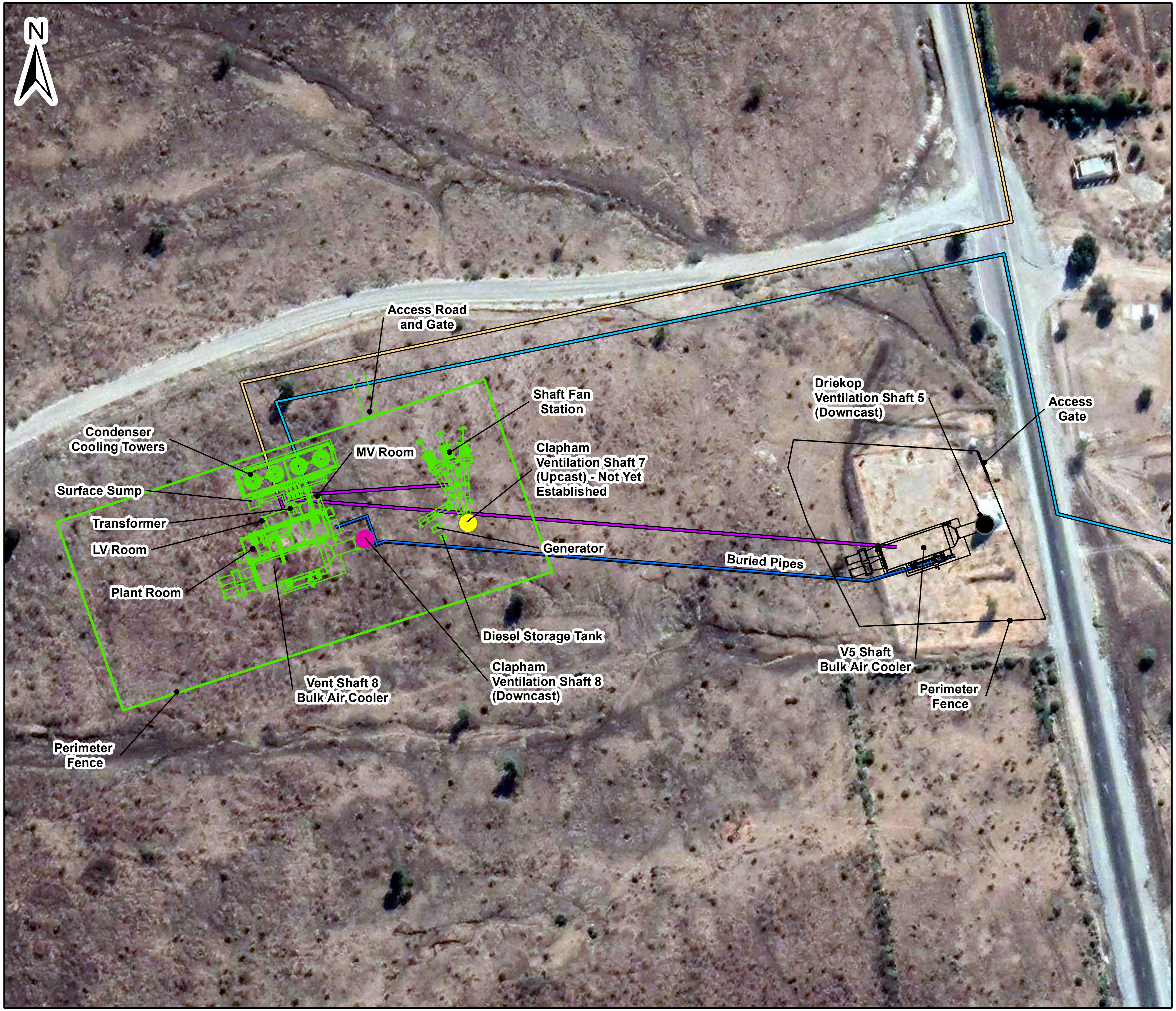
**Figure 5**

**Driekop Refrigeration and Ventilation Shaft Infrastructure - Conceptual Layout**

SLR

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.09002.00016 | 2022/01/21




**Legend**

- Existing Ventilation Shaft 5 (Downcast)
- Approved Ventilation Shaft 7 (Upcast) - Not Yet Established
- Proposed Ventilation Shaft 8 (Downcast)
- Proposed Refridgeration and Ventilation Infrastructure
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

0 30 60 Meters

Scale: 1:1 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 6**

**Clapham Refrigeration and Ventilation Shaft Infrastructure - Conceptual Layout**

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
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710.09002.00016

2022/01/21

#### 3.2.3.2 Upgrades of existing services and infrastructure

**Water supply and distribution**

*Water supply*: Raw water required for the proposed project will be sourced from the existing on-site Lebalelo Raw Water Dam (Plant Dam). Marula has sufficient capacity and volume to accommodate the proposed project water requirements and as such no changes are anticipated to the existing water reticulation storage capacities (Plant Dam) or supply demand.

*Distribution*: The proposed project will require the establishment of pipelines from the Plant Dam to the new ventilation shafts (Driekop Ventilation Shaft 9 and Clapham Ventilation Shaft 8). The proposed HDPE pipelines will have a diameter of approximately 150 mm (0.15 cm) and will be below ground. The proposed pipeline to the Clapham Ventilation Shaft 8 will be approximately 2.1 km in length with a throughput of 24 l/s. The proposed Driekop Ventilation Shaft 9 pipeline will be approximately 5.2 km in length with a throughput of 24 l/s. The water supply pipeline will be fed into the plant room and subsequently through to the cooling tower. The establishment of the proposed Driekop water supply pipeline will have a total area of disturbance of 5 250 $m^2$/ 0.525 Ha. The establishment of the proposed Clapham water supply pipeline will have a total area of disturbance of 13 000 $m^2$ / 1.3 Ha. The proposed water supply pipelines and distribution pipelines are shown in Figure 7.

*Wastewater:* Wastewater which contains an elevated salt concentration will emanate from the refrigeration process. This wastewater will be pumped into a surface sump (with approximate dimension of 2 m by 2 m). A return pipeline of approximately 50 mm will carry this wastewater back to the Concentrator Plant. The return pipeline will be located within the same below ground trench as the water supply pipeline to the ventilation shafts and will thus not result in any additional land clearance.

*Disturbance to watercourses*: Watercourses within the proposed project area include the Tshwenyane, Mogompane, Motse Rivers and an unnamed tributary of the Moopetsi River (with riparian vegetation), as well as numerous non-perennial and ephemeral drainage lines. The proposed water distribution lines will be underground; however, they will cross (and likely be located within 32 m) existing watercourses. A water use license (WUL) will need to be applied for due to this disturbance, however this will be undertaken separately from this Basic Assessment.

**Power supply and transmission**

*Supply*: Power is currently supplied to the mine by a consumer Eskom substation which is comprised of 2 x 40 MVA transformers. The power demand is expected to exceed the output from the 2 x 40 MVA transformer in 2025. In addition, the power requirements for the establishment of the new Clapham Ventilation Shaft 8 will need to be accommodated. Marula therefore proposes to increase the existing Eskom yard capacity to 120 MVA by the addition of a 40 MVA transformer. The running load will be 54 MVA. Existing power supply infrastructure is sufficient to support the project components at the remaining ventilation shafts.

*Distribution:* A new 33 kV overhead transmission line will be established from the on-site Eskom yard to the Clapham Ventilation Shaft 8. A new 33 kV overhead transmission line will also be established from the Driekop Shaft Complex to the new Driekop Ventilation Shaft 9, to supply the new ventilation shaft with power. The new 33 kV overhead transmission line will then be fed into a new step-down transformer located at the Clapham and Driekop ventilation shafts. The 33 kV will be stepped down to 11 kV and then fed into the plant room and ventilation fans. The lengths of the Clapham Ventilation Shaft 8 and the Driekop Ventilation Shaft 9 will be 3.8 km and 3.3 km, respectively. The proposed water supply pipelines and distribution pipelines are shown in Figure 7.

*Disturbance to watercourses*: Watercourses within the proposed project area include the Tshwenyane, Mogompane, Motse Rivers and an unnamed tributary of the Moopetsi River (with riparian vegetation), as well as numerous non-perennial and ephemeral drainage lines. The proposed power distribution lines and tower bases will be located within 32 m the existing watercourses. A water use license (WUL) will need to be applied for due to this disturbance, however this will be undertaken separately from this Basic Assessment process.


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Farm Portions
- Marula Mining Right Area
- Existing Infrastructure
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

0 400 800 Meters

Scale: 1:20 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 7**

**Proposed Water Supply Pipelines and Power Distribution Lines**

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2022/02/02

#### 3.2.3.3 The establishment of a product stockpile within the existing footprint of the Concentrator Plant

In order to alleviate storage capacity constraints experienced with their current operations, Marula proposes the establishment of an additional product stockpile. The additional product stockpile will reach a maximum capacity of 200 000 tons and will be located within the existing, disturbed footprint of the Concentrator Plant. The proposed location of the product stockpile is disturbed but unlined. Marula will further investigate the liner requirements for the proposed stockpile as part of their WUL application which will be undertaken as a separate process. Engineered designs of the product stockpile are not available, however a conceptual sketch was provided as shown in Figure 8 below.

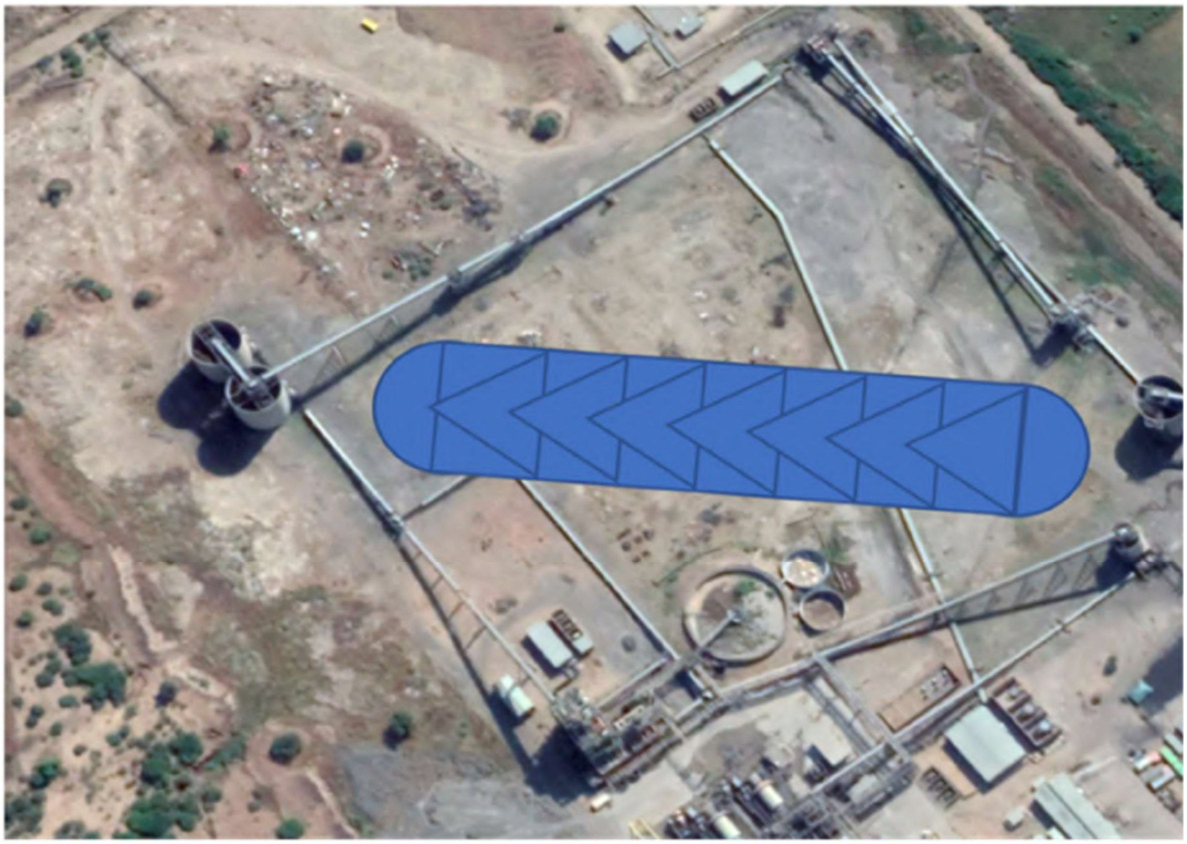

Figure 8: Conceptual design of the proposed product stockpile

#### 3.2.3.4 The establishment of an additional pipeline to the approved TSF

To increase the production capacity at the mine, an additional tailings conveyance pipeline is proposed. The proposed additional pipeline will follow the existing overland pipeline route which runs from the Concentrator Plant to the Phase 2 TSF. The additional pipeline will be 4 km in length with an internal diameter of 243 mm and comprised of HDPE lined steel. The additional TSF pipeline will increase the capacity of the current tailings deposition rate.

The proposed alignment is shown in Figure 9 and detailed as follows:

| | |
|---|---|
| Start point | S24° 30' 3.762" E30° 4' 21.895" |
| Middle point | S24° 30' 30.037" E30° 5' 16.393" |

| | |
|---|---|
| End point | S24° 30' 32.641" E30° 6' 12.020" |

#### 3.2.3.5 Structural upgrades of the existing change house and compressed airline at the Clapham Shaft Complex

The current change house and lamp room at the Clapham Shaft Complex has reached its current capacity. An upgrade of the change house (and lamp rooms) is now proposed to accommodate an increase of the labour force for 600 people. The actual construction timeline is expected to begin in 2024 / 2025. In addition to the upgrade of the Clapham change house, the existing 400 NB compressed air ring main from compressor house to Clapham UG mine will be upgraded with an additional 400 NB. No change to the pipeline pressure is anticipated. The proposed location of these upgrades is shown in Figure 9. The structural upgrades of the change house and compressed air ring main will be undertaken within the existing and disturbed Clapham Shaft Complex footprint and no additional land clearance will be required.

#### 3.2.3.6 Implementation of monitoring and remediation measures to assist with the management of the UG Tailings pollution plume

Marula is investigating various methods of managing the contamination plume emanating from the existing Tailings Dam facility. The investigation of remediation measures is still in a feasibility phase due to budget constraints, as such there are no specific measures available. However, the approved EMPr requires an amendment to accommodate for the inclusion of management measures which are deemed feasible by Marula. The TSF contamination plume component is therefore only administrative at this stage.


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Farm Portions
- Marula Mining Right Area
- Existing Infrastructure
- Proposed Product Stockpile
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

0 400 800 Meters

Scale: 1:20 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 9**

**Proposed Site Layout**

SLR


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### 3.2.4 OVERVIEW OF PROPOSED ACTIVITIES AND INFRASTRUCTURE WITH EACH PROJECT PHASE

The following table details the activities which are associated with the proposed project during the pre-construction, construction, operation, and decommissioning phases.

**Table 11: Activities associated with the proposed activities**

| Main activity/ process | Project Components | Sub-activities | Pre-construction and construction | Operation | Decommissioning and closure |
|---|---|---|---|---|---|
| **General site management** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Appointment of contractors and approval of the contractor's environmental policy. | At the beginning of the pre-construction | | |
| | | Increase the size of the existing of mine camp and areas (for administration, offices, equipment storage, housing, temporary ablution facilities). | At the beginning of the pre-construction | | |
| | | Planning and design of footprint areas. | At the beginning of the pre-construction | | |
| | | Site management (monitoring, inspections, maintenance). | On-going | On-going | On-going |
| | | Environmental awareness training and emergency response. | On-going | On-going | On-going |
| | | On-going rehabilitation of facilities/disturbed areas (where possible). | On-going | On-going | On-going |
| | | Implementing and maintaining management plans. | On-going | On-going | On-going |
| | | Use of existing mine camp. | As required | On-going | On-going |

| Main activity/ process | Project Components | Sub-activities | Pre-construction and construction | Operation | Decommissioning and closure |
|---|---|---|---|---|---|
| **Site preparation** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Selective vegetation clearance (in line with the sites existing biodiversity management plan). | On-going | | |
| **Earthworks** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Stripping and stockpiling of soil resources in line with the soil management procedure. | On-going | | |
| | | Cleaning, grubbing and bulldozing activities. | On-going | | |
| | | Excavation of trenches and foundations and compaction of soils. | On-going | | |
| **Civil works** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Mixing of concrete and concrete work, such as laying of foundations and plinths. | On-going | | |
| | | Erection, use and removal of scaffolding and cranes. | On-going | | |
| | | General building activities and erection of equipment and structures. | On-going | | |
| | | Steel work (including installing re-enforcement steel, grinding and welding). | On-going | | |
| | | Installation and lay down of cables and powerlines. | On-going | | |
| | | Installation and lay down of water pipelines. | On-going | | |
| | | Sinking of ventilation shafts (localised drilling) | On-going | | |

| Main activity/ process | Project Components | Sub-activities | Pre-construction and construction | Operation | Decommissioning and closure |
|---|---|---|---|---|---|
| **Underground ventilation** | Ventilation shafts | Operation and maintenance of ventilation shafts. | | On-going | On-going, until no longer needed |
| | | Operation and maintenance of refrigeration infrastructure. | | On-going | On-going, until no longer needed |
| **Ore and product stockpiling** | Product stockpile | Establishment of product stockpile. | On-going | | |
| | | Operation of product stockpiles). | | On-going | On-going, until no longer needed |
| **Power supply** | Power supply and transmission | Upgrade the capacity of existing Eskom substation to 120 MVA with the addition of an addition 40 MVA transformer. | On-going | | |
| | | Physical extension of Eskom Yard footprint. | On-going | | |
| | | Establishment of 33 kV Overhead Transmission Line (OHT) and 11 kV underground transmission lines. | On-going | | |
| | | Operation and maintenance of transmission lines, upgraded substation, and transformers | | On-going | On-going, until no longer needed |
| **Water supply** | Water supply and distribution | Laying down of a proposed Clapham and Driekop water supply pipelines. | On-going | | |
| | | Operation and use of water pipelines. | | On-going | On-going, until no longer needed |
| **Water management** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile | Establishment of localised water management facilities. This will include temporary diversion of clean water around workings and infrastructure; separation of dirty water and clean water, collection of dirty water run-off, process water and spills using bunded areas and sumps where required. | On-going | On-going | On-going, until no longer needed |

| Main activity/ process | Project Components | Sub-activities | Pre-construction and construction | Operation | Decommissioning and closure |
|---|---|---|---|---|---|
| **Transport systems** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Vehicle and plant equipment servicing and maintenance workshops, spray painting and wash bays. | On-going | On-going | On-going, until no longer needed |
| | | Use of parking, loading and off-loading areas for trucks, busses, and other vehicles. | On-going | On-going | On-going, until no longer needed |
| | | Transportation of staff to and from site (using private cars and busses via surfaced roads). | On-going | On-going | |
| | | Transport of input materials, supplies, services, and waste removal (using trucks and vans via roads). | On-going | | |
| **Continued use of existing services** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Waste management:<br>• Handling and storage and removal of general waste on site (domestic waste; cleared vegetation; building rubble) (as per waste management procedures)<br>• Handling and storage of hazardous waste on site (fuel; lubricants; cement; explosive packaging; solvents)<br>• Separation of oil and water at wash bays<br>• Continued use of sewage facilities | On-going | On-going | On-going, until no longer needed |
| | | Water supply for domestic use. | On-going | On-going | On-going, until no longer needed |
| | | Use of existing process water supply from the Plant Dam. | On-going | On-going | On-going, until no longer needed |
| | | Recycling and re-use of water within the operations via pipelines. | On-going | On-going | On-going, until no longer needed |
| | | Use of established roads and access roads. | On-going | On-going | On-going, until no longer needed |
| | | Use of existing security and access infrastructure. | On-going | On-going | On-going, until no longer needed |

| Main activity/ process | Project Components | Sub-activities | Pre-construction and construction | Operation | Decommissioning and closure |
|---|---|---|---|---|---|
| **Demolition** | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Dismantling and demolition of infrastructure and equipment. Removal of all unused materials. | | | On-going |
| | | Sealing shafts and providing underground support infrastructure. | | | On-going |
| **Rehabilitation, maintenance and aftercare** | TSF contamination plume rehabilitation | Implementation of remediation measures to manage groundwater contamination emanating from the TSF. | | On-going | On-going, until no longer needed |
| | • Ventilation shafts<br>• Power supply and transmission<br>• Water supply and distribution<br>• Product stockpile<br>• Additional pipeline to the approved TSF<br>• Structural upgrade of existing infrastructure at the Clapham shaft complex footprint | Erosion control and landscaping. | As required | As required | On-going, until no longer needed |
| | | Re-vegetation of disturbed areas and where infrastructure is removed. | As required | As required | On-going, until no longer needed |
| | | Removal of alien invasive species from disturbed and rehabilitated sites. | Regularly | Regularly | Regularly |
| | | Restoration of natural drainage patterns as far as practically possible. | As required | As required | |
| | | Maintenance and repair of post closure landforms, facilities, and rehabilitated areas. | | | On-going |

#### 3.2.4.1 Pre-construction and construction phase

Activities which will be undertaken during the pre-construction and construction phase are detailed in Table 11.

**Construction schedule and contractor appointments**

Construction of the new ventilation shafts will take approximately 3 years to complete.

**Employment opportunities**

The proposed project is expected to generate an average of 250 contract job opportunities during the construction phase, however this contract labour is expected to peak at around 600 people. The appointment of local labour will be prioritised in accordance with Marula's standard procurement process. The appointed service provider will provide skilled personnel. Marula will contractually bind the appointed contractor to source unskilled personnel from the affected communities.

**Existing mine camps**

Existing mine camps will be utilized for the temporary storage of construction material.

**Construction water supply**

The Marula mine operates in a water positive environment, as such the water required for the construction will be sourced from the mines current water supply as detailed in Section 3.1.6.

**Construction power supply**

Power is supplied to the mine by Eskom. The power supply for the construction phase will be provided by the current power facilities detailed in Section 3.1.5. Power will also be supplemented by back-up diesel generators where required.

**Stormwater management**

Localised stormwater controls will be put in place during the pre-construction and construction phase. These controls may include; silt fences (near watercourses), diversion channels, catch drains, demarcation of working areas and designation of stockpile areas etc.).

**Security and access control**

The existing procedures associated with site access and security will be implemented for the establishment of the product stockpile, and other project components which will be located within the mine's perimeter fencing. Manned security and temporary fencing may be required for the proposed ventilation shafts and refrigeration infrastructure, given that the area is easily accessible to the surrounding community.

**Materials transport and traffic**

Typical materials transported to site during the construction phase include the following:

- prefabricated materials and containers for contractor's camp;
- plant equipment; and

- building materials which may include hazardous (cement, solvents, hydrocarbon products such as diesel and oils) and non-hazardous (steel, prefabricated component parts for proposed infrastructure).

Typical materials which will be transported off-site include domestic, industrial and sewage waste.

During the construction phase, traffic will be associated with the following activities:

- delivery of construction materials and equipment;
- removal of wastes; and
- transport of contractors (if no temporary on-site housing is utilised).

The proposed ventilation shafts and refrigeration infrastructure will be located adjacent to the established road network. As such, existing roads (R37 and mine access road) are deemed sufficient for servicing the increased traffic during construction. No temporary access roads are required. The proposed product stockpile is located within the footprint of the Concentrator Plant. It is anticipated that traffic activity associated with the establishment of the product stockpile will be adequately serviced by the mines existing road network.

#### Waste management

The types of wastes that could be generated during the construction phase include:

- domestic waste (office waste, detergents, organic waste such as food);
- sewage waste; and
- industrial waste (building rubble, electrical/plastic/material off cuts, spent oil and grease, contaminated soil, hydrocarbon wastes, paints and solvents, containers, scrap and rubble).

All domestic and industrial waste will be managed and disposed according to the mine's waste management procedure outlined in Appendix D. Portable ablution facilities will be utilised during the construction phase and will be the responsibility of the contractor. These facilities must be cleaned and serviced regularly by a contractor. Sufficient toilets must be placed on site to cater for workers.

### 3.2.4.2 Operational phase

#### Operational hours

- Ventilation shafts and refrigeration infrastructure
  Once the ventilation shafts, refrigeration infrastructure and water and power supply infrastructure have been commissioned, it will operate for 24 hours per day, 365 days per year.
- Product Stockpile
  The proposed product stockpile is required for ad-hoc storage of product when the capacity of the primary stockpiles have been reached, or in emergency events.

#### Life of facilities

All proposed project components are planned to be operational for a period aligned with the LoM. Should the proposed project be authorised the ventilation shaft and refrigeration infrastructure will be operational for 28 years (remaining LoM is 11 years, and the proposed project will extend the LOM by an additional 17 years).

### Waste disposal

Less waste is expected during the operational phase than in the construction and decommissioning phases. Wastes emanating during the operation of the proposed project infrastructure will be managed and disposed of in accordance with the mine's waste management procedure outlined in Appendix D.

### Operational water supply and management

The mine needs to upgrade the existing water supply pipelines in order to cater for the proposed ventilation shafts and refrigeration infrastructure. These upgrades are detailed in Section 3.2.3.2. In general terms, the primary source of process water will be from the existing Plant Dam. The supply to the Plant Dam originates from the LWUA (via an underground pipeline), and from excess water re-circulated through the mine's closed water circuit. During operation, this process water will be transferred via the underground pipelines (proposed) to the new Ventilation Shafts (Driekop Ventilation Shaft 9 and Clapham Ventilation Shaft 8). This water will be used as "make-up" water required for the refrigeration processes. Wastewater containing an elevated salt concentration will emanate from the refrigeration process and will be transferred back into the mine water circuit via a return pipeline. Water required for domestic use will be obtained from the existing infrastructure as detailed in Section 3.1.6. Marula has sufficient capacity and volume to accommodate the proposed project water requirements and as such no changes are anticipated to the existing water reticulation storage capacities (Plant Dam) or supply demand.

### Stormwater management

Ventilation shafts and refrigeration infrastructure: The proposed ventilation shafts and refrigeration infrastructure will be established a considerable distance away from the existing mine (albeit sill within the MRA). As such, the potential for dirty water from mining processing and run-off from residue waste facilities is low. The ventilation shaft areas are therefore largely considered clean areas. Localised controls will be established to manage stormwater and prevent water pooling (surfaces will be cemented, graded and/or sloped to promote surface flow. Minor amounts of wastewater emanating from the refrigeration process will be contained in a relatively small surface sump and pumped back to the Concentrator Plant via a below ground pipeline. The associated water pipelines will be below ground and will require no additional stormwater management interventions.
Product stockpile: The proposed product stockpile will be established within the existing Concentrator Plant area. Albeit disturbed, this area comprises of bare soil and is unlined. Investigations into the containment barrier/liner required for the proposed product stockpile (as regulated by the provisions of the NWA) does not form part of this authorisation process and will be addressed separately by Marula. Operational stormwater controls will therefore be managed as per the management and mitigation measures stipulated in Section 26 and Appendix D of this BAR. Recommendations and management measures obtained as part of further investigations into the containment barrier/lining requirements should be adhered to.

Stormwater management for the other project components (water pipelines, power supply lines, structural upgrades at Clapham Shaft Complex and the additional TSF pipeline) will be in accordance with the approved measures implemented at the mine.

**Operational power supply**

Upgrades to the existing power supply network is required to accommodate the proposed ventilation shafts and associated refrigeration infrastructure. The operational phase will require an increase in power capacity and an upgraded transmission network. Power will be sourced from Eskom; however, the existing Eskom yard capacity will be increased to 120 MVA by the addition of a 40 MVA transformer. The new 33 kV overhead transmission lines will be established from the Eskom yard to the Clapham Ventilation Shaft 8. The new 33 kV overhead transmission line from the Driekop Shaft Complex to the new Driekop Ventilation Shaft 9 will be utilized. The 33 kV will be stepped down to 11 kV and then fed into the plant room and ventilation fans. Existing power supply infrastructure is sufficient to support the project components at the remaining ventilation shafts.

**Security and access control**

Perimeter fencing is planned around the new ventilation shaft and refrigeration infrastructure. These fences would be maintained for the duration of the project. The product stockpile with be located within the existing boundaries of the Concentrator Plant, where access is already strictly controlled. Access control and security would be maintained according to the existing security procedure at the mine during the operational phase.

#### 3.2.4.3 Closure and decommissioning phase

The decommissioning phase would include the dismantling and removal of all infrastructure from site and the final rehabilitation of areas. In consultation with I&APs and the authorities the final post closure land use has been determined and aligned with the mine closure objectives for the existing and proposed operations.

# 4. POLICY AND LEGISLATIVE CONTEXT

In accordance with the EIA Regulations (2014, as amended) and the DMRE BAR template, this chapter outlines the key legislative requirements applicable to the proposed project and outlines the legislation, guidelines, policies and plans that have been considered during the Basic Assessment process.

## 4.1 LEGISLATIVE CONSIDERATION IN THE PREPARATION OF THE BASIC ASSESSMENT REPORT

**Table 12: Legal framework**

| Applicable legislation and guidelines used to compile the report | How does this development comply with and respond to the policy and legislative context? | Reference where applied |
|---|---|---|
| **The Constitution of the Republic of South Africa (No. 108 of 1996)** | | |
| Section 24 of the Constitution provides that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that:<br>• Prevent pollution and ecological degradation;<br>• Promote conservation; and<br>• Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. | To give effect to Section 24 of the Constitution, an application for environmental authorisation is being made in terms of the legislative requirements. | The environmental management objectives of the Marula Mine are to ensure that the impacts of mining activities and associated infrastructure developments are avoided or minimised in line with Section 24 of The Constitution. |
| **National Environmental Management Act (No. 107 of 1998) (NEMA) (as amended)** | | |
| The NEMA is the national framework for environmental governance in SA and echoes the mandates set forth in the Bill of Rights and Section 24 of the Constitution. This is specifically enabled through the following provisions:<br>• **Section 2 Principles**: NEMA sets forth nineteen guiding principles which are aimed at realising the objectives of the Constitution and the NEMA sustainability principles. These principles must be applied to inform decision making for proposed activities which may have an impact on the environment. | The NEMA Section 2 Principles and Section 28 are interlinked based on promotion of environmentally sound and sustainable approaches to project development. This application has been undertaken by consideration of these principles. In line with sustainability principles, possible impacts arising from a potential activity must be identified and mitigation actions must be provided. | Considered during project planning and entire environmental authorisation process, this is reflected in the entire BA report. |

| Applicable legislation and guidelines used to compile the report | How does this development comply with and respond to the policy and legislative context? | Reference where applied |
|---|---|---|
| • **Section 28 – Duty of Care**: Duty to prevent and control pollution and remediate contamination arising from proposed activities.<br>• **Section 24 (1)(a) and (b)**: The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law, and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity. | | |
| **National Environmental Management Act: Environmental Impact Assessment Regulations, 2014 (EIA Regulations (2014, as amended)** | | |
| The EIA Regulations (2014, as amended) was promulgated in terms of Chapter 5 of NEMA. The regulations provide for the prohibition in the undertaking of specific activities without obtaining an approved Environmental Authorisation (EA) from a competent authority. An EA will be considered for approval through compliance to the procedures set out in the EIA Regulations, 2014 (as amended). These listed activities are detailed in:<br>• Listing Notice 1 of 2014 (as amended);<br>• Listing Notice 2 of 2014 (as amended) and;<br>• Listing Notice 3 of 2014 (as amended). | Prior to the undertaking of the proposed project, Marula will require an amendment to their approved EMPr from the DMRE in terms of NEMA. In addition, the proposed project activities trigger the listed activities contained in Listing Notice 1 in terms of the NEMA EIA Regulations (2014, as amended). In this regard, a BA process is required in support of the amendment application. | • Introduction<br>• Section 3.2.1 |
| **Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) (as amended)** | | |

| Applicable legislation and guidelines used to compile the report | How does this development comply with and respond to the policy and legislative context? | Reference where applied |
|---|---|---|
| The MPRDA (as amended) governs the acquisition, use and disposal of mineral and petroleum resources. The objectives of the act, amongst others, are to promote economic growth and mineral and petroleum resources development in the Republic, particularly development of downstream industries through provision of feedstock and development of mining and petroleum inputs industries and to promote employment and advance the social and economic welfare of all South Africans. The DMRE must apply the range of environmental principles included in Section 2 of NEMA when taking decisions that significantly affect the environment. To give effect to the general objectives of Integrated Environmental Management, the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed and reported to the competent authority. These principles are included as per the stipulations set forth in Part IV: Pollution Control and Waste Management Regulations of the MPRDA (as amended). | The proposed project entails the establishment of new infrastructure and upgrades to existing infrastructure (as detailed in Section 3.2) within the Marula MRA. The proposed project does not include the addition of any minerals not currently included in the mining right. Therefore, a separate EA under the MPRDA is not deemed applicable. However, Section 102 of the MPRDA governs the amendment of rights, permits, mine work programmes and EAs and management programmes. In terms of the Act, these may not be amended or varied without the written consent of the Minister. The project required a Section 102 amendment in terms of the MPRDA. | • Section 3.2<br>• The Section 102 application will be submitted to the DMRE with the final BA report. |
| **Specific Environmental Management Acts** | | |
| National Environmental Management: Biodiversity Act No. 10 of 2004 (NEM:BA)<br>The NEMBA provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA and provides for:<br>• The protection of species and ecosystems that warrant national protection;<br>• The sustainable use of indigenous biological resources;<br>• The fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources and;<br>• The establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. | A Fauna and Flora Study and a Watercourse Assessment was undertaken to assess the impact of the proposed project on biological diversity within the project area. The proposed project will require the clearance of more than 1 ha but less than 20 ha of indigenous vegetation in order to cater for the Upgrade to existing services and infrastructure at Driekop Ventilation Shaft 6, Clapham Ventilation Shaft 5 and Clapham Ventilation Shaft 7. The protection of biodiversity was considered as part of this EMPr Amendment and BA process and potential impacts as a result | • Section 5.3.<br>• Section 7.3.1.<br>• Section 9. |

| Applicable legislation and guidelines used to compile the report | How does this development comply with and respond to the policy and legislative context? | Reference where applied |
|---|---|---|
| | of proposed project activities have been identified and mitigation measures have been proposed. | |
| National Water Act No. 36 of 1998 (NWA)<br><br>Regulation 704 of 1999 in terms of the NWA | The proposed project activities present a minimal risk to water resources. However, stormwater and surface water management were considered as part of project planning.<br>Measures to prevent pollution and protect water bodies were considered as part of the EMPr Amendment and BA process. | • Section 9. |
| National Heritage Resources Act No. 25 of 1999 (NHRA) | Excavation activities during the construction phase of the proposed project may increase the potential for cultural and heritage resources to be uncovered. In this regard, potential impacts as a result of proposed project activities have been identified and mitigation measures have been proposed. A Heritage Impact Assessment and Paleontological assessment (desktop) was undertaken to assess the cultural-heritage materials within the project footprint have been undertaken as part of this EMPr Amendment application and BA process. | • Section 7.3.2.1<br>• Section 9. |
| National Environmental Management: Air Quality Act No. 39 of 2004 (NEM: AQA) | The proposed project activities may cause atmospheric emissions during the construction phase (for all project components) which may negatively impact the environment.<br>During the operational phase, potential noise impacts may arise as a result of the movement of ventilation shaft fans to the surface. In this regard, air quality and noise assessments have been undertaken as part of the EMPr Amendment application and BA process and potential impacts as a result of proposed project activities have | • Section 7.3.1.8<br>• Section 9. |

| Applicable legislation and guidelines used to compile the report | How does this development comply with and respond to the policy and legislative context? | Reference where applied |
|---|---|---|
| | been identified and mitigation measures have been proposed. | |

## 4.2 CONSIDERATION OF GUIDELINES, POLICIES, PLANS AND FRAMEWORKS

The guidelines, policies, plans and frameworks that have been considered during the EMPr amendment and EA processes are provided in table below.

| Document | Governing Body | Relevance |
|---|---|---|
| Public Participation guideline in terms of NEMA EIA Regulations (DEA, 2017): The purpose of this guideline is to ensure that an adequate public participation process is undertaken during the authorisation process in accordance to Section 24(4)(a)(v) of the NEMA and in accordance to the EIA Regulations (2014, as amended). | Department of Forestry, Fisheries and the Environment (DFFE) | These guidelines were consulted to ensure that an adequate PPP was undertaken during the EMPr amendment and EA process. |
| Guideline for consultation with communities and I&APs (2014) | DMRE | |
| IEM Guideline Series Guideline 7: Public participation in the EIA process (2012) | DFFE | |
| Guideline on need and desirability in terms of the EIA Regulations (2017) | DFFE | These documents informed the consideration of the need and desirability aspects of the proposed project. |
| Guideline on need and desirability in terms of the EIA Regulations (2014) | DFFE | |
| National Development Plan (NDP), 2030 | National Planning Commission | |
| New Growth Path, 2011 | Department of Economic Development | |
| Fetakgomo Tubatse Local Municipality Draft Integrated Development Plan & Budget, 2020/2021 | Fetakgomo Tubatse Local Municipality | |
| Sekhukhune District Municipal District Development Plan, 2020-2021 | Sekhukhune District Municipality | |
| Limpopo Spatial Development Framework (SDF) | Office of the Premier of Limpopo | |
| Cumulative Effects Assessment, IEM, Information Series 7 (2004) | DFFE | |
| Cumulative Effects Assessment, IEM, Information Series 7 (2004) | DFFE | This guideline was consulted to inform the consideration of potential cumulative effects of the proposed project. |
| Criteria for determining Alternatives in EIA, IEM, Information Series 11 (2004) | DFFE | This guideline was consulted to inform the consideration of alternatives. |
| Environmental Management Plans (EMP), IEM, Information Series 12 (2004) | DFFE | This guideline was consulted to ensure that the EMPr has been adequately compiled. |
| Environmental Impact Reporting, IEM, Information Series 15 (2004) | DFFE | This guideline was consulted to inform the approach to impact reporting. |

| Document | Governing Body | Relevance |
|---|---|---|
| Specialist Studies, IEM, Information Series 4 (2002) | DFFE | This guideline was consulted to ensure adequate development of terms of reference for specialist studies. |
| Impact significance, IEM, Information Series 5 (2002) | DFFE | This guideline was consulted to inform the assessment of the significance of impacts of the proposed project. |
| Mining and Biodiversity Guideline (DEA et al., 2013) | DFFE | Biological diversity has been considered as part of project planning. |

# 5. NEED AND DESIRABILITY OF THE PROJECT

## 5.1 BACKGROUND

Proposed developments must be assessed by ascertaining the need and desirability of the proposed activity within the context of sustainable development, to ensure that said development is justifiable from an ecological, social, and economic standpoint (DEA, 2017). The over-arching framework for assessing the need and desirability of developments are taken at a policy level, through the identification and promotion of activities/industries/developments which consider the needs and interests of the broader community. Moreover, at a project level (as part of an impact assessment process), the need and desirability of the project must consider the content of local and regional development plans, frameworks, and strategies. An integral part of the determination of the need and desirability of proposed developments is to take cognisance of strategic concerns such as climate change, natural resource protection, ecosystem services and food security. In doing so, the hopes of working towards achieving the over-arching Constitutional goal of providing a better, equitable quality of life for all, may be realised.

## 5.2 RATIONALE FOR THE PROPOSED PROJECT ACTIVITY

### 5.2.1 THE ESTABLISHMENT OF VENTILATION SHAFTS AND UPGRADES TO REFRIGERATION INFRASTRUCTURE

Employment in the mining industry is recognised as dangerous, where one of the most critical hazards specifically linked to underground mining is the inhalation of toxic atmospheric contaminants and dust. In this regard, ventilation is among the most important functions in a mining operation and is imperative to the successful operation thereof. Marula has identified the need to provide additional ventilation to underground mine workers with the principal aim of improving mineworker safety. The proposed addition of two ventilation shafts at Clapham and one shaft at Driekop and the associated provision of refrigeration plants and bulk air coolers fulfils this need. Mine ventilation shafts provide much-needed air flow to the underground workings of a mine with the aim of diluting and removing dust and noxious gases and regulating air temperatures. Additionally, continued investment into the mine leads to improved efficiency and optimisation of mine operations, hereby reducing costs.

### 5.2.2 UPGRADES OF EXISTING SERVICES AND INFRASTRUCTURE - WATER PIPELINES AND POWERLINES

In order to support the proposed ventilation shafts and associated refrigeration infrastructure, it is proposed that a 33 kV overhead transmission line and HDPE water pipelines be established to supply power and water, respectively, to the aforementioned proposed infrastructure. As mentioned above, the ventilation shafts and associated refrigeration infrastructure is required to improve air quality and regulate air temperatures at the mine, with the overarching aim of improving mineworker safety. This would only be possible with the supply of water and power to these specific project components.

### 5.2.3 THE ESTABLISHMENT OF A PRODUCT STOCKPILE WITHIN THE EXISTING FOOTPRINT OF THE CONCENTRATOR PLANT

In general terms, the stockpiling of product occurs for four main reasons, all of which are described below:

- Campaigning: The processing of several types of ore at once can be problematic from a metallurgical point of view. Through campaigning, problematic ore can be stockpiled until a sufficient inventory is built up, allowing the processing of a specific ore type.
- Grade optimisation: This stockpiling strategy allows for the mine to stockpile various grades of material, thereby allowing for the best grades of material to be processed at a given time, while the lower grade ore can be stockpiled.
- Surge control: This strategy is used in cases where the mine may have inconsistent or fluctuating ore delivery rates. Excess ore produced can be stockpiled and processed on days where there is underproduction of ore. This strategy allows for a steady feed or processing rate.
- Blending: Stockpiles are blended when a processing plant requires a certain quality of feed material. Blending of stockpiles enables the mine operator to ensure that the quality can be within a consistent range.

The above-mentioned stockpiling techniques / reasons for stockpiling improves the overall efficiency of mine operations. Marula now proposes to establish a product stockpile comprised of off-reef low grade ore within the Concentrator Plant which will be utilised on an ad-hoc basis. This low-grade ore is considered a product at Marula and but is currently being disposed on the TSF. The proposed additional stockpile will alleviate storage constraints is associated with grade optimisation as described above.

### 5.2.4 THE ESTABLISHMENT OF AN ADDITIONAL PIPELINE TO THE APPROVED TSF

Marula proposes to establish an additional TSF pipeline which will carry tailings material to the TSF in parallel with the existing tailing pipeline. The additional TSF pipeline will be increase operational efficiency of the current tailings deposition rate because the two TSF pipelines will be operated simultaneously with a 50% split of plant capacity.

### 5.2.5 STRUCTURAL UPGRADES OF THE EXISTING CHANGE HOUSE AND COMPRESSED AIRLINE AT THE CLAPHAM SHAFT COMPLEX

The existing change house and lamp rooms at the Clapham Shaft Complex has reached its current capacity, and an upgrade of the existing infrastructure is required to accommodate future labour. The upgrade of the existing facility is desirable because it eliminates additional land clearance and minimises costs incurred with the development of new structures. The upgrade to the compressed air ring main is required to accommodate current operational requirements.

### 5.2.6 IMPLEMENTATION OF MONITORING AND REMEDIATION MEASURES TO ASSIST WITH THE MANAGEMENT OF THE UG TAILINGS POLLUTION PLUME

The tailings stored within the Marula TSF have the potential to damage and contaminate the environment, by releasing toxic metals, causing erosion and sinkholes and the contamination of soil and water resources. In this regard, Marula is proposing to implement monitoring and remediation measures. The aim and rationale for this is to reduce the risk of the pollution plume emanating from the UG2 Tailings Dam to contaminate the environment.

## 5.3 ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

On a regional scale, the mine falls within the Savanna Biome and within the broad vegetation type “Mixed Bushveld”, also known as Sourish Mixed Bushveld or Broad-orthophyll Plains Bushveld. This type of savanna covers an area of approximately 66 647 $km^{2,}$ within approximately 60% classified as transformed and 3.05% conserved. The vegetation for the mine and surrounding areas is known as Sekhukhune Plains Bushveld and Sekhukhune Mountain Bushveld, respectively. This is an arid vegetation type associated with the Sekhukhune Centre of Plant Endemism, a region that has a unique combination of climatic, topographical, and geological factors that qualify to support a relatively high percentage of regionally endemic fauna and flora.

The Marula mining area has, however, been transformed by relatively high-density rural development. Farming and subsistence activities have disturbed the vegetation and flora over most of the area, with cattle and goats grazing over almost all of the areas between the villages and fields. Marula is located in the archaeologically sensitive Steelpoort area of the Limpopo Province. The most prominent natural features surrounding the mine are the chromite hills to the east and the Leolo Mountain range to the west, the latter of which is known as a beacon in the history of the origins of the Pedi. Several historical beacons occur in the Leolo Mountain range, including the Tsjate Provincial Heritage Site, which coincides with the Hackney area. The proposed project has the potential to directly disturb fauna and flora, particularly within the proposed water pipeline and powerline servitudes. Soil is a valuable resource that supports a variety of ecological functions, and the proposed project has the potential to damage soil resources through physical disturbance, which has a direct impact on the potential loss of the natural capability of the land. The proposed project also has the potential to affect archaeological resources, given its proximity to the Tsjate Provincial Heritage Site. As part of the Basic Assessment Process , independent biodiversity (terrestrial and aquatic), soil and heritage specialists were appointed to determine the sensitivity of areas within the proposed development footprints. The construction of the additional ventilations shafts and the water pipeline and powerline servitudes will require the clearing of vegetation, which will result in the loss of several faunal and floral species and soil resources and may impact archaeological resources negatively. Measures that were considered to avoid the destruction and disturbance of biodiversity and archaeological resources and the loss of soil resources include limiting the extent of the development footprint and relocating the proposed ventilation shafts to an area of least environmental sensitivity. Where sensitive areas cannot be avoided, management actions focus on ensuring ecological sustainability through appropriate rehabilitation measures.

## 5.4 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

Community/society priorities are officially expressed through public documents including the national, provincial, district and local municipal spatial development strategies and frameworks. In this regard, the priorities of the National Development Plan (2030; NDP), the Fetakgomo Tubatse Local Municipal Draft Integrated Plan & Budget (2020/2021; IDP) and Sekhukhune District Development Plan (2020/2021; DDP) will be discussed and the applicability thereof to the proposed project would be described.

### 5.4.1 NATIONAL STRATEGY FOR SUSTAINABLE DEVELOPMENT AND ACTION PLAN

The National Strategy for Sustainable Development and Action Plan 2011 - 2014 (NSSD 1) (2011) states the following:

- In the first instance, it recognises that the maintenance of healthy ecosystems and natural resources are preconditions for human wellbeing. In the second instance, it recognises that there are limits to the goods and services that can be provided. In other words, ecological sustainability acknowledges that human beings are part of nature and not a separate entity.

- What is needed and desired for a specific area should primarily be strategically and democratically determined beyond the spatial extent of individual EIAs. The strategic context for informing need and desirability may therefore firstly be addressed and determined during the formulation of the sustainable development vision, goals, and objectives of Municipal IDPs and SDFs during which collaborative and participative processes play an integral part, and are given effect to, in the democratic processes at local government level.
- When formulating project proposals and when evaluating project specific applications, the strategic context of such applications and the broader societal needs and the public interest should be considered. In an effort to better address these considerations and their associated cumulative impacts, the NEMA also provides for the compilation of information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship, and significance of such attributes which must be taken into account. Whether a proposed activity will be in line with or deviate from the plan, framework or strategy per se is not the issue, but rather the ecological, social and economic impacts that will result because of the alignment or deviation. As such, the EIA must specifically provide information on these impacts in order to be able to consider the merits of the specific application. Where a proposed activity deviates from a plan, framework or strategy, the burden of proof falls on the applicant (and the EAP) to show why the impacts associated with the deviation might be justifiable. The need and desirability of the development must be measured against the abovementioned contents of the IDP, SDF and EMF for the area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use reflected in, the area's IDP and SDF. While project-level EIA decision-making therefore must help us stay on course by finding the alternative that will take us closer to the desired aim/goal, it is through Integrated Development Planning (and the SDF process) that the desired destination is firstly to be considered and the map drawn of how to get there.

### 5.4.2 NATIONAL DEVELOPMENT PLAN (2030)

The NDP was established by national government and provides the context for all growth in South Africa, with the overarching aim of eradicating poverty and inequality between people in South Africa through the promotion of development. The NDP provides a broad strategic framework, setting out an overarching approach to confronting poverty and inequality based on six focussed and interlinked priorities. Two of the key priorities applicable to the proposed project are to stimulate the “economy and employment” and to build an “inclusive rural economy”. The proposed project is considered to be in line with the above-mentioned objectives, as outlined in the NDP, as it will facilitate economic activity / growth in a rural area and is conducive to job creation (particularly during the construction phase).

### 5.4.3 REGIONAL AND LOCAL POLICY AND PLANNING FRAMEWORK

This Section provides an overview of the regional and local policy and planning context relating to the project.

#### 5.4.3.1 Limpopo Spatial Development Framework (SDF)

The key objectives of the Limpopo Province Spatial Development Framework include a rationalisation and optimal use of the land and protection of natural resource by considering high / moderate potential agricultural areas, high moderate / environmental sensitivity areas and mining / mineral deposit areas as well as other relevant factors. The proposed development will be undertaken within already disturbed areas, within the footprint of the Marula Platinum Mine MRA which leads to the consolidation of environmental impacts as new virgin areas will not be impacted by the development. From this perspective, the proposed development is aligned with the objectives of the Spatial Development Framework. The implementation of the project will include employment opportunities being generated during the construction phase of the project. Although temporary, the creation of these employment opportunities, even though negligible will contribute towards the reduction of the unemployment rate within the province and within the Fetakgomo-Tubatse Local Municipality.

#### 5.4.3.2 Sekhukhune District Municipal District Development Plan (2021- 2022)

The Sekhukhune District Municipality engages in comprehensive strategic planning processes which encourages inclusive mainstreamed budget based on the needs and aspirations of the people and communities at a local level. In this regard, the DDP was borne, and aims at maximising the impact and resources across various spheres of government, in collaboration with the private sector. The DDP identifies six major Mayoral Strategic Priorities, among them being "Local economic development, growth and job creation through agrarian reform, mining, tourism and repositioning of the Sekhukhune District Agency". In line with this, the proposed project would contribute to this Mayoral Strategic Priority, directly through the provision of job opportunities in the mining sector during the construction phase, and through wages, taxes and profits that would be derived from its operation and through continued investment into the mine.

#### 5.4.3.3 Fetakgomo Tubatse Local Municipal Draft Integrated Development Plan (IDP) & Budget (2020/2021)

The IDP sets out policy guidelines and proposals to direct future development in the municipal area in a manner that is desirable and sustainable. Future growth, development and land use planning in the municipal area must be based on the vision and principles which were agreed to address spatial challenges to create, and support integrated, sustainable and liveable environments and socio-economic opportunities. The IDP recognises the mining industry as the largest opportunity for economic growth in the Local Municipality. Moreover, it identifies mining activities and natural resources (specifically the intrusion of the volcanic bushveld igneous complex) as an important structuring element of the municipality's spatial development. Taking this into consideration, the proposed project would result in positive socio-economic impact due to the job opportunities presented during the construction phase, the resulting improvement in mineworker safety and the continued investment into the mining sector, that contributes to the national South African economy and forms an integral part of the economy in this region.

### 5.5 CONSISTENCY WITH NEMA PRINCIPLES

The national environmental management principles contained in NEMA serve as a guide for the interpretation, administration, and implementation of NEMA and the EIA Regulations. In order to demonstrate consistency with the NEMA principles, a discussion of how these principles is taken into account during the BAR process is provided in Table 13 below.

**Table 13: Consideration of NEMA principles in relation to the project**

| National Environmental Management Principles | Comment |
|---|---|
| (2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. | The rationale of the proposed project is to improve mine worker safety at Marula, through the provision of air flow to underground mine workings and the regulation of temperatures. |

| National Environmental Management Principles | Comment |
|---|---|
| (3) Development must be socially, environmentally, and economically sustainable. | The proposed project will facilitate economic activity and growth in a rural area and will create job opportunities. Measures that were considered to avoid the destruction and disturbance of biodiversity and archaeological resources included limiting the extent of the development footprint and relocating the proposed infrastructure to areas of least environmental sensitivity. Where sensitive areas cannot be avoided, management actions and associated management outcomes were provided in an EMPr to ensure ecological sustainability and the implementation of appropriate rehabilitation measures. |
| (4)(a) Sustainable development requires the consideration of all relevant factors including the following:<br>(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;<br>(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;<br>(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;<br>(iv) that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;<br>(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;<br>(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised; | As mentioned above, measures that were considered to avoid the destruction and disturbance of biodiversity and archaeological resources included limiting the extent of the development footprint and relocating the proposed infrastructure to areas of least environmental sensitivity. Where sensitive areas cannot be avoided, management actions and associated management outcomes were provided in an EMPr to ensure ecological sustainability and the implementation of appropriate rehabilitation measures.<br>During construction, a minimal volume of construction waste would be produced. The appointed Contractor would be required to ensure that all generated waste is managed adequately in accordance with the requirements of the Construction EMPr. During operation, the mine would be required to manage waste in accordance with the Operational EMPr.<br>The proposed additional ore stockpile area will ensure that mineral resources are used in the most effective way, increasing overall efficiency of mine operations, through the implementation of the four above-mentioned stockpiling techniques. |
| (4)(a)(vii) that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions. | The socio-economic impacts of the proposed project are limited to air quality, noise, visual and traffic impacts. Insofar as possible, local communities have been consulted to understand other potential impacts and specialist studies were undertaken to provide input into the assessment of impacts in this BA process. |
| (4)(a)(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied. | Potential impacts associated with the proposed project will be managed in accordance with the EMPr. |
| (4)(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by | As mentioned above, measures to minimise environmental impacts included limiting the development footprint and relocating project infrastructure to an area of least environmental sensitivity. Moreover, considering that the rationale of |

| National Environmental Management Principles | Comment |
|---|---|
| pursuing the selection of the best practicable environmental option. | the proposed project is to improve mine worker safety, the project is the best practicable environmental option. |
| (4)(c) Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons. | The proposed project will not result in impacts that would unfairly discriminate against any person. |
| (4)(d) Equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination. | Given the scale and nature of the proposed project, the requirement to enable access to environmental resources, benefits, and services to meet basic human needs of persons disadvantaged by unfair discrimination is deemed to fall outside of the project-level scope. |
| (4)(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service, or activity exists throughout its life cycle. | Marula is committed to comply with environmental health and safety (Where applicable) obligations for their operations. The EMPr (Part B of this document) provides environmental health and safety management measures applicable to the full life cycle of the project. |
| (4)(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills, and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured. | The public participation process entailed the consultation of various I&APs including surrounding landowners and land users, local and regional regulatory and commenting authorities, community-based organisations, as well as traditional councils and Kgosi's. |
| (4)(g) Decisions must consider the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge. | |
| (4)(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means. | As mentioned previously, local communities and traditional councils and Kgosi's were consulted during the BA process. This was done to share and gain knowledge and understand key concerns and issues associated with the proposed project. |
| (4)(i) The social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment. | The BA process considered the social, economic, and environmental impacts of the proposed project activities and is detailed in Appendix D. |
| (4)(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected. | The rationale for the proposed ventilation shaft and refrigeration infrastructure is to improve mine worker safety at Marula, through the provision of air flow to underground mine workings and the regulation of temperatures. |
| (4)(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law. | This BA process has been undertaken in accordance with NEMA and the NEMA EIA Regulations (2014, as amended) and provided all I&APs with the relevant documentation and information associated with the proposed project. |

| National Environmental Management Principles | Comment |
|---|---|
| (4)(l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment. | The intergovernmental coordination and harmonisation of policies and legislation relating to the environment, resolution of conflicts of interest between organs of state and the discharge of global and international responsibilities in national interest fall out of the scope of this BA process. |
| (4)(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures. | |
| (4)(n) Global and international responsibilities relating to the environment must be discharged in the national interest. | |
| (4)(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage. | As mentioned above, measures were considered to avoid the destruction and disturbance of biodiversity and archaeological resources. Where sensitive areas cannot be avoided, management actions and associated management outcomes were provided in an EMPr to ensure ecological sustainability and the implementation of appropriate rehabilitation measures |
| (4)(p) The costs of remedying pollution, environmental degradation, and consequent adverse health effects and of preventing, controlling, or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. | The costs associated with the mining activities at Marula mine are provided for in a Financial Provision as required by law and is presented in Section 18 and Section 27. |
| (4)(q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted. | The public participation process for the project has been and will continue to be inclusive of women and the youth. |
| (4)(r) Sensitive, vulnerable, highly dynamic, or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure. | No highly dynamic / stressed ecosystems will be impacted by the proposed project. |

# 6. MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

The proposed project comprises of multiple components which are described in Section 3.2.3. At a high-level, the proposed establishment of two additional ventilation shafts and the upgrade to refrigeration and ventilation infrastructure at the existing ventilation shafts are aimed at improving underground working conditions and safety. This includes the establishment of additional water pipelines and the expansion and establishment of additional power supply and distribution infrastructure in support of the establishment of additional ventilation shaft and upgrades to existing ventilation shafts.

The alternatives identified and preferred for this project were dependent on the location of existing infrastructure and the feasibility of new infrastructure to tie into the existing operations. As such, feasible location alternatives were investigated for the proposed water pipelines and powerlines routes. Location alternatives were investigated for the proposed Driekop ventilation shaft. These alternatives are described in Section 7 and was carried out through the assessment of the site by the Marula engineering team and the EAP project team. The preferred location alternatives are detailed in Section 3.2.3.1 and Section 3.2.3.2. The preferred alternatives were selected as feasible due to the prevailing terrain, engineering requirements and least disturbance caused to the communities within the Marula MRA. No technology alternatives were considered for the OHT lines and water supply lines. Technology considerations were given to the establishment of the ventilation shafts as described in Section 7.

Additional power is required to support the operation of the additional shaft complexes. To optimise existing infrastructure, Marula has made a strategic decision to upgrade the existing Eskom substation located within the MRA. Due to the fixed location, no alternatives sites have been considered for the Expansion and capacity upgrade of the existing Eskom substation.

The establishment of an additional product stockpile, additional TSF pipeline and the proposed upgrade of the compressed air main ring, aim to optimize current mine operations. The preferred route for the proposed additional TSF pipeline will follow the existing overland TSF pipeline from the Concentrator Plant to the TSF. The additional proposed TSF pipeline will alleviate current capacity constraints. Once the proposed TSF pipeline is authorised and commissioned, the two pipelines will operate simultaneously (the load will be split between the two pipelines). Due to the fixed location of the existing TSF pipeline, no locations alternatives were possible. No technology and activity alternatives were considered.

The establishment of an additional product stockpile is proposed at the Concentrator Plant which is an already disturbed area. In addition, the Concentrator Plant provides an optimal location for the transport of product on an ad-hoc basis. Given this operational advantage and the least disturbance associated with the Concentrator Plant, no other location alternatives were considered for the product stockpile. No technology and activity alternatives are possible for this project component.

The structural upgrade to the existing change house at the Clapham Shaft Complex aims to accommodate an increase of the labour force. No feasible location alternatives were identified for the structural upgrades to the change house and compressed air main ring at the Clapham Shaft Complex because these components are location specific. No technology and activity alternatives were feasible because ethe activity relies on upgrades to existing infrastructure.

Location alternatives are not applicable to the Implementation of monitoring and remediation measures to assist with the management of the UG Tailings pollution plume because this project component is administrative in nature. Marula is investigating various methods of managing the contamination plume emanating from the existing Tailings Dam facility. The investigation of remediation measures is in the feasibility stage, but these investigations will take cognisance of economically viable and environmentally effective technology to manage the contamination plume.

# 7. FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

## 7.1 DETAILS OF THE DEVELOPMENT FOOTPRINT ALTERNATIVES CONSIDERED

### 7.1.1 THE "NO-GO" ALTERNATIVE

The No-Go alternative would be to not undertake any of the below activities:

- The establishment of two additional ventilation shafts.
- The upgrade to refrigeration and ventilation infrastructure at existing ventilation shafts.
- The establishment of additional water pipelines to support the additional ventilation shafts.
- The expansion and establishment of additional power supply and distribution infrastructure in support of the establishment of additional ventilation shaft and upgrades to existing ventilation shafts.
- The establishment of a product stockpile within the existing footprint of the Concentrator Plant.
- The establishment of an additional pipeline to the approved Tailings Storage Facility (TSF).
- Structural upgrades of the existing change house and compressed airline at the Clapham Shaft Complex.
- Implementation of monitoring and remediation measures to assist with the management of the UG Tailings pollution plume.

The remaining LOM is 11 years however the authorisation of the proposed project will extend the current LOM by 17 years. It follows that the No-Go option would mean that the efficacy of the mine operations would not be optimised, and the LOM may be reduced. This is especially pertinent to the proposed establishment of a product stockpile within the existing footprint of the Concentrator Plant, the establishment of an additional pipeline to the approved Tailings Storage Facility (TSF) and the structural upgrade of the compressed air main ring. In addition, the no-go option will prevent further economic growth for the Marula Mine and South African economy.

The establishment of additional ventilation shafts and refrigeration infrastructure will contribute to improved mining operations and is also aimed at improving worker health and safety. It follows that the proposed water pipelines and the expansion and establishment of additional power supply and distribution infrastructure in support of the establishment of additional ventilation shaft and upgrades will also contribute to the operation of the infrastructure. The No-Go option may detrimentally affect the health and safety of underground workers due to existing ventilation inefficiency. The proposed structural upgrades of the existing change house and compressed airline at the Clapham Shaft Complex is aimed at accommodating a future increase of 600 people for the Marula work force. The implementation of the No-Go option will stretch the capacity of the Clapham change house and result in significant discomfort for the labour force.

The implementation of monitoring and remediation measures to assist with the management of the UG Tailings pollution plume comprises an administrative change to the approved EMPr for Marula Mine (Metago, 2012), aimed at improving environmental management of the site. The No Go option would mean that no formal commitment and provision is made to the mines' approved EMPr to accommodate future technologies and management measures to reduce the TSF contamination plume.

### 7.1.2 ALTERNATIVES CONSIDERED

As part of the proposed project, alternatives for the ventilation shaft (location and technology) and the route of the water and power infrastructure were considered. All project related alternatives are limited to the farms Driekop 253 KT, Winnarshoek 250 KT and Clapham 118 KT. These alternatives are described below.

#### 7.1.2.1 SITE LOCATION

Alternatives that were considered for the proposed project include:

- The location of new Driekop Ventilation Shaft 9;
- The route for the OHT lines to the new Driekop Ventilation Shaft 9; and
- The routes for the water supply pipeline to the new Driekop Ventilation Shaft 9 and Clapham Ventilation Shaft 8.

The alternative location for the new Driekop Ventilation Shaft 9 is depicted in Figure 10, and is situated within the surrounding community. This alternative location was not chosen because the preferred alternative is located closer to the existing Driekop Ventilation Shaft 6 and is not within proximity to communities. The location of the preferred alternative does not require additional vegetation clearance or biodiversity disturbance, because the proposed ventilation shaft will be constructed within the current approved footprint of Driekop Shaft 6. The location of the additional cooling infrastructure (Bulk air coolers and surface fans) is dictated by the position of the ventilation shafts and therefore do not have alternative locations.

Alternative routes for the OHT line and water supply pipelines are shown in Figure 10. The alternative Water line 1 and Water line 2 traverse communities and was therefore not considered further. This is mainly due to potential disturbance to communities in the construction phase. Security concerns regarding the preservation of the proposed infrastructure (water pipelines and OHT lines) were also considered when determining the preferred routes. The preferred routes for both the water and OHT lines was chosen because they followed existing servitudes as far as possible, avoided communities (as far as possible) and linked to existing and proposed infrastructure of the mine.

#### 7.1.2.2 TECHNOLOGY TO BE USED

Marula had two alternatives to consider for the ventilation shafts; either to place the machinery above surface or below the surface. Marula opted to place as much of the ventilation shafts machinery underground as possible to reduce noise pollution in the area. No other technology options were considered.


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Marula Mining Right Area
- Existing Infrastructure
- Existing Ventilation Shafts
- Approved Ventilation Shaft
- Proposed Ventilation Shafts
- Alternative Driekop Ventilation Shaft
- Alternative Power Line
- Alternative Water Line 1
- Alternative Water Line 2

0 300 600 Meters

Scale: 1:16 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 10**

**Project Alternatives Considered**

SLR

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2022/01/21

## 7.2 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

This Section describes the public participation process undertaken in line with Section 6 of the NEMA EIA Regulations (GNR 982 of 2014, as amended). The public participation process (PPP) plays an integral role in any environmental authorisation process because:

- It ensures that potential consequences or impacts of activities on the environment (biophysical and social) are communicated to all interested & affected parties (I&APs), including all organs of State, in all spheres of government that may have jurisdiction over any aspect of the activity;
- It provides I&APs with a reasonable opportunity to participate in information sharing and participation procedures in an accessible and objective manner; and
- Allows for I&APs to contribute local knowledge and raise comments which informs the EA process.

The aim of the public participation process is to co-ordinate a mechanism through which I&APs are informed of the proposed project and environmental authorisation process required. The I&APs are given an opportunity to provide input into the project plan, the assessment and proposed mitigation measures. The proposed project was introduced to the public in November 2020. Initial stakeholder consultation was undertaken to notify the I&APs of the proposed project scope which comprised of only the proposed ventilation shaft infrastructure and associated supporting infrastructure. Subsequent to November 2020, additional project components have been included, requiring this additional application process. An overview of the public participation process (PPP) undertaken as part of the environmental authorisation process is detailed in this chapter.

### 7.2.1 PUBLIC PARTICIPATION COMPLETED TO DATE

#### 7.2.1.1 Identification of I&APS

I&APs who could be affected either directly or indirectly by the proposed project activities and those I&APs who have may have an interest it the proposed project were identified during project initiation. This was done by a desktop screening of farms located within proximity of the Marula Mine. Details of the landowners were obtained through Windeed searches and were verified telephonically or by e-mail. Authorities, non-governmental organisations, and parastatals required to participate in the process were identified through SLR knowledge and experience in the area.

Details of the identified I&APs were collated to produce a project database which was updated through the lifecycle of the project and were considered as registered I&APs. This public participation process took cognisance of the Protection of Personal Information Act (2013). As such, registered I&APs were informed of their right to withdraw as a registered I&AP at any stage of the environmental authorisation process. Notifications were sent in the form of emails and bulk SMS notifications. The I&APs who were identified for the project are listed Table 14 below.

**Table 14: I&APs identified as part of the environmental authorisation process**

| **Competent authority** |
|---|
| Department of Mineral Resources and Energy (Polokwane) |
| **Commenting authorities** |

| | |
|---|---|
| Department of Economic Development, Environment and Tourism (DEDET) | Department Human Settlements, Water and Sanitation (DHSWS): Lydenburg Area |
| Department of Agriculture, Land Reform and Rural Development (DALRRD) including the Land Claims Commissioner | Department of Agriculture – Provincial |
| Roads and Public Transport Limpopo | Greater Tubatse Local Municipality including the ward councillor |
| Greater Sekhukhune District Municipality | Limpopo Parks and Tourism |
| South African Heritage Resources Agency (SAHRA) | |
| **Others** | |
| Immediate landowners | Adjacent landowners |
| Traditional councils, Kgosi's and Developmental Forums | Communities |
| Surrounding mines and industries | Non-Government Organisations |

#### 7.2.1.2 Notification of I&APs

An overview of the material used to notify I&APs as part of the PPP undertaken to date is shown in Table 15 below.

**Table 15: Overview of notification material and distribution means undertaken to date**

| Material | Purpose | Proposed distribution |
|---|---|---|
| Site Notices (A2 sized site notices in English and Sepedi). | The site notices will contain information on the proposed activity, the authorisation process, details of the EAP and information on how to register and participate in the public participation process. | The site notices were erected at conspicuous places in and around the mine as part of the initial PPP in 2020 and in January 2022 as part of the readvertisement of the proposed project. Copies of the site notices (English and Sepedi) are attached in Appendix C. |
| Background Information Document (BID) prepared in English and Sepedi | The purpose of the BID was to provide information about:<br>• The proposed project;<br>• The baseline environment of the project area;<br>• The environmental assessment process being followed;<br>• Possible biophysical / cultural / socio-economic impacts; and<br>• How to have input into the environmental assessment process. | The BID was made available to all I&APs and commenting authorities registered on the project stakeholder database using email and postal methods. In addition to this, SMS notification were sent to all I&APs registered on the project database to inform I&APs of the availability of the BID which was downloadable from either the SLR website or the SLR data-free website. Links to these websites were included in the SMS notifications. Copies of the BID and the proof of distribution are attached in Appendix C. |
| Newspaper Advertisement | Two newspaper advertisements will be published to notify I&APs of the project and authorisation process. The newspaper advertisement will | The advertisement was published in the Steelburger News and the Sekhukhune Times, in English. |

| Material | Purpose | Proposed distribution |
|---|---|---|
| | contain information on the nature of the activity, the application process, as well as details of the EAP and details on how to register as an I&AP and provide comment. | • The advert was placed in the Sekhukhune Times on the 13 January 2021.<br>• The advert in the Steelburger was placed on the 21 January 2021.<br>• Re-advertisement: A single advertisement was published in the Steelburger News in English in November 2021.<br><br>Copies of the advertisement is attached in Appendix C. |

#### 7.2.1.3 Lands Claims Commissioner

The Department of Agriculture, Land Reform and Rural Development (DALRRD) in Limpopo was contacted to confirm if there are land claims on properties that form part of the Marula mining area upon which the proposed activities will be undertaken. These farms include Driekop 253 KT; Clapham 118 KT and Winnarshoek 250 KT. The land claims commissioner confirmed that there are existing land claims for the properties. These are pending claims and have all been lodged prior to 1998. The registered claimants will be included in the I&AP database and involved as stakeholders in the public consultation process once their contact details have been obtained. Correspondence from the Land Claims Commissioner is attached as Appendix C.

#### 7.2.1.4 Pre-consultation with the competent authority

On 5 June 2020, the General Notice 650 (Disaster Management Act (57/2002): Directions Regarding Measures to Address, Prevent and Combat the Spread of COVID-19 Relating to National Environmental Management Permits and Licences was published in order to provide directions to ensure fair licensing processes and public participation processes. A public participation plan was formulated according to the prevailing COVID-19 regulations. The public participation plan was discussed during the pre-application meeting and recommendations from the competent authority were included into the final public participation plan. The minutes of the pre-application meeting is in Appendix C.

A virtual pre-application meeting was held with the DMRE on 27 October 2020. The purpose of the pre-application meeting was to:

- Provide an overview of the project;
- Provide an overview of the EA process identified for the project and obtain guidance and/or confirmation of environmental authorisation process required;
- Provide information pertaining to the motivation of the proposed project and alternatives being considered;
- Provide information pertaining to the potential bio-physical, cultural, and socio-economic impacts identified for the proposed project; and
- Provide information and confirmation of the proposed PPP for the project.

#### 7.2.1.5 Focussed meetings

Focussed meeting were held with the relevant Kgoshi, Traditional Councils and the Seuwe and Driekop Community Development Forum, from the 23 – 25 November 2020 at Marula Platinum Mine. The purpose of the focussed meetings was to:

- Provide an overview of the project;
- Provide an overview of the EA process identified for the project;
- Provide information pertaining to the motivation of the proposed project and alternatives being considered;
- Provide information pertaining to the potential bio-physical, cultural and socio-economic impacts identified for the proposed project; and
- Provide information how I&APs may have input into the EA process.
- Minutes of these meetings are provided in Appendix C.

In November 2021, Marula's stakeholder department distributed BIDs to the traditional authorities and developmental forums to inform them of the recommencement of the environmental authorisation process.

### 7.2.2 PUBLIC PARTICIPATION PROCESS TO FOLLOW

All consultation processes were guided as per the prevailing COVID-19 regulations at the time. Consideration was given to the risk and potential spread of the virus before undertaking any public participation and/or consultation process.

#### 7.2.2.1 Review of the Basic Assessment Report

This BAR and EMPr is available for public review and comment for a period of 30 days. A non-technical summary of the EIAR was made available to all I&APs registered on the project database via email in English and Sepedi. Full copies of the BAR (including supporting appendices) and Non-Technical Summaries is downloadable from the SLR website (at https://slrconsulting.com/za/slr-documents/) and the zero data website (at https://www.slrconsulting.com/en/public-documents). Hard copies will only be distributed if specifically requested.

#### 7.2.2.2 Submission of the BAR to the Competent Authority

The mechanism of submission of the EMPr and BAR will be delivered via hard copy to the regional DMRE official. The final application will be made online via the SAMRAD website or as otherwise instructed by the DMRE official case worker. All comments received during the public review period will be collated and responded to in the BAR and EMPr report submitted to the regional DMRE offices.

#### 7.2.2.3 Notification of DMRE Decision

Registered I&APs will be notified via e-mail and text message of the decision reached by the DMRE, within 14 days of the decision being granted. I&APs will also be informed of their right to appeal the decision in terms of Chapter 2 of the National Appeal Regulations (2014).

### 7.2.3 SUMMARY OF ISSUES RAISED BY I&APS

The following table details the issues raised by I&APs through the public participation process completed to date.

**Table 16: Summary of issues raised by I&APS**

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| **Regulatory authority** | | | | | |
| **Department of Mineral Resources (DMRE)** | | | | | |
| Department of Mineral Resources (DMRE) | x | 27 October 2020 | Contents of BAR must take cognisance of the status quo of the mining environment; this is particularly important for the local community. | Noted by SLR and Marula. | Section 7.3 |
| | | | The EMPr must be a consolidated document and all commitments should be presented in the EMPr. The new amended EMPr will replace all existing EMPr. | Noted by SLR and Marula. | Part B of this document. |
| | | | The financial provision calculation needs to indicate the current liability of the mine as well as the influence on the current liability as a result of the proposed project components. It follows that the relevant shortfall needs to be indicated. | Noted by SLR and Marula. | Section 18. Section 27. |
| | | | The BAR must reflect the paleontological results as well as whether the SAHRA has accepted the exemption letter or not. | Noted by SLR and Marula. | Section 7.3.2.1. |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| **Interested Parties** | | | | | |
| Peter Mmatjie Babina Kgomo Traditional Council Member | X | 23 November 2020 (During focussed meeting) | How will people know about information and/or announcements from the mine? I was thinking that site notices and other posters regarding the project should be placed within conspicuous locations of the jurisdictional areas of each of the Headmen. It would also be ideal that the site notices are placed here at the Tribal Office. | We will make the public participation documents available at the Traditional Council Office and on other conspicuous locations within the community, which include but not limited to, tuckshops, taverns, and Toyota Avanza Taxi Rank near the mine. We will where possible, have the public participation documents translated in Sepedi. | |
| Aubrey Moropa Babina Kgomo Royal Family Member | X | 23 November 2020 (During focussed meeting) | I think everybody knows that where there are mining operations, there are environmental impacts such as noise, dust and impacts on land capability. We can put aside the impact associated with land capability as the mine currently provides compensation on affected crop fields. However, there is the issue of cracked houses, lack of water supply. My question is how will the mine address dust and cracked houses impacts? | **Dust Impacts**: For this project, we have appointed specialists to undertake an Air Quality Study. The outcome of the study will provide us with mitigation measures to reduce the significance of any assessed impacts. All mitigation measures will be included in the Environmental Management Programme (EMPr). The reports for the project will be made available for the community to review and comment on. Therefore, if there are any concerns regarding the recommended mitigation measures, these concerns can be submitted to us during the 30-day review and comment period. | Section 7.3. Section 9. |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| | | | | A complaints and concerns register will be made available during the construction phase for community members to submit any issues and/or complaints resulting from the project activities. These issues can include any additional dust impacts being experienced. Marula will review the register and implement additional mitigation measures to reduce the dust if necessary. In addition, water tankers / bowsers will be used to suppress dust levels in the working area for the duration of the construction phase.<br>**Cracked houses**: We do have a challenge of cracked houses in the area. The information at our disposal is that the current activities of the mine are not cracking houses. This may have been the case during the incipient stages of the mine when blasting was taking place at a shallower level. I visited some of the affected houses last year, with a Marula appointed service provider. The service provider brought machinery which was used to determine the impact of the mine's activities (i.e. blasting) on the cracked houses. It was determined that the activities of the mine do not have an impact. I am still liaising with community members who have raised the same issue in 2002 and 2003. They indicated that when the mine was still developing their houses were cracked. Unfortunately, this issue will need to be escalated to higher management of Implats, because we are unable to prove that the cracks were caused by the structural integrity of the houses or from the mine's activities. | |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| | | | | **Water**: We agree that there is a water challenge. We are in liaison with the Sekhukhune District Municipality regarding the issue of the lack of access to drinking water. By law, the Sekhukhune District Municipality is mandated to provide drinking water to communities within its jurisdiction. In addition, the ongoing mining operations in the area may also impact groundwater resources. There are discussions taking place between Marula and the Sekhukhune District Municipality to resolve the issue. The outcome of these discussions will be communicated to the Babina Kgomo Traditional Council. | |
| Aquila Mabilu Babina Kgomo Traditional Council Member | X | 23 November 2020 (During focussed meeting) | How will communities on the Farm Driekop 253KT benefit from the implementation of the project? | The project will provide employment and business opportunities during the construction phase construction phase. The EMPr for the project will include mitigation measures which will require the selected Contractor to appoint community members for low and semi-skilled vacancies. Preference will be given to local Small Medium and Micro Enterprises (SMMEs) where possible. This includes support services such as ablution facilities and transportation of workers for the duration of the construction phase of the project. | Section 3.2.4. |
| Serious Serage Community Member | X | 23 November 2020 (During focussed meeting) | Are there no mitigation measures that can be implemented to ensure that the dust levels from the Tailings Storage Facility (TSF) do not have a detrimental impact on the surrounding homesteads? | The issue of the dust from the TSF is a concern. We are engaging numerous service providers to assist with solutions / mitigation measures to address the issue of the dust levels from the TSF. | - |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| Esrom Phoku Driekop & Seuwe Community Development Forum | X | 23 November 2020 (During focussed meeting) | From experience, there could be a challenge with the communities if the proposed infrastructure is placed on two separate farm portions. As community members from each of the farm portions will envisage that they will derive some form of benefit from the project either through employment or business opportunities. | The majority of the infrastructure components proposed for the project will be located on one farm. | Section 2. |
| Harry Phoku Driekop & Seuwe Community Development Forum | X | 23 November 2020 (During focussed meeting) | I would suggest that the EIA Report is compiled first, and the community is consulted thereafter. Also, these projects encompass a myriad of environmental impacts, therefore where required, compensation should be included as a mitigation measure to address issues such as the cracks on houses within the area. | The comments are noted by the project team. This focussed group meeting is the first stage in the consultation process, however public participation materials will be made available to all affected communities. Part of the public participation process will include the placement of a newspaper advert being placed in the Sekhukhune Times to advertise the commencement of the 30-day review and comment period for the impact assessment report. | - |
| | | | The newspaper article should be placed in the Steelburger Newspaper to ensure local communities are notified, and to limit attention to the proposed projects by far away communities. | We will also include an advert in the Steelburger Newspaper. | |
| Lazarus Mabelane Tswako Mohlala Traditional | X | 24 November 2020 (During focussed meeting) | We plead with the project team to timeously issue invites to meetings as well as the agenda / presentation of the meeting so that we have enough time to go through the information and avail ourselves accordingly. | The comments were noted by the project team. The project team indicated that it would ensure that any future invites (if required) are sent to council members timeously and that information for discussion is shared accordingly. | - |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| Council Member | | | | | |
| Lucas Kgoete Nareng Thokoane Traditional Council Member | X | 24 November 2020 (During focussed meeting) | Please explain the registration process. What will be the community members registering themselves for in this registration process? Is it just meant for people who are currently unemployed and are only interested in employment opportunities? | The registration process is for anyone who have any interest, concerns or questions relating to the proposed project. A Background Information Document (BID) and flyers, summarising key information on the proposed project will be made available to community members. The BID will include I&AP registration form for I&APs to complete and send it through to Mavisha Nariansamy (mnariansamy@slrconsulting.com) or to Phumlani Dlamini from Marula. Marula will then send any contact information to us in order to be included in the I&AP database which will be submitted to the DMRE. Comments can be emailed to SLR in Sepedi if required. | - |
| Steve Mashishi Roka Mashishi Traditional Council MemberX | x | 25 November 2020 (during focussed meeting) | You have indicated that the mine intends to generate its own electricity through the development of the proposed 10 MW solar PV facility. How will the mine go about this? | Government, through the Integrated Resources Plan (IRP) (in 2019) has allowed Independent Power Producers (IPP) to produce their own electricity from renewable energy sources such as solar and wind through the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). The mine has embarked on this self-generation process in order to create back-up power when there are constraints on the Eskom system. This will enable our underground activities to continue as usual even during load shedding. | - |
| | | | Will the construction of the ventilation shafts and the solar PV plant be undertaken concurrently? | Our intention was for the construction phase of the projects to kick-off at the same, but this will no longer be the case due to technical issues that need to be resolved on the solar PV plant project. As a result, the ventilation shaft project is more likely to kick-off first but there will | - |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| | | | | be a point where both projects will run simultaneously for the duration of the construction phase. | |
| | | | When do you envisage to commence with the construction phase of these projects? | The plan is to commence with the implementation of these projects in late 2021 after receiving the Environmental Authorisation from the DMRE. Our planning shows that we will be able to receive a decision from the DMRE on the ventilation shaft project between July and August 2021. We have so far commenced with internal procurement processes to appoint service providers that will execute the construction of the solar PV plant. Their appointment will be conditional based on receiving an Environmental Authorisation from the Competent Authority. | - |
| Esrom Phoku Driekop & Seuwe Community Development Forum | X | 18 January 2021 Received via e-mail | Dear SLR Consulting<br>We last year and we agreed to have a proper consultation meeting…so according to the progress that is there seems like you did progress without us. There is now where you can progress without us, maybe at other villages not at our village Diphale and Seuwe. You undermine up. You even inform people to bid, to bid what? Please come down, you are flying very high, we are still waiting here down for you. | Dear Mr Phoku,<br>Thank you for your email below. I thought it would be a good idea to provide clarity on a few of the points you have brought up. These responses are as follows:<br>1. **Consultation Meeting**: From our initial meeting held last year, there was no resolution for a follow up meeting. There was a request for a meeting with technical experts from the project team. It was decided that Marula will arrange this meeting with the forum independently of SLR. Please request clarity with Marula.<br>2. **Progress of the project**: The project has commenced with notification of I&APs as detailed in the presentation and discussed last year. If you have any comments or concerns regarding the process or project, please forward them in writing. SLR will | - |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| | | | | record these concerns and provide responses in the draft Basic Assessment Report. No other progress has been made.<br>3. **Request for BID:** SLR has not requested anyone to BID for any aspect of the project. The BID we referred to be the acronym for the Background Information Document (BID) which was provided with all communication. The purpose of the BID is to provide I&APs with relevant project background. Please let me know if there was another issue pertaining to a BID. | |
| Esrom Phoku Driekop & Seuwe Community Development Forum | X | 18 January 2021 | It seems like it is part of the scope to forget…From the meeting, remember we deny signing your rollcall, because you had a meeting with other people before us. Mr Maroga agreed that for further progress he will communicated with Esrom Phoku through an email that was agreed and submitted. So, the team ask any progress, you tell us about experts. We said to you when you do consultations, please bring along all experts that will be able to clarity raising questions because your team is not complete. Remember that there have never been any proper consultations from you up to so far…and if you are moving fast forward without doing the | Marula has committed to undertake another engagement with all groups consulted during the focus meetings. The aim of this meeting was to explain the technical details involved with the proposed project. Marula has indicated to SLR that this engagement will be a separate undertaking outside the scope of this Basic Assessment Process. The technical meeting will be facilitated by the Marula Stakeholder Department. | - |

| Interested and affected party | Mark with an X if those who must be consulted were in fact consulted | Date comment received | Issues raised | Response provided | Section and paragraph reference in this report where the issues and or responses were incorporated |
|---|---|---|---|---|---|
| | | | correct thing, you will have to make correction and are costly. We don't know of your score of work, and we don't expect fooling us to be part of the scope. | | |
| Nnankie Matlala | X | 26 January 2021 | How to illustrates an organised system of ventilation planning for an underground mine. The procedure assumed the availability of computer assistance including ventilation simulation software and eliminate most of the manual techniques and intuitive estimates of older planning methodologies. | | |
| Multiple | | 28 January 2021<br>25 January 2021<br>23 January 2021 | CVs were received from the following I&APs.<br>Tole Thabo Nkune<br>Ayanda Gqoli<br>Pleasure Makubedu<br>Itumeleng Keletso<br>Mkhond Phillemon | The CVs were forwarded to the Marula project team. | - |
| Mpho Mokone | x | 29 November 2021 | May you kindly share with us coordinates of the proposed surface infrastructure. | The proposed project will be undertaken within the Marula Mine mining right area on the Farms Driekop 253 KT, Clapham 118 KT, Forest Hill 117 KT and Winnarshoek 250 KT. Please refer to the proposed site layout map provided in the Draft Basic Assessment Report which will be available for public review form the 8 February 2022 – 10 March 2022. | Section 2<br>Figure 9 |

## 7.3 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE PROPOSED PROJECT AND THE ALTERNATIVES

### 7.3.1 BASELINE BIOPHYSICAL ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

An understanding of the existing environmental and social context and sensitivity within which mining activities are currently located is important to understanding the potential impacts at closure. This section provides a description of the attributes of the biophysical and socio-economic receiving environment at the mine. This section also provides a discussion on the environmental attributes associated with the various project alternatives.

#### 7.3.1.1 Geology

INTRODUCTION AND LINK TO IMPACT

Mineral resources can be sterilised and/or lost through the placement of infrastructure and activities in close proximity to resources, by preventing access to potential mining areas. Geological processes can also influence soil forms and the potential for palaeontological resources.

A baseline situational analysis is described below in order to understand:

- The potential for sterilisation of mineral reserves;
- The potential for geological lineaments such as faults and dykes. Faults, dykes and other lineaments can act as preferential flow paths of groundwater which can influence both the dispersion of potential pollution plumes and the inflow of water into mine working areas.

DATA SOURCES

Information in this section was sourced from the approved 2012 EIA and EMPr Report (Metago, October 2012) and the Classification, Assessment and SDS for Waste Streams compiled by Golder Associates (August 2015).

DESCRIPTION

**Regional Geology**

The eastern limb of the Bushveld Igneous Complex (BIC) underlies the farms Winnarshoek 250KT, Driekop 253KT, Clapham 118KT, Forest Hill 117KT and Hackney 116KT. Two lithologically distinct units that are mainly intrusive into the Transvaal Supergroup make up the BIC: a lower sequence of layered mafic and ultramafic rocks, known as the Rustenburg Layered Suite (RLS), and an overlying unit of granites, known as the Lebowa Granite Suite.

All the chromitite and platinum mineralisation is located in the RLS. These layered rocks have a maximum thickness of up to 8 km and occur in four areas known as the western, eastern, Potgietersrus and Bethal lobes. The RLS comprises five stratigraphic zones representing the sequential fractional crystallization that accompanied the cooling of this magmatic body:

- The Marginal Zone, which comprises pyroxenites and norites with no economic potential;
- The Lower Zone which comprises ultramafic rocks, such as pyroxenites and harzburgites, containing thin, high-grade chromitite seams;
- The Critical Zone pyroxenites, norites and anorthosites that host all the significant platinum group metals chromite deposits;

- The Main Zone, which consists mainly of homogeneous norites and gabbros that are locally exploited as dimension stone; and
- The Upper Zone norites, gabbros and diorites, which host over 20 massive magnetite seams, some of which are exploited for vanadium and iron ore.

The Marula mining area in general is underlain by norite, leuconorite, anorthosite and pyroxenite of the Main and Critical Zone of the RLS of the BIC. The Leolo mountains to the west of Winnarshoek 250KT comprise of norite. The norite has weathered to black turf-like clay in the plains adjacent to the mountains and hills. The main rock types in the RLS (Geological Map, Sheet 2430 Pilgrim’s Rest 1:250 000) include:

- Diabase: Green, fine to medium grained diabase.
- Shelter Norite: fine to medium grained norite and pyroxenite.
- Croydon Subsuite: medium to coarse grained pyroxenite and felspathic pyroxenite.
- Dwars River Subsuite: medium to coarse grained norite and anorthosite, pyroxenite - includes the Merensky Reef.
- Dsjate Subsuite: coarse grained gabbro and anorthosite.

The entire area is covered with quaternary sediments and the streambeds and floodplains consist of alluvium and unconsolidated deposits.

### Local geology

The UG2 and Merensky Reefs are present in the Marula mining area. Currently, the mine is exploiting the UG2 Reef, while the construction of an additional vent shaft will ensure access to the Merensky Reef (approved but not yet constructed). The UG2 Reef is a lower chromitite layer within the Upper Critical Zone, while the Merensky Reef is a shallow sizeable platinum group element (PGE) mineral resource in a relatively simple structural regime. Both reefs strike north-north-west to south-south-east, with a vertical thickness of approximately 400 m between the Reefs. The Merensky Reef is located about 650 m below the surface with the UG2 Reef approximately 400 m deeper than the Merensky Reef. The Merensky Reefs occurs near the top of the Upper Critical Zone in a sequence of rocks knows as the Merensky Cycle.

A schematic representation of the Merensky Cycle Unit showing expected widths (in metres) and informal stratigraphy within the MRA, is shown in Figure 11. The Merensky Pyroxenite Unit comprises the top of the Merensky Upper Pyroxenite (MPU), the Merensky Chromitite Marker (MRC), the Merensky Lower Pyroxenite, the Merensky Lower Chromitite (MLC), and the Merensky Pegmatoid (MPG). A third chromitite stringer, the Merensky Pegmatoid Chromitite, is intermittently developed at the base of the pegmatoid. Sulphide (and PGE) mineralisation is associated mainly with the upper (MRC) and lower (MLC) chromitite stringers and the pyroxenite between these stringers. The PGE mineralisation is concentrated mainly from the Merensky Chromitite Marker (MRC) down towards the middle of the Merensky Lower Pyroxenite (MLP).

| | | | | | |
|---|---|---|---|---|---|
| | | MHW1 | | Norite – Leuconorite | Merensky Hanging Wall 1 |
| 40 | | MPU | MRC | Feldspathic Pyroxenite & Pegmatoid | Merensky Upper Pyroxenite |
| 180 | | MPL | MLC | Feldspathic Pyroxenite | Merensky Pyroxenite |
| 40 | | MPG | MPC | Feldspathic Pyroxenite & Pegmatoid | Merensky Lower Pegmatoid |
| 550 | | MF1 | | Feldspathic Pyroxenite & Pegmatoid | Merensky Footwall 1 |
| | | MF2 | | Leuconorite-Norite-Pyroxenite | Merensky Footwall 2 |

**Figure 11: Merensky cycle unit and informal stratigraphy within the MRA**

### Structural features

There are several structural features that have resulted in some displacement of the UG2 and Merensky Reefs underlying the Marula Mine. Several dolerite dykes and dunite pipes intrude the RLS on the farms Winnarshoek 250 KT and Driekop 253 KT. The dykes generally trend north-east to south-west and east-northeast to south-southwest. There is a prominent dolerite dyke running down the centre of the MRA from north-northeast to south-southwest. This type of dyke is known to have a damming and conduit effect on subsurface water and has been taken into consideration in mine planning. The centre and southern part of the approved Merensky shaft complex area is structurally relatively simple, with little major faulting. Potholes, which represent important disruptions to normal magmatic layering in the upper Critical Zone of the Bushveld Complex, occur within the Merensky Reef.

Two major pothole structures were identified in the Merensky project area. A large (regional scale) pothole was identified on the Forest Hill / Winnarshoek boundary, which affects the Merensky Reef boundary. The Merensky Reef in this area forms a mega pothole feature, with the outcrop trending eastward prior to resuming its regional position. This structure is expected to be in the order of a 1,000 m in diameter. The Merensky Reef is hundreds of metres deeper than expected with an unusual reef development. The dunite pipe also affects this area and appears to be interrelated with the mega pothole. Other Merensky Reef potholes were encountered in a number of boreholes. These appear to be relatively minor in size, although the frequency is relatively high. The northern part of Winnarshoek 250 KT is structurally more complex. Numerous small (<0.5m) faults and fractures were intersected in borehole cores. There is also a well-established dunite pipe on the farm. Dunite pipes disrupt the layered reefs in their vicinity and, therefore, are considered as areas of structural disturbance.

### CONCLUSION

The geological structures in the area may influence groundwater flow and the dolerite dykes can compartmentalise the aquifer. The major faults and dyke intrusions can form preferential flow paths for groundwater, influence dewatering (zone of influence) along zones of enhanced transmissivity, and low permeable dykes can prevent dewatering. These geological structures will, influence the impact of groundwater on mining operations as well as the impact of mining on the groundwater levels. However, groundwater levels do not indicate any significant compartmentalisation but rather mimic the surface topography. The proposed ventilation shafts will not interfere with dewatering practices of the current mining operations; therefore, the major faults and dyke intrusions will present little influence on proposed ventilation shaft infrastructure. The refrigeration infrastructure will be placed on the surface and the water supply pipelines and power lines will not be excavated and laid to a depth which can be affected by geological structures. In addition, the large pothole was identified on the Forest Hill / Winnarshoek boundary which is located north of the proposed project components. The proposed TSF pipeline follows the existing TSF pipeline route which is placed overland. The structural upgrades of the change house and compressed airline will be undertaken at the Clapham Shaft Complex which is an already approved operational area. It follows that these proposed project components will not be affected by the geology of the area.

With respect to mineral sterilisation, given the depth and location of the ore reserves, the placement of the proposed infrastructure will not sterilise any mineral reserves. The majority of infrastructure will be laid at a depth which is shallower than the prevailing ore reserves. The product stockpile, change house and compressed airline will be located within the built up area of the mine and will not cause mineral sterilisation.

#### 7.3.1.2 Topography

INTRODUCTION AND LINK TO IMPACT

Changes to topography through the development of the proposed project may impact on surface water drainage, visual aspects, hazardous excavations (safety of both third parties and animals) and surface subsidence. To understand the basis of these potential impacts, a baseline situational analysis of the topographical features within the project area is described below.

DATA SOURCES

Information in this section was sourced from the 2012 EIA and EMPr Report (Metago, October 2012), study of topographical maps and site observations made by the project team.

DESCRIPTION

The project area lies in a flat, broad valley formed by the Moopetsi River. The valley drains to the north and is bound by the hills of the Leolo Mountain which are found to the west, and the Lebalelo Mountains to the southeast. The Leolo Mountains rise in elevation from approximately 1 000 meters above mean sea level (mamsl) to 1 622 mamsl. The plains lie at elevations between 889 mamsl and 1 000 mamsl and the valley basin slopes down to the east and north. The flat topography of the valley is interrupted by three hills knows as the three heads of the farm Driekop, namely, Seuwe (1 059 mamsl), Diphalana (1 119 mamsl) and Diphale (1 139 mamsl). Additionally, there are several smaller hills also located in the area ranging in altitude from 910 mamsl to 959 mamsl. This applies to all project alternatives considered.

CONCLUSION

Mining activities and infrastructure have the potential to alter the topography and the natural state of areas. An alteration of the natural topography has the potential to present dangers to both animals and people. The design of proposed surface infrastructure should be such that any changes to topography results in stable topographic features, which do not pose significant risk to third parties and limit impacts on the visual character, water resources and the surrounding land users.

#### 7.3.1.3 Climate

INTRODUCTION AND LINK TO IMPACT

Climate can influence the potential for environmental impacts and related mine design. Specific issues include:

- Rainfall could influence erosion, evaporation, vegetation growth, rehabilitation planning, dust suppression and surface water management planning;
- Temperature could influence air dispersion through impacts on atmospheric stability and mixing layers, vegetation growth, and evaporation which could influence rehabilitation planning; and
- Wind could influence erosion, the dispersion of potential atmospheric pollutants and rehabilitation planning.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

## DATA SOURCES

Information in this section was sourced from the 2007 approved EIA and EMP (Metago, 2007), Integrated Water and Waste Management Plan (SRK, November 2019), Marula 2012 EIA and EMPr Report (Metago, August 2012), Noise Impact Assessment (Airshed, November 2020) and from meteoblue online weather resource (accessed from https://www.meteoblue.com, January 2021).

## DESCRIPTION

### Regional climate

The regional climate can be described as savanna with hot and wet summers and cool and dry winters. The mean annual evaporation is approximately 1 600 mm per annum. Temperatures are mostly moderate, with a mean temperature of about 20°C. However, extreme temperature fluctuations occur, with frost in winter and temperatures rising to above 40°C in summer. The closest weather station to the Marula Mine is Maandagshoek. The detail below provides the average climate data based on 30 years of hourly weather model simulation.

### Temperature and precipitation

Temperatures reach a maximum in the months of January and December (up to 36°C) whilst lowest temperatures occur at night and can drop to a minimum of 2 °C.

An illustration of the average precipitation and temperature is shown in Figure 12. The wettest six months of the year are between November and March, with maximum precipitation occurring in December / January. The mean annual precipitation (MAP) recorded at the weather station (Maandagshoek) with the longest record (81 years) is 565. Rainfall conditions are highly variable, and droughts and floods do occur. Thunderstorms occurred on 37 days a year on average at the Maandagshoek station. On average, approximately 7 days of heavy frost occur per year. On average 1 day of hail is experienced per year and on average 1 day of fog is experienced per year. An illustration of precipitation amounts is shown in Figure 13.

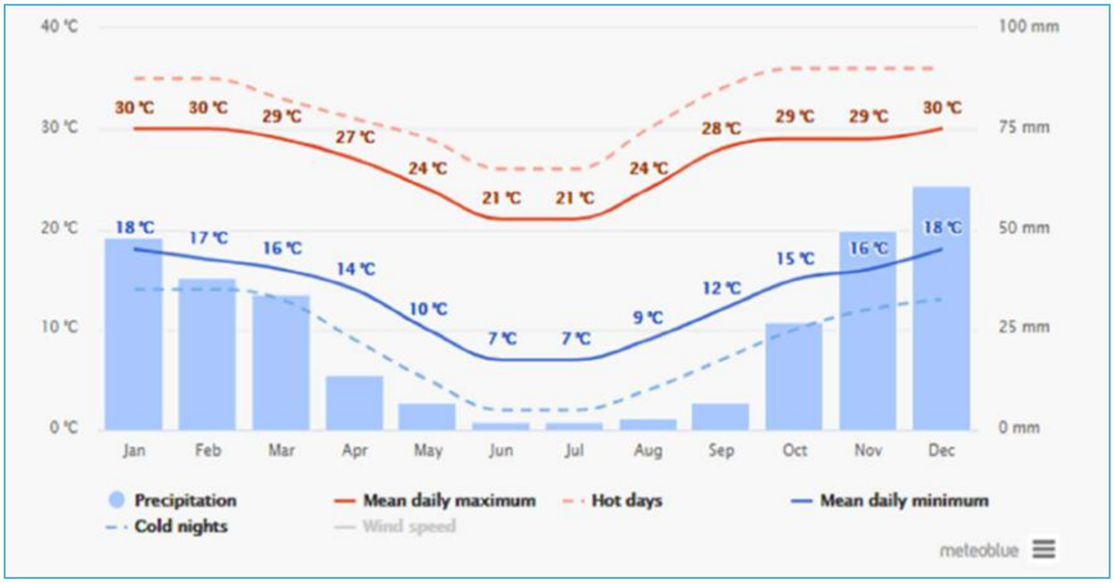



**Figure 12: Average temperatures and precipitation**[1]

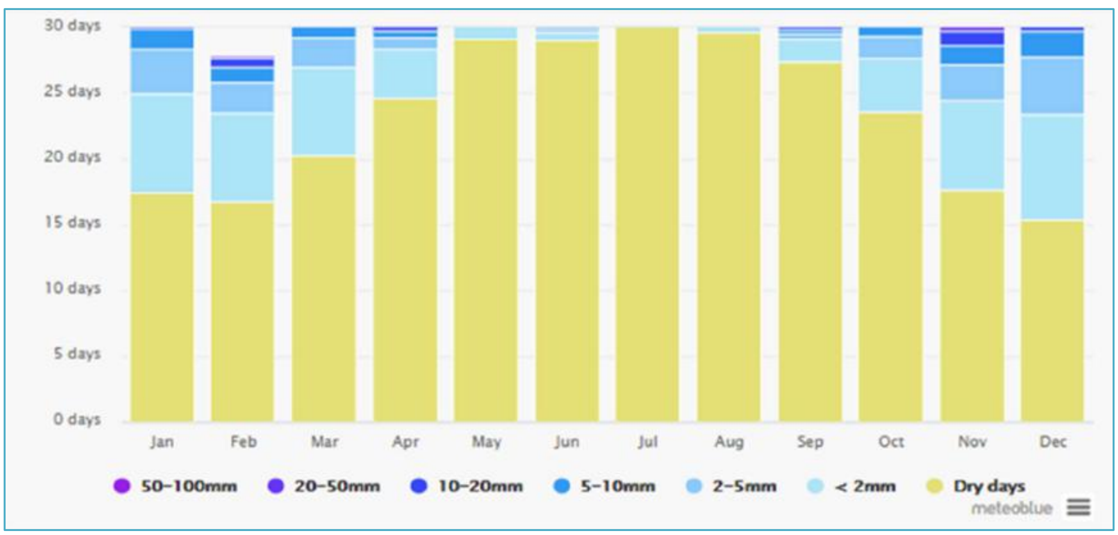



**Figure 13: Precipitation amounts**[2]

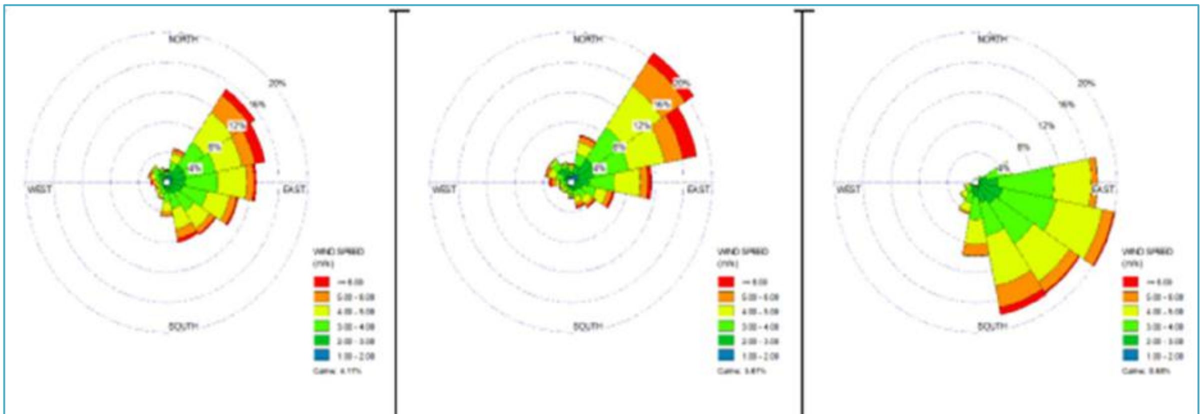
## Wind data

Data provided in the 2007 approved EIA and EMP (Metago, 2007) indicated that wind conditions differed markedly according to the season. During the summer months, winds from the north-easterly and easterly sectors dominate, with stronger winds of up to 10 m/s occurring. During autumn, the winds blow more frequently from the north-easterly, easterly and south-easterly sectors. The winter months reflect a more frequent flow from the southeast. In spring, wind flow is predominant from the north-easterly sector, with

[1] accessed from https://www.meteoblue.com , January 2021

[2] accessed from https://www.meteoblue.com, January 2021

an increase in frequencies of occurrence of winds greater than 6 m/s being evident. Updated information from the Weather Research and Forecasting (MM5)1 data for the period 2008 to 2010 was used by Airshed for their Noise Impact Assessment for the Marula mine (Airshed, November 2020). The assessment showed that during the day, the predominant wind direction is from the northeast sector while during the night the predominant wind direction is from the south-eastern sector. The wind roses for MM5 data (1 January 2008 – 31 December 2010) are shown in Figure 14.




(a) Period average wind rose | (b) Day-time wind rose (06:00 – 22:00) | (c) Night-time wind rose (22:00 – 06:00)

**Figure 14: Wind rose for MM5 data, 1 January 2008 to 31 December 2010 (Airshed, November 2020)**

CONCLUSION

Marula experiences typical savannah climate conditions, namely hot and wet summers, and cold and dry winters. Extreme temperatures do occur, and the prevailing wind direction is north-easterly with a speed variance between 15 – 25 km/hr. These climatic aspects would need to be considered during both the construction and rehabilitation phases, to minimise erosion and dust related impacts, as well as during water management planning.

#### 7.3.1.4 Soils and Land Capability

INTRODUCTION AND LINK TO IMPACT

Soils are an important component of most ecosystems. As an ecological driver, soil is the medium in which most vegetation grows and a range of vertebrates and invertebrates exist. In the context of mining operations, soil is even more significant if one considers that mining is a temporary land use where after rehabilitation (using soil) is the key to re-establishing post closure land capability that will support post closure land uses. Mining projects have the potential to damage soil resources through physical loss of soil and/or the contamination of soils, thereby impacting on the soils' ability to sustain natural vegetation and altering land capability. Contamination of soils may in turn contribute to the contamination of surface and groundwater resources. Loss of the topsoil resource reduces chances of successful rehabilitation and restoration. To understand the basis of these potential impacts, a baseline situational analysis is described below.

DATA SOURCES

Information in this section was sourced from the Soil, Land Use, Land Capability and Agricultural Potential Study prepared for the proposed project (Zimpande Research Collaborative, 2021).

## DESCRIPTION

### Soil forms

The assessment report by the ZRC indicated that the dominant parent material for majority of the Marula MRA is Gabbro with the remaining western portion dominated by Pyroxenite. Moreover, the Soil and Terrain database determined that majority of the MRA is comprised of Calcic Vertisols, with the western and north-eastern portions dominated by Lithic Leptosols.

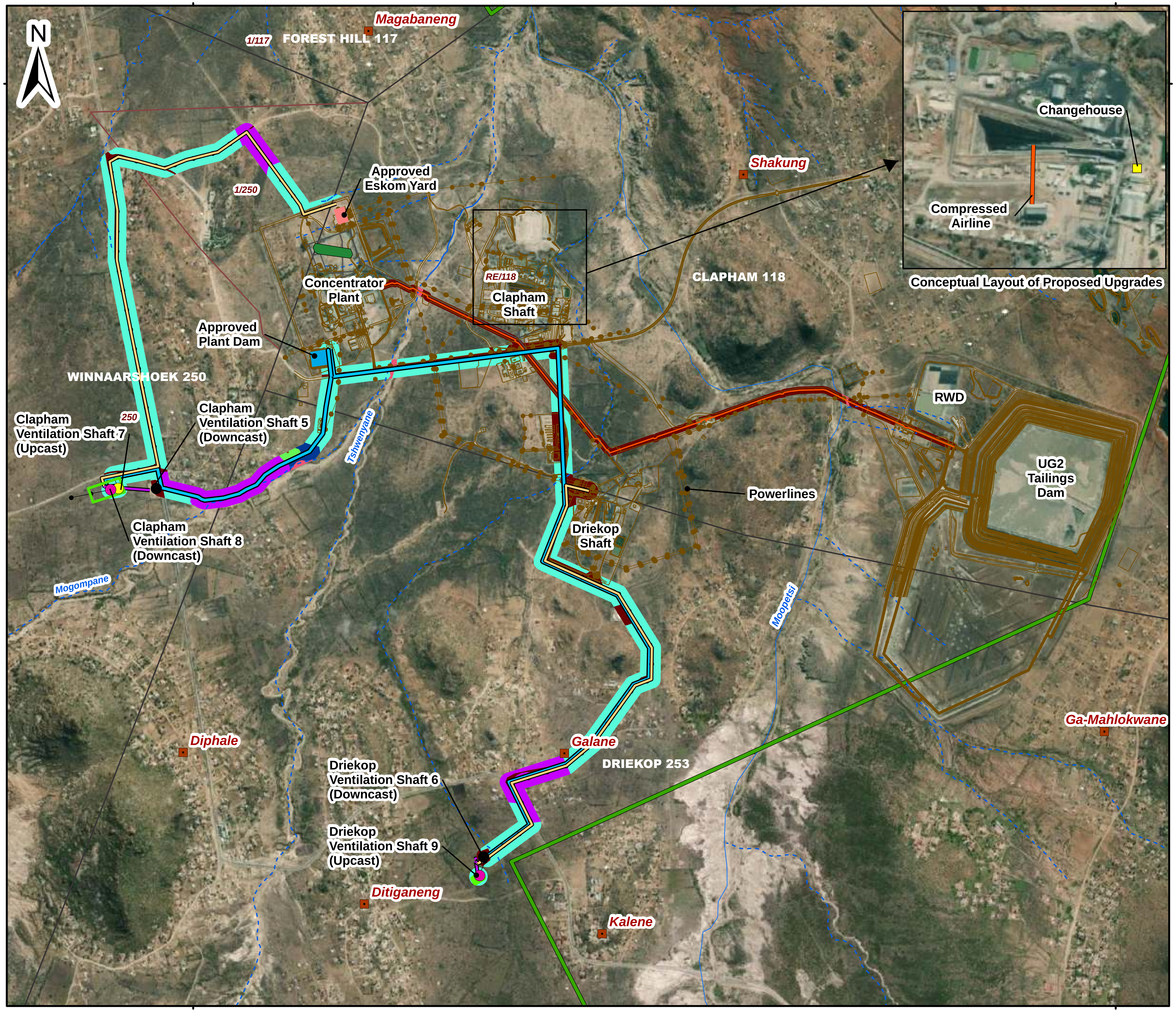
A soil survey was conducted in November 2020 to identify the soil forms, according to the Soil Classification System: A Natural and Anthropogenic System for South Africa Soil Classification System (2018), within the footprint (and a 15 m buffer area) of the proposed infrastructure. It was revealed that the proposed project area is dominated by soils namely, Spionberg/Valsrivier and Brandvlei. Refer to Figure 15 for the distribution of the various soil forms within the proposed project areas. It is however important to note that the upgrades of existing services and infrastructure at VS 6, VS 5 and VS 7, expansion of the Eskom substation, the product stockpile, and the Clapham Shaft complex upgrades are located within existing complexes and as such will be established on already disturbed areas. Due to the homogenous nature of the site, it is anticipated that similar soil forms would be associated with the proposed alternatives. These soil forms associated with the proposed project areas are considered to have poor drainage characteristics; shallow rooting depth due to high clay content in the B horizon; inadequate moisture; and bleached topsoil which lack nutrient retention capacity to support optimum growth and production. Some rocky outcrops were identified along the proposed project area and transformed soils were noted as being used as roads and recreational areas. These soil form characteristics imply broadly that they are not suited for cultivation and supporting agricultural activities. However, it follows that grazing activities and wildlife / wilderness can be supported.

### Land use capability

With reference to Figure 16, the land capability within the proposed project areas includes a combination of grazing, watercourse, and wilderness. The watercourse land capability areas are associated with soil forms that have a poor land capability due to wetness limitation during the good rainy seasons. These soils are associated with watercourse feature in the arid environmental and cultivation of these soils would prove impractical. The proposed project areas that are associated with grazing land capability is considered to be land that has permanent limitations that restrict the choice of crops or the intensity of crop production to a large extent. The wilderness land capability is considered to be an area of poor land capability and is not suitable for arable agriculture. These soils are considered to have low land potential. Due to the homogenous nature of the site, it is anticipated that the land capability associated with the project alternatives would also be associated with low land potential.

## CONCLUSION

Soil forms within the proposed project footprints have a restricted land capability potential. This is because the dominant soils have poor drainage characteristics; shallow rooting depth; and limited nutrient retention due to bleached topsoil. While the land capability of the soil resources within the proposed project area has a limited land capability potential, these resources are still key to the success of rehabilitation post closure. It follows that soils located within the undisturbed project areas will require appropriate management measures to prevent the loss of soil resources through pollution and erosion as soil resources form a crucial role during rehabilitation.




**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Farm Portions
- Marula Mining Right
- Existing Infrastructure
- Proposed Product Stockpile
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

Soil Forms

- Alluvial (Watercourse)
- Brandvlei
- Mispah
- Rock Outcrop
- Spionberg/Valsrivier
- Witbank
- Transformed

0 400 800 Meters

Scale: 1:20 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 15**

**Soil Forms (Zimpande Research Collaborative, 2021)**

SLR

SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerview, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

710.09002.00016

2022/02/02


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Farm Portions
- Marula Mining Right Area
- Existing Infrastructure
- Proposed Product Stockpile
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

Land Capability

- Grazing (Class VI)
- Watercourse (Class V)
- Wilderness (Class VIII)
- Transformed

0 400 800 Meters

Scale: 1:20 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 16**

**Land Cabability (Zimpande Research Collaborative, 2021)**


SLR

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| | |
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| 710.09002.00016 | 2022/02/02 |

#### 7.3.1.5 Biodiversity

INTRODUCTION AND LINK TO IMPACT

In the broadest sense, biodiversity provides value for ecosystem functionality, aesthetic, spiritual, cultural, and recreational reasons. Biodiversity and ecosystems influence soils, food and fuel supply, shelter and building materials, water, atmospheric gases, climate and weather, pests and diseases and genetic resources.

The establishment of infrastructure and mining activities have the potential to result in the loss of vegetation, habitat and related ecosystem functionality through physical disturbance and/or contamination of soil and/or water resources. As a baseline, this section provides an outline of habitat types occurring in the project area and the status of the habitats, highlights the occurrence of sensitive ecological environments including sensitive/ endangered species (if present) that require protection and/or additional management actions should they be disturbed.

DATA SOURCE

Information in this section was sourced from the Biodiversity Study (STS, 2022) and Watercourse Assessment (SAS, 2020) prepared for the proposed project.

DESCRIPTION

**Terrestrial conservation characteristics**

STS has compiled a summary of the key conservation characteristics of the project area – refer to Table 17. Relevant mapping figures are provided in the biodiversity report (refer to Appendix H). The following main points can be summarised from this information (STS, 2022):

- The project area falls within the Savanna Biome and is situated within the Sekhukhune Plains Bushveld, an endangered vegetation type;
- The project area does not fall within a Critical Biodiversity Area (CBA);
- The project area intersects Ecological Support Areas (ESA);
- The project area falls within ecosystems classified as Endangered (CR) and which is currently poorly protected; and
- The project area and proposed infrastructure areas fall within areas of high and highest biodiversity importance.

### Table 17: Biodiversity characteristics associated with the project area (Quarter Degree Square (QDS) 2430AC and 2430CA) (STS, 2022)

<table>
<tr><th colspan="2">Details of the project area in terms of Mucina & Rutherford (2012)</th><th colspan="2">Limpopo Conservation Plan V2 (2013)</th></tr>
<tr><td>Biome</td><td>The project area is situated within the Savanna Biome.</td><td rowspan="2">Ecological Support Areas 1</td><td rowspan="2">Parts of the powerlines and waterlines, as well as the Proposed ROM stockpile and existing WRD transverse areas considered to be ESA 1.<br>ESA 1 are in a largely natural state.<br>Land management recommendations: Implement appropriate zoning and land management guidelines to avoid impacting on ecological processes. Avoid intensification of land use and fragmentation of natural landscapes. Incompatible land use: Urban land use including Residential (including golf estates, rural residential, and resorts). Business, Mining and Industrial: Infrastructure (roads, powerlines, pipelines).</td></tr>
<tr><td>Bioregion</td><td>The proposed project area is situated within the Central Bushveld Bioregion.</td></tr>
<tr><td rowspan="2">Vegetation Type</td><td rowspan="2">The proposed project area falls within the Sekhukhune Plains Bushveld (SVcb 27).</td><td>Ecological Support Areas 2</td><td>Parts of the powerlines and waterlines, the compressed airline, proposed conveyors, change house as well as three ventilation shafts (and associated infrastructure) are located within an ESA 2.<br>ESA 2 areas are no longer intact but potentially retain significant importance from a process perspective (e.g., maintaining landscape connectivity).<br>Land management recommendations: Maintain current land-use. Avoid any intensification of the current land-use which may result in additional impact on ecological processes. Incompatible land-use: any land-use activity that results in additional impacts on ecological functioning mostly associated with the intensification of and use in the area.</td></tr>
<tr><td>Flora</td><td>A Key location for a key vegetation community intersects the project area. The entire extent of the project area is located within an area identified as important for Red Data<br>Species.</td></tr>
<tr><th colspan="4">Description of the vegetation type relevant to the project area (Mucina & Rutherford 2006)</th></tr>
<tr><td>Distribution</td><td colspan="3">Limpopo and Mpumalanga Provinces: Lowland area from Burgersfort and the lower basin of the Steelpoort River in the south, northwards through the plains of the Motse River basin to Jobskop and Legwareng (south of the Strydpoort Mountains). Continues up the basin of the Olifants River to around Tswaing and the valleys of the Lepellane and Mohlaletsi Rivers.</td></tr>
<tr><td>Climate</td><td colspan="3">Summer rainfall with very dry winters<table><tr><td>MAP (mm)</td><td>MAT (°C)</td><td>MFD (days)</td><td>MAPE (mm)</td><td>MASMS (%)</td></tr><tr><td>518</td><td>19</td><td>4</td><td>2084</td><td>79</td></tr></table></td></tr>
<tr><td>Altitude</td><td colspan="3">700 - 1 100</td></tr>
</table>

| | |
|---|---|
| **Conservation** | Vulnerable according to Mucina and Rutherford (2006) but the status has been changed to Endangered according to the updated National Biodiversity Assessment (2018). Target 19%. Nearly 2% statutorily conserved in Potlake, Bewaarkloof and Wolkberg Caves Nature Reserves. Approximately 25% of this area has been transformed and is mainly under dry-land subsistence cultivation. A small area is under pressure from chrome and platinum mining activities and the associated urbanisation. Depending on commodities, this threat could increase in the future. There is a high level of degradation of much of the remaining vegetation by unsustainable harvesting and utilisation. Erosion widespread at usually high to very high levels with donga formation. Alien *Agave* species, *Caesalpinia decapetala*, *Lantana camara*, *Melia azeda-rach, Nicotiana glauca, Opuntia* species, *Verbesina encelioides* and *Xanthium strumarium* are widespread but scattered. |
| **Vegetation & landscape features (Dominant Floral Taxa in Appendix B)** | Mainly semi-arid plains and open valleys between chains of hills and small mountains running parallel to the escarpment. Predominantly short, open to closed thornveld with an abundance of Aloe species and other succulents. Heavily degraded in places and overexploited by man for cultivation, mining, and urbanisation. Both man-made and natural erosion dongas occur in areas containing clays rich in heavy metals. Encroachment by indigenous microphyllous (fine-leaved) trees and invasion by alien species is common throughout the area. |
| **Geology and Soils** | Complex geology, with rocks mainly mafic and ultramafic intrusive rocks of the main to lower zones of the Rustenberg Layered Suite on the eastern lobe of the Bushveld Igneous Complex (Vaalian). The zones (subsuites) are dominated by concentric belts of norite, gabbro, anorthosite and pyroxenite, with localised protrusions of magnetite, chromatite, serpentinised harzburgite, olivine diorite, shale, dolomite and quartzite. Most of the area consists of red apedal soils. Deep, loamy Valsrivier soils are characteristic of the plains and shallow Glenrosa soils are found on the low-lying, rocky hills. Patches of erodable black, melanic structured horizons are common around small mountains. Some Steendal soils are underlain by gypsum. Land types mainly Ae, Ib, Ea and Ia. |
| **Conservation details pertaining to the project area (various databases)** | |
| **National Threatened Ecosystems (2011)** | According to the National Threatened Ecosystem Dataset, the sections of the project area is located within an ecosystem that is considered Endangered, namely the Sekhukhune Plains Bushveld. None of the three proposed ventilation shafts, nor the proposed ore stockpile are located within the remnants of the endangered ecosystem. Only the proposed water pipelines and power line routes are located within remnants of the endangered ecosystem.<br>Endangered (EN) ecosystems have lost significant habitat or have experienced significant deterioration in condition, with loss of structure and function. Further loss or deterioration should be avoided. For Environmental Impact Assessments (EIAs), the 2011 National list of Threatened Ecosystems remains the trigger for a Basic Assessment in terms of Listing Notice 3 of the EIA Regulations published under the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA). |
| **National Biodiversity Assessment (2018)** | The project area falls within the remaining extent of the Sekhukhune Plains Bushveld (Endangered), which is currently poorly protected. Ecosystem types are categorised as “not protected”, “poorly protected”, “moderately protected” and “well protected” based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act, 2003 (Act No. 57 of 2003), and compared with the biodiversity target for that ecosystem type.<br>The ecosystem protection level status is assigned using the following criteria:<br>i. If an ecosystem type has more than 100% of its biodiversity target protected in a formal protected area either A or B, it is classified as Well Protected;<br>ii. When less than 100% of the biodiversity target is met in formal A or B protected areas it is classified it as Moderately Protected;<br>iii. If less than 50% of the biodiversity target is met, it is classified it as Poorly Protected; and |

<table>
<tr><td></td><td>iv. iv. If less than 5% it is Hardly Protected.</td></tr>
<tr><td>SAPAD (2020, Q2); SACAD (2020, Q2); NPAES (2009)</td><td>According to the National Protected Areas Expansion Strategy (NPAES, 2009) database, the project area falls within 10 km of the North East Escarpment Focus Area. The South African Protected Area Database (SAPAD, 2020)3 and the South African Conservation Areas Database (SACAD, 2020)4 do not indicate that any protected or conservation areas fall within 10 km of the project area.</td></tr>
<tr><td>IBA (2015)</td><td>The project area is not located within an Important Bird and Biodiversity Area (IBA, 2015), nor is it located within 10 km of an IBA</td></tr>
<tr><td colspan="2">National web-based environmental screening tool (2020)</td></tr>
<tr><td>The Screening Tool is intended to allow for pre-screening of sensitivities in the landscape to be assessed within the EA process. This assists with implementing the mitigation hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas.</td><td><table>
<tr><td>Plant Species</td><td>For the Plant Species theme, the entire project area is within an area that has a High sensitivity. Sensitive species identified by the Screening tool include: Sensitive species 374, Sensitive species 275, Sensitive species 163, Polygala sekhukhuniensis, Searsia batophylla, Asparagus fourei, and Asparagus sekukuniensis.</td></tr>
<tr><td>Animal Species</td><td>For the Animal Species theme, a medium sensitivity was reported for the project area. Sensitive species identified by the Screening tool include: Aroegas fuscus (Brown false shieldback), Dasymys robertsii (Robert's shaggy rat), and Sagittarius serpentarius (Secrutary Bird).</td></tr>
<tr><td>Terrestrial Sensitivity</td><td>The Terrestrial Sensitivity for the project area has a very high sensitivity. Triggered features include: CBA1, CBA2, ESA1, and ESA2.</td></tr>
</table></td></tr>
<tr><td colspan="2">Mining & Biodiversity Guidelines</td></tr>
<tr><td>High Biodiversity Importance</td><td>Small sections of the powerlines and waterlines throughout the project area transverse areas of High Biodiversity Importance.<br>Risk for mining: High risk for mining.<br>Implications for mining: These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, for maintaining important ecosystem services for communities or the country. An EIA should include an assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on spatial biodiversity.</td></tr>
<tr><td>Highest Biodiversity Importance</td><td>Risk for mining: Highest risk for mining.<br>Implications for mining: These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, for maintaining important ecosystem services for communities or the country. An EIA should include an assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on spatial biodiversity.</td></tr>
</table>

CBA = Critical Biodiversity Areas; ESA = Ecological Support Area; IBA = Important Bird and Biodiversity Areas; MAP – Mean annual precipitation; MAT – Mean annual temperature; MAPE – Mean annual potential evaporation; MFD = Mean frost days; MASMS – Mean annual soil moisture stress (% of days when evaporative demand was more than double the soil moisture supply); NBA = National Biodiversity Assessment; NPAES = National Protected Areas Expansion Strategy; SACAD = South African Conservation Areas Database; SAPAD = South African Protected Areas Database.

### Habitat units

Five habitat units have been determined to occur in the project area (STS, 2022) as described in Table 18 below and shown in Figure 17. All of these habitat units have been impacted to varying degrees by historic and current anthropogenic activities.

**Table 18: Habitat units in the project area (STS, 2022)**

| Habitat unit | Description |
|---|---|
| Degraded Bushveld | This habitat unit was relatively species poor, with a poorly represented grass layer throughout. The woody component included species such as *Dichrostachys cinerea, Ziziphus mucronata, and Boscia albitrunca*. The Ventilation Shafts (and associated infrastructure), as well as parts of the proposed water and power lines were located within this habitat unit |
| Encroached Habitat | Located in the northern section of the proposed power line, this habitat unit is characterised by encroached bushveld1. The main encroaching species included *Dichrostachys cinerea, Vachellia nilotica* subsp. *kraussiana* and *Terminalia sericea*. |
| Rocky Habitat | This habitat unit consisted of two subunits, namely Rocky Outcrops and Rocky Riverine Habitat:<br>The Rocky Outcrop Subunit comprised of a moderately diverse species composition typical of rocky areas; and<br>The Rocky Riverine Habitat, although supporting a species composition typical of rocky areas, supported a floral community different to that of the Rocky Outcrop Subunit. This habitat subunit bordered but was not located within the Mogompane River. |
| Watercourse Habitat | This habitat consisted of the watercourses2 that transverse the proposed powerlines and pipelines in several sections throughout the project area. These watercourses were all dry at the time of assessment. |
| Transformed habitat | This habitat unit includes the road along which the proposed water and powerlines will be located, as well as built-up areas located next to the roads which include informal residential development and mining-related developments. Due to anthropogenic influences, these areas have an altered physical environment and are scarcely vegetated. The vegetation that is present within these areas includes AIP species. |

### Alien and invasive species

Alien and invasive floral species are floral species that are of exotic origin and are invading previously pristine areas or ecological niches. A high abundance of alien and invasive plant species was observed during the field assessment, and a full list is provided in the biodiversity report (refer to Appendix xx). This includes thirteen species listed as NEMBA Category 1b, two as NEMBA Category 2 and one as NEMBA Category 3. Most of the species identified comprised forbs and woody species, with some areas being more invaded than others, e.g. areas with higher disturbance have both a higher abundance and density of AIP (Transformed habitat unit) (STS, 2019).

### Medicinal plants

Medicinal plant species are not necessarily indigenous species, with many of them regarded as alien invasive weeds. No medicinal species were identified during the field assessment.

### Terrestrial Habitat sensitivity

STS has developed a habitat sensitivity map for the project area based on (STS, 2022):

- Presence of or potential for floral and faunal species of conservation concern;
- Habitat integrity and current levels of disturbance;
- Threat status of the habitat type;
- Presence of unique landscapes; and
- Overall levels of biodiversity.

The sensitivity ratings are provided in Table 7-19, along with the conservation objectives and development implications. In this regard the Rocky habitat and Watercourse habitat units have been assigned the highest sensitivity mapping, that of moderately high ecological sensitivity. The Degraded Bushveld unit and Encroached Habitat unit have a moderately low sensitivity, while the remaining habitat types are given a low sensitivity. Refer to Figure 18 for the sensitivity mapping.

**Table 7-19: Habitat sensitivity and conservation objectives (STS, 2022)**

| Proposed project areas | Sensitivity | Description |
|---|---|---|
| **Rocky Habitat (encompassing the Rocky Outcrop subunit and the Rocky Riverine Subunit) & Watercourse Habitat** | | |
| • Proposed TSF pipeline<br>• Proposed powerline<br>• Proposed water pipelines | Moderately High - Preserve and enhance biodiversity of the habitat unit while limiting development and disturbance. | Areas of moderately high sensitivity include those areas, particularly the Rocky Habitat and the watercourse Habitat, where the floral diversity was intermediate to moderately high, the habitat was largely intact and where features of conservation significance were present, including the below list:<br>• Confirmed presence of protected plant species according to Schedule 12 (Protected Plants) of the Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) (LEMA), namely *Aloe cryptopod*a and *Scadoxus puniceus* within the Rocky Habitat;<br>• Areas confirmed to be ESA 1 within both the Rocky and Watercourse Habitat; and<br>• Watercourses are legally protected within the NWA. |
| **Degraded Bushveld & Encroached Habitat** | | |
| • Proposed TSF pipeline<br>• Proposed powerline<br>• Proposed water pipelines<br>• Ventilation Shafts | Moderately Low - Optimise development potential while improving biodiversity integrity of surrounding natural habitat and | These floral communities are of moderately low importance and significance from a floral resource management perspective. This is due to historic anthropogenic activities (e.g., dumping) and current grazing pressures which have altered the floral species composition significantly from the reference state (i.e. the Sekhukhune |

| Proposed project areas | Sensitivity | Description |
|---|---|---|
| | managing edge effects. | Plains Bushveld). Decreased habitat integrity and bush encroachment have resulted in low potential for SCC to be present.<br><br>Despite the moderately low floral richness within the Degraded Bushveld Habitat, a protected species as per Schedule 12 (Protected Plants) of the Limpopo Environmental Management Act, 2003 (Act No. 7 of 2003) (LEMA), namely *Aloe cryptopoda*, was observed in this habitat unit. Permits from the Limpopo Economic Development, Environmental and Tourism LEDET will be required to remove, cut, or destroy the above-mentioned protected species before any vegetation clearing may take place. Additionally, the NFA protected species, *Boscia albitrunca*, was observed within this habitat unit albeit not very abundantly. Permits will have to be obtained from the DFFE for the individuals of *Boscia albitrunca* that will have to be removed for construction to proceed. |
| **Transformed Habitat** | | |
| • Proposed TSF pipeline<br>• Proposed powerline<br>• Product stockpile<br>• Eskom substation<br>• Proposed water pipelines<br>• Clapham upgrades | Low - Optimise development potential. | This habitat unit is of low ecological importance and sensitivity and development related activities are unlikely to have any significant impact on the floral community. The Transformed Habitat has experienced large degrees of modification and provides little habitat for indigenous floral species. Much of the habitat unit is dominated by a lack of vegetation but where vegetation is present, AIP species dominate. As such, AIP control must take place to improve possible function of the area and to control edge effects. |

## Faunal species

As part of the proposed project, field work surveys were undertaken to identify the presence of faunal species. The results of the field work are tabulated below.

### Table 7-20: Summary of faunal characteristics of the proposed project area (STS, 2022)

| Aspects | Faunal species |
|---|---|
| **Mammals** | |
| O v e | **Moderately low sensitivity** |

| Aspects | Faunal species |
|---|---|
| | Long term habitat disturbance and, in many instances, habitat loss has led to a notable decrease in mammal species diversity and abundance. Existing mining activities continued human presence in the areas and probable persecution from snaring activities has further led to a loss of diversity throughout the proposed infrastructure development sites. The resultant mining activities and habitat disturbance has led to a loss of habitat connectivity and food resources, resulting in a loss of habitat suitability and overall integrity. Whilst on site signs of *Lepus saxatilis* (Scrub Hare) were noted while a single indigenous mammal, *Galerella sanguinea* (Slender Mongoose), was observed. These species are adept at surviving within disturbed habitats and are often noted within areas adjacent to communities. |
| **SCC** | No mammal SCC were observed. None of the proposed infrastructure is located within habitat that is deemed favourable or suitable for mammal SCC. The National Web Based Screening Tool indicated that *Dasymys robertsii* (Robert's Shaggy Rat), a Vulnerable species may occur within the study area. The absence of surface water areas and wetland renders the habitat unsuitable for the species. |
| **Avifauna** | |
| **Overview** | **Intermediate sensitivity** |
| | Avifaunal diversity largely restricted to small common species with a low abundance of birds of prey. Within the study area it was also evident that the human settlements (within the Transformed Habitat) attracted more bird species than the adjacent Degraded Bushveld. This is predominantly due to the increased structure and the presence of fruiting trees within the household gardens foraging opportunities for avifauna, increasing both abundance and diversity of birds. The Degraded Bushveld was homogenous in its structure with a species poor floral assemblage and heavily grazed forb, herb and graminoid layer reducing its favourability to most avifaunal species, the limited food resources are likely to be a key driver in limiting avifaunal abundance herein. The Rocky Habitat and Encroached Habitat comprised of small portions within the study area, however, the greater structural diversity, floral diversity, and shelter, specifically within the Rocky Outcrop sub-unit, did appear to be favoured by many avifaunal species. The overall disturbed nature of the habitats, transformation of suitable habitat and surrounding existing mining activities has led to notable decrease in habitat integrity. |
| **SCC** | During the field assessment an individual *Gyps coprotheres* (Cape Vulture) was noted soaring to the east of the study area. *Falco biarmicus* (Lanner Falcon) have a high reporting rate within the area and will likely utilize some of the transformed habitat to hunt should an opportunity present itself. Due to the degraded nature of the habitat and limited food resources it is unlikely that further avifaunal SCC will inhabit the proposed development sites. Due to the low levels of applicable food resources, it is further unlikely that any avifaunal SCC will forage in the proposed infrastructure development sites. *Sagittarius serpentarius* (Secretarybird) was flagged by the national web based Screening Tool, however, the encroached/dense habitat and high abundance of humans and their associated activities within the study area will not be suitable for this species. |
| **Herpetofauna** | |
| **Ove** | **Moderately low sensitivity** |

| Aspects | Faunal species |
|---|---|
| | Herpetofauna diversity and abundances appeared low during the field assessment as only rock skinks were observed. It is anticipated that an intermediate diversity of reptiles will inhabit the area while a low diversity of amphibians is likely due to the arid nature of the region. The degraded state of the various habitat units corroborated the lower than anticipated diversity levels. Very few amphibians are expected to occur within the proposed infrastructure development sites, owing to the lack of surface water or areas of increased soil moisture needed to sustain amphibians. The habitat units further had limited food resources due to the moderately low abundance levels of insects and small mammals, however, very little rain had fallen prior to the field assessment which likely limited the invertebrate abundance. Smaller reptile species may permanently inhabit the proposed sites, however larger predatory snakes and species that require more niche habitat (rocky outcrops, wetlands etc) are unlikely to permanently reside within the proposed study area. |
| **SCC** | No amphibian or reptile SCC were observed during the assessment, nor are any expected to occur within the proposed development sites due to the unsuitable habitat available within the footprint areas. |
| **Invertebrates** | |
| **Overview** | **Intermediate sensitivity** |
| | Habitat degradation and transformation coupled with high human activity is a major factor contributing to this lowered diversity. The degraded habitat and reduced floral species composition limits insect diversity as suitable food resources are not readily available. The resources that are available are severely competed for by the domestic animals within the study area and overgrazing was apparent. The decreased abundance and diversity of insects directly impacts on arachnid species populations, as insects form the base food resource for arachnid species. |
| **SCC** | During the field assessment no invertebrate SCC were observed nor, given the disturbed and sub-optimal condition of the available habitat, are any expected to occur within the study area. |

### Aquatic ecosystem characterisation

As part of the proposed project watercourses associated with the proposed project were delineated on a desktop level with the use of digital satellite imagery and topographical maps. Portions of the features were then verified during the field survey according to the guidelines advocated by DWA (2005). Ground-truthing of riparian boundaries focused on those areas associated with the proposed project components. In this regard, the Tshwenyane, Mogompane, Motse Rivers and an unnamed tributary of the Moopetsi River (with riparian vegetation), along with numerous non-perennial and ephemeral drainage lines without riparian characteristics and an artificial wetland in the vicinity of the proposed mining infrastructure were targeted.

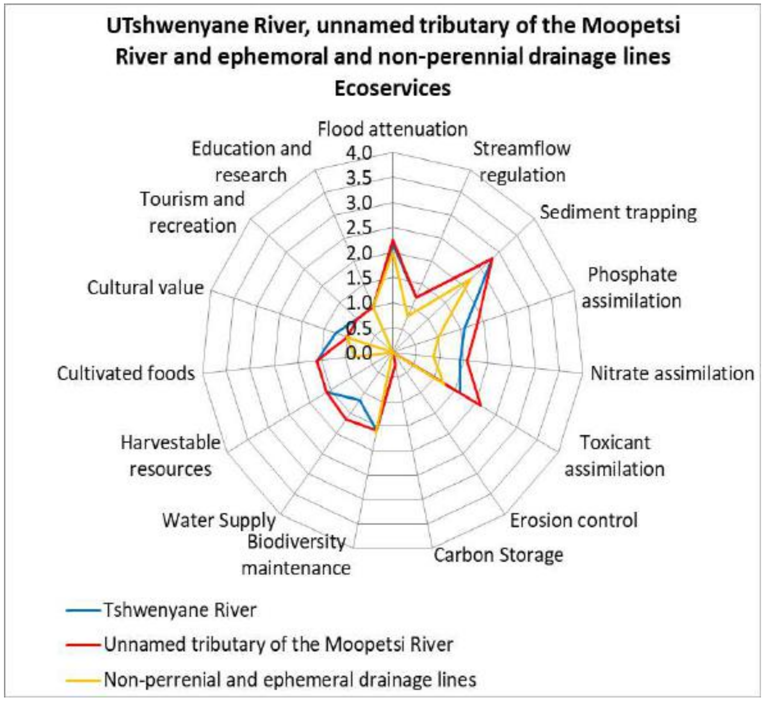
Following the field surveys, various assessments of these watercourses were undertaken to determine:

- PES, incorporating aspects such as hydrology, vegetation and geomorphology;
- Service provision of the watercourses, which incorporates aspects such as biodiversity maintenance, flood attenuation, streamflow regulation and assimilation; and
- The EIS is guided by the results obtained from the assessment of PES and service provision of the watercourses.

The results of these assessments are summarised in Table 7-21 below. These results show that all riparian non-perennial and ephemeral watercourses associated with the proposed project area have undergone significant levels of transformation because of historical and current agricultural practices, and to a slightly lesser extent because of mining activities.

## Table 7-21: Summary of watercourse assessment (SAS, 2022)

**Ecological & socio-cultural service provision graph:**




**Photograph notes:** (Top left) The Tshwenyane River channel (with road crossing) associated with the location of the proposed water pipeline installation. (Top right) Non-perennial river channel showing vegetation presence of the Tshwenyane River. (Bottom left) Non-perennial drainage line at the proposed Clapham ventilation shaft, showing lack of riparian vegetation. (Bottom right) Non-perennial channel showing vegetation presence and degradation of the channel bank walls.

**Present Ecological State**

**Unnamed tributary of the Moopetsi River: D**

**Tshwenyane River: D**

The IHI calculations for the unnamed tributary of the Moopetsi River, and the Tshwenyane River indicate that modifications to the systems have occurred, and that the loss of natural habitat, biota and ecosystem functions is large. Historical and current small-scale agricultural activities, and the presence of mining activities as well as the greater catchment area are the predominant modifiers to the systems. These factors, in conjunction with severely eroded soils within the systems, have resulted in loss of vegetation cover within the riparian zones, and where vegetation cover remains, the species composition consists primarily of alien vegetation or pioneer species.

| |
|---|
| Loss of vegetation cover (in both the riparian and terrestrial ecosystems within the study area) and highly erodible soils has in turn led to severe bank incision and increased sediment inputs as a result of this are anticipated, thus altering the geomorphology of the systems. |
| **Ecoservice provision** |
| **Unnamed tributary of the Moopetsi River: Intermediate**<br>**Tshwenyane River: Intermediate**<br>**Non-perennial and ephemeral drainage lines: Low**<br>The river systems are considered to provide intermediate levels of ecological functioning and service provision. Functions which are strongly dependent on the presence of surface water and/or long periods of saturation (i.e. a permanent zone) such as streamflow regulation, toxicant assimilation and provision of water for domestic use are likely to fluctuate seasonally, given the ephemeral nature of these rivers. Functions such as flood attenuation on the other hand are more efficient when the system is not already saturated, as there is greater capacity for the reduction of flood peaks when the system is dry. Biodiversity maintenance is intermediate within both systems, primarily due to the extent of these rivers, their connectivity to natural areas and the locality within a relatively undeveloped catchment. Nevertheless, bush encroachment and proliferation of alien vegetation because of removal of indigenous floral species (resulting in habitat loss), alteration of the sediment and water quality regime, and the seasonal nature of these rivers all contribute to a lowered importance in terms of maintenance. The rivers were not considered to be important in terms of erosion control, considering the extensive bank erosion apparent at the time of the assessment. |
| **EIS** |
| **EIS Category for the Tshwenyane River, the Unnamed tributary of the Moopetsi River, and the non-perennial and ephemeral drainage lines: C Moderate**<br>These results indicate that the unnamed tributary of the Moopetsi River and the Tshwenyane River fall within EIS Category C, indicating that these watercourses are low in biodiversity support and low in ecological importance and sensitivity at a landscape level, however the private protection of the watercourses by the mine increases the ecological importance and sensitivity on a provincial and local scale. |
| **Ecological sensitivity** |
| These assessments show that all riparian non-perennial and ephemeral watercourses within the study area have undergone significant levels of transformation as a result of historical and current agricultural practices, and to a slightly lesser extent as a result of mining activities. These systems are in an area that is of moderate ecological and sensitivity importance and therefore management objectives should aim to maintain the ecological status of the watercourses. |

Legislative requirements were used to determine the extent of buffer zone required for each watercourse depending on whether a group is considered wetland/riparian habitat or not. The Tshwenyane River and unnamed tributary of the Moopetsi River, as well as the non-perennial drainage lines with riparian characteristics are defined as watercourses. In this regard, the applicable buffer zones that were delineated for the proposed project include:

- The 100 m buffer zone from the edge of a watercourse in accordance with GN 509 of 2016 in terms of the NWA;
- The 100 m buffer zone from a watercourse in accordance with the GN 704 Regulations in terms of the NWA regarding the use of water for mining and related activities aimed at the protection of water resources; and
- NEMA EIA Regulations 32 m buffer zone.

The applicability of the above listed buffer zones and the relevant exemptions required are detailed in Section 4. The above listed buffer zones are illustrated in Figure 19 and Figure 20.

The Tshwenyane, Mogompane, Motse Rivers and an unnamed tributary of the Moopetsi River (with riparian vegetation), along with numerous non-perennial and ephemeral drainage lines without riparian characteristics were identified during a field assessment undertaken in mid-November 2020 by SAS, as watercourses which occur within the proposed project area. All the identified rivers are non-perennial, characterized by stream bank incision particularly in areas which are heavily utilized by domestic livestock. The ephemeral and non-perennial drainage lines may historically have possessed riparian vegetation, albeit weakly defined riparian zones.

Due to impacts such as erosion (natural, but exacerbated by anthropogenic activities in the catchment), human activities such as harvesting firewood from woody species in the riparian zone and overgrazing or trampling by domestic livestock, the vegetation communities associated with these drainage lines have been extensively altered over a period of several years. The systems function as waterways by conveying water from the upgradient catchment to the downgradient watercourses, albeit intermittently, forming the headwaters of the riverine systems identified within the project area. Watercourses which were identified within the project area is shown in Figure 21 and Figure 22.

### CONCLUSION

The placement of infrastructure as well as mining activities in general have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality including the disturbance of sensitive/ endangered species. SCC in terms of LEMA have been identified within the proposed project site. Numerous habitat units are associated with the proposed project, with varying degrees of ecological sensitivity (moderately high to low). Further to this, all riparian non-perennial and ephemeral watercourses associated with the proposed project area have undergone significant levels of transformation because of historical and current agricultural practices, and to a slightly lesser extent because of mining activities. Mitigation measures need to be formulated to conserve and reduce the impacts that the project may have towards these areas.

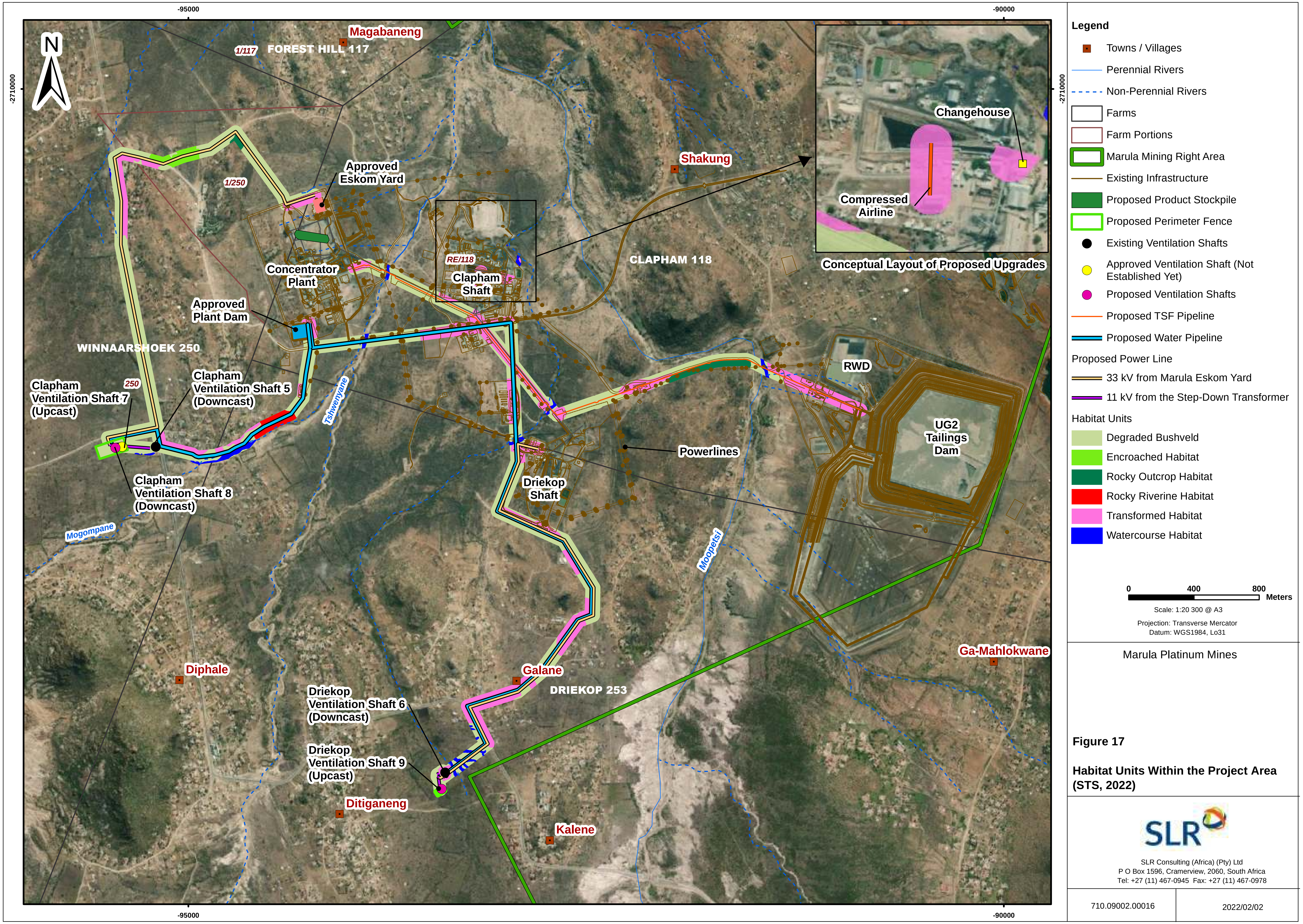
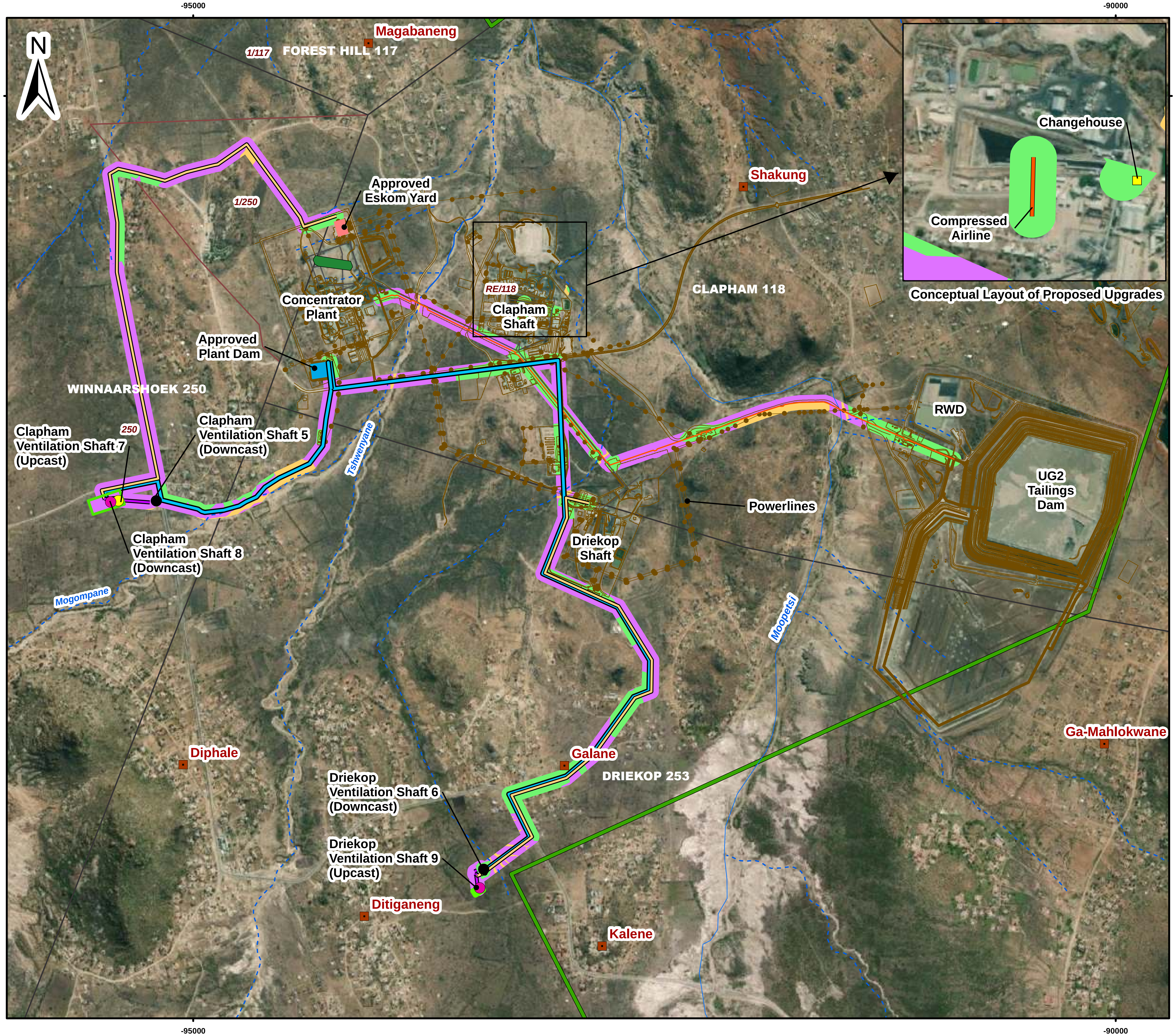



Figure 17

Habitat Units Within the Project Area (STS, 2022)




**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Farm Portions
- Marula Mining Right Area
- Existing Infrastructure
- Proposed Product Stockpile
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

Floral Sensitivity

- Moderately High
- Moderately Low
- Low

0 400 800 Meters

Scale: 1:20 300 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 18**

**Habitat Sensitivity (STS, 2022)**

SLR

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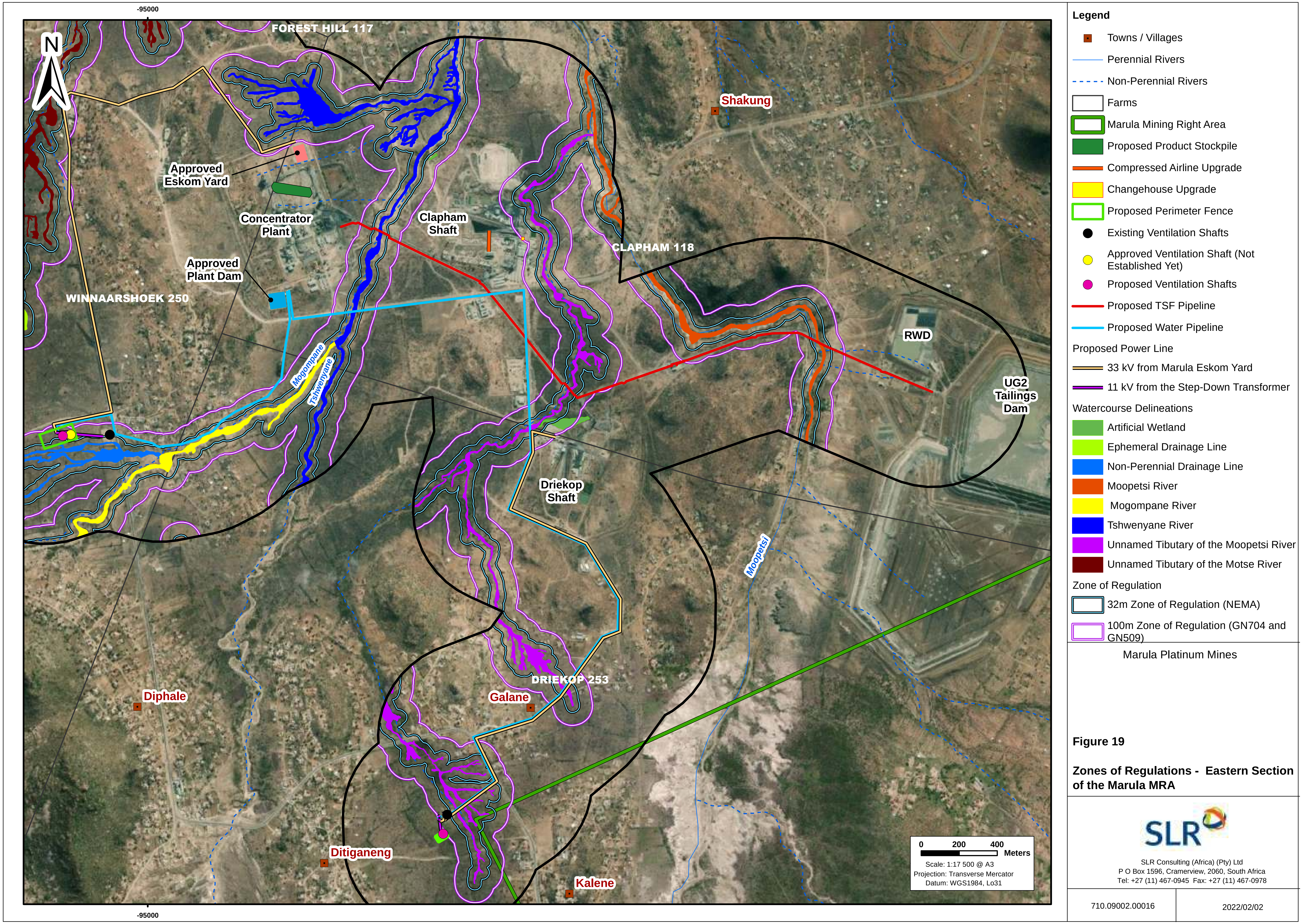
-95000
FOREST HILL 117
Shakung
Approved Eskom Yard
Concentrator Plant
Clapham Shaft
CLAPHAM 118
Approved Plant Dam
WINNAARSHOEK 250
Mogompane
Tshwenyane
RWD
UG2 Tailings Dam
Driekop Shaft
Moopetsi
DRIEKOP 253
Galane
Diphale
Ditiganeng
Kalene
0 200 400 Meters
Scale: 1:17 500 @ A3
Projection: Transverse Mercator
Datum: WGS1984, Lo31
-95000
Legend
Towns / Villages
Perennial Rivers
Non-Perennial Rivers
Farms
Marula Mining Right Area
Proposed Product Stockpile
Compressed Airline Upgrade
Changehouse Upgrade
Proposed Perimeter Fence
Existing Ventilation Shafts
Approved Ventilation Shaft (Not Established Yet)
Proposed Ventilation Shafts
Proposed TSF Pipeline
Proposed Water Pipeline
Proposed Power Line
33 kV from Marula Eskom Yard
11 kV from the Step-Down Transformer
Watercourse Delineations
Artificial Wetland
Ephemeral Drainage Line
Non-Perennial Drainage Line
Moopetsi River
Mogompane River
Tshwenyane River
Unnamed Tributary of the Moopetsi River
Unnamed Tributary of the Motse River
Zone of Regulation
32m Zone of Regulation (NEMA)
100m Zone of Regulation (GN704 and GN509)
Marula Platinum Mines
Figure 19
Zones of Regulations - Eastern Section of the Marula MRA
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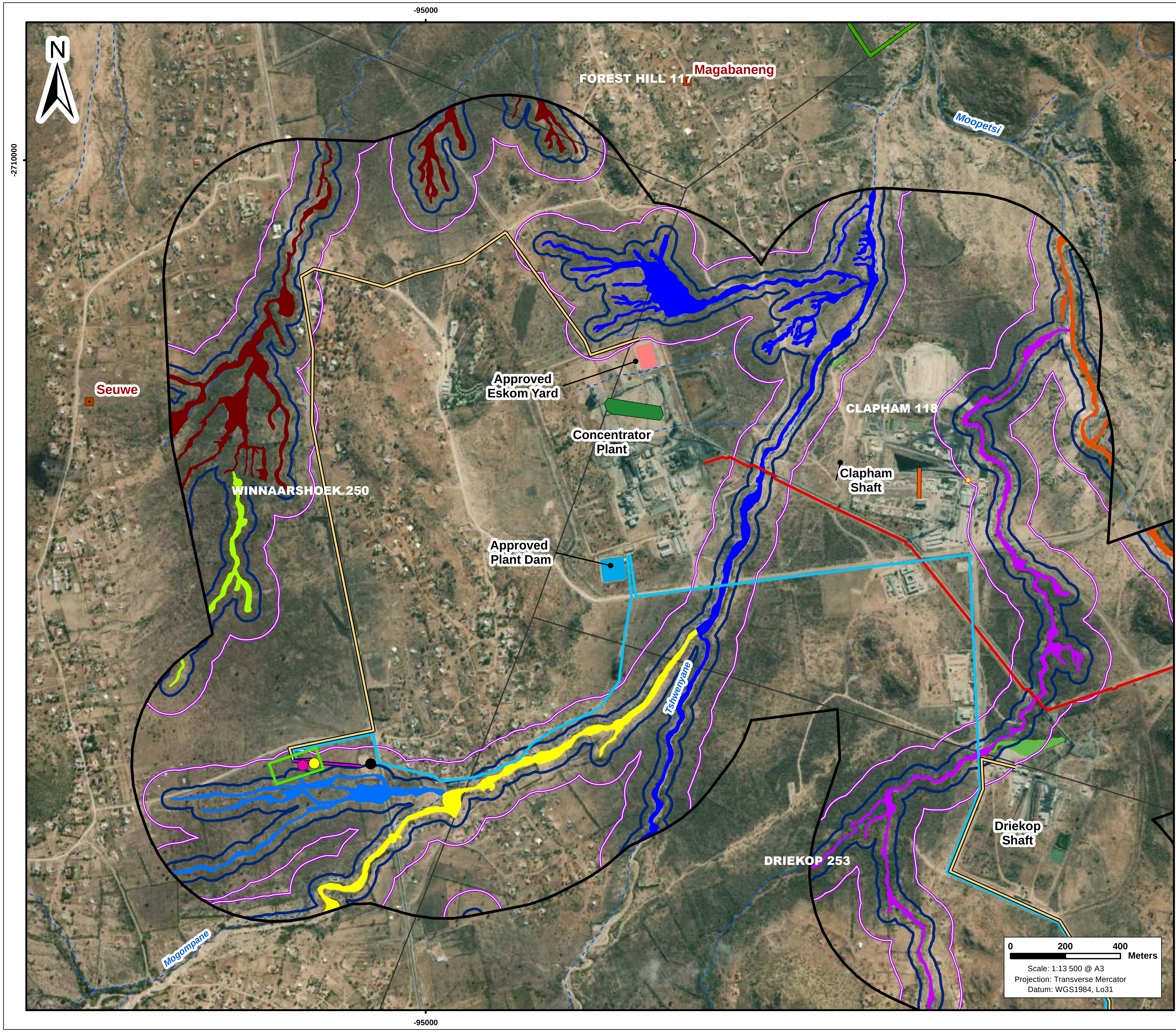


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Marula Mining Right Area
- Proposed Product Stockpile
- Compressed Airline Upgrade
- Changehouse Upgrade
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

Watercourse Delineations

- Artificial Wetland
- Ephemeral Drainage Line
- Non-Perennial Drainage Line
- Moopetsi River
- Mogompane River
- Tshwenyane River
- Unnamed Tributary of the Moopetsi River
- Unnamed Tributary of the Motse River

Zone of Regulation

- 32m Zone of Regulation (NEMA)
- 100m Zone of Regulation (GN704 and GN509)

Marula Platinum Mines

**Figure 20**

**Zones of Regulations - Western Section of the Marula MRA**

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#### 7.3.1.6 Surface water

INTRODUCTION AND LINK TO IMPACT

Surface water resources include drainage lines and paths of preferential flow of stormwater runoff. Mine related activities have the potential to alter the drainage of surface water through the establishment of infrastructure and/or result in the contamination of the surface water resources through seepage and/or spillage of process materials, non-mineralised (general and hazardous) and mineralised wastes. To understand the basis of these potential impacts, a baseline situational analysis is described below.

DATA SOURCES

Information presented in this section was sourced from the 2019 IWWMP prepared for the Marula Platinum Mine (SRK, November 2019) and the Watercourse Ecological Assessment undertaken by Scientific Aquatic Services (SAS) (SAS, January 2022).

DESCRIPTION

**Catchments within the context of South Africa**

The project area is located within Olifants Water Management Area (WMA). The major rivers associated with this water management area include the Elands River, Wilge River, Steelpoort River, and the Olifants River.

**Regional hydrology**

The project area is located with the within the B71E quaternary catchment of the Olifants – North catchment. The catchment area is generally flat and has a low mean annual precipitation of 565 mm and a high annual evaporation rate of 1 695 mm. Catchment characteristics are presented in Table 22 below. All catchments drain in a northerly direction through the mine lease area and comprise drainage lines which have minimal flow (ephemeral drainage lines). Flow is contributed by seepage from both natural and anthropogenic activity. The catchment presents evidence that the area is very vulnerable to erosion if stripped of vegetation. The watercourses are severely eroded, causing feel gullies on the banks. Sheet erosion is also widespread in areas where overgrazing is present.

**Table 22: Summary of catchment characteristics within the Marula Mine (SRK, November 2019)**

| Catchment | Area ($km^2$) | Longest watercourse (km) | 10:85 slope (m/m) | Tc (hrs) |
|---|---|---|---|---|
| Unnamed tributary of Northern Stream (Catchment 1) | 0.93 | 2.41 | 0.016 | 1.146 |
| Northern Stream Catchment 2a | 2.70 | 2.94 | 0.078 | 0.649 |
| Northern Stream Catchment 2b | 4.36 | 4.58 | 0.037 | 1.139 |
| Northern Stream Catchment 2c | 5.12 | 5.89 | 0.017 | 1.799 |
| Tshwenyane tributary (Mogompane) | 1.08 | 1.28 | 0.025 | 0.305 |
| Tshwenyane River upstream | 3.33 | 2.60 | 0.026 | 0.528 |
| Unnamed Tshwenyane tributary Catchment 3 (sub-catchment of Moopetsi tributary 2) | 0.55 | 1.65 | 0.02 | 0.796 |

| Catchment | Area ($km^2$) | Longest watercourse (km) | 10:85 slope (m/m) | Tc (hrs) |
|---|---|---|---|---|
| Moopetsi tributary 2 (Tshwenyane downstream) | 1.98 | 0.30 | 0.013 | 0.161 |
| Moopetsi tributary 1 (Mine Stream) | 4.05 | 3.60 | 0.04 | 0.813 |
| Moopetsi River | 59.86 | 22.64 | 0.017 | 4.78 |

### Local hydrology

Marula MRA

The main drainage line within the Marula MRA is the Moopetsi River which lies approximately 1 km east of the project area. The Moopetsi River drains the farm Forest Hill 117KT and is the main watercourse in the mine area. The Moopetsi River has its confluence with the Motse River 7.5 km downstream of the mine. The Motse River flows into the Olifants River some 23.5 km downstream of the mine. The main tributary within the mine area is the Tshwenyane River (refer to Figure 21 and Figure 22).

The plant area is located to the north and the Clapham shaft complex and sewerage treatment plant to the south of the Tshwenyane River. The Mogompane River converges with the Tshwenyane River south of the Concentrator Plant area. The Matadi River also occurs within the Marula MRA and is a tributary of the Moopetsi River located to the north-east of the TSF. The Matadi River flows into the Moopetsi River more than 7 km downstream of the Marula mine lease area. Two unnamed tributaries of the Moopetsi River (the Mine Stream and the Northern Stream) occur within the MRA and are ephemeral in nature (refer to Figure 21 and Figure 22). The proposed project will intersect the Moopetsi River, Mogompane River, Tshwenyane River and an unnamed tributary of the Moopetsi River.

Hydraulic regime: The extent to which hydrological regime and therefore related functions may have been altered because of in-stream placement of infrastructure such as bridge crossings is difficult to ascertain, since the watercourses are non-perennial/ ephemeral systems and very little to no flowing water was observed in any of the channels at the time of the assessment. However, it can be expected that flow patterns have been altered from their natural state because of infrastructure being placed within the active macro channels.

Geomorphology and sediment balance*:* Channels of the unnamed tributary of the Moopetsi River were shallow to deep and channel incisions were present ranging from slightly to heavily incised banks. Channels of the Tshwenyane River were wide and relatively shallow with a mixture of alluvial sand and large sections of exposed bedrock. Due to the inherent erodibility of soils in the area, erosion has occurred in and around the watercourses associated with project area.

### Wetlands

No natural wetlands were identified in the Marula mining area. However artificial wetland areas were identified by the NFEPA (2011) database. The artificial wetland area are dams constructed specifically as part of the mining operations and has been identified as a small depression-type wetland. The artificial wetland is located adjacent to a mining facility and formed when the old earthen dams associated with the mining activities were not decommissioned. Over a period of many years, water has collected within the former dams, and as there is not an efficient stormwater management system in place within the mining facility's parking / administration area, stormwater runoff collects in the "wetland", thus perpetuating the wetland conditions.

### Surface water use

There is limited use of surface water with most communities reliant on groundwater resources, however livestock and small-scale farming make use of surface water resources when available. Communities have made hand dug wells in the riverbeds to access any subsurface flow.

### Surface water quality

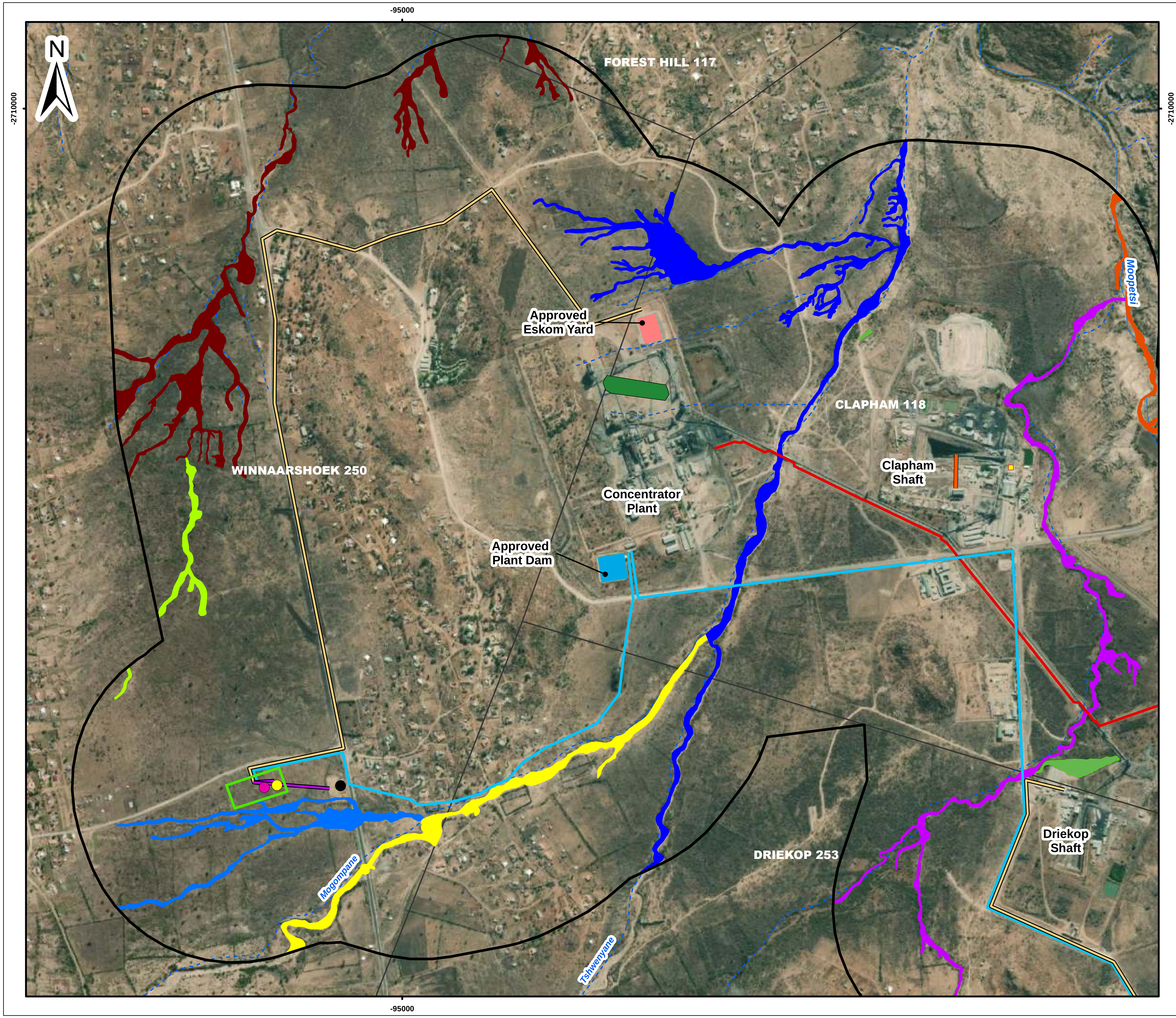
*The information from this section was obtained from the 2019 IWWMP (SRK, November 2019).* Marula has an existing surface water monitoring programme for the mine. In this regard surface water is monitored on a quarterly basis. The 2019 monitoring results indicate:

- The Moopetsi River and the Tshwenyane Stream are both generally dry. Samples could therefore only be taken after rain.
- Water quality in the Moopetsi River is monitored where there is a small consistent flow in the river upstream of the mine operations. The upstream water quality exceeds the 2019 WUL quality limits for electrical conductivity (EC) (2x higher with a median of 102 mS/m), total alkalinity (4x higher with a median of 403 mg/l), nitrate (2x higher with a median of 14 mg/l as N), turbidity (2 x higher with a median of 7.3 NTU) and faecal coliforms varying from 190 counts/100ml to too numerous to count. The water quality is unsuitable for drinking purposes due to elevated bacterial content and elevated nitrate concentrations which also exceed SANS 241:2015 limit of 11 mgN/l. These concentrations have been gradually increasing over time possibly due to upstream anthropogenic impacts.
- The water quality in the Moopetsi River deteriorates from upstream to downstream of the operation with electrical conductivity, total dissolved solids (TDS), sodium, chloride, sulphate and nitrate increasing. The greatest differences are noted for chloride, sulphate and nitrate where concentrations increase by >40% between SW1 and SW2B. In consequence; EC is 2.7 x higher the WUL limit with a median of 136 mS/m (19% increase from SW2B), nitrate is 4 to 6x higher than the limit with a median 26 mg/l as N (55% increase from SW2B).

Taking the above into consideration, Marula is having an impact on the Moopetsi River although it must be noted that the number of downstream water users has also increased, which could also be contributing to the nitrate levels that exceed SANS 241:2015. Higher concentrations are noted during the dry winter period from April to October with lower concentrations in the wetter summer monitoring period (November – March) due to the influence from rain. Within the seasonal variation; trends have generally stabilised with nitrate concentrations improving at SW5 since October 2014. The increasing salinity at SW1, although still below the SANS 241-2015 of 170 mS/m, limit should continue to be monitored.

### CONCLUSION

The project presents infrastructure that has the potential to influence contributions of runoff to the catchment, particularly through their location within watercourses and related natural drainage patterns. In addition to this, mining activities and infrastructure present contamination sources that has the potential to pollute surface water resources when water is available in the non-perennial drainage lines. Only the proposed powerline upgrades, pipelines and vent shafts and associated infrastructure are likely to impact on the associated watercourses. In order to achieve this or an improved state mitigation measures should be strictly implemented.




**Legend**

- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Proposed Product Stockpile
- Compressed Airline Upgrade
- Changehouse Upgrade
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

Watercourse_Delineations

- Artificial Wetland
- Ephemeral Drainage Line
- Non-Perennial Drainage Line
- Moopetsi River
- Mogompane River
- Tshwenyane River
- Unnamed Tributary of the Moopetsi River
- Unnamed Tributary of the Motse River

0 200 400 Meters

Scale: 1:7 000 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 21**

**Location of Watercourses Within the Northern Portion of the Focus Area**

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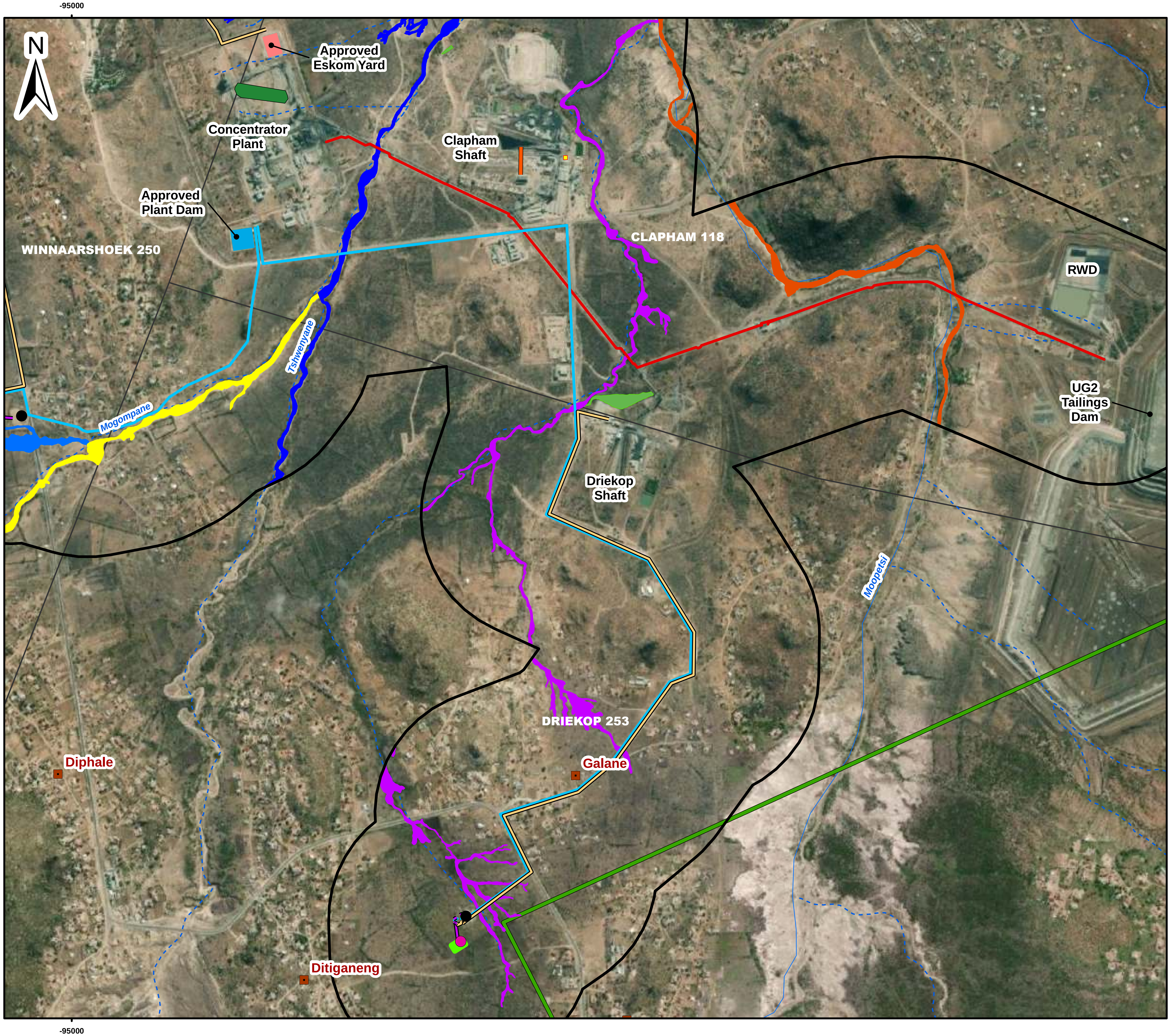


**Legend**

- Towns / Villages
- Perennial Rivers
- Non-Perennial Rivers
- Farms
- Marula Mining Right Area
- Proposed Product Stockpile
- Compressed Airline Upgrade
- Changehouse Upgrade
- Proposed Perimeter Fence
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Proposed TSF Pipeline
- Proposed Water Pipeline

Proposed Power Line

- 33 kV from Marula Eskom Yard
- 11 kV from the Step-Down Transformer

Watercourse Delineations

- Artificial Wetland
- Ephemeral Drainage Line
- Non-Perennial Drainage Line
- Moopetsi River
- Mogompane River
- Tshwenyane River
- Unnamed Tibutary of the Moopetsi River
- Unnamed Tibutary of the Motse River

0 200 400 Meters

Scale: 1:15 000 @ A3

Projection: Transverse Mercator

Datum: WGS1984, Lo31

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**Figure 22**

**Location of Watercourses Within the Southern Portion of the Project Area**

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#### 7.3.1.7 Groundwater

INTRODUCTION AND LINK TO IMPACT

Groundwater is a valuable resource and is defined as water which is located beneath the ground surface in soil/rock pore spaces and in the fractures of lithological formations. Activities such as the handling and storage of hazardous materials and handling and storage of mineralised (waste rock dump) and non-mineralised wastes have the potential to result in the loss of groundwater resources, both to the environment and third-party users, through pollution. To understand the basis of these potential impacts, a baseline situational analysis is described below.

DATA SOURCES

Information In this section was sourced from the Marula Platinum Mine IWWMP (SRK, November 2019).

DESCRIPTION

**Aquifer Characterisation**

The regional aquifer is semi-confined and occurs at a shallow depth and is characterised by an upper intergranular zone and underlying deeper fractured rock zone. Water strikes typically occur at the contact zone between the base of the weathered zone and the hard rock lithologies and / or in deeper fractures within the mafic lithologies of the RLS. The unconsolidated sands and gravels occurring along the drainage lines and rivers provide additional storage to the regional aquifer. The regional aquifer comprises a minor aquifer with yields of 0.5 – 2 l/s and the groundwater exploitation potential is therefore generally low except where higher yields (>2 l/s) are associated with the pyroxenite hanging wall of the UG2 and Merensky Reef and in areas of preferential weathering along major lineaments such as faults, open joint systems and the prominent northeast to southwest dolerite dyke contact. Sustainable yields were calculated as varying from 0.5 l/s to 6 l/s for a 9-hour pump cycle. Mean annual recharge is estimated at 5% of rainfall. Alternatively, recharge can be estimated from the chloride mass balance method as between 1.6 – 3.5 (average of 2.3%) of average rainfall. The main water strikes occur at a depth of 17 – 37 metres below ground level (mbgl), although deeper fractures may be intercepted up to 70 mbgl.

**Groundwater levels**

The ambient groundwater flow directions follow the topography, regionally in a north and north-easterly direction. Water levels vary from 3 – 19 mbgl for boreholes intercepting the regional aquifer. Water levels are assumed to be lower in boreholes utilised for supply (generally around 20 – 30 mbgl) with localised dewatering in abstraction boreholes around the boxcut reducing to >40 mbgl. Water levels are variable but there is an overall drop in water levels particularly in boreholes around Clapham and Driekop (between 2 to 8 m over the past 9 to 10 years) following the initial increase in water levels once abstraction ceased at individual boreholes. Water levels around Driekop are generally lower than at Clapham. A drop in the water levels, particularly since 2015, is evident from regional boreholes (SRKM6, SRKM12, SRKM13) possibly due to the lower rainfall experienced over the period.

### Groundwater use

Most of the surrounding communities are reliant on groundwater resources, as documented in the IWWMP for the mine (SRK, November 2019). Communities within proximity of the TSF, who utilise boreholes for water supply include the Madikane community (located north-west of the TSF), the Ga-Mahlokwane community (located to the south-east and upslope of the TSF) and the Matadi community (located north of the TSF).

### Baseline groundwater quality

Numerous boreholes exist within the Marula Mine area and in the neighboring communities. The Marula Mine monitors their groundwater quality as per the conditions of their approved IWUL. The ambient groundwater quality was estimated based on the 95th percentile concentration for groundwater samples obtained from the site before the deposition of the TSF from the period 1999 to 2004. The local water quality was historically of poor quality in respect to sulphate and nitrate concentrations. Prior to the construction of the TSF, the baseline groundwater quality was unsuitable for domestic use due to the elevated nitrate concentrations of 17 mgN/l (median) to as high as 66 mgN/l (95th percentile) which exceeded the SANS 241-2015 guideline limits of 11 mgN/l and groundwater reserve of 10.4 mg/l as N. The historical groundwater quality may imply that the groundwater quality was influenced by additional sources outside the mining activities of the Marula Mine. It orders to monitor the background groundwater quality concentrations; Marula has included boreholes located up gradient of the TSF (SRKM25; AO3 and 17H-handpump).

The IWWMP for the mine (SRK, November 2019) documents that EC/TDS, sulphate, sodium, nitrate and chloride concentrations have all increased since 2006 relative to the baseline/ambient water quality, but nitrate remains the only constituent elevated above the SANS241-2015 limits of 11 mg/l. Due to the heterogeneity of the aquifer, nitrate varies from < 5 mg/l (west of the tailings dam in SRKM3) to > 50 mg/L as N in boreholes located downgradient and to the west of the RWD (SRKM27, SRKM1, H12-1546 and H12-1545) with concentrations generally between 20 and 30 mgN/l. The main chemical of concern in terms of risk is therefore nitrate; the primary risk being to bottle fed infants under the age of 1 year. A summary of the results from the annual water quality report for 2018 calendar year is provided as follows ((SRK, November 2019):

- Concentrations were comparatively higher in the last six months of 2018. This could be a combination of the reduced recharge from rainfall over this period combined with an increase in abstraction in boreholes located to the north-west of the TSF and RWD which induces the plume to migrate towards the abstraction boreholes.
- Nitrate is more variable with concentrations remaining at the lower concentrations (<30 mg/l as N) reported in 2017 in Mhandug and H12-1546 but increasing again over the latter part of 2018.
- Nitrate increased in H12-1545 (with similar elevated results noted in SRKM26 and SRKM27) with a corresponding increase in sulphate. The poorer quality water in this area (H12-1546 and SRKM16 located to the north of the TSF) could be due to increased pumping by the community at SRK M1, resulting in movement of the seepage plume associated with the TSF towards the affected boreholes. Water levels fluctuate by 2.8 m over the 2017 and 2018 monitoring period supporting the assumption that there is increased abstraction from the aquifer in this area.
- Except for SRK M3S; sulphate concentrations have generally increased in 2018 compared to previous results trends for sodium and chloride remain relatively similar over 2017 and 2018.

- The increased sulfate (and nitrate) concentration is particularly evident in the boreholes located up-gradient of the TSF (SRKM25 and AO3) where concentrations have increased to above 300 mg/l. Water levels in SRKM25 have dropped by more than 4 m over the past two years. This implies that the mining activities (independent of Marula operations) upslope may be drawing in the plume from the TSF. These operations may, however, also be an additional source of contamination to the surrounding aquifer.
- Sulfate concentrations have conversely decreased or stabilised in the boreholes (A011 and Frasers) located downslope of the operating compartment of RWD that was lined in 2011. Water levels in A011 have also decreased by around 2 m since the RWD was lined whilst Fraser water levels continue to fluctuate with localised abstraction from this borehole. This implies that there is less artificial recharge to the aquifer.

**Contamination plume investigations and management**

There is a contamination plume emanating from the Marula Mine TSF. The plume is migrating westwards toward the Moopetsi River and extends to the north and north-west possibly influenced by community abstraction of groundwater in this area. Additional boreholes were drilled in 2016 as a pilot test, to investigate the feasibility of a Scavenger Borehole System to partially contain the contaminant plume. As part of the Scavenger Borehole System, Marula has developed a conceptual strategy for the treatment of seepage water that will be abstracted from the groundwater plume resulting from the operation of the TSF. The project is planned to be conducted in three phases. The first phase of the project has been conducted and consisted of a conceptual study that aimed to identify viable treatment options based on the site-specific requirements. Marula is currently weighing the different options recommended in the phase 1 groundwater study undertaken by SRK (SRK Report 464732, 2014). The second phase will comprise of more detailed modelling and possible piloting options that will be chosen from the phase 1 study. Phase 3 will involve a detail design and implementation of the solution. The amendment of the approved 2012 EMPr (Metago, 2012) will be undertaken as part of this environmental authorisation process, to make provision for the pollution plume mitigation and management measures which will be investigated as part of the Scavenger Borehole System.

CONCLUSION

The nature of the existing Marula infrastructure and activities are such that they present real potential for pollution of groundwater resources that in this case is used by the surrounding communities. Therefore, the proposed project must be implemented/managed in a way that pollution and reduction of groundwater resources is prevented. The product stockpile will be located within the disturbed footprint of the Concentrator Plant on an unlined surface, which may have the potential to negatively impact groundwater resources. Investigations into the appropriate containment barrier or lining requirements should be undertaken prior to the establishment of the product stockpile. The remaining proposed project components are not expected to negatively impact groundwater quality. The proposed TSF remediation measures is included in this amended EMPr to mitigate the TSF contaminant plume.

#### 7.3.1.8 Air quality

INTRODUCTION AND LINK TO IMPACT

Existing sources of emissions in the region and the characterisation of existing ambient pollution concentrations is fundamental to the assessment of cumulative air impacts. A change in ambient air quality can result in a range of impacts which in turn may cause a disturbance and/or health impacts to nearby receptors. To understand the basis of these potential impacts, a baseline situational analysis is described below.

### DATA SOURCES

Information in this section was sourced from the Air Quality Assessment for the Proposed New Vents at Marula Platinum Mine in Limpopo (Airshed, November 2020) and the Marula 2012 EIA and EMPr Report (Metago, August 2012).

### DESCRIPTION

#### Regional air quality

The regional air quality has already been affected by emissions from various mining and industrial facilities, domestic fuel burning (related to neighbouring communities), vehicle tailpipe emissions (due to the vehicle activity along the R37 and other routes within the area), biomass burning and various miscellaneous fugitive dust sources such as agricultural activities, wind erosion of open areas, vehicle entrainment of dust along the unsurfaced roads and Informal refuse burning. Surrounding land uses comprise mining, agriculture (livestock and subsistence farming) and residential (scattered formal and informal villages). Additionally, long-range transport of particulates, emitted from remote tall stacks and from large-scale biomass burning in countries to the north of South Africa, has been found to contribute significantly to background fine particulate concentrations within the South African boundary.

#### Local air quality

Within the context of the Marula mine, pollution sources include PM10 emissions (from dust fallout), total suspended solids (TSP) which can emanate from the tailings scavenger plant, diesel particulate matter (emitted from haul trucks and earthmoving equipment), gaseous emissions such as oxides, nitrogen, sulphur dioxide and carbon monoxide and organic compounds (from vehicle emissions and blasting operations).

#### Air Quality Sensitive Receptors

Air quality sensitive receptors (AQSRS) refer to places where humans reside, schools and hospitals. Aside from the potential fugitive dust emissions during construction and decommissioning phases, the major air pollutant source concerned with the proposed project are the emissions from the proposed ventilation shafts. Therefore, it was necessary to identify the potential AQRS to the proposed ventilation shafts as well as model the emissions.

The AQSRS were selected based on the closest receptors to the vents in various wind directions, as well as AQSRs located at elevations higher than the vent stack height (complex terrain). The nearest residential areas to the proposed Driekop vent (elevation 907 m) are Galane (~300 m from project activities) and Diphale (~600 m from project activities). The nearest residential areas to the proposed Clapham vent (elevation 902 m) are Winnarshoek (~80 m from project activities) and Diphale. The nearest AQSRS are tabulated in Table 23 and illustrated in Figure 23 and Figure 24.

### Table 23: AQSRS for the proposed ventilation shafts

| AQSRs near the Proposed Driekop Vent | | | AQSRs near the Proposed Clapham Vent | | |
|---|---|---|---|---|---|
| Number | Elevation (m) | Distance from vent (m) | Number | Elevation (m) | Distance from vent (m) |
| 1 | 905 | 440 | 1 | 898 | 340 |
| 2 | 904 | 460 | 2 | 904 | 470 |
| 3 | 612 | 465 | 3 | 905 | 750 |
| 4 | 914 | 420 | 4 | 908 | 850 |
| 5 | 920 | 450 | 5 | 911 | 710 |
| 6 | 913 | 390 | 6 | 911 | 520 |
| 7 | 926 | 810 | 7 | 932 | 840 |
| 8 | 924 | 670 | 8 | 928 | 1 000 |
| 9 | 916 | 670 | 9 | 926 | 1 000 |
| 10 | 926 | 820 | 10 | 893 | 640 |

### Historic Dust Fallout Data

Historical dust fallout data was obtained from the 2012 Airshed report done for the Marula Mine. From the 2012 study done by Airshed for the Marula Mine, PM10 emissions were estimated to be 34 tpa. The nearest site to the proposed vents (the "Raw Water Dam" measuring a maximum of 375 mg/m²/day (Aug 2010), ~2.9 km north-northwest from the Driekop Vent and ~1.25 km northeast from the Clapham Vent) was compliant with the National Dust Control Regulations for residential areas.


Legend

- Towns / Villages
- Farms
- Marula Mining Right Area
- Existing Ventilation Shaft
- Proposed Ventilation Shaft
- AQSR Points

0 100 200 Meters

Scale: 1:6 000 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 23**

**AQSRs Surrounding the Proposed Driekop Ventilation Shaft (AIRSHED, November 2020)**


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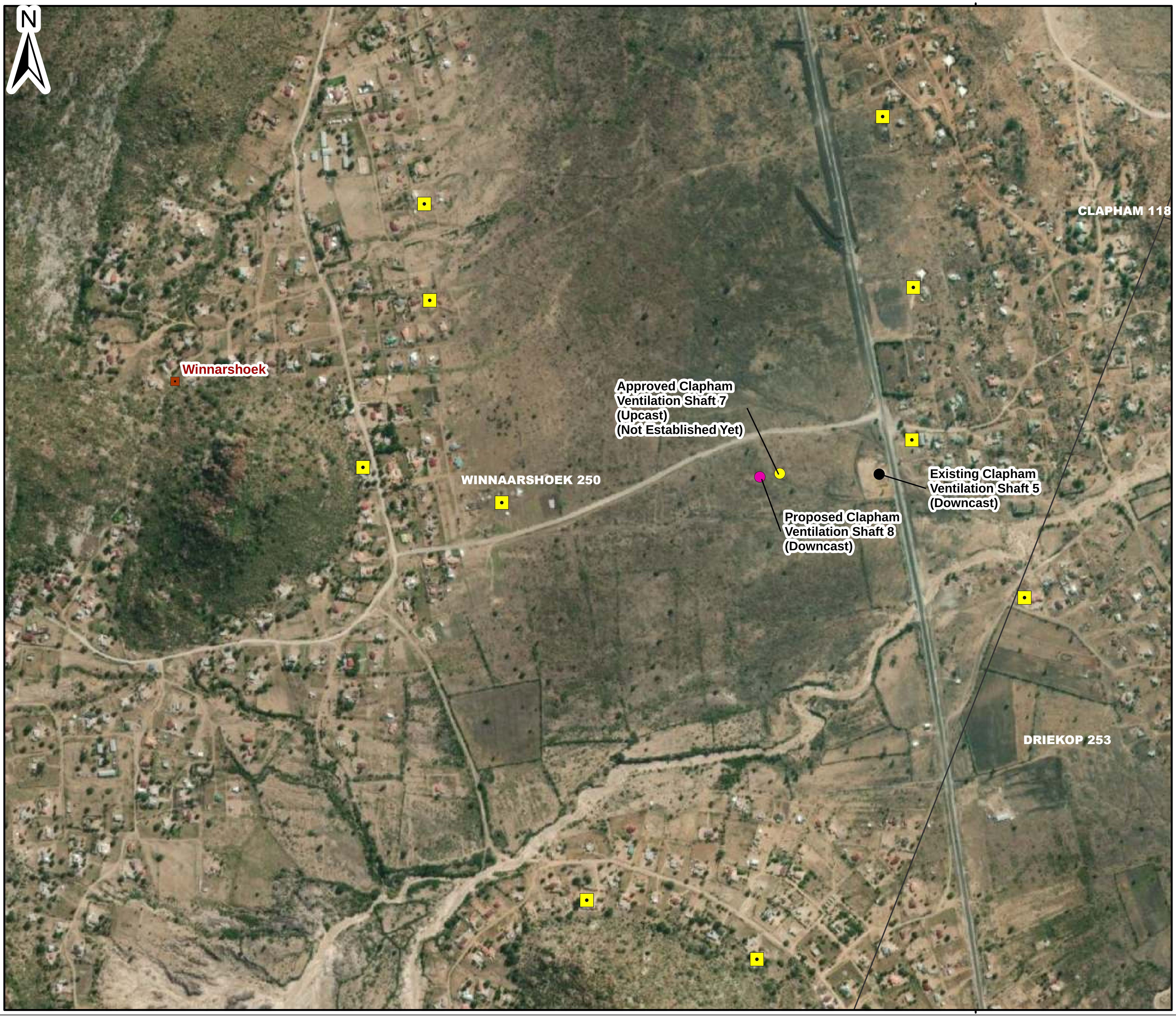


Legend

- Towns / Villages
- Farms
- Marula Mining Right Area
- Proposed Product Stockpile
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- AQSR Points

0 100 200 Meters

Scale: 1:7 800 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

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**Figure 24**

**AQSRs Surrounding the Proposed Clapham Ventilation Shaft (AIRSHED, November 2020)**

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CONCLUSION

The proposed project occurs within an area which is already impacted by various air pollutant sources at a regional and local scale. The proposed project has the potential to negatively impact the existing local ambient air quality during construction and decommissioning activities, but these are expected to be of a short duration. Pollutants released by the proposed operations, likely to result in human health impacts include the following criteria pollutants: $PM_{10}$ (particulate matter 10 micrometers or less in diameter) and $PM_{2.5}$ (particulate matter 2.5 micrometers or less in diameter). AQSRS were identified for the proposed ventilation shafts and included residential areas; Galane, Winnarshoek and Diphale. The simulated ambient criteria pollutant $PM_{10}$ and $PM_{2.5}$ concentrations were below the National Ambient Air Quality Standards (NAAQS) at all the nearby air quality sensitive receptors. However, management measures still need to be considered to minimise any additional significant air quality impacts.

#### 7.3.1.9 Noise

INTRODUCTION AND LINK TO IMPACT

Mining activities and infrastructure have the potential to cause an increase in ambient noise levels in and around the proposed project area. This may cause a disturbance to nearby receptors. Land uses and potential receptor sites including residential areas surrounding the mine have been described in Section 7.3.1.8 and Section 7.3.4. To understand the basis of these impacts, a baseline situational analysis is described below.

DATA SOURCE

Information presented in this section was sourced from the Noise Specialist Study for the new ventilation infrastructure for the Marula Platinum Mine (Airshed, November 2020).

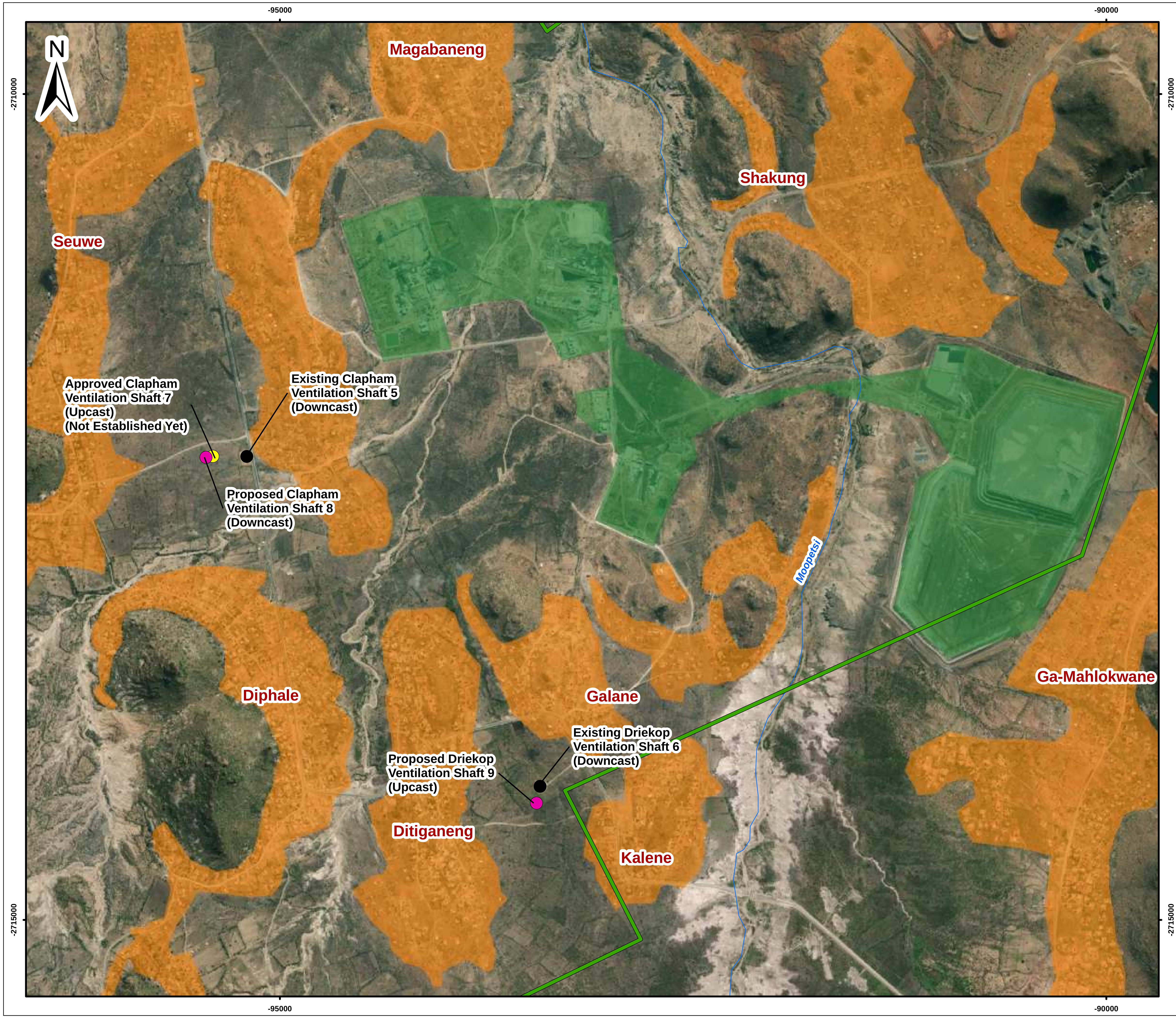
DESCRIPTION

**Noise Sensitive Receptors**

Noise sensitive receptors generally include places of residents and areas where members of the public may be affected by noise generated by the project. Potential noise receptors within the project area include the residential areas of Winnarshoek (~80 m from project activities), Diphale (~600 m from project activities) and Galane (~300 m from project activities). Residential areas further from the project activities that are not likely to be impacted by the proposed project include Ga-Makhwae and Bothashoek and surroundings areas of industrial activities. A map of the potential noise sensitive receptors is included in Figure 25 below.

**Baseline Noise Survey and Results**

A baseline noise survey was undertaken on 17 and 18 August 2020 at six noise survey locations (see Figure 26). Sampling points were selected based on proposed project activities and position of noise sensitive receptors.




**Legend**

- Perennial Rivers
- Marula Mining Right Area
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Sensitive Receptors - Industrial
- Sensitive Receptors - Residential

0 400 800 Meters

Scale: 1:25 000 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 25**

**Potential Noise Sensitive Receptors (Airshed, November 2020)**

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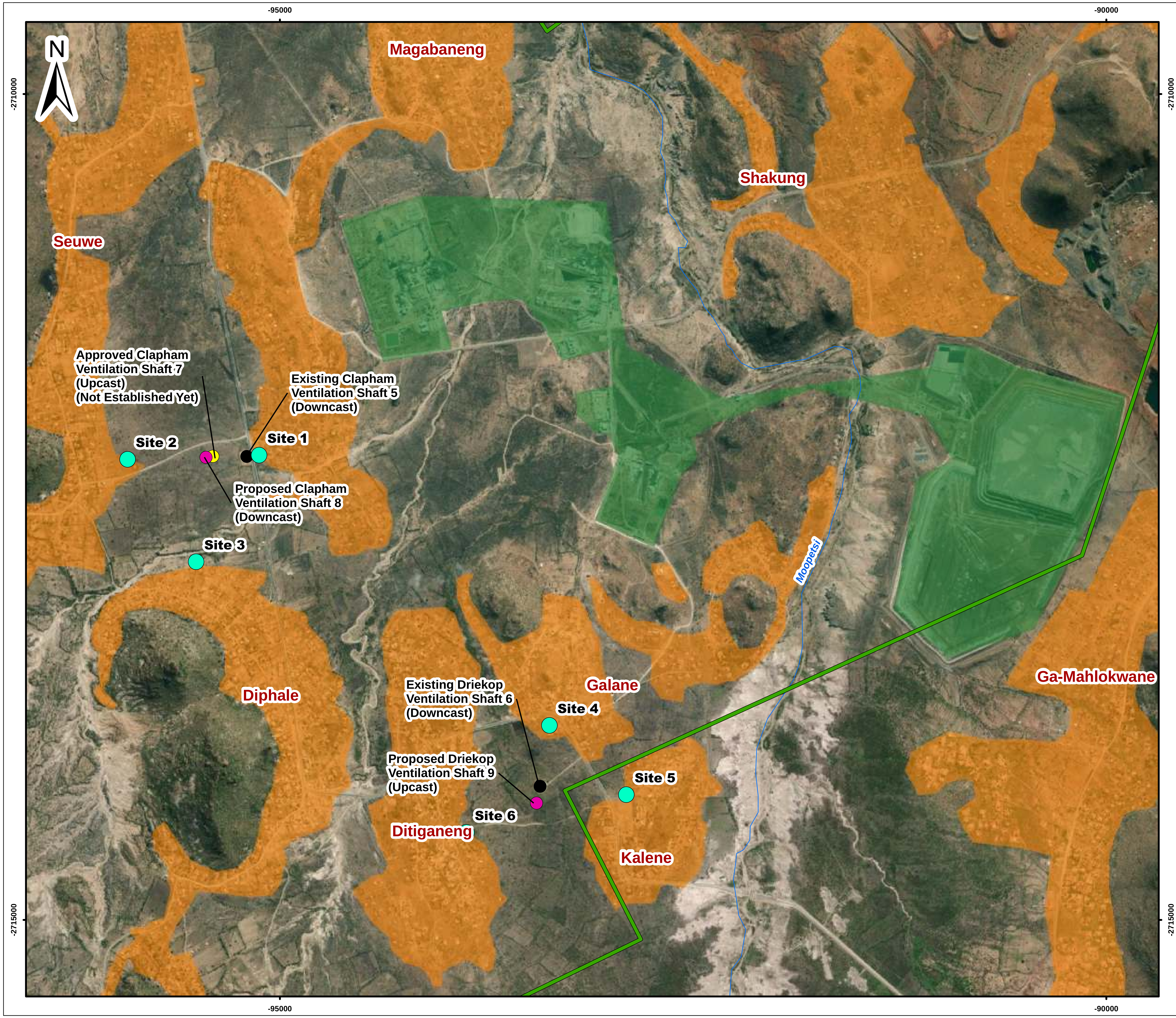


**Legend**

- Perennial Rivers
- Marula Mining Right Area
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Sensitive Receptors - Industrial
- Sensitive Receptors - Residential
- Noise Survey Locations

0 400 800 Meters

Scale: 1:25 000 @ A3

Projection: Transverse Mercator
Datum: WGS1984, Lo31

Marula Platinum Mines

**Figure 26**

**Noise Survey Locations (Airshed, November 2020)**


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| | |
|---|---|
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The following is noted with regards to the baseline survey:

- **Weather conditions:**
  - During the day (06:00 to 22:00), weather conditions were as follows:
    - Mid-day measurements on 17 August 2020 consisted of cloudy skies with temperatures between 17.6ºC and 20.2ºC. Slight to moderate wind conditions (including gusts) with wind speeds between 1.1 and 6 m/s from the northerly direction, prevailed.
    - Evening measurements on 17 August 2020 consisted of cloudy skies with temperatures between 22.4ºC and 25.1ºC. Slight to moderate wind conditions with wind speeds between 1 and 4.1 m/s from the south easterly direction, prevailed.
    - Evening measurements on 18 August 2020 consisted of cloudless skies with temperatures between 21ºC and 24ºC. Slight to moderate wind conditions with wind speeds between 1 and 3 m/s from the southerly direction, prevailed.
  - During the night (22:00-06:00), weather conditions were as follows:
    - Night-time measurements on 17 August 2020 consisted of cloudless skies with temperatures between 16.9ºC and 18ºC. Slight wind conditions with wind speeds between 0.1 and 1.9 m/s from the south easterly direction, prevailed.
    - Night-time measurements on 18 August 2020 consisted of cloudless skies with temperatures between 16.8ºC and 19ºC. Slight wind conditions with wind speeds between 0.1 and 1.4 m/s from the southerly direction, prevailed.
- Day-time baseline noise levels:
  - Measurements indicate day-time ambient noise levels that are influenced by vehicles, mining operations and community activity.
  - LAeq's ranged between 40 dBA and 46 dBA which is considered typical of rural areas according to SANS 10103.
  - Recorded LAeq's during the day were within IFC guidelines for residential, institutional and educational receptors (55 dBA).
- Night-time baseline noise levels:
  - Measurements indicate night-time ambient noise levels that are influenced by vehicles, mining operations and community activity.
  - LAeq's ranged between 27 dBA and 39 dBA which is considered typical of rural to suburban areas according to SANS 10103.
  - Recorded LAeq's during the night were within IFC guidelines for residential, institutional and educational receptors (45 dBA).

Survey results are summarised in Table 24.

### Table 24: Project baseline environmental noise survey results

| Site | Date | Duration (minutes) | LAFmax (dBA) | LAIeq (dBA) | LAeq (dBA) | LAF90 (dBA) | Observations |
|---|---|---|---|---|---|---|---|
| **Day-time (06:00 – 22:00)** | | | | | | | |
| Site 1 | 17/08/2020 9:42 | 30 | 63.2 | 50.0 | 45.6 | 37.7 | Semi cultivated open land near road with community activity, mining activities and vehicles. |
| Site 2 | 17/08/2020 10:27 | 30 | 62.6 | 47.0 | 39.7 | 32.2 | Gusty winds throughout the measurements, with birds audible. |
| Site 3 | 17/08/2020 11:19 | 30 | 65.7 | 47.0 | 41.4 | 36.3 | Gusty winds throughout the measurements, traffic from the road and brick plant activities audible. |
| Site 4 | 17/08/2020 12:09 | 30 | 66.2 | 46.9 | 39.8 | 32.0 | Vehicles and community activities audible. |
| Site 5 | 17/08/2020 12:56 | 30 | 75.5 | 53.6 | 43.1 | 32.6 | Open land with lots of trees and shrubs. Vehicles, community activity and birds audible. |
| Site 6 | 17/08/2020 13:40 | 30 | 64.6 | 46.5 | 38.3 | 29.9 | Goats, birds and vehicles audible. |
| Site 1 | 17/08/2020 18:22 | 10 | 67.2 | 51.3 | 48.0 | 38.4 | Gusty winds throughout the measurements, with vehicles audible. |
| Site 2 | 17/08/2020 18:39 | 10 | 63.5 | 48.6 | 44.7 | 30.0 | Gusty winds throughout the measurements, with community activity and vehicles audible. |
| Site 3 | 17/08/2020 18:58 | 10 | 63.9 | 44.6 | 41.1 | 26.3 | Vehicles audible. |
| Site 4 | 17/08/2020 19:19 | 10 | 74.6 | 54.0 | 39.2 | 22.8 | Vehicles audible. |
| Site 5 | 17/08/2020 19:35 | 10 | 62.0 | 45.8 | 42.5 | 31.9 | Insects and vehicles audible. |
| Site 6 | 17/08/2020 19:52 | 10 | 59.9 | 41.8 | 30.7 | 21.4 | Insects and community activity audible. |
| Site 1 | 18/08/2020 18:50 | 10 | 65.7 | 47.8 | 45.9 | 32.2 | Existing vent shaft, vehicles and mining operations audible. |

| Site | Date | Duration (minutes) | LAFmax (dBA) | LAIeq (dBA) | LAeq (dBA) | LAF90 (dBA) | Observations |
|---|---|---|---|---|---|---|---|
| Site 2 | 18/08/2020 19:21 | 10 | 65.2 | 48.8 | 43.3 | 27.7 | Birds, insects, barking dogs, community activity and vehicles audible. |
| Site 3 | 18/08/2020 19:45 | 10 | 62.6 | 46.2 | 43.7 | 29.6 | Barking dogs, generator to pump water for the community, vehicles and birds audible. |
| Site 4 | 18/08/2020 19:13 | 10 | 69.3 | 48.7 | 45.3 | 34.1 | Existing shaft vents, vehicles and barking dogs audible. |
| Site 5 | 18/08/2020 19:33 | 10 | 64.5 | 48.7 | 45.3 | 35.9 | Barking dogs, birds, vehicles and insects audible. |
| Site 6 | 18/08/2020 19:05 | 10 | 66.8 | 51.2 | 43.7 | 30.0 | Barking dogs, vehicles and insects audible. |
| **Night-time (22:00 – 06:00)** | | | | | | | |
| Site 1 | 17/08/2020 22:28 | 10 | 50.6 | 38.4 | 33.5 | 27.7 | Vehicles and barking dogs audible. |
| Site 2 | 17/08/2020 22:52 | 10 | 51.7 | 37.2 | 31.0 | 25.2 | Community activity, birds and vehicles audible. |
| Site 3 | 17/08/2020 23:15 | 10 | 45.1 | 32.6 | 29.0 | 25.4 | Vehicles, insects, and generator for pumping water audible. |
| Site 4 | 17/08/2020 23:40 | 10 | 60.5 | 47.0 | 41.6 | 28.8 | Barking dogs, mining activities and vehicles audible. |
| Site 5 | 18/08/2020 00:02 | 10 | 49.1 | 32.8 | 25.7 | 21.1 | Community activity, birds and insects audible. |
| Site 6 | 18/08/2020 00:21 | 10 | 50.8 | 34.9 | 24.5 | 19.2 | Community activity audible. |
| Site 1 | 18/08/2020 22:07 | 10 | 59.4 | 40.6 | 36.6 | 21.8 | Barking dogs, mining activities, vehicles, birds and insects audible. |
| Site 2 | 18/08/2020 22:38 | 10 | 59.6 | 39.8 | 28.6 | 18.8 | Barking dogs, chickens, vehicles, birds and insects audible. |
| Site 3 | 18/08/2020 22:10 | 10 | 55.8 | 35.5 | 24.9 | 18.5 | Barking dogs, insects, birds and mining activity audible. |

| Site | Date | Duration (minutes) | LAFmax (dBA) | LAIeq (dBA) | LAeq (dBA) | LAF90 (dBA) | Observations |
|---|---|---|---|---|---|---|---|
| Site 4 | 18/08/2020 22:45 | 10 | 47.8 | 34.3 | 26.9 | 19.1 | Vehicles and mining activity audible. |
| Site 5 | 18/08/2020 23:15 | 10 | 57.6 | 39.9 | 34.2 | 23.8 | Birds and vehicles audible. |
| Site 6 | 18/08/2020 23:55 | 10 | 54.6 | 36.7 | 29.0 | 20.0 | Vehicles and insects audible. |

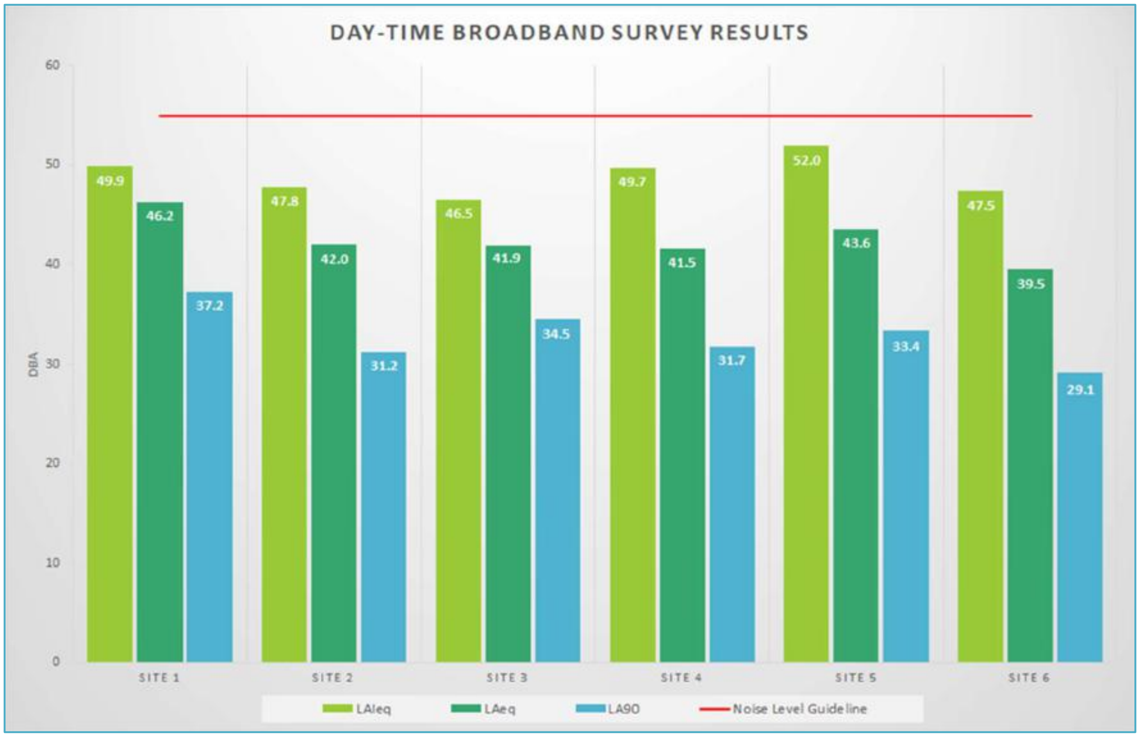



**Figure 27: Day-time broad time survey results**

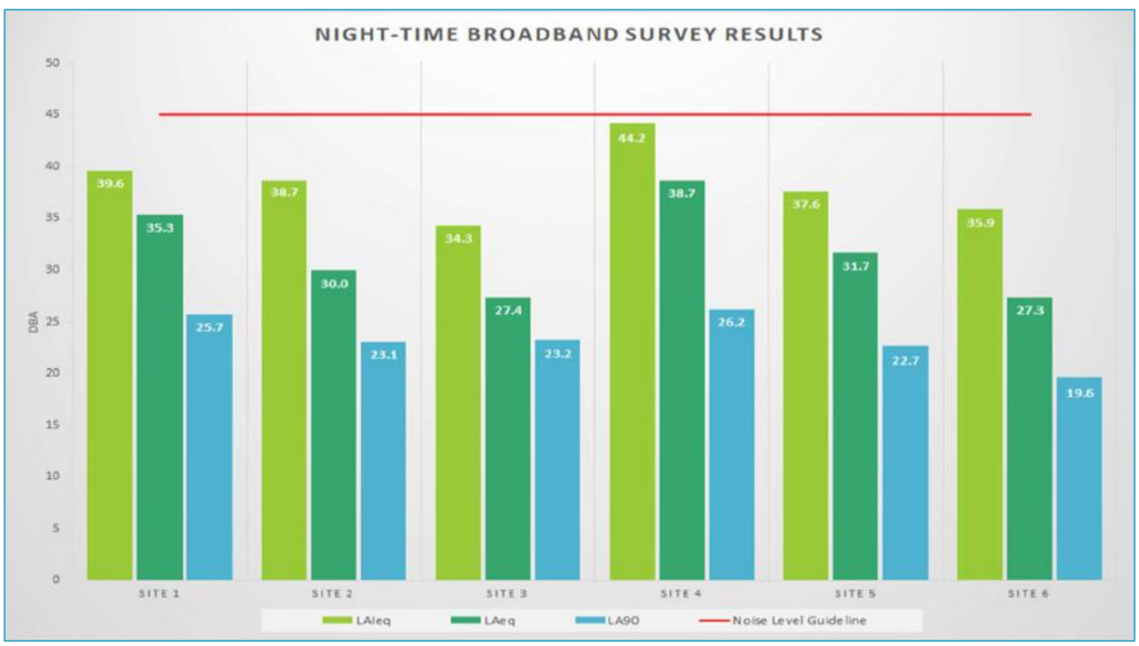



**Figure 28: Night-time broadband survey results**

Ambient baseline noise levels for all noise sampling surveys conducted in the study area are shown in Figure 29. The average baseline noise levels (as measured during the survey) were LReq,d – 43 dBA during the day and LReq,n – 33.8 dBA during the night-time.

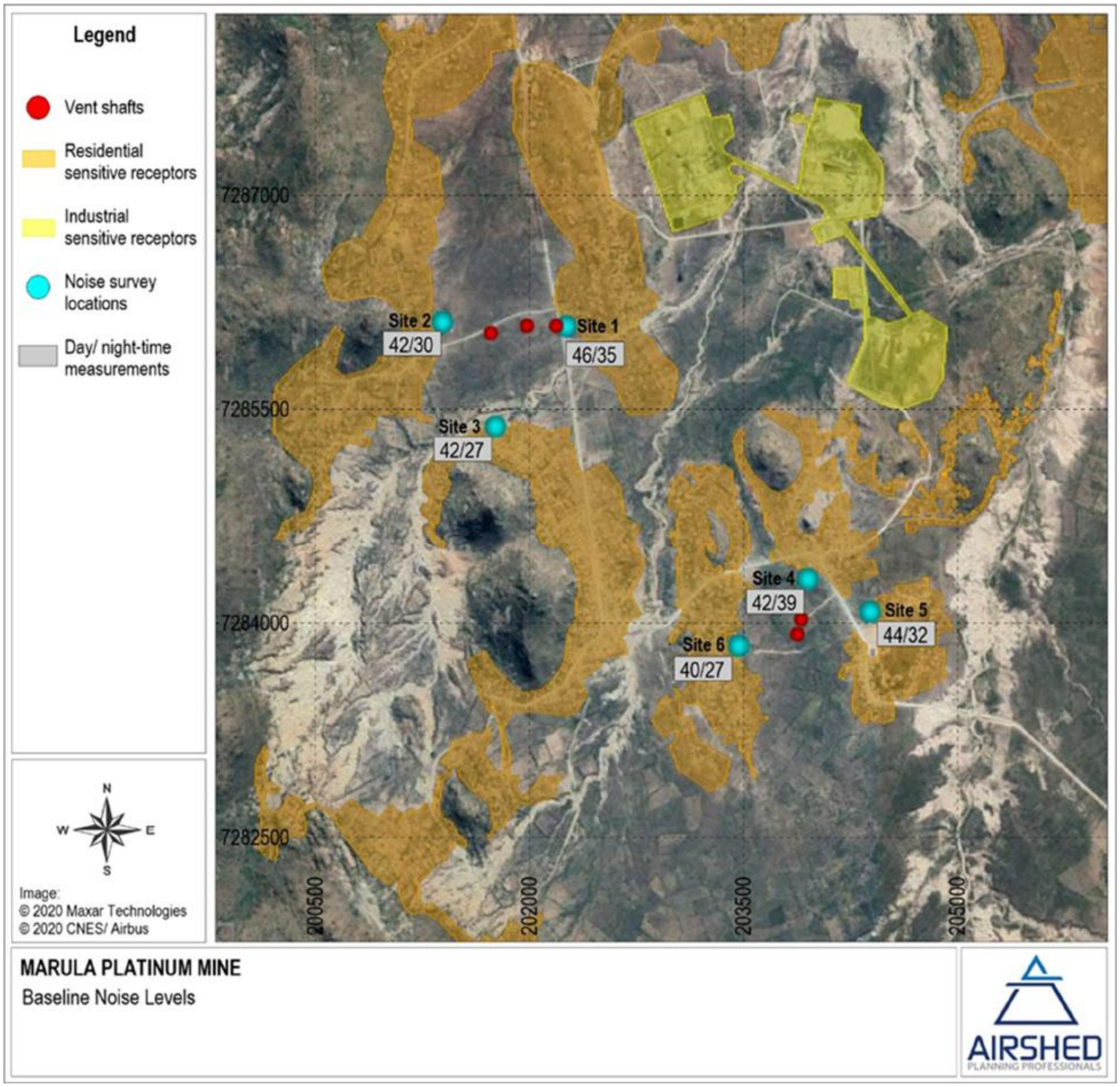



**Figure 29: Average ambient baseline noise levels**

## CONCLUSION

Current baseline noise levels are within the IFC guidelines for residential, institutional and education receptors for both daytime and nigh-time noise. Due to the proximity of sensitive receptors to the proposed ventilations shafts, careful design, planning, mitigation, and monitoring measures will need to be taken into consideration for the proposed project to minimise increasing disturbing noise levels. This will be of particular importance with regards to the increase in noise associated with the activities associated with the operational phase of the proposed project.

### 7.3.1.10Visual aspects

#### INTRODUCTION AND LINK

The proposed project components and related activities have the potential to alter the landscape character of the site and surrounding area through the establishment of infrastructure. As a baseline, this section provides an understanding of the visual aspects (such as landscape character, sense of place, scenic quality, and sensitive views) of the project area against which to measure potential change as a result of project infrastructure and activities.

#### DATA SOURCE

Information in this section was sourced from the EIA and EMPr Report for the Proposed Tailings Scavenger Plant, two Additional Ventilation Shafts and the Extension of Underground Mining Activities to Include the Farm Hackney 116 KT and a Portion of the Farm Driekop 253 KT (Metago, 2012).

#### DESCRIPTION

**Landscape Character**

Regionally, Marula Mine is located within an area used mainly for residential purposes, grazing and mining activities. There are properties used for agricultural purposes, but these fields are mostly associated with smaller villages within the surrounding area. Marula Mine and proposed surface infrastructure are located on the valley floor which stretches between the Lebalelo and Leolo mountain ranges. The site is semi-rural with formal and informal villages scattered throughout the area.

**Scenic Quality**

The scenic quality is linked to the type of landscapes that occur within an area. The overall study area can be regarded as having a high visual resource value with sections, such as the agricultural fields and villages that display a medium visual resource value. Due to the overall medium visual resource value of the area, the study area is not regarded to be sensitive to change in landscape.

**Sense of Place**

Central to the concept of sense of place is that the landscape requires uniqueness and distinctiveness. In this regard, a person can recognise or recall a place as being distinct from other places– as having a vivid and unique character of its own to the extent. When deriving the sense of place of the study area, the landscape context is considered, as it is the existing land uses that define a sense of place. The main land use in the area is subsistence and livestock farming, residential settlements, and mining operations within the larger area. Mining activities have already impacted on the natural sense of place of the area.

#### CONCLUSION

The main land use in the area is subsistence and livestock farming and the mining operations scattered within the larger area. The landscape character and quality of the visual resource has been altered by existing mining operations. The proposed project components are not expected to impact on the visual character of the area, given the following:

- The ventilation shafts and refrigeration infrastructure will be established within close proximity to existing shafts;
- Associated water distributed pipelines will be underground;
- Power supply upgrades will be undertaken within the existing Eskom Yard footprint and distribution lines will present minimal change to the local visual landscape; and
- The product stockpile will be established within the disturbed footprint of the Concentrator Plant.

## 7.3.2 BASELINE CULTURAL ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

### 7.3.2.1 Heritage / cultural and palaeontological resources

INTRODUCTION AND LINK TO IMPACT

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

Paleontological resources are fossils, the remains or traces of prehistoric life preserved in the geological (rock stratigraphic) record. They range from the well-known and well publicized (such as dinosaur and mammoth bones) to the more obscure but nevertheless scientifically important fossils (such as palaeobotanical remains, trace fossils, and microfossils). Paleontological resources include the casts or impressions of ancient animals and plants, their trace remains (for example, burrows and trackways), microfossils (for example, fossil pollen, ostracodes, and diatoms), and unmineralised remains (for example, bones of Ice Age mammals). To understand the basis of the potential impacts, a baseline situational analysis is described below.

DATA SOURCE

Information in this section was based on the Request for Exemption of any Palaeontological Impact Assessment for the proposed project (Marion Bamford, 2020) and the Phase I Heritage Impact Assessment (HIA) Study for the proposed project (Limpopo Province) (Julius CC Pistorius, January 2022).

DESCRIPTION

**Palaeontology**

The Marula Mine areas lies on non-fossiliferous rocks of the Rustenburg Layered Suite (RLS), Bushveld Igneous Complex (BIC) that has intruded through the Transvaal Supergroup rocks. Furthermore, the formations that would be affected as part of the proposed project are that of the Dwars River Subsuite, comprising of norite and anorthosite, and the Croyden subsuite, comprising of pyroxenite and feldspathic pyroxenite. These ancient rocks are highly metamorphosed and there is no chance that fossils may be preserved within. The overlying Quaternary alluvium and soils are a product of weathering and thus, no chance exists for the preservation of fossils. In this regard, the proposed project will not impact South African fossil heritage. This is corresponding with data provided on SAHRIS which indicates that the areas is considered to have a low paleo-sensitivity (Marion Bamford, 2020).

**Local Cultural landscape**

Marula Mine is located in the heartland of the Steelpoort valley, along the eastern slopes of the Leolo Mountain range. This region is the heartland of the pre-historical and the historical Pedi chiefdom and is associated with a wide range of heritage resource. As indicated by the Phase I HIA, various heritage resources are located within the Marula MRA. These include:

- Scatters of stone tools from various periods of the Stone Age in dongas all over the mine lease area and beyond;
- A Late Iron Age stone walled site along the base of a kopje;
- An Early Iron Age site near a dry riverbed where pottery was found;
- Graveyards in the open veld and within the confines of homesteads within residential areas;
- Historical homesteads older than sixty years in residential areas and towns in the mine lease area and further afield; and
- Remains from the recent past all over the mine lease area and beyond.

In terms of the proposed project, none of heritage resources located within the Marula MRA are located in close proximity to the proposed project components.

CONCLUSION

No palaeontological resources are located within the proposed project footprint. From a cultural heritage perspective, various resources are located within the MRA, however, the proposed project components are not located in close proximity to these resources.

### 7.3.3 BASELINE SOCIO-ECONOMIC ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

#### 7.3.3.1 Traffic

INTRODUCTION AND LINK TO IMPACT

Traffic from mining projects have the potential to affect the capacity of existing road networks, as well as result in public road safety issues. To understand the basis of these potential impacts in the context of the project activities, a baseline situational analysis is described below.

DATA SOURCE

Information in this section was derived from the Marula Platinum Mine Traffic Impact Study (JG Afrika, 2020).

DESCRIPTION

**Existing road network**

Provincial R37

This road is surfaced and links the towns of Polokwane and Burgersfort. The provincial road R37 is classified as a Class 2 Primary Arterial road because it links communities in the area.

Mine access road

The Marula Mine is accessed via the access road located off the R37. The mine's access road runs from the R37 to just past the existing mineral processing plant and administration complex. The access road is a surfaced road comprises of two 3.7 m wide lanes, with road shoulders of 0.5 m. The access road is approximately 6 km long with a road reserve of 30 m. Various informal structures have been erected along the access road since the intersection with the R37 was upgraded in 2010. Minibus taxi services are currently operating along the R37 and informal taxi pick-up and drop-off areas was also established over the years, on the southern side of the intersection. This embayment is deemed unsafe in its current state as taxis are forced to drive over a level different caused by edge breaking onto a gravel surface. There are no formal sidewalks provided along the R37 and the Access Road to the mine. Pedestrians make use of the gravel area on either side of the road. It was observed that school children are dropped off and picked up in the vicinity of the intersection. Buses were observed on both the R37 and the Access road to the mine. Additional feeder shuttle services are in place for workers of the Marula Mine.

### Access roads

Smaller access roads exist within the mining area and provide access to various parts of the mining operations. These roads are between 4 and 5 m wide and were constructed from gravel material.

### Existing traffic data

A site inspection and classified traffic counts were conducted on 15 July 2020 for the morning (AM) peak period (06:00 – 09:00) and the afternoon (PM) peak period (14:30 – 18:00) at the R37-access road intersection, as well as the informal taxi embayment. The traffic survey aimed to determine the existing traffic movement and volumes. The traffic volumes for the AM and PM peak hours are shown in Figure 30 and Figure 31. The peak hours for the intersection were determined to be:

- AM peak hour: 06:45 to 07:45; and
- PM peak hour: 15:30 to 16:30.

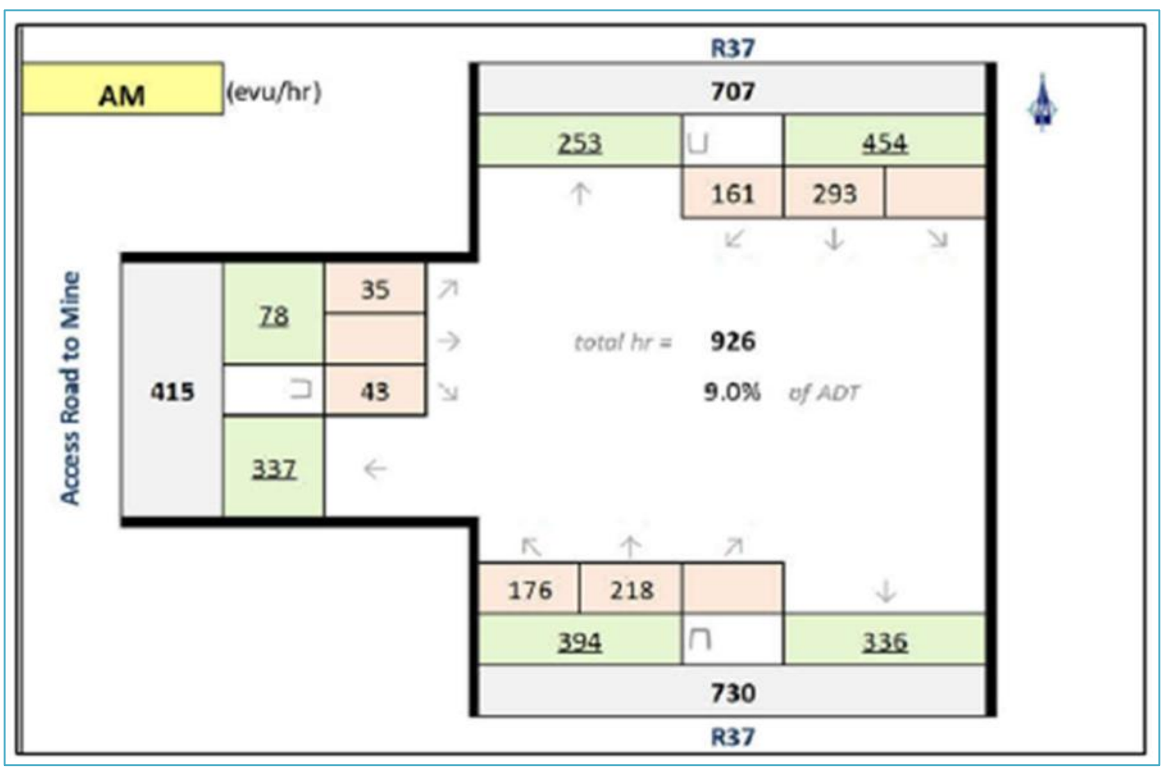


**Figure 30: 2020 AM Background Traffic**

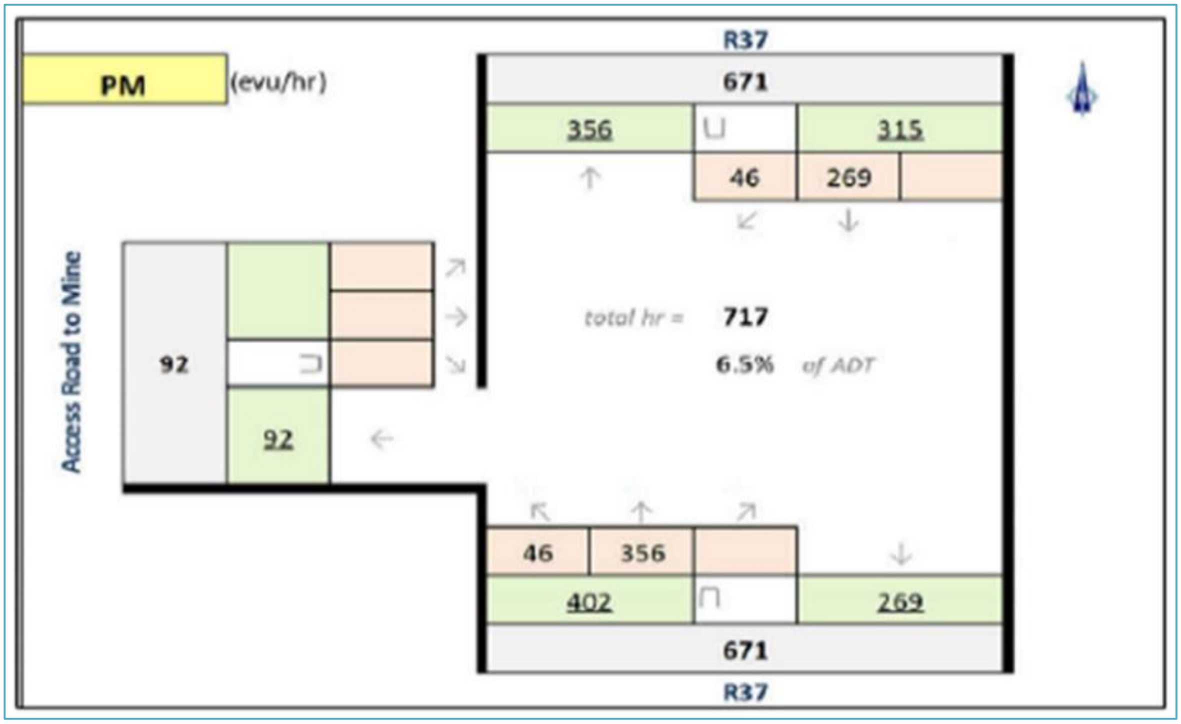



**Figure 31: 2020 PM Background Traffic**

The main movements of heavy vehicles were observed on the right-turn movement from the access road onto the R37 and on through movements on the R37. The maximum number of taxis counted in a 15-minute period, was five taxis between 6:30 and 7:00 in the AM peak period and four taxis in the PM peak period between 15:30 and 15:45. The maximum accumulation of taxis at the informal embayment matches the peak traffic period of the intersection of the R37-Marula Mine access road to the mine. Most of the Marula Mine workers arrive before 8h00 in the morning to start their shift and leave by 16h00 (60%). A second main shift (38%) occurs between 20h00 to 4h00.

The 2007 Traffic Study showed a deterioration of the level of service of the Mine Access road approach. an improvement to the level of service was shown in a 2020 capacity analysis (JG Afrika, 2020) due to the upgrading of the intersection at the R37 and Mine Access road. This improvement was shown for both the morning and afternoon peak hours, indicating that the intersection operates at low average delays from a capacity point of view.

## CONCLUSION

It is possible to conclude that the existing access road to Marula Mine operates sufficiently in terms of the operation of existing transportation. The components of the proposed project are not expected to impact the existing road network significantly. However, the existing operations require that Marula personnel make use of the informal taxi embayment which will require management and further consideration due to its current (unsafe) state. The proposed project is not expected to cause any significant pressure to the existing traffic network during the operational phase. An increase in contract labour of 250 people to a peak of 600 workers is expected during the construction phase.

#### 7.3.3.2 Socio-economic

INTRODUCTION AND LINK TO IMPACT

Mining operations have the potential to result in both positive and negative socio-economic impacts. The positive impacts are usually economic in nature with mines contributing directly towards employment, procurement, skills development, and taxes on a local, regional, and national scale. In addition, mines indirectly contribute to economic growth in the national, local and regional economies by strengthening the national economy and because the increase in the number of incomes earning people has a multiplying effect on the trade of other goods and services in other sectors.

The negative impacts can be both social and economic in nature. In this regard, mines can cause:

- Influx of people seeking job opportunities which can lead to increased pressure on basic infrastructure and services (housing, health, sanitation and education), informal settlement development, increased trespassing, increased crime, introduction of diseases and disruption to the existing social structures within communities
- A change to not only pre-existing land uses, but also the associated social structure and meaning associated with these land uses and way of life. This is particularly relevant in the closure phase when the economic support provided by the mining activities end, the natural resources that were available to the pre-mining society are reduced, and the social structure that has been transformed to deal with the threats and opportunities associated with mining finds it difficult to readapt.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

DATA SOURCES

Information in this section was sourced from the 2020-21 Integrated Development Plan for the Fetakgomo Tubatse Local Municipality (May 2020), the Sekhukhune District Municipality LP (2020), the Sekhukhune District Municipality Integrated Development Plan (2021/2022-2025/26) and the Municipalities of South Africa (**www.municipalities.co.za**., 2022).

DESCRIPTION

**Location**

The mine is located within the Limpopo Province, within the Burgersfort Magisterial District, the Sekhukhune District Municipality (DC47) and the Fetakgomo Tubatse Local Municipality. The Sekhukhune District Municipality is approximately 13 528 km$^2$ in area and is the smallest municipality in the Limpopo Province comprising 11 % of the geographical area. In 2016, the Fetakgomo Tubatse Local Municipalitywas established through the amalgamation of the Fetakgomo and Greater Tubatse Local Municipalities. The Greater Tubatse Local Municipality is approximately 5 693 km$^2$ in area. The main towns include Burgersfort, Ohrigstad and Steelpoort.

**Population**

The Sekhukhune District Municipality population has grown on average of 1.1% a year from 1996 to 2016. The total population is 1 169 762 persons which is 20.4% of the total population in the Limpopo Province. There are 52.56 % more females than males in the District Municipality and is attributed to outward migration. The total population of the Fetakgomo Tubatse Local Municipality is 428 891 as of 2018. This population has a sex ratio of 89 men to 100 women. The age demographic within the local municipality is as follows:

- 32.7% aged between 5 to 19 years;
- 29.2% aged between 30 to 64 years;
- 19.3% aged between 20 to 29 years;
- 13.1% aged less than 5 years; and
- 5.7% aged greater than 66 years.

There are 764 villages within the Sekhune District Municipality, the highest number of which are located within the Fetakgomo Tubatse Local Municipality (335 villages and 44 % of the total of the District Municipality). A number of communities are present in the mine area, these include:

- Ga-Makhwae located west of the mine area upstream of the Tshwenyane River, a tributary of the Moopetsi River;
- Seuwe located west of the mine area along the Leolo mountains;
- Northern part of Seuwe and Matsakane communities located on the tributary of Moopetsi River (north of Tshwenyane River) in the northern portion of the mine area;
- Diphale located within the upper reaches of Tshwenyane River (a portion of which overlies the mine area);
- Lekgwareng and Magabaneng communities located downstream of the Tshwenyane Rivers; and
- Legabeng and Madikane located east of the Tshwenyane River.

### Land Ownership

Tribal authorities own a vast majority of land within the Sekhukhune District Municipality. The estimated total of Traditional Authority Areas is 658 887 ha which accounts for 48 % of the entire municipal area. The Fetakgomo Tubatse Local Municipality is comprised of 58 % of Traditional Authority Areas and an area of 329 850 ha. The proposed project area within the Marula MR area is primarily comprised of state owed land (Section 7.3.4).

### Employment and income

The Sekhukhune District Municipality unemployment rate as of 2018 was 29.3% which increased by 6 360 individuals since 2008. The area displays high percentages of out ward migration with 56.8 % being regular migrants, 27.5 % being seasonal migrants and 15.7 % prolonged migrants who leave for more than 6 months at a time. In 2011 the average household incomes have doubled across the district, to household income shifty from R15 520 to R45 977 in 2011. The mining sector attributes the largest contribution to the economic growth of the Fetakgomo Tubatse Local Municipality (47 %) and agriculture contributes the lowest (2 %) of the GDP to the District Municipality. However, the unemployment rate in the local municipality is 54 % and has a 64% youth unemployment.

### Basic services

Access to water and sanitation, education, refuse removal and health services which are required to be provide to all citizens. The Sekhukhune District Municipality faces challenges with regard to water provision and sanitation, where only 22 % of households in the District Municipality receives rural development plan standard sanitation services. The rural villages within the district do not have access adequate sanitation (78 % of households). The local municipality has similar challenges with only 2.1 % of the population with access to water and 5.3 % with access to flush toilets. The majority of households utilise pit latrines. However, 80 % of the population within the local municipality has access to electricity or solar power.

Of all District Municipalities in Limpopo Province, the Sekhukhune District Municipality has the least highly skilled individuals. This may be compounded by the fact that most schools lack basic services like sanitation, water and electricity. In 2011, 117 139 persons had no schooling and only 4 5 had higher education. Low statistics are available for school facilities within the Fetakgomo Tubatse Local Municipality. As of 2018 there were only 5.1 % of primary schools available per 10 000 population  and 3.1 % of primary schools available per 10 000 population and no tertiary education facilities available. Education statistics in the local municipality showed that 41.3 % had completed some secondary school, 22.9 % completed secondary school, 10.2 % completed some primary school and 5 % completed higher education and 17.1 % had no schooling. Access to proper health facilities influences the resilience of a population, and the Sekhukhune District Municipality has on average 1 clinic for every 17 people and approximately 97 500 persons per hospital. There was also an average annual rate of 1.72 % increase in HIV/AIDS infections in 2018, with a total of 97 300 people infected. The District Municipality has launched the Sekhukhune HIV/AIDS Council in 2018/19 which focuses on education and awareness raising and support for people living with HIV/AIDS and care for children in distress. The Fetakgomo Tubatse Local Municipality has 38 public schools, 2 public hospital and access to 108 weekly and bi-weekly mobile clinics, however the prevalence of TB poses a threat to the population ( recorded 184 mortalities as of 2017 to 2018.

CONCLUSION

The proposed project has the potential to influence socio-economic conditions positively and negatively within the region. In this regard, positive impacts include the economic impact on the local, regional and national economy by allowing for increased job opportunities and the efficient exploitation of mineral resources, while negative impacts include the inward migration of people with the resultant pressure on an already struggling basic infrastructure and service delivery system. Care should be taken to avoid influencing negative impacts further and enhancing positive socio-economic impacts.

### 7.3.4 CURRENT LAND USES

INTRODUCTION AND LINK TO IMPACT

Mining activities have the potential to affect land uses both within the mine area and in the surrounding areas. This can be caused by physical land transformation and through direct or secondary impacts. The key related potential environmental impacts are loss of soil, loss of biodiversity, pollution of water, dewatering, air pollution, noise pollution, visual impacts and the influx of job seekers with related social ills. To understand the basis of the potential land use impacts, a baseline situational analysis is described below.

DATA SOURCE

Mining right and land ownership details were sourced from Marula Mine and a deed search undertaken by SLR as part of the proposed project. On-site and surrounding land use data was sourced from site observations, social scan undertaken by SLR and the review of topographical maps and satellite imagery as part of the proposed project.

DESCRIPTION

#### Mining and Prospecting Rights

The mine holds the following mining rights:

- Converted Mining Right 42/2008 (DMR Ref.: LP 30/5/1/2/2/61 MR), issued by the Department of Minerals and Energy (currently known as the Department of Mineral Resources and Energy (DMRE)) in January 2008.
- Converted Mining Right 23/2008 (DMR Ref: LP 30/5/1/2/2/63 MR), held under Cession 32/2008, issued by the Department of Mineral Resources (currently the DMRE) in January 2008.

### Land Ownership within the Marula Mine Area

The land owned by the state within the Marula MRA, and surrounds is outlined in Table 25. The proposed project components are located on the state-owned land (Farm Driekop 253, Farm Clapham 118 and Farm Winnaarshoek 250). Marula is in the process of formalising a lease agreement over the relevant sections of land portions, required for mining operations, which are owned by the Republic of South Africa required for its operations.

**Table 25: Land owned by the state within the Marula Mine MRA**

| Property Description | Title Deed | LPI Code | Property Owner |
|---|---|---|---|
| Farm Driekop 253 | T16453/1951PTA | T0KT00000000025300000 | Republic of South Africa |
| Farm Clapham 118 | T8670/1948PTA | T0KT00000000011800000 | Republic of South Africa |
| Farm Winnaarshoek 250 | T759/1936PTA | T0KT00000000025000000 | Government of Lebowa |
| Farm Hackney 116 | T8670/1948PTA | T0KT00000000011600000 | Republic of South Africa |
| Farm Forest Hill 117 | T8670/1948PTA | T0KT00000000011700000 | Republic of South Africa |
| Farm Quartzhill 542 | T47101/1989PTA | T0KS00000000054200000 | Republic of South Africa |
| Farm Twickenha, 114 | T8670/1948PTA | T0KT00000000011400000 | Republic of South Africa |
| Farm 115 | Not available | T0KT00000000011500000 | Not available |
| Farm Surbiton 115 | T15303/1927PTA | T0KT00000000011500000 | Government of Lebowa |
| Farm 119 | T7107/1993 | T0KT00000000011900000 | Government of Lebowa |
| Farm Twyfelaar 119 | T16452/1951PTA | T0KT00000000011900000 | Republic of South Africa |
| Farm Croydon 120 | T8670/1948PTA | T0KT00000000012000000 | Republic of South Africa |
| Farm The Shelter 121 | T8670/1948PTA | T0KT00000000012100000 | Republic of South Africa |
| Farm Djstate 249 | T15880/1989PTA | T0KT00000000024900000 | South African Development Trust |
| Farm De Kom 252 | T30711/2015PTA | T0KT00000000025200000 | Republic of South Africa |
| Farm 253 | T7107/1993 | T0KT00000000025300000 | Government of Lebowa |

### Land Claims

The Department of Agriculture, Land Reform and Rural Development (DALRRD) in Limpopo was contacted to confirm if there are land claims on properties that form part of the Marula mining area upon which the proposed activities will be undertaken. These farms include Driekop 253 KT; Clapham 118 KT and Winnarshoek 250 KT. The land claims commissioner confirmed that there are existing land claims for the properties. These are pending claims and have all been lodged prior to 1998.

### Land Use Surrounding the Marula Mine area

<u>Residential and agriculture</u>

The mine is located within a predominantly rural settlement. Prior to mining, the land was used for subsistence farming (dryland agriculture and grazing) as well as residential purposes. Extensive subsistence farming was restricted to the valleys, while residential areas were mostly restricted to foothills and the slopes immediately adjacent to hills. Some areas can also be described as natural / wilderness areas not accessible due to the steep slopes of the topography.

Conservation

In terms of vegetation protection level, the Marula MRA is located on areas that are demarcated as either Poorly Protected or Not Protected (see Section 7.3.1.5). Critical Biodiversity Areas (CBA) (CBA 1, CBA 2, Ecological Support Area (ESA) 1 and ESA 2) overlap with the Marula MRA, however the proposed project area does not fall within 10 km any protected or conservation areas according to the South African Protected Area Database (SAPAD) and South African Conservation Areas Database (SACAD, 2020).

Other mining operations

Regionally, there are several mining and mining-related activities occurring within the Steelpoort valley and along the R37 between Burgersfort and Polokwane. These include:

- Modikwa Mine (Anglo Platinum) (±18km south of Marula);
- Smokey Hills' platinum mining project (Australia Platinum Ltd) (±3km south east of Marula);
- Twickenham Mine (Anglo Platinum) (±6km north of Marula);
- Dilokong Chrome Mine and Asa Metals Furnace (Asa Metals) (±6km south east of Marula, along the R37);
- Kennedy's Vale Mine (Rhodium Reefs/Barplats) (in the Steelpoort valley);
- Lion Ferrochrome smelter and old Vantech mine (Xstrata Alloys) (in the Steelpoort valley); and
- Lannex Mine and Tubatse Ferrochrome Smelter (Samancor) (in the Steelpoort valley).

### Existing structures

Apart from the scattered residential developments and surface infrastructure on the Marula mine, no other structures exist in close proximity to the boundaries of the proposed project area.

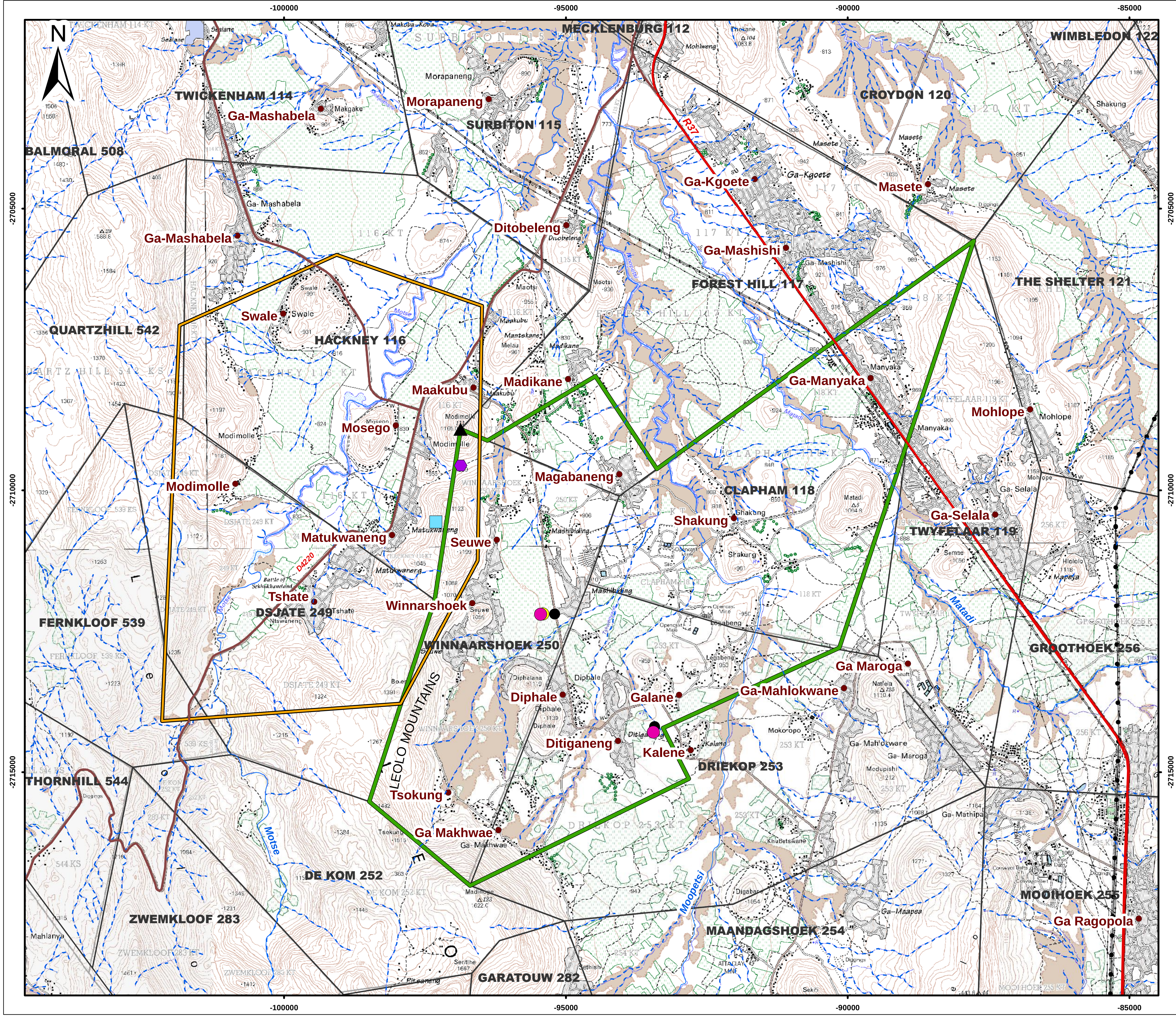
### Infrastructure and servitudes

There are registered and unregistered servitudes on the farms, Driekop 253KT, Clapham 118KT, Winnaarshoek 250KT and Hackney 116KT as detailed below.

- Powerline servitude on Clapham 118 KT (Servitude No. K1921/2005 S – SG Diagram 13542/1997);
- Outspan servitude on the remaining extent of Winnaarshoek 250 KT;.
- Outspan servitudes (two) and Eskom Holdings servitude on Driekop 253 KT;
- There are gravel roads crossing the mine area, which the communities make use of, but no right of way servitudes is registered against the title deeds of the affected properties.

CONCLUSION

Land uses in the surrounding area include mainly residential, mining, and agricultural (subsistence farming and livestock grazing) activities. There are several mining and mining-related activities occurring within the Steelpoort Valley and along R37 between Burgersfort and Polokwane, and no other major surface infrastructure within the MRA. The design of the proposed project components has taken these land uses into account to ensure optimal planning and use of available land. The location of proposed infrastructure was preferred for areas where existing infrastructure could be upgraded. The soil assessment concluded that the proposed project area has low agricultural viability thereby limited cultivation as a land use.




**Legend**

- Marula Mining Right Area
- Existing Ventilation Shafts
- Approved Ventilation Shaft (Not Established Yet)
- Proposed Ventilation Shafts
- Villages / Towns
- Main Roads
- Secondary Roads
- Perennial Rivers
- Non-Perennial Rivers
- Tsjate Provincial Heritage Site
- Perennial Rivers
- Modimolle Sacred Mountain
- Early Iron Age Site
- Sefateng Poort with Communal Grinding Stone and Isivavani
- Farms
- Urban
- Cultivated
- Inland Water and Dams
- Thicket & bushland
- Dongas & Erosion Areas

0 500 1 000 Meters

Scale: 1:65 000 @ A3

Projection: Transverse Mercator

Datum: WGS1984, Lo31

Marula Platinum Mine

**Figure 32**

**Local Land Use**

SLR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| | |
|---|---|
| 710.09002.00016 | 2022/02/02 |

### 7.3.5 DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE

The environmental features in the project area are described in Section 7.3.1 above, however the most notable environmental features are the watercourses which traverse the project area. In particular the main watercourse in the mine area is the Moopetsi River which drains the farm Forest Hill 117KT. The Tshwenyane River is the main tributary of the Moopetsi River which is largely ephemeral which is also located within proximity of the project area.

### 7.3.6 ENVIRONMENT AND CURRENT LAND USE MAP

A conceptual map showing topographical information as well as land uses on and immediately surrounding the Marula Mine area is provided in Section 23.

## 7.4 ENVIRONMENTAL IMPACTS AND RISKS OF ALTERNATIVES

The details of alternatives considered are provided in section 7.1. The project alternatives do not result in any material differences to the project impacts assessed and management measures included in the EMPr.

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

The method used for the assessment of environmental issues is set out in Table 26. This assessment methodology enables the assessment of environmental issues including cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

**Table 26: Impact assessment methodology**

*Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.*

| PART A: DEFINITIONS AND CRITERIA* | | |
|---|---|---|
| **Definition of SIGNIFICANCE** | | **Significance = consequence x probability** |
| **Definition of CONSEQUENCE** | | **Consequence is a function of intensity, spatial extent and duration** |
| **Criteria for ranking of the INTENSITY of environmental impacts** | **VH** | Severe change, disturbance or degradation. Associated with severe consequences. May result in severe illness, injury or death. Targets, limits and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs. |
| | **H** | Prominent change, disturbance or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place. |
| | **M** | Moderate change, disturbance or discomfort. Associated with real but not substantial consequences. Targets, limits and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected. |
| | **L** | Minor (Slight) change, disturbance or nuisance. Associated with minor consequences or deterioration. Targets, limits and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected. |
| | **VL** | Negligible change, disturbance or nuisance. Associated with very minor consequences or deterioration. Targets, limits and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated. |
| | **VL+** | Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range. |
| | **L+** | Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits. |
| | **M+** | Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits. |

| | | |
|---|---|---|
| | **H+** | Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support. |
| | **VH+** | Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected. |
| **Criteria for ranking the DURATION of impacts** | **VL** | Very short, always less than a year. Quickly reversible |
| | **L** | Short-term, occurs for more than 1 but less than 5 years. Reversible over time. |
| | **M** | Medium-term, 5 to 10 years. |
| | **H** | Long term, between 10 and 20 years. (Likely to cease at the end of the operational life of the activity) |
| | **VH** | Very long, permanent, +20 years (Irreversible. Beyond closure) |
| **Criteria for ranking the EXTENT of impacts** | **VL** | A part of the site/property. |
| | **L** | Whole site. |
| | **M** | Beyond the site boundary, affecting immediate neighbours |
| | **H** | Local area, extending far beyond site boundary. |
| | **VH** | Regional/National |

| **PART B: DETERMINING CONSEQUENCE** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | **EXTENT** | | | | |
| | | | A part of the site/property | Whole site | Beyond the site, affecting neighbours | Local area, extending far beyond site. | Regional/ National |
| | | | **VL** | **L** | **M** | **H** | **VH** |
| **INTENSITY = VL** | | | | | | | |
| **DURATION** | Very long | **VH** | Low | Low | Medium | Medium | High |
| | Long term | **H** | Low | Low | Low | Medium | Medium |
| | Medium term | **M** | Very Low | Low | Low | Low | Medium |
| | Short term | **L** | Very low | Very Low | Low | Low | Low |
| | Very short | **VL** | Very low | Very Low | Very Low | Low | Low |
| **INTENSITY = L** | | | | | | | |
| **DURATION** | Very long | **VH** | Medium | Medium | Medium | High | High |
| | Long term | **H** | Low | Medium | Medium | Medium | High |
| | Medium term | **M** | Low | Low | Medium | Medium | Medium |
| | Short term | **L** | Low | Low | Low | Medium | Medium |
| | Very short | **VL** | Very low | Low | Low | Low | Medium |
| **INTENSITY = M** | | | | | | | |
| **DURATION** | Very long | **VH** | Medium | High | High | High | Very High |
| | Long term | **H** | Medium | Medium | Medium | High | High |
| | Medium term | **M** | Medium | Medium | Medium | High | High |
| | Short term | **L** | Low | Medium | Medium | Medium | High |
| | Very short | **VL** | Low | Low | Low | Medium | Medium |
| **INTENSITY = H** | | | | | | | |
| | Very long | **VH** | High | High | High | Very High | Very High |
| | Long term | **H** | Medium | High | High | High | Very High |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **DURATION** | Medium term | **M** | **Medium** | **Medium** | **High** | **High** | **High** |
| | Short term | **L** | **Medium** | **Medium** | **Medium** | **High** | **High** |
| | Very short | **VL** | **Low** | **Medium** | **Medium** | **Medium** | **High** |
| **INTENSITY = VH** | | | | | | | |
| **DURATION** | Very long | **VH** | **High** | **High** | **Very High** | **Very High** | **Very High** |
| | Long term | **H** | **High** | **High** | **High** | **Very High** | **Very High** |
| | Medium term | **M** | **Medium** | **High** | **High** | **High** | **Very High** |
| | Short term | **L** | **Medium** | **Medium** | **High** | **High** | **High** |
| | Very short | **VL** | **Low** | **Medium** | **Medium** | **High** | **High** |

| **PART C: DETERMINING SIGNIFICANCE** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PROBABILITY (of exposure to impacts)** | Definite/ Continuous | **VH** | **Very Low** | **Low** | **Medium** | **High** | **Very High** |
| | Probable | **H** | **Very Low** | **Low** | **Medium** | **High** | **Very High** |
| | Possible/ frequent | **M** | **Very Low** | **Very Low** | **Low** | **Medium** | **High** |
| | Conceivable | **L** | **Insignificant** | **Very Low** | **Low** | **Medium** | **High** |
| | Unlikely/ improbable | **VL** | **Insignificant** | **Insignificant** | **Very Low** | **Low** | **Medium** |
| | | | **VL** | **L** | **M** | **H** | **VH** |
| | | | **CONSEQUENCE** | | | | |

| **PART D: INTERPRETATION OF SIGNIFICANCE** | |
|---|---|
| **Significance** | **Decision guideline** |
| Very High | Potential fatal flaw unless mitigated to lower significance. |
| High | It must have an influence on the decision. Substantial mitigation will be required. |
| Medium | It should have an influence on the decision. Mitigation will be required. |
| Low | Unlikely that it will have a real influence on the decision. Limited mitigation is likely to be required. |
| Very Low | It will not have an influence on the decision. Does not require any mitigation |
| Insignificant | Inconsequential, not requiring any consideration. |

***H = high, M= medium and L= low and + denotes a positive impact.**

## 7.6 POSITIVE AND NEGATIVE IMPACTS OF THE PROPOSED ACTIVITY AND ALTERNATIVES ON THE ENVIRONMENT AND COMMUNITY THAT MAY BE AFFECTED

The site layout and / or infrastructure location alternatives that were considered are detailed in Section 1.1. Impacts assessed for the preferred project alternative are detailed in Appendix D and summarised in Section 11.3.

## 7.7 POSSIBLE MANAGEMENT ACTIONS THAT COULD BE APPLIED AND THE LEVEL OF RISK

### Table 27: Possible management actions and the anticipated level of risk

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| The BAR must reflect the paleontological results as well as whether the SAHRA has accepted the exemption letter or not. | Remedy through chance find procedure | N/A | N/A |
| There is the issue of cracked houses, lack of water supply. My question is how will the mine address dust and cracked houses impacts? | *Air Quality*<br>• Manage through monitoring<br>• Manage through air control measures<br><br>*Groundwater*<br>• Manage through waste management conservation procedures<br>• Remedy through emergency control procedures<br>• Management through design<br><br>*Alteration of Natural Drainage Patterns through the location within watercourses*<br>• Manage through design and stormwater management controls<br>• Remedy through emergency response procedures<br><br>*Contamination of Surface Water Resources*<br>• *Mange through waste conservation procedures*<br>• *Remedy through emergency response procedures* | Low – Medium<br><br>Low (high cumulative)<br><br>Low (High for cumulative) | Low<br><br>Insignificant (low cumulative)<br><br>Very Low (Medium for cumulative) |
| Are there no mitigation measures that can be implemented to ensure that the dust levels from the Tailings Storage Facility (TSF) do not have a | *Air Quality*<br>• Manage through monitoring<br>• Manage through air control measures | Low – Medium | Low |

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| detrimental impact on the surrounding homesteads? | | | |

## 7.8 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

The details of alternatives which were considered and alternatives which could not be considered is provided in Section 6.

## 7.9 STATEMENT MOTIVATING THE PREFERRED ALTERNATIVE

Refer to Section 7.1 for more information regarding the motivation for no alternative considered. It follows that the preferred alternative applies to the project description detailed in Section 3.2.3.

# 8. FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE THROUGH THE LIFE OF THE ACTIVITY

## 8.1 DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY IMPACTS

Biophysical and socio-economic impacts associated with the proposed project were identified through site visits undertaken by the SLR team, review of project description and operational information provided by the Marula team, specialist input and input from I&APs through the public participation process.

### 8.1.1 High-level assessment

A high-level assessment was undertaken by the SLR project team to gain an understanding of the proposed project activities within the context of the existing mine operations and to strengthen SLR's institutional knowledge of the site. An overview of the typical information sources included:

- Description of the proposed activities obtained from the Marula project team;
- Previous environmental and specialist reports undertaken for the Marula Mine;
- Site layout maps of the mine and existing infrastructure; and
- Google Earth imagery of the MRA and adjacent land uses.

### 8.1.2 Engagement with local knowledge

Input into the assessment of impacts included engagement with local knowledge which occurred through collaboration with the Marula project team (including Marula's Stakeholder Engagement Team), engagement with local authorities (competent and commenting) and engagement with project specialists. Opportunities were provided to I&APs to contribute their indigenous knowledge of the area as part of the public participation process. All comments and concerns received were considered in the assessment of impacts where relevant.

### 8.1.3 Site investigations

Site investigations which were undertaken by the following suitably qualified specialists to determine sensitive terrestrial and aquatic habitats and species (faunal and floral), water resources, sensitive communities, and receptors and sensitive or culturally important areas within the project area. Site investigations were undertaken for the following aspects:

- Air quality;
- Noise;
- Soils and land capability;
- Aquatic biodiversity; and
- Terrestrial Biodiversity,

### 8.1.4 Impact Assessment

A description of SLR's assessment methodology which was used to assess the severity of identified impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated, is provided in Section 7.5. The SLR impact assessment methodology was also provided to the specialist team to ensure that impact assessment rankings would be comparable.

## 8.2 A DESCRIPTION OF THE ENVIRONMENTAL IMPACTS AND RISKS IDENTIFIED DURING THE ENVIRONMENTAL ASSESSMENT PROCESS

The table below provides a list of potential impacts.

**Table 28: List of potential impacts as they related to the proposed project**

| Potential impact | Activity | Project phases |
|---|---|---|
| • Hazardous excavations and infrastructure resulting in safety risks to third parties and animals | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site) | • Construction<br>• Operational<br>• Decommissioning |
| • Loss of soil resources and land capability through contamination | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |
| • Loss of soil resources and land capability through physical disturbance | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |

<table>
<tr><th>Potential impact</th><th>Activity</th><th>Project phases</th></tr>
<tr><td></td><td>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas</td><td></td></tr>
<tr><td>• Physical destruction of terrestrial biodiversity, affecting habitat, species diversity and SCC</td><td rowspan="3">• Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas</td><td>• Construction<br>• Operational<br>• Decommissioning<br>• Closure</td></tr>
<tr><td>• General disturbance of biodiversity</td><td>• Construction<br>• Operational<br>• Decommissioning<br>• Closure</td></tr>
<tr><td>• Destruction and disturbance of aquatic biodiversity</td><td>• Construction<br>• Operational<br>• Decommissioning<br>• Closure</td></tr>
<tr><td>• Alteration of surface drainage patterns</td><td>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas</td><td>• Construction<br>• Operational<br>• Decommissioning<br>• Closure</td></tr>
<tr><td>• Contamination of surface water resources</td><td>• Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation</td><td>• Construction<br>• Operational<br>• Decommissioning<br>• Closure</td></tr>
</table>

| Potential impact | Activity | Project phases |
|---|---|---|
| | • Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | |
| • Contamination of groundwater resources | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |
| • Positive impact of the implementation of remediation measures to reduce the ug tailings contamination plume | • Rehabilitation, maintenance and aftercare | • Operational<br>• Decommissioning<br>• Closure |
| • Air pollution | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |

| Potential impact | Activity | Project phases |
|---|---|---|
| | • Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | |
| • Increase in disturbing noise levels | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Construction<br>• Operational<br>• Decommissioning |
| • Road disturbance and traffic safety | • Transport systems | • Construction<br>• Operational<br>• Decommissioning |
| • Visual impacts | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site) | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |

| Potential impact | Activity | Project phases |
|---|---|---|
| | • Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | |
| • Loss of heritage and palaeontological resources | Not applicable | Not applicable |
| • Economic impacts | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |
| • Inward migration | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |

| Potential impact | Activity | Project phases |
|---|---|---|
| | • Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | |
| • Change in land uses | • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Construction<br>• Operational<br>• Decommissioning<br>• Closure |

## 8.3 ASSESSMENT OF THE SIGNIFICANCE OF EACH IMPACT AND RISK AND AN INDICATION OF THE EXTENT OF TO WHICH THE ISSUE AND RISK CAN BE AVOIDED OR ADDRESSED BY THE ADOPTION OF MANAGEMENT ACTIONS

The assessment of the significance of potential biophysical, cultural and socio-economic impacts, including the extent to which impacts can be avoided or mitigated, is included in Section 9 and Appendix D.

# 9. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

A summary of the assessment of the biophysical and socio-economic impacts associated with the proposed project is provided in Table 29 below. A full description of the assessment is included in Appendix D.

**Table 29: Assessment of significant impacts and risks**

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines | Hazardous excavations and infrastructure resulting in safety risks to third parties and animals. | Topography | • Construction<br>• Operation<br>• Decommissioning | High (incremental and cumulative) | • Manage through access control | • Very Low (incremental)<br>• High (cumulative) | • Permanent injury or death cannot be reversed.<br>• High as mitigation measures should achieve impact avoidance.<br>• Permanent injury or death would be an irreplaceable loss.<br>• High as mitigation measures should achieve impact avoidance. |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | Loss of soil resources and land capability through contamination | Soil and land capability | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Medium (incrementally)<br>• High (cumulative) | • Manage though soil conservation management plans<br>• Manage through waste management procedures<br>• Remedy through emergency response procedure | • Low (incrementally and cumulatively) | • Possible with mitigation.<br>• Possible with mitigation.<br>• Possible, where mitigation measures are not correctly implemented.<br>• High as mitigation measures should achieve avoidance |
| | Loss of soil resources and land capability through physical disturbance | Soil and land capability | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Medium (incrementally)<br>• High (cumulative) | | • Very low (incrementally)<br>• Low (cumulative) | • Possible to reverse impact with mitigation.<br>• Possible to avoid impact with mitigation<br>• Possible to cause irreplaceable loss, where mitigation measures are not correctly implemented.<br>• High as mitigation measures should achieve avoidance |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | Physical destruction of biodiversity affecting habitat, species diversity and SCC | Biodiversity | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Medium (High for cumulative) | • Manage though soil conservation management plants<br>• Manage through waste management procedures<br>• Remedy through emergency response procedure | • Low (Medium for cumulative)<br>• Very Low (closure for incremental) | • Unlikely to be reversed until the closure phase with focus on rehabilitation.<br>• Although the area of disturbance will be minimised, habitat will be lost due to the establishment of surface infrastructure. Therefore, impact avoidance is unlikely even with mitigation.<br>• Irreplaceable loss where mitigation measures are not correctly implemented.<br>• Medium until the closure phase which focusses on rehabilitation and restoration of habitats. |
| | General disturbance of biodiversity | | | • Low (high cumulative) | • Management through prohibiting collection of biodiversity by contractors<br>• Mange through implementation of noise and dust measures | • Very low (medium cumulative) | • Serious injury or killing of species cannot be reversed.<br>• While some types of disturbance can be avoided e.g. harvesting of species, others such as lighting, noise and vibration disturbance are unlikely to be totally avoided.<br>• Likely where mitigation measures are not correctly implemented and protected, threatened and vulnerable species are lost within the project area of influence.<br>• Medium degree to which impact can be mitigated. |
| | General and physical destruction of aquatic environments | | | • Low (Medium cumulative) | • Management through limiting project footprint<br>• Management through waste management procedures<br>• Remedy through rehabilitation | • Very low (Low cumulative) | • Serious injury or killing of species cannot be reversed.<br>• While some types of disturbance can be avoided e.g. harvesting of species, others such as lighting, noise and vibration disturbance are unlikely to be totally avoided.<br>• Likely where mitigation measures are not correctly implemented and protected, threatened and vulnerable species are lost within the project area of influence.<br>• Medium degree to which impact can be mitigated. |
| • Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Alteration of surface drainage patterns | Surface water | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Low (high cumulative) | • Manage through design and stormwater management controls<br>• Remedy through emergency response procedures | • Insignificant (low cumulative) | • Impact is likely to be reversed with mitigation.<br>• The impact can fully be avoided.<br>• Low possibility to cause loss due to the limited infrastructure footprint when compared to the catchment area.<br>• High as mitigation measures should achieve avoidance. |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Contamination of surface water resources | Surface water | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Low (High for cumulative) | • Mange through waste conservation procedures<br>• Remedy through emergency response procedures | • Very Low (Medium for cumulative) | • Likely to be reversed with mitigation.<br>• Likely to be avoided with mitigation.<br>• Irreplaceable loss where mitigation measures are not correctly implemented.<br>• High as mitigation measures should achieve avoidance. |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Contamination of groundwater resources | Groundwater | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • High (High cumulative) | • Manage through waste management conservation procedures<br>• Remedy through emergency control procedures<br>• Management through design | • Low (Medium cumulative) | • Likely to be reversed with mitigation.<br>• Likely to be avoided with mitigation.<br>• Irreplaceable loss where mitigation measures are not correctly implemented.<br>• High as mitigation measures should achieve avoidance. |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | | | | |
| • Rehabilitation, maintenance and aftercare | • Positive impact of the implementation of remediation measures to reduce the ug tailings contamination plume | Groundwater | • Operation<br>• Decommissioning<br>• Closure | • Medium+ (incremental and cumulative) | • Management through rehabilitation | • High+(incremental and cumulative) | • This is a positive impact.<br>• This is a positive impact.<br>• Possible where mitigation measures are not correctly implemented.<br>• High degree of mitigation |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Air pollution | Air quality | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Low – Medium | • Manage through monitoring<br>• Manage through air control measures | • Low | • Likely to be reversed with mitigation.<br>• Likely to be avoided with mitigation.<br>• Not likely to cause irreplaceable loss.<br>• High as mitigation measures should achieve avoidance. |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Operation of ventilation shafts and refrigeration infrastructure | • Increase in disturbing noise levels | Noise | • Construction<br>• Operation<br>• decommissioning | • Medium (construction and decommissioning)<br>• High (operation) | • Management through noise attenuation measures<br>• Management through monitoring | • Very Low (construction and decommissioning)<br>• Medium (operation)<br>• Medium (cumulative) | • Impact can only be reversed at the closure phase when mining related activities cease and all infrastructure has been removed from site.<br>• Impact cannot be avoided until closure when mining related activities cease.<br>• Impact cannot cause irreplaceable loss |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Demolition (removal of infrastructure from site)<br>• Rehabilitation | | | | • High (cumulative) | | | • Even with mitigation measures, IFC guideline limits will be exceeded at sensitive receptors, particularly in the operational phase. |
| • Transport systems | • Road disturbance and traffic safety | Traffic | • Construction<br>• Operation<br>• Decommissioning<br>• | • High (incremental and cumulative) | • Manage through transport system procedures | • Medium (incremental and cumulative) | • Permanent injury or death cannot be reversed.<br>• High as mitigation measures should achieve impact avoidance.<br>• Permanent injury or death would be an irreplaceable loss.<br>• High as mitigation measures should achieve impact avoidance. |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrade<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Visual impacts | Visual | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Medium | • Management through limiting a projects footprint<br>• Management through design<br>• Remedy through rehabilitation | • Very Low | • Low possibility of being reversed until closure.<br>• Low, the impact cannot be avoided, but mitigation measures can reduce the significance of the impact during the operational phase.<br>• Unlikely to cause irreplaceable loss.<br>• High as mitigation measures should achieve reduction of the impact. |
| • N/A | • Loss of heritage and palaeontological resources | Heritage and palaeontologic al resources | • • N/A | • N/A | • Remedy through chance find procedure | • N/A | • N/A |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation | • Economic impacts | Socio-economic | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Medium + (incremental and cumulative) | • Manage through procurement policies | • Medium + (incremental and cumulative) | • Not Applicable. This is a positive impact.<br>• Not Applicable. This is a positive impact.<br>• Not Applicable. This is a positive impact.<br>• Not Applicable. This is a positive impact. |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Inward migration | Socio-economic | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Low (incremental)<br>• Medium (cumulative) | • Management through social policies and procedures<br>• Remedy through emergency procedures | • Low (incremental)<br>• Medium/Low (cumulative) | • Likely to be reversed with mitigation.<br>• Likely to be avoided with mitigation.<br>• Possible where mitigation measures are not correctly implemented.<br>• High degree with mitigation |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure | • Change in land uses | Land use | • Construction<br>• Operation | • Medium (incremental) | • Management through loss of land through compensation | • Low (incremental)<br>• Medium (cumulative) | • Likely to be reversed with mitigation.<br>• Likely to be avoided with mitigation. |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided, or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|---|---|---|---|---|---|
| • Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | • Decommissioning<br>• Closure | • High (cumulative) | • Remedy through rehabilitation | | • Possible where mitigation measures are not correctly implemented<br>• Medium degree with mitigation. |

# 10. SUMMARY OF SPECIALIST REPORT FINDINGS

The relevant specialist studies that were undertaken as part of the project including the recommendations made by the specialists are summarised in Table 30 below. All relevant specialist reports have been attached in the appendices to this report.

**Table 30: Summary of specialist recommendations**

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| Air quality | • The main findings from the air quality impact assessment are:<br>○ Historic dust fallout data at the mine indicates compliance with the NDCR. The dust fallout from the vents were not assessed as only Tier 1 modelling was undertaken[3]. The proposed vents, however, will not result in significant dust fallout.<br>○ Simulated ambient criteria pollutant ($PM_{10}$ and $PM_{2.5}$) concentrations were below the National Ambient Air Quality Standards (NAAQS) at all the nearby air quality sensitive receptors.<br>• Recommended management measures:<br>○ It is recommended that the mine continues with the dust fallout monitoring.<br>• Specialist opinion: The proposed new ventilation shafts may be authorised. | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |
| Noise Study | • For general activities, the following good engineering practice should be applied to all project phases:<br>○ Equipment with lower sound power levels must be selected. Vendors should be required to guarantee optimised equipment design noise levels.<br>○ Where possible, other non-routine noisy activities such as construction, decommissioning, start-up and maintenance, should be limited to day-time hours.<br>○ A noise complaints register must be kept.<br>• The specifications and equipment design and enclosures include: | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |

[3] Tier 1 models are only able to simulate highest hourly ground level concentrations.

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | ○ Equipment to be employed should be reviewed to ensure the quietest available technology is used. Equipment with lower sound power levels must be selected in such instances and vendors/contractors should be required to guarantee optimised equipment design noise levels;<br>○ As far as is practically possible, sources of significant noise should be enclosed. The extent of enclosure will depend on the nature of the machine and their ventilation requirements. Pumps and motors are examples of such equipment;<br>○ The compressors will also be enclosed in the refrigeration plant building. This will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses;<br>○ It should be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise should be directed into a partial enclosure and not out of it, there should not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure.<br>• The use and sitting of equipment and noise sources:<br>○ As far as is practically possible, sources of significant noise should be enclosed. The extent of enclosure will depend on the nature of the machine and their ventilation requirements. Pumps and motors are examples of such equipment;<br>○ The compressors will also be enclosed in the refrigeration plant building. This will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses;<br>○ It should be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise should be directed into a partial enclosure and not out of it, there should not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure;<br>○ Regular and effective maintenance of equipment are essential to noise control. Increases in equipment noise are often indicative of eminent mechanical failure. Also, sound reducing equipment/materials can lose effectiveness before failure and can be identified by visual inspection.<br>• Implement the monitoring programme as outlined in Section 28.<br>• In terms of controlling the spread of noise using barriers or berms the following applies: | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | ○ If noise can be controlled at the source to meet IFC guidelines at the NSR, then no further attenuation measures will be required. However, if IFC guidelines are still exceeded at the NSR after source attenuation has been implemented, noise reduction screens, barriers, or berms must be installed.<br>○ The effectiveness of a noise barrier is dependent on its length, effective height, and position relative to the source and receiver as well as material of construction. To optimize the effect of screening, screens should be located close (within 50 m) to either the source of the noise, or the receiver.<br>○ The careful placement of barriers such as screens or berms can significantly reduce noise impacts but may result in additional visual impacts. Although vegetation such as shrubs or trees may improve the visual impact of construction sites, it will not significantly reduce noise impacts and should not be considered as a control measure.<br>○ Earth berms can be built to provide screening for large scale earth moving operations and can be landscaped to become permanent features once construction is completed. Care should be taken when constructing earth berms since it may become a significant source dust.<br>• If exceedances of IFC guidelines are measured at the NSR, the following earth berm construction is recommended:<br>• Clapham Shaft Complex:<br>○ Height of earth berm preferably 10 m<br>○ Constructed not more than 50 m from the main noise sources at the Clapham Shaft Complex<br>• Driekop Shaft Complex:<br>○ Height of earth berm preferably 15 m<br>○ Constructed not more than 50 m from the main noise sources at the Driekop Shaft Complex<br>○ Berms can be constructed from waste rock material. It is recommended that noise sampling be undertaken at the NSRs once the berm is constructed to understand the effectiveness of the noise barrier. If IFC guidelines are still exceeded, the berm should be covered with topsoil and then vegetated. The vegetated berms will reduce their acoustic “hardness” and increase their attenuation potential. An unvegetated berm constructed solely from waste rock could compound impacts by reflecting noise. | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | • Specialist opinion: Provided the recommended management and mitigation measures are in place, it is the specialist opinion that the project may be authorised. | | |
| Soils and land capability | • Key recommended mitigation measures:<br>○ The project operations be kept within the demarcated footprint areas which must be well defined;<br>○ Bare soils within the access roads should be regularly dampened with water to suppress dust during the construction phase, especially when strong wind conditions are predicted according to the local weather forecast;<br>○ A soil monitoring programme should be initiated within the access roads and adjacent areas to ascertain whether the dust suppression has an impact on the soil chemistry; and<br>○ Soil Compaction is usually greatest when soils are moist. Therefore, soils should be stripped when moisture content is as low as possible. If soil must be moved when wet, truck and shovel should be used as bowl scrapers create excessive compaction when moving wet soils.<br>• Specialist opinion: From a soil and land capability point of view, this project is not regarded as being fatally flawed due to various inherent soil constraints for commercial agricultural production, however mitigation measures and recommendations outlined in this document need to be strongly considered and implemented accordingly in efforts to conserve soil resources. | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |
| Watercourse Assessment | • All development footprint areas should remain as small as possible and should not encroach into the freshwater areas unless essential and part of the proposed development. It must be ensured that the freshwater habitat is off-limits to construction vehicles and non-essential personnel;<br>• The boundaries of footprint areas, including contractor laydown areas, are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. Edge effects will need to be extremely carefully controlled;<br>• Planning of temporary roads and access routes should avoid freshwater areas and be restricted to existing roads where possible;<br>• Appropriate sanitary facilities must be provided for the life of the pre-construction and construction phase and all waste removed to an appropriate waste facility; | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | • All hazardous chemicals as well as stockpiles should be stored on bunded surfaces and have facilities constructed to control runoff from these areas;<br>• It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage;<br>• No fires should be permitted in or near the construction area;<br>• Ensuring that an adequate number of waste and "spill" bins are provided will also prevent litter and ensure the proper disposal of waste and spills;<br>• All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into the topsoil;<br>• In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss;<br>• All spills should they occur, should be immediately cleaned up and treated accordingly.<br>• Proliferation of alien and invasive species is expected within any disturbed areas. Whilst not considered severe at this time, the vegetation component within the freshwater environment is already transformed to an extent because of alien plant invasion; therefore, these species should be eradicated and controlled to prevent their spread beyond the project footprint;<br>• Removal of the alien and weed species encountered within the freshwater resources must take place to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational, and maintenance phases;<br>• Species specific and area specific eradication recommendations:<br>• Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;<br>• Footprint areas should be kept as small as possible when removing alien plant species;<br>• No vehicles should be allowed to drive through designated sensitive wetland areas during the eradication of alien and weed species; | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | • Sheet runoff from access roads should be slowed down by the strategic placement of berms;<br>• As far as possible, all construction activities should occur in the low flow season, during the drier winter months;<br>• As much vegetation growth as possible (of indigenous floral species) should be encouraged to protect soils;<br>• No stockpiling of topsoils is to take place within close proximity to the river, and all stockpiles must be protected with a suitable geotextile to prevent sedimentation of the river;<br>• All soils compacted as a result of construction activities as well as ongoing operational activities falling outside of project footprint areas should be ripped and profiled; and<br>• A monitoring plan for the development and the immediate zone of influence should be implemented to prevent erosion and incision.<br>• The following management actions need to be implemented during the decommissioning and closure phase:<br>○ Construction rubble must be collected and disposed of at a suitable landfill site;<br>○ All soils compacted because of construction activities falling outside of project footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat;<br>○ Rehabilitate all drainage line and riparian habitat areas to ensure that the ecology of these areas is re-instated during all phases;<br>○ Edge effects of activities including erosion and alien/ weed control need to be strictly managed in these areas;<br>○ As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months;<br>○ As much vegetation growth as possible should be promoted within the proposed development area to protect soils;<br>○ All alien vegetation in the riparian zone should be removed upon completion of construction and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist); | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | ○ All areas affected by construction should be rehabilitated upon completion of the construction phase of the development;<br>○ Bank vegetation cover should be monitored to ensure that sufficient vegetation is present to bind the bankside soils and prevent bankside erosion and incision; and<br>○ All alien vegetation in the footprint area as well as immediate vicinity of the proposed development activities should be removed. Alien vegetation control should take place for a minimum period of two growing seasons after rehabilitation is completed.<br>• Specialist opinion: Therefore, it is in the opinion of the specialist that the proposed product stockpile, ventilation shafts and related infrastructure, water pipelines, and powerlines are acceptable for authorisation, provided that the mitigation measures stipulated in this report are implemented. | | |
| Terrestrial biodiversity - Flora | • Recommended management measures:<br>○ Minimise loss of indigenous vegetation where possible through adequate planning and, where necessary, by incorporating the sensitivity of the biodiversity report as well as other specialist studies;<br>○ Prior to the commencement of construction activities, an Alien and Invasive Plant (AIP) Management/Control Plan should be compiled for implementation:<br>- Removal of AIPs should preferably commence during the pre-construction phase and continue throughout the construction and operational phases. AIPs should be cleared within the study area before any vegetation clearing activities commence, thereby ensuring that no AIP propagules are spread with construction rubble, or soils contaminated with AIP seeds during the construction phase;<br>- An AIP Management/Control Plan should be implemented by a qualified professional. No use of uncertified chemicals may be used for chemical control of AIPs. Only trained personnel are to use chemical and mechanical control methods of AIPs. Chemical control may not be used within the Watercourse Habitat.<br>- Species protected under NFA and Schedule 12 of the Limpopo Environmental Management Act, 2003 (Act No 7 of 2003) were recorded on site. Suitable habitat for such species is present, especially in the within the Degraded Bushveld and Rocky Habitats. A walkdown of the footprint | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | area is required before construction activities commence where anticipated floral SCC/protected species are searched and marked (if encountered);<br>- If SCC/protected species are encountered and will be affected by the construction activities, these species must be marked and where possible, relocated to suitable habitat surrounding the disturbance footprint. Suitable habitat is available in nearby surrounding locations. A licence from the DFFE is required for the removal of NFA protected tree species (*Boscia albutruncia*). For the removal, destruction, or relocation of protected flora in terms of the LEMA (Schedules 11 and 12), a license is required from the Department of Economic. Development, Environment & Tourism (LEDET);<br>- The construction footprint must be kept as small as possible in order to minimise impact on the surrounding environment (edge effect management);<br>- Removal of vegetation must be restricted to what is absolutely necessary and should remain within the approved development footprint;<br>- Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimal; and<br>- No collection of indigenous floral species must be allowed by construction personnel, especially with regards to floral SCC (if encountered).<br>○ Care should be taken during the construction and operation of the proposed development to limit edge effects to surrounding natural habitat. This can be achieved by:<br>- Demarcating all footprint areas during construction activities;<br>- No construction rubble or cleared alien invasive species are to be disposed of outside of demarcated areas, and should be taken to a registered waste disposal facility;<br>- All soils compacted as a result of construction activities should be ripped and profiled and reseeded; | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | - Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. Specific mention in this regard is made to Category 1b and 2 species identified within the development footprint areas (refer to section 2.7.3 of this report); and<br>- No dumping of litter, rubble or cleared vegetation on site should be allowed. Infrastructure and rubble removed as a result of the construction activities should be disposed of at an appropriate registered dump site away from the development footprint. No temporary dump sites should be allowed in areas with natural vegetation. Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility.<br>○ If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil;<br>○ Upon completion of construction activities, it must be ensured that no bare areas remain, and that indigenous species be used to revegetate the disturbed area;<br>○ Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b and 2 AIP species (as listed in the NEMBA Alien species lists, 2020), in line with the NEMBA Alien and Invasive Species Regulations (2014);<br>○ Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the construction and operational phase of the development, and a 30 m buffer surrounding the study area should be regularly checked for AIP proliferation and to prevent spread into surrounding natural areas;<br>○ Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility which complies with legal standards;<br>○ No collection of floral SCC must be allowed by construction personnel; | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | ○ Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area;<br>○ No illicit fires must be allowed during the construction of the proposed development;<br>○ Rehabilitation of natural vegetation should proceed in accordance with the rehabilitation plan – concurrent rehabilitation is recommended. This rehabilitation plan should consider all phases of the project indicating rehabilitation actions to be undertaken during and once construction has been completed, ongoing rehabilitation during the operational phase of the project as well as rehabilitation actions to be undertaken after operations have ceased;<br>○ Any natural areas beyond the direct footprint, which have been affected by the construction or operational activities, must be rehabilitated using indigenous species;<br>○ Floral monitoring should be done annually during operational activities;<br>○ Rehabilitation must be implemented concurrently as per the rehabilitation plan, and disturbed areas must be rehabilitated as soon as such areas become available. This will not only reduce the total disturbance footprint but will also reduce the overall rehabilitation effort and costs associated with it;<br>○ All soils compacted because of construction activities falling outside of the project area should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas;<br>○ No additional habitat is to be disturbed during the operational phase of the development;<br>○ No vehicles are allowed to indiscriminately drive through sensitive habitat and natural areas;<br>○ No dumping of litter must be allowed on-site.<br>○ Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the operational phase, and the project perimeters should be regularly checked for AIP establishment to prevent spread into surrounding natural areas;<br>○ As far as possible, no collection of floral SCC/protected or medicinal floral species within the study area or adjacent natural habitat must be allowed during the decommissioning and closure phase of the proposed development; | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | ○ Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC/protected species or suitable habitat for such species outside of the proposed development footprint;<br>○ All infrastructure and footprint areas should be rehabilitated in accordance with the rehabilitation plan;<br>○ All rehabilitated areas should be rehabilitated to a point where natural processes will allow the ecological functioning and biodiversity of the area to be re-instated;<br>○ Edge effects such as erosion and AIP proliferation, which may affect adjacent or downstream sensitive habitat, need to be strictly managed adjacent to the footprint areas and as part of the rehabilitation phase;<br>○ Ongoing alien and invasive vegetation monitoring and clearance should take place throughout the rehabilitation phase of the project;<br>○ Due to the impacts on ESA 1, ESA 2 and an endangered ecosystem, rehabilitation must be to the pre-mined condition. Where possible, vegetation condition should be improved through bush encroachment and AIP management; and<br>○ Monitoring of rescued and relocated floral SCC should continue during the Decommissioning & Closure Phase until it is evident that the species have successfully established. Where possible, these species should be reintroduced into rehabilitation sites.<br>• Specialist opinion: The impacts arising from the proposed development are predominantly medium. With mitigation measures fully implemented, it is the opinion of the specialist that all impacts can be effectively reduced to low and insignificant levels. | | |
| Terrestrial biodiversity – Fauna | • Recommended management measures:<br>○ Faunal Habitat and Diversity<br>- At all times, ensure that sound environmental management is in place during the planning phase;<br>- Minimise loss of indigenous vegetation where possible through refining the final development footprint, optimising the design within habitat of lowered ecological importance and sensitivity; and | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | - Design of infrastructure should be environmentally sound and all construction equipment to be utilised must be a good working condition, and all possible precautions taken to prevent potential spills and /or leaks.<br>○ Development footprint<br>- The development footprint should be demarcated, and it should be ensured that no development related activities take place outside of the demarcated footprint;<br>- Faunal habitat beyond the demarcated area should not be altered;<br>- Construction equipment should be restricted to travelling only on designated roadways to limit the ecological footprint of the development activities. Additional road construction should be limited to what is absolutely necessary, and the footprint thereof kept to a minimal;<br>- No dumping of litter, rubble or cleared vegetation on site should be allowed. As such it is advised vegetation cuttings (especially AIP) to be carefully collected and disposed of at a separate waste facility;<br>- No illicit fires must be allowed during the construction phase of the proposed development.<br>- If any pollutant spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder floral rehabilitation later down the line and faunal recolonization. In the event of a breakdown, maintenance of vehicles must take place with care, and the collection of spillages should be practised preventing the ingress of hydrocarbons into the topsoil;<br>- Anti-collision devices should be installed along the entire length of the powerline.<br>- These must be Eskom approved anti-collision devices that are durable as the area is prone to strong winds. Anti-collision devices must be installed as soon as the wires are strung. The devices must be installed 5m apart and alternate between a light and dark colour in order to increase the visibility of the wires.<br>- Any structures which may act as perching sites for birds should be installed with anti-perching spikes;<br>- Excavated topsoil must be stored with associated native vegetation debris for subsequent use in rehabilitation; | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | - An AIP control plan must be developed for the site and must include ongoing alien and invasive plant monitoring and clearing/control throughout all phases of the development;<br>- Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which comply with legal standards;<br>- During the site-pegging phase of surface infrastructure, should any faunal SCC (albeit considered unlikely) be observed, all activities should be halted, and a suitably qualified specialist is to be contact to advise on the best way forward;<br>- Edge effect control needs to be implemented to ensure no further degradation and potential loss of faunal habitat outside of the proposed project footprint areas occurs; and<br>- Smaller species such as scorpions and reptiles are likely to be less mobile during the colder periods of the year, as such should any be observed in the footprint sites during clearing and operational activities, they are to be carefully and safely moved to an area of similar habitat outside of the disturbance footprint. Construction personnel are to be educated about these species and the need for their conservation. Smaller scorpion species and harmless reptiles should be carefully relocated by a suitably nominated construction person or staff member. For larger venomous snakes, a suitably trained official or specialist should be contacted to affect the relocation of the species, should it not move off on its own.<br>- All vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the development activities;<br>- No litter or cleared plant material should be dumped or allowed to remain on-site. As such it is advised that vegetation cuttings to be carefully collected and disposed of at a separate waste facility;<br>- Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the operational phase, and the project perimeters should be regularly checked for AIP establishment to prevent spread into surrounding natural areas which may alter the suitability of the habitat to avifaunal species; | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIR (mark with an x) | Reference to applicable section in this report |
|---|---|---|---|
| | - Where bare soils are left exposed as a result of construction activities, they should be immediately rehabilitated. Rehabilitated efforts should continue to be monitored throughout the operational phase, until natural processes will allow the ecological functioning and biodiversity of the area to be re-instated;<br>- No hunting/trapping or collecting of faunal species is allowed; and<br>- Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which comply with legal standards.<br>• Specialist opinion: The proposed activities are not anticipated to transform or destroy sensitive areas or large portions of habitat and are not likely to result in changes to the faunal diversity or abundances within the study area. | | |
| Heritage/ cultural | • None of the heritage resources documented in the Heritage Study report will be affected by the proposed Marula Project. Marula should implement a chance find procedure.<br>• Specialist opinion: The Marula Project will have no direct or indirect impact on any of the heritage resources which have been mapped. All heritage resources occur at safe distances from the various developmental components of the Marula Project. There is consequently no reason from a heritage point of view why the Marula Project cannot proceed if the mitigation and management measures recommended. | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |
| Palaeontology | • Specialist opinion: There is no chance of any impact on the South African fossil heritage from this project because the overlying Quaternary alluvium and soils located within the project area are a product of weathering and no not preserve fossils. An exemption from a palaeontological impact assessment is required for this project. As far as the palaeontology is concerned, the project may proceed. | X | Section 8.3<br>Section 9<br>Section 11<br>Appendix D |

# 11. ENVIRONMENTAL IMPACT STATEMENT

## 11.1SUMMARY OF KEY FINDINGS

This section provides a summary of the findings as part of the proposed project and assessed potential impacts on the receiving environment in both the unmitigated and mitigated scenarios, including cumulative impacts. A summary of the potential impacts associated with the preferred alternative in the unmitigated and mitigated scenarios for all project phases is included in Table 31.

The assessment of the proposed project presents the potential for negative impacts to occur (in the unmitigated scenario in particular) on the biophysical, cultural, and socio-economic environments both on the project site and in the surrounding area. With management actions these potential impacts can be prevented or reduced to acceptable levels. It follows that provided the EMPr is effectively implemented there is no biophysical, social or economic reason why the project should not proceed.

**Table 31: Summary of potential impacts**

| Aspect | Potential impact | Cumulative impact significance of the impact (The ratings are negative unless otherwise specified) | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| Topography | Hazardous excavations and infrastructure resulting in safety to third parties and animals | High (incremental and cumulative) | Very Low (incremental)<br>High (cumulative) |
| Soil and land capability | Loss of Soil Resources and Land Capability Through Contamination | Medium (incrementally)<br>High (cumulative) | Low (incrementally and cumulatively) |
| | Loss of Soil Resources and Land Capability Through Physical Disturbance | Medium (incrementally)<br>High (cumulative) | Very low (incrementally)<br>Low (cumulative) |
| Biodiversity | Physical destruction of biodiversity affecting habitat, species diversity and SCC | Medium (High for cumulative) | Low (Medium for cumulative) |
| | General disturbance of biodiversity | Low (high cumulative) | Very low (medium cumulative) |
| | General and physical destruction of aquatic environments | Low (Medium cumulative) | Very low (Low cumulative) |
| Surface water resources | Alteration of Natural Drainage Patterns through the location within watercourses | Low (high cumulative) | Insignificant (low cumulative) |
| | Contamination of Surface Water Resources | Low (High for cumulative) | Very Low (Medium for cumulative) |
| Groundwater | Contamination of Groundwater Resources | High (High cumulative) | Low (Medium cumulative) |
| Air Quality | Air Pollution | Low – Medium | Low |

| Aspect | Potential impact | Cumulative impact significance of the impact (The ratings are negative unless otherwise specified) | |
|---|---|---|---|
| | | Unmitigated | Mitigated |
| Noise | Increase in disturbing noise levels | Medium (construction and decommissioning)<br>High (operation)<br>High (cumulative) | Very Low (construction and decommissioning)<br>Medium (operation)<br>Medium (cumulative) |
| Visual | Visual Impacts | Medium | Very Low |
| Traffic | Road Disturbance and Traffic Safety | High (incremental and cumulative) | Medium (incremental and cumulative) |
| Cultural/heritage and palaeontological resources | Loss of heritage and palaeontological resources | N/A | N/A |
| Socio-economic | Economic impacts | Medium + (incremental and cumulative) | Medium + (incremental and cumulative) |
| Land use | Change in land uses | Medium (incremental)<br>High (cumulative) | Low (incremental)<br>Medium (cumulative) |

## 11.2 FINAL SITE MAP

A site map depicting the final layout (contingent of approval of this application) is shown in Figure 9.

## 11.3 SUMMARY OF THE POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES

The potential positive and negative impacts due to the proposed activity are summarised above in section 11.1.

# 12. IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES FOR INCLUSION IN THE EMPR

## 12.1PROPOSED MANAGEMENT OBJECTIVES AND OUTCOMES FOR ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

Specific environmental objectives to control, remedy or prevent potential impacts emanating from the proposed project are provided in Table 32 below.

**Table 32: Environmental objectives and outcomes**

| Aspect | Environmental objective | Outcome |
|---|---|---|
| Topography | The objective is to prevent physical harm to third parties and animals from potentially hazardous excavations and infrastructure. | Limit the alteration of the topography during mining and through rehabilitation. |
| Soil and land capability | To minimise the loss of soil resources and related land capability through physical disturbance, erosion, compaction, and soil pollution. | Handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability. |
| Biodiversity | To prevent the unacceptable disturbance and loss of biodiversity and related ecosystem functionality through physical and general disturbance. | Limit the area of disturbance as far as practically possible. |
| Surface water | To minimise unacceptable alteration of drainage patterns and related reduction of downstream surface water flow and pollution of surface water resources | Ensure that the reduction of the volume of runoff into the downstream catchment is limited to what is necessary and that natural drainage patterns are re-established as part of rehabilitation in order to prevent unacceptable alteration of drainage patterns and related reduction of downstream surface water flow. To ensure that potential contaminates does not reach nearby watercourses. |
| Groundwater | To minimise the contamination of groundwater resources and related harm to water users | Ensure groundwater quality remains within acceptable limits for both domestic and agricultural purposes. |
| Air | To prevent air pollution health impacts. | Ensure that any pollutants emitted as a result of the project remains within acceptable limits so as to prevent health related impacts. |
| Noise | To prevent public exposure to disturbing noise. | Ensure that any noise generated as a result of the project remains within acceptable limits to avoid the disturbance of third parties. |
| Visual | To limit negative visual impacts. | Limit negative visual views. |

| Aspect | Environmental objective | Outcome |
|---|---|---|
| Traffic | To prevent transport related accidents and/or injury to people and livestock. | Ensure the mine's use of public roads is done in a responsible manner to reduce the potential for safety and vehicle related impacts on road users. |
| Heritage and cultural | To minimise the disturbance of heritage resources. | Protect heritage resources where possible.<br>If disturbance is unavoidable, then mitigate impact in consultation with a specialist and the SAHRA and in line with regulatory requirements. |
| Socio-economic | To enhance the positive economic impacts and limit the negative economic impacts. Part of this objective is to enhance the contribution to the local economy.<br><br>To limit inward migration and related social impacts and enhance positive economic impacts. | Work with existing structures and organisations to establish and maintain a good working relationship with surrounding communities, local authorities, and landowners in order to limit the impacts associated with inward migration. Enhance the positive economic impacts by working together with existing structures and organisations. |
| Land uses | To prevent unacceptable negative impacts on surrounding land uses. | Minimise the impact on land uses as little as possible in order to prevent unacceptable impacts on surrounding land uses and their economic activity. |

### 12.1.1 IMPACTS THAT REQUIRE MONITORING PROGRAMMES

Refer to Section 28.

### 12.1.2 ACTIVITIES AND INFRASTRUCTURE

The source activities of potential impacts which require management are detailed in Section 3.2.4 and include:

- General site management;
- Site preparation;
- Earthworks;
- Civil works;
- Underground ventilation;
- Ore and product stockpiling;
- Power supply;
- Water supply;
- Water management;
- Transport systems;
- Continued use of existing services;
- Demolition; and
- Rehabilitation, maintenance, and aftercare.

### 12.1.3 MANAGEMENT ACTIONS

Management actions which will be implemented to control the project activities or processes which have the potential to pollute or result in environmental degradation are detailed in Section 9.

### 12.1.4 ROLES AND RESPONSIBILITIES

The key personnel to ensure compliance to this EMP report will be the operations executive, the environmental department manager and the stakeholder engagement manager. As a minimum, these roles as they relate to the implementation of monitoring programmes and management activities will include:

- Senior Operational Manager and Environmental Manager
    - ensure that the monitoring programmes and audits are scoped and included in the annual mine budget; identify and appoint appropriately qualified specialists/engineers to undertake the programmes; and appoint specialists in a timeously manner to ensure work can be carried out to acceptable standards.
- Stakeholder engagement department
    - liaise with the relevant structures in terms of the commitments in the SLP;
    - ensure that commitments in the SLP are developed and implemented timeously; and
    - establish and maintain good working relations with surrounding communities and landowners; and facilitate stakeholder communication, information sharing and grievance mechanism.

# 13. ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

Management actions including monitoring requirements as outlined in Section 9, Section 26 and Section 28 should form part of the conditions of the environmental authorisation. With reference to Regulation 26 of the NEMA EIA Regulations (GNR 982 of 2014, as amended) additional conditions that should form part of the environmental authorisation that are not specifically included in the EMPr report include compliance with all applicable environmental legislation whether specifically mentioned in this document or not and which may be amended from time to time.

# 14. ASSUMPTIONS, UNCERTAINTIES, LIMITATIONS AND GAPS IN KNOWLEDGE

Assumptions, uncertainties, and limitations associated with the associated with the BA process and the proposed project are included below.

## 14.1PROVISION OF PROJECT INFORMATION

It is assumed that all project information provided by the Client is true and valid. SLR assumes that there have been no changes to the project description and information provided to SLR, and that commencement of activities described herein will only occur after an environmental authorisation to proceed has been obtained from the competent authority.

## 14.2ENVIRONMENTAL ASSESSMENT LIMITS

This BAR focuses on third parties only and does not assess health and safety impacts on employees and contractors because the assumption is made that these aspects are separately regulated by health and safety legislation, policies, and standards and that Marula Mine will adhere to these.

## 14.3PREDICTIVE MODELS IN GENERAL

All predictive models are only as accurate as the input data provided to the modellers. If any of the input data is found to be inaccurate or is not applicable because of project design changes that occur over time, then the model predictions will be less accurate.

## 14.4AIR QUALITY

The main assumptions and limitations from the basic air quality impact assessment (Airshed, August 2020) are:

- The underground shafts will need to be compliant with occupational exposure limits (OEL). These limits were used in the dispersion modelling exercise as a conservative estimate of the incremental impact of proposed vents.
- No ambient criteria pollutant data was available close to site. It was therefore only possible to estimate the incremental impact from the vents only.

## 14.5BIODIVERSITY ASSESSMENT

- The main assumptions and limitations from the Floral Assessment (STS, January 2022) are:
    - The floral assessment is confined to the study area and includes the sites earmarked for development as well as an 80 m buffer around the proposed infrastructure. The assessment does not include the entire Mining Rights Area (MRA) nor the neighbouring and adjacent properties. The entire study area and immediate surroundings were, however, included in the desktop analysis;
    - With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most floral and faunal communities have been accurately assessed and considered. Relevant online sources and background information were further assessed to improve on the overall understanding of the study area's ecology;

    - Sampling, by its nature, means that not all individuals are assessed and identified. Some species and taxa associated with the study area may have been missed during the assessment; and
    - The data presented in this report are based on one site visit, undertaken on the 18-19th of November 2020 (late spring). A more accurate assessment would require that assessments take place in all seasons of the year. However, on-site data was augmented with all available desktop data. Together with project experience in the area, the findings of this assessment are considered an accurate reflection of the ecological characteristics of the study area.

- The main assumptions and limitations from the Faunal Assessment (STS, November 2022) are:
    - With ecology being dynamic and complex, some aspects (some of which may be important) may have been overlooked. It is, however, expected that most faunal communities have been accurately assessed and considered and the information provided is considered sufficient to allow informed decision making to take place and facilitate integrated environmental management;
    - Due to the nature and habits of most faunal taxa, the high level of surrounding anthropogenic activities, it is unlikely that all species would have been observed during a field assessment of limited duration. Therefore, site observations were compared with literature studies where necessary;
    - This assessment was limited to the study area only and did not consider the entire MRA;
    - Following the site visit, new infrastructure has been proposed by the client which was not part of the original design. Thus, small portions of the study area, specifically portions of the proposed TSF pipeline have not been thoroughly investigated. However, it is the opinion of the ecologist that through on-site observations of the area and its surroundings sufficient information has been captured to accurately discuss these localities;
    - Sampling by its nature, means that not all individuals are assessed and identified. Some species and taxa within the footprint area may therefore have been missed during the assessment; and
    - A field assessment was undertaken from the 18-19th of November 2020 (summer season), to determine the faunal ecological status of the study area, and to “ground-truth” the results of the desktop assessment. A more accurate assessment would require that assessments take place in all seasons of the year. However, on-site data was significantly augmented with all available desktop data and specialist experience in the area, and the findings of this assessment are considered to be an accurate reflection of the ecological characteristics of the study area.

## 14.6SOILS AND LAND CAPABILITY

The following limitations and assumptions from the Soils and Land Capability Assessment (Zimpande Research Collective, January 2022) should be noted:

- The soil survey conducted as part of the land capability assessment was confined within the study area outline. This includes linear and surface infrastructure; and
- Land capability was classified according to the current soil restrictions, with respect to prevailing climatic conditions on site; however, it is virtually impossible to achieve 100% purity in soil mapping, the delineated soil map units could include other soil type(s) as the boundaries between the mapped soils are not absolute but rather form a continuum and gradually change from one type to

another. Soil mapping and the findings of this assessment were therefore inferred from extrapolations from individual observation points.

## 14.7NOISE

The following limitations and assumptions from the 2020 Noise Study (Airshed, 2020) should be noted:

- Meteorological data set was based on MM5 data for the period 2008-2010. This limitation is not found to be significant, however, as the meteorological conditions within the study area have not shown any significant historical changes.
- The quantification of sources of noise was limited to the operational phase of the project. Construction and closure phase activities are expected to be similar or less significant and its impacts only assessed qualitatively. Noise impacts will cease post-closure.
- The assessment is based on the list of equipment and information provided by BBE Consulting. The assumption is that this information is correct and reflects the routine operational phase of the project.
- Process activities were assumed to be 24 hours per day, 7 days per week.
- Although other existing sources of noise within the area were identified during the survey, such sources were not quantified but were taken into account during the baseline sampling.

## 14.8HERITAGE

The following limitations and assumptions from the Heritage Impact Assessment (Julius CC Pistorius, January 2022) should be noted:

- The findings, observations, conclusions, and recommendations reached in this report are based on the author's best scientific and professional knowledge, available information, and his ability to keep up with the physical challenges that the project commanded. The author has a good understanding of the types and ranges of heritage resources that occur in the region as he was involved in several Heritage Impact Assessment studies in the area during the last twenty years.
- The project area was surveyed on several former occasions in the past when heritage surveys were done for Marula Mine. Several heritage surveys were also done over the years for Eskom's power lines which either cross the project area or which were constructed close to the boundaries of the mining area.
- The heritage report findings are based on accepted archaeological survey and assessment techniques and methodologies. However, the author preserves the right to modify aspects of the report including the recommendations if and when new information becomes available particularly if this information may have an influence on the reports final results and recommendations. This in particular applies to the uncovering of graves as these may have been missed during the survey as a result of various reasons.
- The heritage survey may have missed other heritage resources as these may be located below the surface of the earth and may only be exposed once development commences. It is also possible that heritage resources simply may have been missed because of human failure to observe or to recognise them.

## 14.9FINANCIAL PROVISION STUDY

The following assumptions from the Financial Provision Study (E-Tek, November 2021) should be noted:

- The financial provision represents a 10-year closure forecast;

- The currency of estimate: South African Rands (ZAR) and costing was based on today's value only;
- No allowance was made to offset the value of scrap steel and or salvageable equipment to the liability;
- It was accepted that all information used to support the costing was accurate and true; this report only addresses the decommissioning and reclamation costs, equating to an outside (third party) contractor establishing on-site and conducting reclamation-related work. Other components such as staffing of the site after decommissioning, the infrastructure and support services (e.g. power supply, etc.) for this staff as well as workforce matters such as separation packages, retraining /re-skilling, etc. are outside the scope of the study;
- Dedicated contractors would be commissioned to conduct the demolition and reclamation work on the site. This would inter alia require the establishment and overhead costs for the contractors and hence, the allowance for P&Gs in the cost estimate;
- Allowance has also been made for third-party contractors and consultants to conduct post-closure care and maintenance work as well as compliance monitoring;
- The financial provision calculated represents the financial requirements to implement the closure criteria identified and agreed upon as part of the closure plan;
- Weighted percentages for P&Gs and Contingencies have been applied, VAT is also included;
- Quantities were obtained from information supplied by the project team. Where information was not available, estimates were made based on experience and benchmarked against similar facilities elsewhere;
- All drawings and information used is in the feasibility phase and construction drawings is required to confirm the final quantities.;
- General surface rehabilitation as per Marula's current criteria will apply;
- Steel and re-useable material, salvaged from the plant demolition and which has a salvage value, will be relocated to an authorized facility within a 30km radius to be sold or auctioned off. However, as per the regulatory requirements, the salvage value of steel and salvageable equipment have not been considered as part of the closure costing;
- It has been assumed all inert demolition waste will be disposed of into shaft portals before capping; and
- No beneficial use for infrastructure is currently allowed for an all infrastructure will be removed.

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

## 15.1REASONS WHY THE ACTIVITY SHOULD BE AUTHORIZED OR NOT

The proposed activities and infrastructure will optimise the current mining operation. The proposed project activities and proposed infrastructure will be confined to the Marula MRA. The assessment of the proposed project presents the potential for negative impacts to occur (in the unmitigated scenario in particular) on the biophysical, cultural/heritage and socio-economic environments, both on the project footprint and in the surrounding area without any management actions being implemented (Appendix D). With the implementation of management actions, these potential impacts can be prevented or reduced to acceptable levels or enhanced in the case of positive impacts. It follows that provided the EMPr is effectively implemented, there is no reason from a biophysical, cultural/heritage or socio-economic standpoint why the proposed project should not proceed.

## 15.2CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

### 15.2.1.1 SPECIFIC CONDITIONS FOR INCLUSION IN THE EMPR

Refer to Section 13.

### 15.2.1.2 REHABILITATION REQUIREMENTS

Refer to Section 9 and Section 26.

# 16. PERIOD FOR WHICH AUTHORISATION IS REQUIRED

The authorisation will be required for the duration of the life of the mine, of which the remaining life of mine is estimated at 21 years. Therefore, the required validity for the environmental authorisation is 21 years.

# 17. UNDERTAKING

I, Mavisha Nariansamy for compiling this report, undertake that:

- The information provided herein is correct.
- Comments and inputs from stakeholders and I&APs have been included and correctly recorded in this report.
- Inputs and recommendations from the specialist reports have been included where relevant.
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.

| | |
|---|---|
| Signature of EAP | Date |
| Signature of commissioner of oath | Date |

# 18. FINANCIAL PROVISION

## 18.1 METHOD TO DERIVE THE FINANCIAL PROVISION

The following approach was applied to determine the financial provision:

- Financial models were developed to cater for the requirements of GNR 1147;
- The costing models were developed to address all the identified closure components applicable to Marula;
- The costing models provide the following output:
  - Executive Summary;
  - P&G's: Allocation of P&G's for each component and provides weighted P&G's, as certain P&G's allowances, can vary per component;
  - Contingencies: Allocation of Contingencies for each component and provides weighted Contingencies, as certain Contingency allowances can vary per component;
  - Closure Components Summary (Provides a summary of all costs per closure component).
  - The five main closure components have been identified as follows:
    - Infrastructural Aspects;
    - Mining Aspects;
    - Biophysical Closure Aspects;
    - Social Closure Aspects; and
    - General Aspects.
  - Closure Components (Breakdown of the detailed facilities and aspects under each of the five main closure components); and
  - Rates Table (Unit rates for various actions required).

The approach followed with the determination of the closure costs is summarised as follows:

- Review of available information and identification of infrastructure that would need to be decommissioned at closure;
- Gathering of relevant data which forms the basis of the calculation;
- All-newly proposed infrastructure was assigned with a reference number which can be referenced directly to the costing model;
  Reference map was created indicating the position of the proposed infrastructure in relation to the existing infrastructure;
- Closure criteria was developed and workshopped with Marula as part of the annual liability assessment;
- The closure forecast was based on the proposed project timeframe;
- Compilation of a Bill of Quantities (BoQ) capturing the quantities and actions relating to the closure of the different closure aspects; and
- Unit rates from E-TEK's database were updated to be aligned with the current market-related rates acquired from local civil- and demolition contractors. (Note – these rates refer to closure conditions when the mine is no longer operational).

## 18.2 CONFIRM THAT THE AMOUNT CAN BE PROVIDED FOR FROM OPERATING EXPENDITURE

The amount required in order to manage and rehabilitate the environmental impacts as determined for financial provision can be provided for i.e., there is adequate revenue which will be provided for in the mines' operating costs of budget. To align the financial provisioning with the requirements of the NEMA Financial Provisioning Regulations (GNR 1147, 2015) the project will increase provisioning into the current closure provision

# 19. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

## 19.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

The impacts associated with socio-economic conditions are discussed in Appendix D. Management and management actions identified to address any socio-economic impacts are included in Section 26.

No person will be directly affected by the project given that no I&APs currently reside within the proposed extension footprint area. However, other direct impacts include:

- Road and traffic safety;
- Influx of job seekers to an area which in turn increases pressure on existing communities, housing, basic service delivery and raises concerns around safety and security; and
- Employment and procurement of goods and services.

Indirect socio-economic impacts include:

- Alteration of drainage patterns by reducing the volume of runoff into the downstream catchments;
- Contamination of surface water resources;
- Air pollution sources that can have a negative impact on ambient air quality;
- Increase in disturbing noise levels; and
- Visual impacts on the receiving environment.

## 19.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT

Not applicable. No national estate will be affected as part of the project.

## 19.3 DEPARTMENT OF ENVIRONMENTAL AFFAIRS SCREENING TOOL

The DFFE of has developed an online screening tool, which is compulsory to use as of 04 October 2019. The report generated by the DFFE screening tool was attached to the NEMA application for the project as included in Appendix E. The screening tool report outlines specialist studies that need to be considered as part of the project. Table 33 below outlines the specialist studies proposed in the screening tool report along with an explanation pertaining to the applicability of these proposed specialist studies in relation to the proposed project.

**Table 33: Findings of the DFFE screening**

| Theme | Sensitivity | Requirements addressed as part of the S&EIA Process |
|---|---|---|
| Archaeological and Cultural Heritage | High | A Heritage Impact Assessment (HIA) and Palaeontological Assessment (PIA) (desktop review) was undertaken to determine the potential impact of the proposed project on heritage, cultural and palaeontological resources within the project area. The results of both these assessments were used to inform the baseline environment description (Section 7.3.2), the impact assessment (Appendix D) and mitigation, management, and monitoring actions (Section 26 and Table 37). The Heritage Impact Assessment and Palaeontological Assessment (desktop) are provided in Appendix H. |
| Palaeontology | Medium | |

| Theme | Sensitivity | Requirements addressed as part of the S&EIA Process |
|---|---|---|
| Civil Aviation | High | Not applicable to Marula because the proposed project does include the establishment of any structures which could influence flight paths. It follows, for this project a civil aviation specialist study is deemed unnecessary for this project. |
| Defence | Medium | Not applicable to Marula because the mine is not located near any areas of defence and as such a defence specialist study is deemed unnecessary for this project. |
| Agriculture, soils, and land capability | Very High | A Soils and Land Capability Study which addressed agricultural sensitivity was undertaken as part of this authorisation process. The results of the study were used to inform the baseline environment description  the impact assessment and mitigation, management, and monitoring actions. |
| Animal species Assessment | High | A Biodiversity Study (terrestrial, animal and plant species) was undertaken as part of this process. A Freshwater Ecological Study was undertaken to determine the impacts of the proposed water pipelines and powerlines which traverse watercourses. The results of both these studies were used to inform the baseline environment description the impact assessment and mitigation, management, and monitoring actions (Section 26 and Table 37). The full Biodiversity and Freshwater Ecological reports are provided in Appendix H. |
| Plant Species Assessment | Medium | |
| Aquatic Biodiversity | Low | |
| Terrestrial biodiversity | Very high | |
| Noise Impact Assessment | Not specified in screening tool report. | The screening tool report does not specify an environmental sensitivity for this theme, but a noise study was undertaken to identify impacts due to the additional ventilation shafts and associated refrigeration and ventilation infrastructure. The results of the noise impact study were used to inform the baseline environment description (Section 7.3.1.9 and Section 7.3.1.4) the impact assessment (Appendix D) and mitigation, management, and monitoring actions (Section 26 and Table 37). The Noise Impact Assessment is provided in Appendix H. |
| Air Quality Assessment | Not specified in screening tool report. | The screening tool did not require an Air Quality Study. Due to the establishment of additional ventilation shafts, the movement of the fans to the surface and additional bulk air coolers, the proposed project is likely to present additional air emission sources that need to be taken into consideration, given the proximity of the project components to surrounding communities. For this reason, an Air Quality Assessment was prepared for the proposed project. The results of the noise impact study were used to inform the baseline environment description (Section 7.3.1.8 and Section 7.3.1.4**Error! Reference source not found.**) the impact assessment (Appendix D) and mitigation, management, and monitoring actions (Section 26 and Table 37). The Air Quality Assessment is provided in Appendix H. |

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

No other matters are required in terms of Section 24(4)(A) and (B) of the Act.

# PART B - ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

# 21. DETAILS OF THE EAP

The details of the EAPs who undertook the EIA process and prepared this EIR are provided in Part A, Section 1.

# 22. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

The activities that are covered in the EMP are included in Part A, Section 1.

# 23. COMPOSITE MAP

A composite map superimposed on the environmental sensitive areas of the preferred site is included in Appendix F.

# 24. DESCRIPTION OF THE IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENT

## 24.1DETERMINATION OF CLOSURE OBJECTIVES

The closure objectives for the project were determined taking into account the existing type of environment as described in Section 7.3.1, in order to ensure that the closure objectives achieve a condition approximating its natural state as far as possible. Further information pertaining to the closure objectives identified for the Proposed project in provided in Section 27.1.1.

## 24.2 VOLUMES AND RATE OF WATER USE FOR MINING

According to the 2019 Marula Platinum Mine IWWMP (SRK, November 2019), the mine (shafts and concentrator) uses 5 709 $m^3$/day of which 2 877 $m^3$/d is reused water and 2 832 $m^3$/d is make-up water. Of the mine demand 4 258 $m^3$/d is used in the concentrator of which 1 697 $m^3$/d is makeup water. The proposed project components will not result in any changes to the current volume and rates of water used for mining activities. The proposed refrigeration and ventilation infrastructure (including the water supply pipelines) will recycle water within the closed water system. A total of 1.1l/s (Clapham) and 0.6l/s (Driekop) (150 $m^3$/day) of return water from the refrigeration plants will be recycled back into the process water for the Concentrator Plant.

## 24.3HAS A WATER USE LICENCE BEEN APPLIED FOR?

An amendment to the existing IWUL for water uses listed under Section 21 of National Water Act (36 of 1998) (NWA) is may also require from the competent authority, which in this case is the Limpopo (Polokwane) Regional Province of the Department of Water and Sanitation (DWS). The requirement for an amended IWUL as well as the actual authorisation process will be undertaken outside of this Basic Assessment process.

## 24.4IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

The assessment of potential impacts is included in Section 9 and Appendix D. Management actions which will be implemented to avoid and minimise potential impacts are detailed in Section 27.

## Table 34: Measures to rehabilitate the environment affected by the undertaking of any listed activity

| Activity (Listed: NEMA and NEM:WA) | | Phase | Size and scale of disturbance | Mitigation measures | Compliance with standards | Time period for implementation |
|---|---|---|---|---|---|---|
| Number | Description | | | | | |
| NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 10 | The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where - (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area. | Construction | Approximately 4 km. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. |
| NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 21 D | Any activity including the operation of that activity which requires an amendment or variation to a right or permit in terms of section 102 of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity contained in this Listing Notice or in Listing Notice 3 of 2014 (as amended) required for such amendment. | Construction Operation Decommissioning Closure | Approximately 4.169 ha. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. |
| NEMA GNR 983 of 2014 (as amended): Listing Notice 1, Activity 27 | The clearance of an area of 1 ha or more, but less than 20 ha of indigenous vegetation, except where such clearance of indigenous vegetation is required for - | Construction | Approximately 1.8 ha. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. |

| Activity (Listed: NEMA and NEM:WA) | | Phase | Size and scale of disturbance | Mitigation measures | Compliance with standards | Time period for implementation |
|---|---|---|---|---|---|---|
| **Number** | **Description** | | | | | |
| | (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. | | | | | |
| NEMA (GNR 983 of 2014), as amended: Listing Notice 1, Activity 48 | The expansion of - (i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or where such expansion occurs - (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse. | Construction Operation Decommissioning Closure | Approximately 7.1 km. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. | Refer to Table 36 for the mitigation measures. |

# 25. IMPACT MANAGEMENT OUTCOMES

Table 35 below provides a description of the outcomes and objective of management actions in order to manage, remedy, control or modify potential impacts. The management actions identified to achieve these outcomes and objectives are described in Section 26.

**Table 35: Description of impact management outcomes**

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines | • Hazardous excavations and infrastructure resulting in safety risks to third parties and animals. | • Topography | • Construction<br>• Operation<br>• Decommissioning | • Manage through access control | • Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Loss of soil resources and land capability through contamination | • Soil and land capability | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage though soil conservation management plants<br>• Manage through waste management procedures<br>• Remedy through emergency response procedure | • Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines | • Loss of soil resources and land capability through physical disturbance | • Soil and land capability | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage though soil conservation management plants<br>• Manage through waste management procedures | • Not applicable |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | • Remedy through emergency response procedure | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Physical destruction of biodiversity affecting habitat, species diversity and SCC | • Biodiversity | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage though soil conservation management plants<br>• Manage through waste management procedures<br>• Remedy through emergency response procedure | • Obtain permits to remove protected species in terms of LEMA |
| | • General disturbance of biodiversity | | | | • Removal of the alien and weed species to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). |
| | • General and physical destruction of aquatic environments | | | | • Not applicable |
| • Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Alteration of surface drainage patterns | • Surface water | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage through design and stormwater management controls<br>• Remedy through emergency response procedures | • Compliance with GN 704 for the separation of clean and dirty water. |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline | • Contamination of surface water resources | • Surface water | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Mange through waste conservation procedures<br>• Remedy through emergency response procedures | • Not applicable |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| • Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Contamination of groundwater resources | • Groundwater | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage through waste management conservation procedures<br>• Remedy through emergency control procedures<br>• Management through design | • Not applicable |
| • Rehabilitation, maintenance and aftercare | • Positive impact of the implementation of remediation measures to reduce the ug tailings contamination plume | • Groundwater | • Operation<br>• Decommissioning<br>• Closure | • Management through rehabilitation | • Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile | • Air pollution | • Air quality | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage through monitoring<br>• Manage through air control measures | • Not applicable |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| • Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Operation of ventilation shafts and refrigeration infrastructure | • Increase in disturbing noise levels | • Noise | • Construction<br>• Operation<br>• decommissioning | • Management through noise attenuation measures<br>• Management through monitoring | • Compliance with IFC limits for noise monitoring |
| • Transport systems<br>• Transport systems<br>• Transport systems | • Road disturbance and traffic safety | • Traffic | • Construction<br>• Operation<br>• Decommissioning | • Manage through transport system procedures | • Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrade<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Visual impacts | • Visual | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Management through limiting a projects footprint<br>• Management through design<br>• Remedy through rehabilitation | • Not applicable |
| • N/A | • Loss of heritage and palaeontological resources | • Heritage and palaeontological resources | • N/A | • Remedy through chance find procedure | • Compliance with the NHRA in case of a chance find procedure |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7) | • Issue: economic impacts | • Socio-economic<br>• | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Manage through procurement policies | • Not applicable |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| • Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Inward migration | • Socio-economic | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Management through social policies and procedures<br>• Remedy through emergency procedures | • Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines | • Change in land uses | • Land use | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | • Management through loss of land through compensation<br>• Remedy through rehabilitation | • Not applicable |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| • Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | | |

# 26.IMPACT MANAGEMENT ACTIONS

Management actions identified to prevent, reduce, control or remedy the assessed impacts are presented in Table 36 below. The action plans include the timeframes for implementing the management actions together with a description of how management actions comply with relevant standards. Management actions and recommendations identified by specialists have been summarised and are included in the table below. Any management actions indicated in *italics* are additional management measures to this in the current approved EMPr.

**Table 36: Description of impact management actions**

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines | Hazardous excavations and infrastructure resulting in safety risks to third parties and animals. | • During the construction phase, each hazardous excavation will have a barrier around it to prevent access by people and animals. The barrier may be in the form of fences, walls, or berms. In addition, the barriers must have warning signs at appropriate intervals. These warning signs must be in picture format and/or written in English, Afrikaans, and Sepedi.<br>• Ventilation shafts will be sealed in the decommissioning phase. Sufficient waste rock will be stored to backfill the shafts on mine closure.<br>• All surface infrastructure, relevant to this project, will be removed at the end of life of mine.<br>• The environmental manager and appointed engineer are responsible for ensuring that these actions are implemented during the construction phase of the excavations, and that they are maintained until rehabilitation and closure.<br>• The proposed project components will be designed, constructed, operated, and closed in a manner to ensure that stability and safety risks to third parties and animals are addressed. These issues will be monitored according to a schedule that is deemed relevant to the type of facility.<br>• During all project phases, Marula will survey all the proposed project areas and update its surface use area map on a routine basis to ensure that the position and extent of all potential hazardous excavations, hazardous infrastructure and subsidence is known.<br>• Where Marula has caused injury to third parties and/or animals, appropriate compensation will be provided. | As required<br>As required<br>As required<br>As required<br>Ongoing<br>Ongoing<br>As required<br>As required | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| | | • If people or animals fall off or into hazardous excavations or infrastructure causing injury, or if any mineralised waste or water facilities fail causing injury to people or animals, the Marula emergency response procedure in Section 29.2. will be initiated. | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Loss of soil resources and land capability through contamination | Management actions include the following:<br>• In the construction, operation and decommissioning phases Marula will ensure that all, dirty water, and non-mineralised wastes are transported, in a manner that they do not pollute soils. This will be implemented through a procedure(s) covering the following:<br>○ pollution prevention through basic infrastructure design;<br>○ pollution prevention through maintenance of equipment;<br>○ pollution prevention through education and training of permanent and temporary workers (relevant to all projects);<br>○ pollution prevention through appropriate management of hazardous materials and wastes;<br>○ the required steps to enable fast reaction to contain and remediate pollution incidents. In this regard the remediation options include containment and in situ treatment or disposal of contaminated soils as hazardous waste. In-situ treatment is generally considered to be the preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The in-situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bioremediation at a designated area after which the soils are returned (relevant to all projects);<br>○ the mine will ensure that all vehicles and equipment will be serviced in workshops and washbays with impermeable floors, dirty water collection facilities and oil traps;<br>○ all chemical, fuel, oil storage and handling facilities will be designed and operated in a manner that all spillages | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | are contained in impermeable areas and cannot be released into the environment;<br>○ ad hoc spills of potentially polluting substances (whether in dirty areas or in the environment) will be reported to the environmental manager and cleaned up/remediated immediately;<br>○ a dirty water management system (where relevant) is implemented; and<br>○ The waste management practices as outlined in Table 39 need to be implemented. | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Loss of soil resources and land capability through physical disturbance | Management actions include the following:<br>• In the construction, operation, and decommissioning phases a soil management plan, with the following key components, will be implemented:<br>○ limit the disturbance of soils to what is absolutely necessary for earthworks, on-going activities, infrastructure footprints and use of vehicles; and<br>○ where soils have to be disturbed the soil will be stripped, stored, maintained, and replaced in accordance with the specifications of the soil management principles as tabulated int Table 40. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | • Physical destruction of biodiversity affecting habitat, species diversity and SCC | During all mine phases, the mine will implement a biodiversity action plan, refine it and implemented in consultation with the biodiversity expertise and resources of an ecological specialist and the Limpopo Parks Board. This action plan will aim at preserving and restoring the natural ecology at the mine. This action plan will be in place prior to the commencement of the project, and it will include additional detail on the following management actions:<br>• the mine will limit mine activities, infrastructure, and disturbance to those specifically identified and with controlled access and zero tolerance of disturbances to identified sensitive habitats and associated species of the rocky hills/outcrops and natural dongas/natural drainage line;<br>• special care will be given to the natural drainage lines and rocky hills/outcrops – disturbance to these areas will be avoided as far as possible; where disturbance cannot be avoided structures will be established to minimise the impact on these areas; and<br>• all new pipelines will be lifted off the ground to prevent the establishment of a movement barrier for fauna species and to allow movement of smaller organisms.<br><br>*Prior to the construction phase, Marula will:*<br>• *Minimise loss of indigenous vegetation where possible through adequate planning and, where necessary, by incorporating the sensitivity of the biodiversity report as well as other specialist studies;*<br>• *Implement an AIP Management/Control Plan as outlined in Section 28;*<br>• *Species protected under NFA and Schedule 12 of the LEMA were recorded on site. Suitable habitat for such species is present, especially in the Degraded Bushveld and Rocky Habitats. A walkdown of the footprint area is required before construction activities commence where anticipated floral SCC/protected species are searched and marked (if encountered); and* | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| | | • *If SCC/protected species are encountered and will be affected by the construction activities, these species must be marked and where possible, relocated to suitable habitat surrounding the disturbance footprint. Suitable habitat is available in nearby surrounding locations. A licence from the DEFF is required for the removal of NFA protected tree species (Boscia albutruncia). For the removal, destruction, or relocation of protected flora in terms of the LEMA (Schedules 11 and 12), a license is required from the LEDET.*<br><br>*Management actions specific to the construction and operational phases include:*<br>• *The construction footprint must be kept as small as possible to minimise impact on the surrounding environment (edge effect management);*<br>• *Removal of vegetation must be restricted to what is necessary and should remain within the approved development footprint;*<br>• *Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is necessary, and the footprint thereof kept to a minimal;*<br>• *No collection of indigenous floral species must be allowed by construction personnel, especially with regards to floral SCC (if encountered).*<br>• *Care should be taken during the construction and operation of the proposed development to limit edge effects to surrounding natural habitat. Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area. This can be achieved by:*<br>  ○ *Demarcating all footprint areas during construction activities;* | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| | | ○ *Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. Category 1b and 2 species were identified within the development footprint areas;*<br>○ *Rubble is to be disposed of on the existing waste rock dump (WRD) whilst cleared alien invasive plant species are to be taken to a registered waste disposal facility;*<br>○ *All soils outside of the operational area that have been compacted as a result of construction activities should be ripped and profiled and reseeded;*<br>○ *No dumping of waste is allowed on site. Rcoek material and any rubble removed as a result of the construction activities should be disposed of on the WRD. No temporary dump sites should be allowed in areas with natural vegetation. Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility.*<br>• *If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder* floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event *of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil; and*<br>• *Upon completion of construction activities, where bare / disturbed areas remain that are not part of the everyday operations/functions of the mine, these areas are to be revegetated with indigenous species.*<br>• *Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the construction and operational phase of the development as outlined in Section 28;* | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| | | • *No illicit fires must be allowed during the construction of the proposed development; and*<br>• *Floral monitoring should be implemented as outlined in the monitoring programme (Section 28).*<br><br>*During the decommissioning and closure phases the following management actions apply:*<br>• *No additional habitat outside of the footprint areas is to be disturbed during the closure phase;*<br>• *Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b and 2 AIP species (as listed in the NEMBA Alien species lists, 2020), in line with the NEMBA Alien and Invasive Species Regulations (2014). Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC/protected species or suitable habitat for such species outside of the proposed development footprint;*<br>• *Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which complies with legal standards. Ongoing alien and invasive plant monitoring should continue during the decommissioning phase as outlined in the monitoring programme (Section 28);*<br>• *Any natural areas beyond the direct footprint, which have been affected by the construction or operational activities, must be rehabilitated using indigenous species;*<br>• *Areas that have been disturbed as a result of mining activities must be rehabilitated as soon possible.*<br>• *This will not only reduce the total disturbance footprint but will also reduce the overall rehabilitation effort and costs associated with it;* | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| | | • *All infrastructure and footprint areas should be rehabilitated in accordance with the rehabilitation plan;*<br>• *All rehabilitated areas should be rehabilitated to a point where natural processes will allow the ecological functioning and biodiversity of the area to be re-instated;*<br>• *Due to the impacts on ESA 1, ESA 2 and an endangered ecosystem, rehabilitation must be to the pre-mined condition. Where possible, vegetation condition should be improved through bush encroachment and AIP management; and*<br>• *Monitoring of rescued and relocated floral SCC should continue during the Decommissioning & Closure Phase until it is evident that the species have successfully established. Where possible, these species should be reintroduced into rehabilitation sites.* | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site) | • General Disturbance of Terrestrial Biodiversity | Management actions specific to the construction and operational phases include:<br>• *No collection of indigenous floral species must be allowed by construction personnel, especially with regards to floral SCC (if encountered);*<br>• *No illicit fires must be allowed during the construction of the proposed development;*<br>• The use of light is kept to a minimum, and where it is required, yellow lighting is used where possible;<br>• Vertebrates should be kept away from the illuminated areas with appropriate fencing where feasible;<br>• There is training for workers on the value of biodiversity and the need to conserve the species and systems that occur within the proposed project areas;<br>• There is zero tolerance of the killing or collecting of any biodiversity *within project areas* by anybody working for or on behalf of Marula;<br>• Noisy and/or vibrating equipment will be well maintained to control noise and vibration emission levels;<br>• Dust control measures will be implemented (see Section 28); and | • Construction<br>• Operation<br>• Decommissioning<br>• Closure | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | • Pollution and litter prevention measures will be implemented (see section 7.2.3 and 7.2.7).<br><br>During the decommissioning and closure phases the following management actions apply:<br>• *No vehicles are allowed to indiscriminately drive through sensitive habitat and natural areas;*<br>• No dumping of litter must be allowed on-site; and<br>• *As far as possible, no collection of floral SCC/protected or medicinal floral species within the study area or adjacent natural habitat must be allowed during the decommissioning and closure phase of the proposed development.* | | |
| • Construction of ventilations shafts (V8) and refrigeration infrastructure<br>• Upgrades at V7<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>Demolition (removal of infrastructure from site)<br>Rehabilitation | • Destruction and disturbance of aquatic biodiversity | *Management actions applicable to the construction and operational phases include:*<br>• *All development footprint areas should remain as small as possible and should not encroach into the freshwater areas unless essential and part of the proposed development. It must be ensured that the freshwater habitat is off-limits to construction vehicles and non-essential personnel;*<br>• *The boundaries of footprint areas, including contractor laydown areas, are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. Edge effects will need to be extremely carefully controlled;*<br>• *Planning of temporary roads and access routes should avoid freshwater areas and be restricted to existing roads where possible;*<br>• *Appropriate sanitary facilities must be provided for the life of the pre-construction and construction phase and all waste removed to an appropriate waste facility;*<br>• *All hazardous chemicals as well as stockpiles should be stored on bunded surfaces and have facilities constructed to control runoff from these areas;* | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| Maintenance and aftercare of rehabilitated areas | | • *It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage;*<br>• *No fires should be permitted in or near the construction area;*<br>• *Ensuring that an adequate number of waste and "spill" bins are provided will also prevent litter and ensure the proper disposal of waste and spills;*<br>• *All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into the topsoil;*<br>• *In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss;*<br>• *All spills should they occur, should be immediately cleaned up and treated accordingly.*<br>• *Proliferation of alien and invasive species is expected within any disturbed areas. Whilst not considered severe at this time, the vegetation component within the freshwater environment is already transformed to an extent because of alien plant invasion; therefore, these species should be eradicated and controlled to prevent their spread beyond the project footprint;*<br>• *Removal of the alien and weed species encountered within the freshwater resources must take place to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational, and maintenance phases;*<br>• *Species specific and area specific eradication recommendations:*<br>• *Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;* | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| | | • *Footprint areas should be kept as small as possible when removing alien plant species;*<br>• *No vehicles should be allowed to drive through designated sensitive wetland areas during the eradication of alien and weed species;*<br>• *Sheet runoff from access roads should be slowed down by the strategic placement of berms;*<br>• *As far as possible, all construction activities should occur in the low flow season, during the drier winter months;*<br>• *As much vegetation growth as possible (of indigenous floral species) should be encouraged to protect soils;*<br>• *No stockpiling of topsoils is to take place within close proximity to the river, and all stockpiles must be protected with a suitable geotextile to prevent sedimentation of the river;*<br>• *All soils compacted as a result of construction activities as well as ongoing operational activities falling outside of project footprint areas should be ripped and profiled; and*<br>• *A monitoring plan for the development and the immediate zone of influence should be implemented to prevent erosion and incision.*<br><br>*The following management actions need to be implemented during the decommissioning and closure phase:*<br>• *Construction rubble must be collected and disposed of at a suitable landfill site;*<br>• *All soils compacted because of construction activities falling outside of project footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat;*<br>• *Rehabilitate all drainage line and riparian habitat areas to ensure that the ecology of these areas is re-instated during all phases;* | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| | | • *Edge effects of activities including erosion and alien/ weed control need to be strictly managed in these areas;*<br>• *As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months;*<br>• *As much vegetation growth as possible should be promoted within the proposed development area to protect soils;*<br>• *All alien vegetation in the riparian zone should be removed upon completion of construction and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist);*<br>• *All areas affected by construction should be rehabilitated upon completion of the construction phase of the development;*<br>• *Bank vegetation cover should be monitored to ensure that sufficient vegetation is present to bind the bankside soils and prevent bankside erosion and incision; and*<br>• *All alien vegetation in the footprint area as well as immediate vicinity of the proposed development activities should be removed. Alien vegetation control should take place for a minimum period of two growing seasons after rehabilitation is completed.* | | |
| • Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Alteration of surface drainage patterns | Management actions include the following:<br>• The necessary exemptions/approvals will be obtained from the DHSWS where pipeline and powerline infrastructure crosses non-perennial drainage patterns.<br>• The detailed designs of the pipeline/powerline crossings associated will be in accordance with the requirements of Regulation 704, the requirements as stipulated in the IWUL, and will be done by an appropriately qualified engineer.<br>• In these designs, considerations will be given to the biodiversity and rehabilitation requirements. | Ongoing | • Compliance with GN 704 for the separation of clean and dirty water. |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Maintenance and aftercare of rehabilitated areas | | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Contamination of surface water resources | Management actions include:<br>• Marula will ensure that the soil/erosion management, pollution prevention and management, and waste management; the procedures, practices and actions included in Table 39 and Table 40 will be implemented.<br>• The clean and dirty water systems as depicted in the mine's water balance will be designed, implemented, and managed in accordance with the provisions of Regulation 704 for water management on mines. In this regard:<br>○ Clean water will be diverted around operational areas; and<br>○ Areas in which polluting substances can be spilled will be minimised and contained on impermeable floors with bund walls and sumps with traps. These bunded areas will be capable of holding 110% of the volume of the hazardous/polluting substances that could be spilled therein.<br>• The mine will continue monitoring surface water in the vicinity of its operations and when possible (during the rainfall season) this will include surface water sampling points both up and downstream of the mining operations in the following water courses: the Moopetsi, potentially affected tributaries of the Moopetsi, the Tshwenyane and the Mogompane.<br>• Should any contamination be detected the mine will immediately notify DHSWS. The mine, in consultation with DHSWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and the long term) and then implement these measures.<br>• The site wide water balance is refined on an on-going basis with the input of actual flow volumes and used as a decision-making tool for water management and impact mitigation; and | Ongoing<br>Ongoing<br>Ongoing<br>Ongoing<br>Ongoing<br>As required | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| • Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | • where monitoring results indicates that third party water supply has been polluted by Marula, Marula will ensure that an alternative equivalent water supply will be provided. | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines | • Contamination of groundwater resources | Management actions during all project phases include:<br>• With regard to soil/erosion management, pollution prevention and management, and waste management; the procedures, practices and actions included in Table 39 and Table 40will be implemented;<br>• The clean and dirty water systems will be designed, implemented, and managed in accordance with the provisions of Regulation 704 for water management on mines. In this regard:<br>○ clean water will be diverted around operational areas;<br>○ areas in which hazardous and/or polluting substances can be spilled will be minimised and contained on impermeable floors with bund walls and sumps with traps. These bunded areas will be capable of holding 110% of the volume of the hazardous/polluting substances that could be spilled therein; and<br>○ all other dirty water will be contained in the dirty water run-off and/or process water system at the mine that comprises dirty water pipes, channels, berms, and dams, and from which dirty water will be reused rather than discharged to the environment. These systems will be routinely inspected to detect possible breaches and implement preventative or corrective action.<br>• The mine will continue monitoring groundwater in accordance with the existing monitoring programme (Section 28);<br>• Where monitoring results indicates that third party water supply has been polluted by Marula, Marula will ensure that an alternative equivalent water supply will be provided; and<br>• *Prior to the establishment of the product stockpile, Marula is required to undertake a geochemical analysis on the project material. This information must be used to inform the liner requirements for the product stockpile. Alternatively, the product* | Ongoing<br><br>Ongoing<br><br>As required<br><br>Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | *stockpile area should be concrete lined with suitably sized bunded areas to prevent any seepage and/or run-off.* | | |
| • Rehabilitation, maintenance and aftercare | • Positive impact of the implementation of remediation measures to reduce the ug tailings contamination plume | The following management actions apply:<br>• The mine will continue monitoring groundwater in accordance with the existing monitoring programme (Section 28);<br>• *Marula should Investigate and implement monitoring and remediation measures to reduce the contamination plume emanating from the UG Tailings Facility. The management measures should aim to reduce negative impacts to 3rd party groundwater users and the environment; and*<br>• *Marula must ensure that these monitoring and remediation measures are investigated with input from a suitably qualified geohydrologist or equivalent specialist.* | Ongoing<br>Ongoing<br>Ongoing | Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines | • Air pollution | The following measures as part of the approved EIA and EMPr (Metago, 2012) remain applicable:<br>• The following measures will be implemented including updating the mine's current monitoring programme and the related dust monitoring points:<br>  ○ construction activities – target dust control efficiency of 50% – achieved through effective water sprays and managed blasting techniques;<br>  ○ unpaved roads – target dust control efficiency of 75% – achieved by applying 0.058 litres of water per square meter of road every hour that it is in use by vehicles. In addition, the access road to the Merensky shaft will be tarred. The monitored fallout must be below 600mg/m$^2$/day near residential areas;<br>  ○ Marula will investigate options for achieving the targeted dust control efficiency on the top surface. This will be verified by perimeter dust fallout monitoring. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | ○ topsoil stockpiles – target dust control efficiency of 60% – achieved by vegetation establishment on the stockpiles. This will be verified by perimeter dust fallout monitoring. Dust fall immediately downwind to be less than 1200mg/m²/day and 600mg/m²/day near residential areas; and<br>○ crushing and screening and materials handling (including stockpiles) target dust control efficiency of 60% – achieved by adding water sprays at all crushers. This will be verified by visual inspection to ensure that there is no plume and perimeter dust fallout monitoring. Dust fall immediately downwind must be less than 1200mg/m²/day and 600mg/m²/day near residential areas.<br>• The mine will develop and implement other key elements of an air quality control system. This system will include:<br>○ monitoring at sensitive receptors around the mine area; and<br>○ if monitoring determines that unacceptable dust emissions is occurring, immediate steps will be taken to address the issue in consultation with a suitable air quality specialist.<br>• Establish a meteorological station where there is no influence from infrastructure or topography.<br>• *The mine should continue with the dust fallout monitoring programme (Section 28).* | Ongoing<br><br>Ongoing<br><br>Ongoing | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7) | • Increase in disturbing noise levels | *For general activities, the following good engineering practice should be applied to all project phases:*<br>• *Equipment with lower sound power levels must be selected. Vendors should be required to guarantee optimised equipment design noise levels.*<br>• *Where possible, other non-routine noisy activities such as construction, decommissioning, start-up and maintenance, should be limited to day-time hours.*<br>• *A noise complaints register must be kept.*<br><br>*The specifications and equipment design and enclosures include:* | *As required*<br><br>*As required* | Compliance with IFC limits for noise monitoring |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Operation of ventilation shafts and refrigeration infrastructure<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation | | • *Equipment to be employed should be reviewed to ensure the quietest available technology is used. Equipment with lower sound power levels must be selected in such instances and vendors/contractors should be required to guarantee optimised equipment design noise levels;*<br>• *As far as is practically possible, sources of significant noise should be enclosed. The extent of enclosure will depend on the nature of the machine and their ventilation requirements. Pumps and motors are examples of such equipment;*<br>• *The compressors will also be enclosed in the refrigeration plant building. This will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses;*<br>• *It should be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise should be directed into a partial enclosure and not out of it, there should not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure.* | *As required* | |
| | | *The use and sitting of equipment and noise sources:*<br>• *As far as is practically possible, sources of significant noise should be enclosed. The extent of enclosure will depend on the nature of the machine and their ventilation requirements. Pumps and motors are examples of such equipment;*<br>• *The compressors will also be enclosed in the refrigeration plant building. This will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses;*<br>• *It should be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise should be directed into a partial enclosure and not out of it, there should not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure;*<br>• *Regular and effective maintenance of equipment are essential to noise control. Increases in equipment noise are often indicative of eminent mechanical failure. Also, sound reducing equipment/materials can lose effectiveness before failure and can be identified by visual inspection.*<br>• *Implement the monitoring programme as outlined in Section 28.* | *As required* | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| | | *In terms of controlling the spread of noise using barriers or berms the following applies:*<br>• *If noise can be controlled at the source to meet IFC guidelines at the NSR, then no further attenuation measures will be required. However, if IFC guidelines are still exceeded at the NSR after source attenuation has been implemented, noise reduction screens, barriers, or berms must be installed.*<br>• *The effectiveness of a noise barrier is dependent on its length, effective height, and position relative to the source and receiver as well as material of construction. To optimize the effect of screening, screens should be located close (within 50 m) to either the source of the noise, or the receiver.*<br>• *The careful placement of barriers such as screens or berms can significantly reduce noise impacts but may result in additional visual impacts. Although vegetation such as shrubs or trees may improve the visual impact of construction sites, it will not significantly reduce noise impacts and should not be considered as a control measure.*<br>• *Earth berms can be built to provide screening for large scale earth moving operations and can be landscaped to become permanent features once construction is completed. Care should be taken when constructing earth berms since it may become a significant source dust.*<br>• *If exceedances of IFC guidelines are measured at the NSR, the following earth berm construction is recommended:*<br>○ *Clapham Shaft Complex:*<br>▪ *Height of earth berm preferably 10 m*<br>▪ *Constructed not more than 50 m from the main noise sources at the Clapham Shaft Complex*<br>○ *Driekop Shaft Complex:*<br>▪ *Height of earth berm preferably 15 m*<br>▪ *Constructed not more than 50 m from the main noise sources at the Driekop Shaft Complex*<br>• *Berms can be constructed from waste rock material. It is recommended that noise sampling be undertaken at the NSRs once the berm is constructed to understand the effectiveness of* | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
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| | | *the noise barrier. If IFC guidelines are still exceeded, the berm should be covered with topsoil and then vegetated. The vegetated berms will reduce their acoustic "hardness" and increase their attenuation potential. An unvegetated berm constructed solely from waste rock could compound impacts by reflecting noise.* | | |
| • Transport systems | • Road disturbance and traffic safety | Management actions to mitigate traffic impacts are:<br>• The mine will record and respond, appropriately and without delay, to any complaints about the usage of roads by mine vehicles. | Ongoing | Not applicable |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile | • Visual impacts | Management measures as per the approved EMPr will remain relevant, and are as follows:<br>• During the construction and operational phases, the mine will ensure that the absolute minimum amount of vegetation and land is disturbed during site development and operation.<br>• Implement the air pollution control system to avoid plumes of dust that can reduce visibility.<br>• Paint structures and buildings in colours (browns and greens) that reflect and compliment the natural landscape – whites, blacks and bright colours will be avoided.<br>• To reduce the amount of glare, external surfaces of buildings and other structures should be articulated or textured to increase the interplay of light and shade.<br>• Night lighting will be: fitted with fixtures to prevent light spillage an focus the light on precise mine activities and infrastructure, fitted as low to the ground as is practicable, and security lights will be activated with movement sensors.<br>• In the decommissioning phase Marula will implement its closure plan which involves the removal of infrastructure, and the rehabilitation and re-vegetation of cleared areas and any final landforms that will remain post closure. These final landforms should be rehabilitated in a manner that both achieves landscape functionality and limits and/or enhances the long-term visual impact.<br>• At closure, final landforms will be managed through an aftercare and maintenance programme to limit and/or enhance the long-term post closure visual impacts. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrade<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | |
| • N/A | • Loss of heritage and palaeontological resources | • Implement a chance find procedure | As required | Compliance with the NHRA. |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Economic impacts | • In the approved EIA and EMPr (Metago, 2012) it is outlined that Marula will continue to implement the commitments in its Social and Labour Plan (SLP) in accordance with the employment, procurement, and social investment principles of the Mining Charter. These measures will be applied to the project components, where applicable. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines | • Inward migration | The measures outlined in the approved EIA and EMPr (Metago, 2012) (with refence to the mines approved SLP) can be implemented for the proposed project as follows.<br><br><u>Recruitment and relationships with surrounding communities</u><br><br>The mine will ensure that its recruitment process incorporates the following:<br>• Clear communication that employment of exclusively local people for the proposed project cannot be guaranteed but the mine will aim to realize their employment target as per the approved SLP.<br>• Effective and timeous communication with community leaders.<br>• The precise number of job opportunities (permanent and temporary) will be made public together with the required skills and qualifications by mine management and the relevant communities. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | | • The duration of temporary work will be clearly indicated, and employees provided with regular reminders and revisions throughout the employment period.<br>• Good communication with all job seekers will be maintained throughout the recruitment process, to ensure that the process is seen and understood to be fair and impartial by all involved.<br>• Selection of young local people for assistance with furthering their education.<br>• Urging people to get all their documents and certificates, including valid driving licenses, in order prior to recruitment.<br>• Facilitating the recognition of prior learning of those job applicants who do not possess formally documented qualifications.<br>• Encouraging the Department of Labour and Local Economic Development Forums to educate potential workers about the recruitment process and helping with the organisation of the necessary documentation, as well as keeping an up-to-date database of unemployed people who are looking for work.<br><br><u>Influx of workers including stress on housing related infrastructure and crime</u><br><br>The focus of these actions is to prevent the establishment of informal settlements.<br>• The mine recognizes the importance of its workforce (including that of its contractors) residing in decent housing which is of an adequate size and serviced with basic infrastructure in terms of water, sanitation and electricity, in line with the Constitution of the country. As such the key principles guiding the mine's strategic planning during the life of the mine include the following:<br>○ Marula Platinum Mine's core business should remain that of mining and not the provision of housing.<br>○ It is not the mine's intention to become a land owner or landlord in the local area without a clear strategy of transferring land or housing stock to individual owners (i.e. the workforce). | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| | | ○ Hostel accommodation is not an acceptable solution to the housing needs of its workforce, and whilst this may be necessary in the short term during the establishment of alternative housing accommodation, will not be utilized as a long term strategy.<br>○ Local recruitment is a key objective of the mine with a view to ensuring a fully localized labour force at the mine.<br>○ The housing policy at the mine must work in conjunction with the mine's recruitment, remuneration and local economic development programmes to ensure a holistic approach to the issue during the life of the mine.<br>○ The housing policy will take cognizance of the business plan of the mine and its related projected workforce requirements in good time for effective planning mechanisms to be implemented.<br>○ The mine endeavours, through its company housing policy, to prevent squatting in the vicinity of the mine development.<br>• All contractors and sub-contractors working on behalf of the mine must comply with the recruitment process. If possible, other developers and employers in the immediate area should adhere to the same process. The following additional points must be adhered to in the mine's recruitment process:<br>○ There will be no recruitment at the construction site. All recruitment will take place on set dates and at an arranged venue-preferably a formal gathering place in a nearby community.<br>○ There will be no ad hoc hiring of temporary casual labour, no matter how small and temporary the job (washing of vehicles or litter clearance). A sign clearly indicating that there will be no recruitment at the construction site will be erected at the entrance to the site. Also, a list of available temporary workers in the area will be drawn up and kept by the mine in the event that temporary labour is required. If it is not possible to draw up such a list, information will be | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| | | distributed through existing community related communication structures.<br>  ○ Recruitment will take place during a prescribed 1-2 day period. Subsequent recruitment of replacement staff will take place at discrete, well-advertised intervals during the year.<br>  ○ Once the recruitment process is complete, unsuccessful job seekers must be clearly informed as such and understand that there is absolutely no reason to remain in the vicinity of the development;<br>• Local authorities will be requested to remove any informal settlements in the vicinity of the mine that are occupied by people who are there in the hope of obtaining employment. This must be carried out immediately.<br>• There will be no worker accommodation at the construction site.<br>• In regard to crime, the mine will communicate with its own security team and the local police force particularly in the context of developing strategies for combating crime in the vicinity of the mine, surrounding communities and surrounding land users/owners.<br><br>Influx of workers, hygiene/disease - HIV/AIDS<br>• The mine will ensure that its employees and contractors are made aware of the issues surrounding the spread of HIV and AIDS in the area. This awareness will be promoted by initiatives such as training and development, peer education, community interventions and visual awareness campaigns. Prevention and management strategies also need to be introduced.<br>• Voluntary Counselling and Testing (VCT) is a vital aspect to any HIV/Aids management programme. All stakeholders at the mine need to agree to a rigorous VCT programme. Once a high level of VCT is taking place it is possible to define the magnitude of the problem and begin to develop appropriate strategies for dealing with it.<br><br>These measures will be applied to the project components, where applicable. | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades<br>• Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades<br>• Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Change in land uses | The measures outlined in the approved EIA and EMPr (Metago, 2012) can be implemented for the project as follows:<br>• Land disturbance by mine activities will be limited to those activities and areas that are described in the EIA and EMP reports.<br>• For its current operations, Marula has agreements in place with crop field owners regarding compensation for lost land. The same will apply to the Merensky areas. As part of the above process, the mine will keep a record of affected farmers including the type and size of their farming operations.<br>• Solutions will also be investigated for loss of grazing land, where required, in consultation with the *Department of Agriculture, Land Reform and Rural Development (DALRRD)* and affected farmers.<br>• Rehabilitation will commence as soon as mine activities cease. Where possible, areas will be rehabilitated on an ongoing basis.<br>• All rehabilitation initiatives will ensure that current land capabilities are restored through the conservation and replacement of soil and the re- establishment of vegetation that naturally occurs in the mine area.<br>• Land not required for the mining and process operations and associated infrastructure will not be disturbed. These rehabilitation efforts must be limited to the measures provided in the biodiversity section.<br>• Marula will implement the EMP commitments with a view not only to prevent and/or mitigate the various environmental and social impacts, but also to prevent negative impacts on surrounding land uses.<br>• Where there is a risk of damage to existing infrastructure, this will be diverted and/or relocated in consultation with the relevant landowners/ stakeholders.<br>• Closure planning will incorporate measures to achieve the future land use plans for the land within the Marula surface use area. | Ongoing<br>As required<br>As required<br>As required<br>As required<br>Ongoing<br>As required<br>As required | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---|---|---|---|
| • Maintenance and aftercare of rehabilitated areas | | | | |

# 27. FINANCIAL PROVISION

Determination of the financial provision for the proposed Ventilation Shaft's 8 and 9 at the Marula Platinum Mine was undertaken by E-TEK Consulting (Pty) Ltd (E-Tek). The financial provision was calculated according to the requirements of the NEMA (GNU R1147) published in November 2015. This section summarises the financial provision required for the proposed project. The financial provision represents a 10-year liability forecast.

## 27.1 DETERMINATION OF THE AMOUNT OF THE FINANCIAL PROVISION

### 27.1.1 CLOSURE OBJECTIVES DESCRIPTION AND THE ALIGNMENT WITH THE BASELINE ENVIRONMENT

### 27.1.2 ENVIRONMENTAL ASPECTS THAT DESCRIBE THE PRE-MINING ENVIRONMENT

Environmental aspects that describe the pre-mining environment as informed by the baseline description (Section 8.3) are listed below. This list serves to guide the setting of environmental objectives for mine closure.

- relatively flat topography with scattered koppies to the west and south;
- pre-mining soils supported arable, grazing and wilderness land capabilities and/or uses, closure objectives around land capability and use must be informed by consensus with relevant stakeholders;
- functioning pockets of more ecologically sensitive environments;
- perennial and non-perennial drainage patterns;
- poor groundwater quality (due to elevated concentrations of nitrate and magnesium);
- stable water table providing groundwater as a water supply source; and
- rural environment.

### 27.1.3 MEASURES TO CONTROL OR REMEDY ANY CAUSES OF POLLUTION OR DEGRADATION

Measures required to contain or remedy any causes of pollution or degradation or migration of pollutants, both for closure of the mine and post-closure are listed below.

- implement a waste management procedure for general and hazardous waste on site;
- ensure immediate clean-up of any spills as per the emergency response procedures (Section 30.2.2);
- establish and maintain dirty stormwater control measures in line with regulatory requirements, until such time as potentially polluting areas are rehabilitated;
- contain pollutants at source by storing and handling potentially polluting substances on impermeable substrates, within bunded areas and with the capacity to contain spills; and
- rehabilitate the site in line with a detailed closure plan to be developed at least five years prior to decommissioning.

### 27.1.4 CONFIRMATION THAT THE CLOSURE OBJECTIVES HAVE BEEN CONSULTED WITH I&APS

The closure objectives are outlined in this report which will be made available to I&APs for review and comment (Section 7.2.2).

### 27.1.5 REHABILITATION PLAN

The project does not require the development of an annual rehabilitation plan as outlined in the Financial Provisioning Regulations, 2015 (GNR 1147 of 20 November 2015) that focusses on rehabilitation for the forthcoming 12 months. The proposed project components will be operational for many years to come, and the rehabilitation of disturbed areas would only be considered nearer to the end of life of mine.

### 27.1.6 COMPATIBILITY OF THE REHABILITATION PLAN WITH THE CLOSURE OBJECTIVES

It can be confirmed that the rehabilitation plan is compatible with the closure objectives given that the closure objectives were taken into account during the determination of the financial provision.

### 27.1.7 CALCULATE AND STATE THE QUANTUM OF THE FINANCIAL PROVISION

The following components were identified and form part of the calculation (see also Figure 3 9).

- Ventilation Shaft 8 at the Clapham Shaft:
  - Ventilation shaft (Downcast);
  - Bulk air cooler;
  - Refrigeration plant and condenser cooling towers.
- Ventilation Shaft 9 at the Driekop Shaft:
  - Ventilation shaft with surface main fans and electrical rooms.
- Water pipelines;
- Wastewater pipelines;
- Powerlines;
- TSF pipeline;
- Clapham change house;
- Driekop change house;
- Low grade product stockpile; and
- Compressed airline upgrade.

#### 27.1.7.1Methodology Applied to Liability Model

The following approach was applied to determine the financial provision:

- Financial models were developed to cater for the requirements of GNR 1147;
- The costing models were developed to address all the identified closure components applicable to Marula;
- The costing models provide the following output:
  - Executive Summary;
  - P&G's: Allocation of P&G's for each component and provides weighted P&G's, as certain P&G's allowances, can vary per component;
  - Contingencies: Allocation of Contingencies for each component and provides weighted Contingencies, as certain Contingency allowances can vary per component;
  - Closure Components Summary (Provides a summary of all costs per closure component).
  - The five main closure components have been identified as follows:
    - Infrastructural Aspects;
    - Mining Aspects;
    - Biophysical Closure Aspects;
    - Social Closure Aspects; and
    - General Aspects.

- Closure Components (Breakdown of the detailed facilities and aspects under each of the five main closure components); and
- Rates Table (Unit rates for various actions required).

#### 27.1.7.2 Assessment Methodology

The approach followed with the determination of the closure costs is summarised as follows:

- Review of available information and identification of infrastructure that would need to be decommissioned at closure;
- Gathering of relevant data which forms the basis of the calculation;
- All-newly proposed infrastructure was assigned with a reference number which can be referenced directly to the costing model;
- Reference map was created indicating the position of the proposed infrastructure in relation to the existing infrastructure;
- Closure criteria was developed and workshopped with Marula as part of the annual liability assessment;
- The closure forecast was based on the proposed project timeframe;
- Compilation of a Bill of Quantities (BoQ) capturing the quantities and actions relating to the closure of the different closure aspects; and
- Unit rates from E-TEK's database were updated to be aligned with the current market-related rates acquired from local civil- and demolition contractors. (Note – these rates refer to closure conditions when the mine is no longer operational).

#### 27.1.7.3 Summary

The financial provision represents a 10-year forecast (2021 – 2030) of the proposed project. The financial provision takes into consideration the proposed project schedule for implementation. Marula is to financially provide for the highest liability figure out of the 10-year closure forecast, which has been calculated at:

- Closure Forecast (Y2029): R 11, 46million (rounded).

The above figure includes P&G's (6%), Contingencies (10%) and value-added tax (VAT) (15%).

### 27.1.8 CONFIRMATION THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED

The amount required in order to manage and rehabilitate the environmental impacts as determined for financial provision can be provided for i.e., there is adequate revenue which will be provided for in the mines' operating costs of budget. To align the financial provisioning with the requirements of the NEMA Financial Provisioning Regulations (GNR 1147, 2015) the project will increase provisioning into the current closure provision.

# 28.MECHANISMS FOR MONITORING COMPLIANCE AND PERFORMANCE AGAINST THE EMPR

Environmental impacts requiring monitoring are listed in Table 37 below. As a general approach, Marula will ensure that the monitoring programmes comprises the following:

- adherence to a formal monitoring procedure;
- use of appropriately calibrated equipment by personnel trained to use the equipment;
- the preservation of samples according to laboratory specifications by personnel trained to use the equipment, where samples require analysis;
- the identification of monitoring parameters in consultation with a specialist in the relevant field and/or the relevant authority;
- the amendment of monitoring parameters, where necessary, following the initial monitoring results and in consultation with a specialist and/or the relevant authority; and
- the interpretation of data and reporting of trends will be undertaken by an appropriately qualified person.

**Table 37: Monitoring of compliance and performance**

| Source Activity | Impacts Requiring Monitoring Programmes | Functional Requirements for Monitoring | Roles and Responsibilities | Monitoring and Reporting Frequency and Time Periods for Implementing impact Management Actions |
|---|---|---|---|---|
| **Alien and invasive species** | | | | |
| • Ventilations shafts and refrigeration infrastructure<br>• TSF pipeline<br>• Powerlines<br>• Water pipelines<br>• Demolition<br>• Rehabilitation | Physical destruction of biodiversity affecting habitat, species diversity and SCC | Marula will implement an AIP Management/Control Plan. AIPs should be cleared within the study area before any vegetation clearing activities commence, thereby ensuring that no AIP propagules are spread with construction rubble, or soils contaminated with AIP seeds during the construction phase. As part of developing the plan, cognizance of the following is required:<br>• An AIP Management/Control Plan should be implemented by a qualified professional.<br>• No use of uncertified chemicals may be used for chemical control of AIPs. Only trained personnel are to use chemical and mechanical control methods of AIPs. Chemical control may not be used within the Watercourse Habitat. | Marula Environmental department | • To be implemented during all mine phases.<br>• The frequency of monitoring and report should be undertaken as per the requirements of he AIP. |

| Source Activity | Impacts Requiring Monitoring Programmes | Functional Requirements for Monitoring | Roles and Responsibilities | Monitoring and Reporting Frequency and Time Periods for Implementing impact Management Actions |
|---|---|---|---|---|
| • Maintenance and aftercare of rehabilitated areas | | • A 30 m buffer surrounding the study area should be regularly checked for AIP proliferation and to prevent spread into surrounding natural areas. | | |
| **Floral monitoring** | | | | |
| • Ventilations shafts and refrigeration infrastructure<br>• TSF pipeline<br>• Powerlines<br>• Water pipelines<br>• Demolition<br>• Rehabilitation<br>• Maintenance and aftercare of rehabilitated areas | Physical destruction of biodiversity affecting habitat, species diversity and SCC | A floral monitoring plan must be designed and implemented throughout all phases of the proposed mining project, should it be approved. The following points aim to guide the design of the monitoring plan, and it must be noted that the monitoring plan must be continually updated and refined for site-specific requirements:<br>• Permanent monitoring plots must be established within (target area) and surrounding (reference area) all rehabilitated areas. These plots must be designed to accurately monitor the following parameters:<br>– Species diversity and species abundance;<br>– Recruitment of indigenous species and of alien and invasive species, including alien vs Indigenous plant ratios;<br>– Erosion levels and the efficacy of erosion control measures; and<br>– Vegetation community structure including species composition and diversity which should be compared to pre-development conditions and work towards the post-closure objective.<br>• Monitoring of all the natural areas should continue throughout the operational phase to ensure these systems are not adversely affected by associated activities; | Marula Environmental department | • To be implemented during all mine phases. |

| Source Activity | Impacts Requiring Monitoring Programmes | Functional Requirements for Monitoring | Roles and Responsibilities | Monitoring and Reporting Frequency and Time Periods for Implementing impact Management Actions |
|---|---|---|---|---|
| | | • The rehabilitation plan must be continuously updated (i.e. adaptive management) in accordance with the monitoring results to ensure that optimal rehabilitation measures are employed. Adaptive management is an integral part of any rehabilitation plan as it assesses monitoring results to allow rehabilitation measures to be revisited and to be adapted accordingly;<br>• Results of the monitoring activities must be considered during all phases of the proposed project and action must be taken to mitigate impacts as soon as negative effects from mining activities become apparent;<br>• The method of monitoring must be designed to be subjective and repeatable to ensure consistent results; and<br>• Monitoring of rescued and relocated floral SCC should continue during the Decommissioning & Closure Phase until it is evident that the species have successfully established. Where possible, these species should be reintroduced into rehabilitation sites. | | |
| **Noise** | | | | |
| • Ventilations shafts and refrigeration infrastructure | | In the event that noise related complaints are received short term ambient noise measurements, at the complainant, should be conducted as part of investigating the complaints. The results of the measurements should be used to inform any follow up interventions. The investigation of complaints should include an investigation into equipment or machinery that likely result or resulted in noise levels annoying to the community. This could be achieved with source noise measurements.<br><br>The following procedure should be adopted for all noise surveys (for complaints): | Marula environmental department | • As and when required for a noise complaint<br>• Annual at Winaarshoek and Galane<br>• Noise monitoring should take place during all mine phases prior to closure. |

| Source Activity | Impacts Requiring Monitoring Programmes | Functional Requirements for Monitoring | Roles and Responsibilities | Monitoring and Reporting Frequency and Time Periods for Implementing impact Management Actions |
|---|---|---|---|---|
| | | • Any surveys should be designed and conducted by a trained specialist.<br>• Sampling should be carried out using a Type 1 SLM that meets all appropriate IEC standards and is subject to annual calibration by an accredited laboratory.<br>• The acoustic sensitivity of the SLM should be tested with portable acoustic calibrator before and after each sampling session.<br>• Samples sufficient for statistical analysis should be taken with the use of portable SLM's capable of logging data continuously over the time period. Samples representative of the day- and night-time acoustic environment should be taken.<br>• The following acoustic indices should be recoded and reported: LAeq (T), statistical noise level LA90, LAFmin and LAFmax, octave band or 3rd octave band frequency spectra.<br>• The SLM should be located approximately 1.5 m above the ground and no closer than 3 m to any reflecting surface.<br>• Efforts should be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g. wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet.<br>• A detailed log and record should be kept. Records should include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site. | | |

| Source Activity | Impacts Requiring Monitoring Programmes | Functional Requirements for Monitoring | Roles and Responsibilities | Monitoring and Reporting Frequency and Time Periods for Implementing impact Management Actions |
|---|---|---|---|---|
| | | In addition to the above ad-hoc sampling campaigns for complaints, annual noise sampling campaigns should be conducted at Winaarskhoek and Galane. The same procedures as stipulated above should be followed. | | |

## 28.1 FREQUENCY OF PERFORMANCE ASSESSMENT REPORT

Marula will, for the period during which the EA and the EMPr is valid, submit environmental audit reports to the DMRE. These audits will focus on the mine's compliance with the conditions of the EA and the commitments stipulated in this EMPr. These audits will be undertaken by a qualified independent person and will comply with the relevant NEMA EIA Regulations (2014, as amended). The Environmental Manager will conduct internal management audits against the commitments in the EMPr in accordance with an annual audit plan. During the operational phase, external audits will be conducted on a quarterly basis. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

## 28.2 CLOSURE COST REPORTING

The financial provision for the mine will be updated on an annual basis and be submitted to the DMRE for the duration of the operation in accordance with the relevant legislation at the time.

# 29. ENVIRONMENTAL AWARENESS PLAN

## 29.1 MANNER IN WHICH THE APPLICANT INTENDS TO INFORM EMPLOYEES OF THE ENVIRONMENTAL RISKS

The purpose of the environmental awareness plan is to ensure that all personnel and management understand the general environmental requirements of the site. In addition, greater environmental awareness must be communicated to personnel involved in specific activities which can have a significant impact on the environment and ensure that they are competent to carry out their tasks on the basis of appropriate education, training and/or experience. The environmental awareness plan should enable Marula to achieve the objectives of the environmental policy. All contractors that conduct work on behalf of Marula are bound by the content of the EMP and a contractual condition to this effect will be included in all such contracts entered into by the mine. If contractors are used, the responsibility for ensuring compliance with the EMP will remain with Marula. Marula will display the environmental policy.

### 29.1.1 ENVIRONMENTAL POLICY

Marula aims to achieve world class environmental performance in a sustainable manner Marula is currently committed to:

- Integrating environmental management into all aspects of our business.
- Complying with all applicable legislation and other requirement to which Marula subscribes.
- Practising responsible stewardship by adopting world class standards.
- Proactively identifying and managing significant environmental aspects in order to:
    - Optimise resource consumption;
    - Mitigate our impacts on climate change;
    - Minimise waste;
    - Rehabilitate disturbed land and protect environmental biodiversity; and
    - Protect cultural heritage resources.
- Ensuring environmental awareness and appropriate competency among employees and promoting environmental awareness in the community.
- Engaging with all IAPs towards the shared goal of improving the environment.
- Setting objectives and, where possible, quantitative targets, to determine continual improvement in environmental performance and the prevention of pollution.
- The policy will be made available to the public in particular the communities, though the Stakeholder Engagement Department and community structures.
- This policy and associated objectives and targets will be regularly reviewed to ensure that they adequately reflect Marula’s commitment to continually improve environmental management systems and performance.
- Action by an Audit Finding conducted for ISO 14001:2004 Requirements.

Marula’s environmental policy will be realised by setting specific and measurable objectives as follows:

Management of environmental responsibilities:

- Marula will establish and appoint Managers at senior mine management level, who will be provided with all necessary resources to carry out the management of all environmental aspects of the site irrespective of other responsibilities, for example:

  - Compliance with environmental legislation and EMP commitments;
  - Implementing and maintaining an environmental management system;
  - Developing environmental emergency response procedures and coordinating personnel during incidents;
  - Manage routine environmental monitoring and data interpretation;
  - Environmental trouble shooting and implementation of remediation strategies; and
  - Closure planning.

Communication of environmental issues and information:

- Meetings, consultations and progress reviews will be carried out, and specifically Marula will:
  - Set the discussion of environmental issues and feedback on environmental projects as an agenda item at all company board meetings;
  - Provide progress reports on the achievement of policy objectives and level of compliance with the approved EMPs to the Department of Minerals Resources (DMR);
  - Ensure environmental issues are raised at monthly mine management executive committee meetings and all relevant mine wide meetings at all levels; and
  - Ensure environmental issues are discussed at all general liaison meetings with local communities and other interested and affected parties.

Environmental awareness training:

- Marula will provide environmental awareness training to individuals at a level of detail specific to the requirements of their job, but will generally comprise:
  - Basic awareness training for all prior to granting access to site (e.g. short video presentation requiring registration once completed). Employees and contractors who have not attended the training will not be allowed on site;
  - General environmental awareness training including biodiversity will be given to all employees and contractors as part of the Safety, Health and Environment induction programme;
  - All non-Marula personnel who will be on site for more than three days must undergo the SHE induction training; and
  - Specific environmental awareness training will be provided to personnel whose work activities can have a significant impact on the environment (e.g. workshops, waste handling and disposal, sanitation, etc.).
- Review and update the environmental topics already identified in the EMP which currently includes the following purpose:
  - Topography (hazardous excavations);
  - Soil and land capability management (loss of soil resource);
  - Management of biodiversity;
  - Surface water management (alteration of surface drainage and pollution of surface water);
  - Groundwater management (reduction in groundwater levels/availability and groundwater contamination);
  - Management of air quality (dust generation);
  - Noise (specifically management of disturbing noise);
  - Visual aspects (reduction of negative visual impacts);
  - Surrounding land use (traffic management, blast management, land use loss);

  - Heritage resources (management of sites); and
  - Socio-economic impacts (management of positive and negative impacts).
- All mine projects will be designed to minimise impact on the environment and to accomplish closure/rehabilitation objectives.
- Marula will maintain records of all environmental training, monitoring, incidents, corrective actions and reports.

#### 29.1.2 TRAINING OBJECTIVES OF THE ENVIRONMENTAL AWARENESS PLAN

The environmental awareness plan ensures that training needs are identified, and that appropriate training is provided. The environmental awareness plan communicates the following:

- The importance of conformance with the environmental policy, procedures, and other requirements of good environmental management.
- The significant environmental impacts and risks of individuals work activities and explain the environmental benefits of improved performance.
- Individuals' roles and responsibilities in achieving the aims and objectives of the environmental policy.
- The potential consequences of not complying with environmental procedures.

#### 29.1.3 GENERAL CONTENTS OF THE ENVIRONMENTAL AWARENESS PLAN

To achieve the objectives of the environmental awareness, plan the general contents of the training plans are attached in Appendix H.

### 29.2 MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION OF THE ENVIRONMENT

#### 29.2.1 ON-GOING MONITORING AND MANAGEMENT ACTIONS

The monitoring programme as described in Section 26 will be undertaken to provide early warning systems necessary to avoid environmental emergencies.

#### 29.2.2 PROCEDURES IN CASE OF ENVIRONMENTAL EMERGENCIES

Emergency procedures apply to incidents that are unexpected and that may be sudden, and which lead to serious danger to the public and/or potentially serious pollution of, or detriment to the environment (immediate and delayed). Procedures to be followed in case of environmental emergencies are described in the table below (Table 38). These procedures are the same as those for the current and approved Merensky operations and are deemed adequate for the proposed project components and related activities.

##### 29.2.2.1 General emergency procedure

The general procedure that should be followed in the event of all emergency situations is as follows:

- Applicable incident controller defined in emergency plans must be notified of an incident upon discovery.
- Area to be cordoned off to prevent unauthorised access and tampering of evidence.
- Undertake actions defined in emergency plant to limit/contain the impact of the emergency.

- If residue facilities/dams, stormwater diversions, etc., are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Operations Engineer on shift must be notified.
- Take photographs and samples as necessary to assist in investigation.
- Report the incident immediately to the environmental department for emergencies involving environmental impacts or to the safely department in the case of injury.
- The Environment department must comply with Section 30 of the National Environmental Management Act (107 of 1998) such that:
  - The Environment department must immediately notify the Director-General (DWA and DEA, DMRE and Inspectorate of Mines as appropriate), the South African Police Services, the relevant fire prevention service, the provincial head of LEDET, the head of the local municipality, the head of the regional DWA office and any persons whose health may be affected of;
  - The nature of the incident;
  - Any risks posed to public health, safety and property;
  - The toxicity of the substances or by-products released by the incident; and
  - Any steps taken to avoid or minimise the effects of the incident on public health and the environment.
- The Environment department must as soon as is practical after the incident:
  - Take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
  - Undertake clean up procedures;
  - Remedy the effects of the incident; and
  - Assess the immediate and long term effects of the incident (environment and public health).
- Within 14 days the Environment department must report to the Director-General DWA and DEA, the provincial head of LEDET, the regional manager of the DMRE, the head of the local and district municipality, the head of the regional DWA office such information as is available to enable an initial evaluation of the incident, including:
  - The nature of the incident;
  - The substances involved and an estimation of the quantity released;
  - The possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
  - Initial measures taken to minimise the impacts;
  - Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure; and
  - Measures taken to avoid a recurrence of the incident.

#### 29.2.2.2 Identification of emergency situations

The site wide emergency situations that have been identified together with specific emergency response procedures are outlined in Table 38 below.

### 29.2.3 TECHNICAL, MANAGEMENT AND FINANCIAL OPTIONS

Technical, management and financial options that will be put into place to deal with the remediation of impacts in cases of environmental emergencies are described below:

- Marula will appoint a competent management team with the appropriate skills to develop and manage the proposed project of this scale and nature;
- To prevent the occurrence of emergency situations, Marula will implement, as a minimum, the mine plan and mitigation measures as included in this BAR and EMPr;
- Marula has an environmental management system in place where to identify, report, investigate, address and close out environmental incidents;
- As part of its annual budget, Impala will allow a contingency for handling of any risks identified and/or emergency situations; and
- Where required, Marula will seek input from appropriately qualified people.

### Table 38: Emergency response procedure

| Item | Emergency Situations | Response in addition to general procedures |
|---|---|---|
| 1 | Spillage of chemicals, engineering substances and waste | • Where there is a risk that contamination will contaminate the land (leading to a loss of resource), surface water and/or groundwater, Marula will:<br>○ Notify residents/users downstream of the pollution incident.<br>○ Identify and provide alternative resources should contamination impact adversely on the existing environment.<br>○ Cut off the source if the spill is originating from a pump, pipeline or valve (e.g. Tailings delivery pipeline, refuelling tanker) and the infrastructure 'made safe'.<br>○ Contain the spill (e.g. construct temporary earth bund around source such as road tanker).<br>○ Pump excess hazardous liquids on the surface to temporary containers (e.g. 210 litre drums, mobile tanker, etc.) for appropriate disposal.<br>○ Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired |
| 2 | Discharge of dirty water to the environment | • Apply the principals listed for Item 1 above.<br>• To stop spillage from the dirty water system the mine will:<br>○ Redirect excess water to other dirty water facilities where possible;<br>○ Pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system; and<br>○ Carry out an emergency discharge of clean water and redirect the spillage to the emptied facility.<br>• Apply for emergency discharge as a last resort. |
| 3 | Pollution of surface water | • Personnel discovering the incident must inform the Environment department of the location and contaminant source.<br>• Apply the principals listed for Item 1 above.<br>• Absorbent booms will be used to absorb surface plumes of hydrocarbon contaminants.<br>• Contamination entering the surface water drainage system should be redirected into the dirty water system.<br>• The Environment department will collect in-stream water samples downstream of the incident to assess the immediate risk posed by contamination. |
| 4 | Groundwater contamination | • Use the groundwater monitoring boreholes as scavenger wells to pump out the polluted groundwater for re-use in the process water circuit (hence containing the contamination and preventing further migration). |

| Item | Emergency Situations | Response in addition to general procedures |
|---|---|---|
| | | • Investigate the source of contamination and implement control/mitigation and prevention measures. |
| 5 | Burst water pipes (loss of resource and erosion) | • Notify authority responsible for the pipeline (if not mine responsibility).<br>• Shut off the water flowing through the damaged area and repair the damage.<br>• Apply the principals listed for Item 1 above if spill is from the dirty/process water circuit. |
| 6 | Flooding from failure of surface water control infrastructure | • Evacuate the area downstream of the failure.<br>• Using the emergency response team, rescue/recover and medically treat any injured personnel.<br>• Temporarily reinstate/repair stormwater diversions during the storm event (e.g. emergency supply of sandbags).<br>• Close the roads affected by localised flooding or where a stormwater surge has destroyed crossings/bridges |
| 7 | Risk of drowning from falling into water dams | • Attempt rescue of individuals from land by throwing lifeline/lifesaving ring.<br>• Get assistance of emergency response team whilst attempting rescue or to carry out rescue of animals and or people as relevant.<br>• Ensure medical assistance is available to recovered individual. |
| 8 | Veld fire | • Evacuate mine employees from areas at risk.<br>• Notify downwind residents and industries of the danger.<br>• Assist those in imminent danger/less able individuals to evacuate until danger has passed.<br>• Provide emergency firefighting assistance with available trained mine personnel and equipment. |
| 9 | Overtopping or failure of the tailings dam | • Sound the alarm to evacuate danger area.<br>• Pump water from top of dam and follow redirection of water as indicated in Item 2 above.<br>• Stop pumping tailings to the tailings.<br>• Recover casualties resulting from dam failure using the emergency response team.<br>• Make the remaining structure safe.<br>• Apply the principles of Item 1 above. |
| 10 | Falling into hazardous excavations | • Personnel discovering the fallen individual or animal must mobilise the emergency response<br>• team to the location of the incident and provide a general appraisal of the situation (e.g. human or animal, conscious or unconscious, etc.).<br>• The injured party should be recovered by trained professionals such as the mine emergency<br>• response team. |

| Item | Emergency Situations | Response in addition to general procedures |
|---|---|---|
| | | • A doctor (or appropriate medical practitioner)/ambulance should be present at the scene to provide first aid and transport individual to hospital. |
| 11 | Road traffic accidents (on site) | • The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so.<br>• Access to the area should be restricted and access roads cleared for the emergency response team.<br>• Vehicles must be made safe first by trained professionals (e.g., crushed, or overturned vehicles).<br>• Casualties will be moved to safety by trained professionals and provided with medical assistance.<br>• Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected.<br>• A nearby vet should be consulted in the case of animal injury . |
| 12 | Development of informal settlements | • The mine will inform the local authorities (municipality and police) that people are illegally occupying the land and ensure that action is taken within 24 hrs. |
| 13 | Injury from fly rock | • The person discovering the incident will contact the mine emergency response personnel to recover the injured person or animal and provide medical assistance.<br>• Whilst awaiting arrival of the emergency response personnel, first aid should be administered to the injured person by a qualified first aider if it is safe to do so. |
| 14 | Uncovering of graves and sites | • Personnel discovering the grave or site must inform the Environment department immediately.<br>• Prior to damaging or destroying any of the identified graves, permission for the exhumation and relocation of graves must be obtained from the relevant descendants (if known), the National Department of Health, the Provincial Department of Health, the Premier of the Province, and the local Police.<br>• The exhumation process must comply with the requirements of the relevant Ordinance on Exhumations, and the Human Tissues Act, 65 of 1983. |
| 15 | Uncovering of fossils | • Personnel discovering the fossil or potential site must inform the Environment department immediately.<br>• Should any fossils be uncovered during the development of the site, a palaeontologist or paleoanthropologist will be consulted to identify the possibility for research. |

# 30. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The following documents will be submitted to the DMRE from the start of construction until mine closure:

- As noted in Section 28, an environmental audit report, prepared by an independent person, will be submitted to the DMRE at intervals indicated in the environmental authorisation. The purpose of the environmental audit report is to ensure compliance with the conditions of the environmental authorisation and the EMP; and
- The financial provision will be updated on an annual basis and submitted to the DMRE in accordance with the relevant legislation at the time.

# 31. UNDERTAKING

I, ________________________, the Environmental Assessment Practitioner responsible for compiling this EMPr, undertake that:

- The information provided herein is correct;
- Comments and inputs from stakeholders and I&APs have been included and correctly recorded in this report;
- Inputs and recommendations from the specialist reports have been included where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.

| | |
|---|---|
| Signature of EAP | Date |
| Signature of commissioner of oath | Date |

# 32. REFERENCES


- Airshed Planning Professionals. August 2020. A Basic Air Quality Assessment for the Proposed New Vents at Marula Platinum Mine in Limpopo.
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- Golder Associates. October 2015. Marula Platinum Classification, Assessment and SDS for Waste Streams – Final. Report Number: 1527373-13763-1.
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- Metago Environmental Engineers. October 2007. Environmental Impact Assessment and Environmental Management Programme (EIA AND EMP) report for the proposed Merensky project at Marula Mine.
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- SRK Consulting (South Africa) (Pty) Ltd. November 2019. Marula Platinum Mine – Integrated Water and Waste Management Plan. Report Number 542259/IWWMP.
- Zimpande Research Collaborative. January 2022. Soil, Land Use, Land Capability and Agricultural Potential Assessment as part of the Environmental Impact Assessment (EIA) and Authorisation Process for the Proposed Ventilation Shafts and Associated Infrastructure at Marula Platinum Mine, Limpopo Province.

# Appendix A: Existing authorisations
# Attached separately

## Appendix B: EAP curriculum vitae and registration
## Attached Separately

## Appendix C: Public participation process
## Attached Separately

## APPENDIX D: DETAILED ASSESSMENT OF POTENTIAL IMPACTS

# APPENDIX D: DETAILED ASSESSMENT OF POTENTIAL IMPACTS

Potential biophysical, cultural, and socio-economic impacts were identified by SLR, specialists and I&APs. All identified impacts were considered both incrementally, i.e. assessing impacts associated with the changes to infrastructure and activities for the project, as well as cumulatively in the context of the existing and approved mining infrastructure and activities. The criteria used to rate each impact is outlined in Section 7.6. The section below also addresses the possibility of residual risks (means the environmental impact remaining after a closure certificate has been issued in terms of the MPRDA).

The potential impacts are rated with the assumption that no management actions are applied and then again with management/mitigation actions. An indication of the phases in which the impact will occur, including the project specific activity associated with each impact, is provided below. A summary of the impact assessment is provided in Section 7.6 of the main report. Management actions identified to prevent, reduce, control, or remedy the assessed impacts are provided under the relevant impact discussions sections below. The section below includes management actions outlined in the approved EIA and EMPr (Metago, 2012). Any additional management actions are indicated in *italics*. **It is important to note that the management actions outlined in the section below are specific to the project components only.**

## TOPOGRAPHY

The discussion provided below follows a qualitative assessment approach through the review of topographical data and information sourced from the approved EIA and EMPr (Metago, 2012).

### ISSUE: HAZARDOUS EXCAVATIONS AND INFRASTRUCTURE RESULTING IN SAFETY RISKS TO THIRD PARTIES AND ANIMALS

#### INTRODUCTION

Hazardous excavations and infrastructure include all structures into, or off of which third parties and animals can fall and be harmed. Hazardous excavations and infrastructure can occur in all mine phases from construction through operation to decommissioning and closure. In the construction and decommissioning phases these hazardous excavations and infrastructure are usually temporary in nature, usually existing for a few weeks to a few years. The operational phase will present more long-term hazardous excavations and infrastructure. No hazardous structures are expected at closure, as all infrastructure will be removed.

#### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | N/A |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of water pipelines | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of water pipelines | • Demolition (removal of infrastructure from site) | |

## RATING OF IMPACT

Certain proposed project components (upgrades of existing services and infrastructure at VS 6, VS 5 and VS 7, expansion of the Eskom substation, the product stockpile, powerlines and the Clapham Shaft complex upgrades) are located within existing complexes which are fully-fenced and access-controlled areas. It follows that the impact associated with these project components is expected to be **NEGLIGIBLE** and is therefore not assessed further. The remaining project components (new ventilation shafts, proposed water pipelines and TSF pipeline) have the potential to present hazardous excavations and infrastructure, that can be harmful to both people and animals, when considering that numerous communities reside within the Marula MRA.

Where third party death or permanent injury occurs because of hazardous excavations and infrastructure, this is considered a long term, permanent impact. Direct impacts associated with hazardous infrastructure and excavations will stay within the Marula MRA in all project phases, with or without management actions. The potential indirect impacts because of injury or death will however extend beyond the Marula MRA to the communities to which the injured people and/or animals belong. In the unmitigated scenario, without design and management interventions such as security and access control the impact probability is expected to be medium. With management actions that focus on infrastructure safety design and implementation as well as on limiting access to third parties and animals the probability of the impact occurring reduces to low. The incremental significance is **HIGH** and reduces to **VERY LOW** with mitigation.

The cumulative impact associated with hazardous excavations and infrastructure was assessed as having a high significance in the unmitigated scenario and medium in the mitigated scenario in the approved EIA and EMPr (Metago, 2012). When considered cumulatively in the context of existing approved infrastructure, the proposed project presents additional sources of hazardous excavations and infrastructure, albeit these do not differ from what is already located at the mine. Due to the small scale of the project, these additional sources are not expected to significantly contribute to cumulative impacts. The proposed project does not influence the cumulative rating. The approved cumulative EIA and EMPr (Metago, 2012) rating remains unchanged.

| **Issue: Hazardous excavations and infrastructure resulting in safety risks to third parties and animals** | | |
|---|---|---|
| **Phases: Construction, Operation and Decommissioning** | | |
| **Project components: New ventilation shafts (V8 and V9), water pipelines and TSF pipeline** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | High | Low |
| **Duration** | High | High |
| **Extent** | Medium | Medium |
| **Consequence** | High | Medium |
| **Probability** | Medium | Very Low |
| **Significance** | High (incrementally)<br>High (cumulative) | Very low (incrementally)<br>High (cumulative) |
| | | |
| **Nature of cumulative impacts** | No significant contribution to cumulative impacts. | |

| Issue: Hazardous excavations and infrastructure resulting in safety risks to third parties and animals | |
|---|---|
| **Phases: Construction, Operation and Decommissioning** | |
| **Degree to which impact can be reversed** | Permanent injury or death cannot be reversed. |
| **Degree to which impact can be avoided** | High as mitigation measures should achieve impact avoidance. |
| **Degree to which impact may cause irreplaceable loss** | Permanent injury or death would be an irreplaceable loss. |
| **Degree to which impact can be mitigated** | High as mitigation measures should achieve impact avoidance. |

## RESIDUAL RISK

None as all infrastructure will be removed and the area rehabilitated.

## MANAGEMENT OBJECTIVES

The objective is to prevent physical harm to third parties and animals from potentially hazardous excavations and infrastructure.

## MANAGEMENT ACTIONS

Management actions include the following:

- During the construction phase, each hazardous excavation will have a barrier around it to prevent access by people and animals. The barrier may be in the form of fences, walls, or berms. In addition, the barriers must have warning signs at appropriate intervals. These warning signs must be in picture format and/or written in English, Afrikaans, and Sepedi.
- Ventilation shafts will be sealed in the decommissioning phase. Sufficient waste rock will be stored to backfill the shafts on mine closure.
- All surface infrastructure, relevant to this project, will be removed at the end of life of mine.
- The environmental manager and appointed engineer are responsible for ensuring that these actions are implemented during the construction phase of the excavations, and that they are maintained until rehabilitation and closure.
- The proposed project components will be designed, constructed, operated, and closed in a manner to ensure that stability and safety risks to third parties and animals are addressed. These issues will be monitored according to a schedule that is deemed relevant to the type of facility.
- During all project phases, Marula will survey all the proposed project areas and update its surface use area map on a routine basis to ensure that the position and extent of all potential hazardous excavations, hazardous infrastructure and subsidence is known.
- Where Marula has caused injury to third parties and/or animals, appropriate compensation will be provided.

## EMERGENCY SITUATIONS

If people or animals fall off or into hazardous excavations or infrastructure causing injury, or if any mineralised waste or water facilities fail causing injury to people or animals, the Marula emergency response procedure in Section 29.2. will be initiated.

## SOIL AND LAND CAPABILITY

Information in this section was sourced from the approved EIA and EMPr (Metago, 2012) and the Soil Study undertaken by Zimpande for the project (Zimpande Research Collective, January 2021).

### ISSUE: LOSS OF SOIL RESOURCES AND LAND CAPABILITY THROUGH CONTAMINATION

#### INTRODUCTION

Soil is a valuable resource that supports a variety of ecological functions. Mining projects in general have the potential to damage soil resources through contamination. Contamination of soils also has the potential to impact biodiversity, surface, and groundwater resources. Biodiversity, surface water and groundwater contamination impacts are discussed under their respective headings in this appendix. The loss of soil resources has a direct impact on the potential loss of the natural capability of the land. This section focuses on the potential contamination of the soil resources and the effect this has on land capability.

The proposed project presents several sources in all phases that have the potential to pollute soil resources. In the construction and decommissioning phases these activities are temporary in nature, usually existing from a few weeks to a few months. The operational phase will present more long-term activities and the closure phase will present rehabilitated areas.

#### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

#### RATING OF IMPACT

The proposed changes in the surface infrastructure and activities present additional sources of contamination albeit not different from those already present on site. This in turn can result in a loss of soils as an ecological driver because it can create a toxic environment for vegetation and ecosystems that rely on the soil.

When considered incrementally, most pollution impacts and associated loss in land capability will remain long after closure of the project. In the mitigated scenario, most of these potential impacts should either be avoided or be remedied within the life of the project. This will be achieved by the effective reaction time of the clean-up team and the chosen remediation methods. In both the unmitigated and mitigated scenarios for all phases, the potential loss of soil resources and associated land capabilities will be restricted to within the Marula MRA. Without any mitigation the probability of impacting on soils and land capability through pollution events is possible. With mitigation, the probability will be reduced to low because emphasis will be placed on preventing pollution events and on quick and effective remediation if pollution events do occur. When considered incrementally, in the unmitigated scenario, the significance of this potential impact is rated as **MEDIUM**. In the mitigated scenario, the significance rating reduces to **LOW** because with mitigation the severity, duration and probability associated with the potential the impact all reduces.

The cumulative impact was assessed as having a high significance in the unmitigated scenario and medium in the mitigated scenario in the approved EIA and EMPr (Metago, 2012). When considering the proposed project's impact cumulatively with the current and approved operations, the proposed project presents additional sources of contaminates to those already present on site. Due to the small scale of the project, these additional sources are not expected to significantly contribute to cumulative impacts. It follows that in the cumulative scenario the significance rating remains **HIGH** and reduces to **LOW** with mitigation. This impact rating remains unchanged when compared to the approved EIA and EMPr (Metago, 2012).

| Issue: Loss of Soil Resources and Land Capability Through Contamination | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project component: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | High | Medium |
| **Duration** | High | Low |
| **Extent** | Low | Low |
| **Consequence** | High | Medium |
| **Probability** | Medium | Low |
| **Significance** | Medium (incrementally)<br>High (cumulative) | Low (incrementally and cumulatively) |
| | | |
| **Nature of cumulative impacts** | No significant contribution to cumulative impacts. | |
| **Degree to which impact can be reversed** | Possible with mitigation. | |
| **Degree to which impact can be avoided** | Possible with mitigation. | |
| **Degree to which impact may cause irreplaceable loss** | Possible, where mitigation measures are not correctly implemented. | |
| **Degree to which impact can be mitigated** | High | |

### RESIDUAL RISK

None as all infrastructure will be removed and the area rehabilitated.

### MANAGEMENT OBJECTIVE

The objective is to prevent soil pollution.

### MANAGEMENT ACTIONS

Management actions include the following:

- In the construction, operation and decommissioning phases Marula will ensure that all, dirty water, and non-mineralised wastes are transported, in a manner that they do not pollute soils. This will be implemented through a procedure(s) covering the following:
    - pollution prevention through basic infrastructure design;
    - pollution prevention through maintenance of equipment;
    - pollution prevention through education and training of permanent and temporary workers (relevant to all projects);
    - pollution prevention through appropriate management of hazardous materials and wastes;
    - the required steps to enable fast reaction to contain and remediate pollution incidents. In this regard the remediation options include containment and in situ treatment or disposal of contaminated soils as hazardous waste. In-situ treatment is generally considered to be the preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The in-situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bioremediation at a designated area after which the soils are returned (relevant to all projects);
    - the mine will ensure that all vehicles and equipment will be serviced in workshops and washbays with impermeable floors, dirty water collection facilities and oil traps;
    - all chemical, fuel, oil storage and handling facilities will be designed and operated in a manner that all spillages are contained in impermeable areas and cannot be released into the environment;
    - ad hoc spills of potentially polluting substances (whether in dirty areas or in the environment) will be reported to the environmental manager and cleaned up/remediated immediately;
    - a dirty water management system (where relevant) is implemented;
    - the waste management practices, as set out in Table 39 below, are implemented.

**Table 39: Waste management practices for domestic and industrial waste**

| Items to be considered | | Intentions |
|---|---|---|
| General | Specific | |
| Classification and record keeping | General | • The waste management procedure for the mine will cover the storage, handling and transportation of waste to and from the mine. The mine will ensure that the contractor's responsible are made aware of these procedures. |
| | Waste opportunity analysis | • In line with DWEAs' strategy to eliminate waste streams in the longer term, the mine will assess each waste type to see whether there are alternative uses for the material. This will be done as a priority before the disposal option. |

| Items to be considered | | Intentions |
|---|---|---|
| **General** | **Specific** | |
| | *Classification* | • *Wastes (except those listed in Annexure 1 of the new Waste Regulations) will be classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation.*<br>• *Waste will be re-classified every five (5) years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of relevant factors.* |
| | *Safety data sheets* | • *The mine will maintain, where required in terms of the Regulations, the safety data sheets for hazardous waste (prepared in accordance with SANS 10234).* |
| | *Inventory of wastes produced* | • *The mine will keep an accurate and up to date record of the management of the waste they generate, which records must reflect:*<br>o *the classification of the wastes;*<br>o *the quantity of each waste generated, expressed in tons or cubic metres per month;*<br>o *the quantities of each waste that has either been re-used, recycled, recovered, treated or disposed of; and by whom the waste was managed.* |
| | *Labelling and inventory of waste produced* | • *Any container or storage impoundment holding waste must be labelled, or where labelling is not possible, records must be kept, reflecting:*<br>o *the specific category or categories of waste in the container or storage impoundment as identified in terms of the National Waste Information Regulations, 2012; and*<br>o *the classification of the waste in terms of Regulation 4 once it has been completed (if required).* |
| | Disposal record | • Written evidence of safe disposal of waste will be kept. |
| | *Record keeping* | • *Records will be retained for a period of at least 5 years and will be made available to the Department on request.* |
| Waste management facilities | Collection points | • Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity and that these are serviced frequently. |
| | Laydown areas | • During decommissioning and closure, lay down areas for re-usable non-hazardous materials will be established.<br>• Mixing of re-usable materials with other wastes, especially hazardous wastes will be prevented. |
| | Scrap metal | • Care will be taken to ensure that scrap metal does not become polluted or mixed with any other waste.<br>• The scrap metal will be collected in a designated area for scrap metal (scrap yard). It will be sold to scrap dealers. |
| | Oil and grease | • Oil and grease will be collected in suitable containers at designated collection points. The collection points will be bunded and underlain by impervious materials to ensure that any spills are contained.<br>• An approved subcontractor will remove oil from site. |

| Items to be considered | | Intentions |
|---|---|---|
| General | Specific | |
| | Any soil polluted by a spill | • If remediation of the soil in situ is not possible, the soils will be classified as a waste in terms of the Minimum Requirements and will be disposed of at an appropriate permitted waste facility. |
| | Off-site waste disposal facilities | • Waste will be disposed of at appropriate permitted waste disposal facilities as outlined below. For general waste the closest permitted site is Burgersfort municipal dump. For hazardous waste the closest permitted site is at Holfontein (Springs, Gauteng). |
| | | • *Unless collected by the municipality, the mine must ensure that the waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the NEM:WA prior to the disposal of the waste to landfill.* |
| Waste transport | *Contractor* | • *An approved waste management contractor will undertake the waste transport. The contractor will provide an inventory of each load collected and of proof of disposal at a licenced facility.* |
| Banned practices | Long-term stockpiling of waste | • Stockpiling of waste is a temporary measure. Waste stockpiling sites must have an impervious floor, be bunded and have a drainage system for collection and containment of water on the site. |
| | Burying of waste | • No wastes other than mine residues will be placed on site. |
| | Burning of waste and explosives packaging | • Waste may only be burned in permitted incinerators. |

### EMERGENCY SITUATIONS

Major spillage incidents will be handled in accordance with the mine's emergency response procedure in Section 29.2.

## ISSUE: LOSS OF SOIL RESOURCES AND LAND CAPABILITY THROUGH PHYSICAL DISTURBANCE

### INTRODUCTION

Soil is a valuable resource that supports a variety of ecological functions. Soil is the key to re-establishing post closure land capability. There are several activities/infrastructures in all phases that have the potential to disturb soils and related land capability through removal, compaction and/or erosion. The loss of soil resources has a direct impact on the potential loss of the natural capability of the land. This section focuses on the potential for physical disturbance of the soil resources and the effect this has on land capability.

In the construction and decommissioning phases these activities could be temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long-term activities and the closure phase will present rehabilitated areas that may be susceptible to erosion.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

## RATING OF IMPACT

In the unmitigated scenario, physical soil disturbance can result in a loss of soil functionality as an ecological driver. In the case of erosion, the soils will be lost to the area of disturbance, and in the case of compaction the soils functionality will firstly be compromised through a lack of rooting ability and aeration, and secondly the compacted soils are likely to erode because with less inherent functionality there will be little chance for the establishment of vegetation and other matter that naturally protects the soils from erosion. Certain proposed project components (upgrades of existing services and infrastructure at VS 6, VS 5 and VS 7, expansion of the Eskom substation, the product stockpile, and the Clapham Shaft complex upgrades) are located within existing complexes and as such will be established on already disturbed areas. It follows that the impact associated with these project components is expected to be **NEGLIGIBLE** and is therefore not assessed further. The remaining project components (new ventilation shafts, proposed powerline, proposed water pipelines and TSF pipeline) will present additional activities and infrastructure that have the potential to further disturb soil resources and related land capability. It is however important to note that the footprint areas of the new ventilation shafts are limited (0.5 ha) and majority of the powerline and pipeline infrastructure will be located within existing servitudes.

When considered incrementally, in the unmitigated scenario the intensity of the impact is moderate as the area of disturbance is limited and with mitigation further reduces with focus on limiting disturbance footprints to what is necessary. At closure, with mitigation focussed on successful rehabilitation, the land capability will be restored which reduces the intensity of the impact to very low. In the unmitigated scenario the loss of soil and related land capability is long term and will continue after the life of the project. In the mitigated scenario, the soil is conserved and replaced in all areas which reduces the duration of the impact to the life of the project. In both the unmitigated and mitigated scenarios for all phases, the potential loss of soil resources and associated land capabilities will be restricted to within the site boundary. Without any mitigation the probability of losing soil and related land capability is probable. With mitigation, the probability will be reduced because emphasis will be placed on soil conservation, which further reduces at closure with successful re-establishment of land capability. It follows that in the unmitigated scenario, when considered incrementally the impact significance is **MEDIUM** and reduces to **VERY LOW** with mitigation.

The cumulative significance of the impact associated with the current operations, was assessed in the approved EIA and EMPr (Metago, 2012) and was rated high in the unmitigated scenario and was reduced to medium in the mitigated scenario. When considering the proposed project's impact cumulatively with the current and approved operations, the proposed project presents additional areas of disturbance to those already present on site. Due to the small scale of the project, these additional sources are not expected to significantly contribute to cumulative impacts. It follows that in the cumulative scenario the significance rating is **HIGH** and reduces to **LOW** with mitigation. This impact rating remains unchanged when compared to the approved EIA and EMPr (Metago, 2012).

| Issue: Loss of Soil Resources and Land Capability Through Physical Disturbance | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project component: New ventilation shafts (V8 and V9), proposed powerlines, water pipelines and TSF pipeline** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Medium | Low (very low at closure) |
| **Duration** | High | Medium |
| **Extent** | Low | Low |
| **Consequence** | Medium | Low |
| **Probability** | High | Low (very low at closure) |
| **Significance** | Medium (incrementally)<br>High (cumulative) | Very low (incrementally)<br>Low (cumulative) |
| | | |
| **Nature of cumulative impacts** | No significant contribution to cumulative impacts. | |
| **Degree to which impact can be reversed** | Possible with mitigation. | |
| **Degree to which impact can be avoided** | Possible with mitigation | |
| **Degree to which impact may cause irreplaceable loss** | Possible, where mitigation measures are not correctly implemented. | |
| **Degree to which impact can be mitigated** | High. | |

## RESIDUAL RISK

None as all infrastructure will be removed and the area rehabilitated.

## MANAGEMENT OBJECTIVE

The objective is to minimise the loss of soil resources and related land capability through physical disturbance, erosion and compaction.

## MANAGEMENT ACTIONS

Management actions include the following:

- In the construction, operation, and decommissioning phases a soil management plan, with the following key components, will be implemented:
  - limit the disturbance of soils to what is absolutely necessary for earthworks, on-going activities, infrastructure footprints and use of vehicles; and
  - where soils have to be disturbed the soil will be stripped, stored, maintained, and replaced in accordance with the specifications of the soil management principles as tabulated below.

### Table 40: Soil management principles

| Steps | Factors to consider | Detail |
|---|---|---|
| Delineation of areas to be stripped | | Stripping will only occur where soils are to be disturbed by activities and infrastructure that are described in the EIA and EMP report, and where a clearly defined end rehabilitation use for the stripped soil has been identified. |
| Reference to biodiversity mitigation | | All requirements for moving and preserving fauna and flora according to the biodiversity mitigation measures will be adhered to. |
| Stripping | Topsoil | As a general requirement, a minimum of 50 cm topsoil will be stripped unless a soils expert advises otherwise. |
| | Subsoil | If present, subsoil will be removed and stockpiled separately to the topsoil. |
| Delineation of stockpiling areas | Location | Stockpiling areas will be identified in close proximity to the source of the soil to limit handling and to promote reuse of soils in the correct areas. |
| | Designation of the areas | Soil stockpiles will be clearly identifiable on a plan in terms of soil type and the intended areas of rehabilitation. |
| Stockpile management | Vegetation establishment and erosion control | Rapid growth of vegetation on the topsoil stockpiles will be promoted. The purpose of this exercise will be to encourage vegetation growth on soil stockpiles and to combat erosion by water and wind. |
| | Storm water controls | Stockpiles will be established with storm water diversion berms to prevent run off erosion. |
| | Height and slope | Soil stockpiles height will be controlled to avoid compaction and damage to the underlying soils. The stockpile side slopes should be flat enough to promote vegetation growth and reduce run-off related erosion. |
| | Waste | No waste material will be placed on the soil stockpiles. |
| | Vehicles | Equipment movement on top of the soil stockpiles will be limited to avoid topsoil compaction and subsequent damage to the soils and seedbank. |
| Rehabilitation of disturbed land: restoration of land capability | Placement of soil | A minimum layer of 50 cm of topsoil will be replaced unless a soils expert advises otherwise. |
| | Fertilisation | Samples of stripped soils will be analysed to determine the nutrient status of the soil before rehabilitation commences. As a minimum the following elements will be tested for: cation exchange capacity, pH and phosphate. These elements provide the basis for determining the fertility of soil. Based on the analysis, fertilisers will be applied if necessary. |

| Steps | Factors to consider | Detail |
|---|---|---|
| | Erosion control | Erosion control measures will be implemented to ensure that the topsoil is not washed away, and that erosion gulley's do not develop prior to vegetation establishment. |
| | Restore land function and capability | Apply landscape function analysis and restoration interventions to areas where soil has been replaced as part of rehabilitation, but the land function and capability has not been effectively restored. |

### EMERGENCY SITUATIONS

Soil eroding incidents such as burst water pipes will be handled in accordance with the Marula emergency response procedure in Section 29.2.

## BIODIVERSITY

### ISSUE: PHYSICAL DESTRUCTION OF TERRESTRIAL BIODIVERSITY AFFECTING HABITAT, SPECIES DIVERSITY AND SCC

Information in this section was sourced from the Biodiversity Study prepared for the project (Scientific Terrestrial Services, 2022) and from the approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

There are several activities/infrastructures in all project phases that have the potential to destroy biodiversity in the broadest sense. In this regard, the discussion relates to the physical destruction of specific biodiversity areas and of related species which are significant because of their status, and/or the role that they play in the ecosystem. In the construction and decommissioning phases these activities could be temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long-term activities. The closure phase will present rehabilitated areas, where activities/infrastructure that has the potential to disturb biodiversity has been removed.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

## RATING OF IMPACT

High biodiversity areas are functioning biodiversity areas with species diversity and associated intrinsic value. In addition, some of these high biodiversity areas host species of conservational concern. The linking areas have value because of the role they play in allowing the migration or movement of flora and fauna between the areas of high biodiversity which is a key function for the broader ecosystem. The transformation of land for any purpose, including the proposed project, increases the destruction of site-specific biodiversity, reduces its intrinsic functionality, and reduces the linkage role that undeveloped land fulfils between different areas of biodiversity importance.

The proposed project falls within the Sekhukhune Plains Bushveld vegetation unit, which is endangered. It is however important to note that most of the proposed project components do not fall within the fragmented remnants of the vegetation unit. Where proposed project comments do fall within the remnant areas (water pipelines and powerlines) these areas are no longer considered to be a good representation of the Sekhukhune Plains Bushveld vegetation type due to overgrazing and degradation associated with anthropogenic activities. The proposed project also falls within an ESA. ESAs are important features in the greater landscape and provide unique conditions for flora and important ecological functionality within the ecosystem.

With reference to Section 7.3.1.5, the proposed project area is associated with numerous habitat units, namely the degraded habitat, encroached habitat, rock habitat, watercourse habitat and the transformed habitat. Key aspects of these habitat units that are of relevance to this impact discussion are summarised below.

| | Rocky habitat and Watercourse habitat units | Degraded Bushveld and Encroached habitat Unit | Transformed habitat unit |
|---|---|---|---|
| **Terrestrial Description** | Development within these habitat units is likely to result in the loss of floral habitat, protected floral species (as per Schedule 12 of LEMA), and species diversity. Two protected species as identified by LEMA were recorded (refer to Section 7.3.1.5) within the Rocky Habitat and it is anticipated that more are present. Both the Rocky Habitat and parts of the Watercourse Habitat Unit are situated within an ESA 1, which is important for ecological functioning. Furthermore, given the location of the Rocky Riverine Subunit near the Mogompane River, the ecological functioning of this habitat unit is of particular importance, particularly those associated with the edge effects of the river system. | In its current modified state, these areas are not deemed important to support indigenous floral communities. Despite the moderately low floral richness within these habitat units, a protected species as per Schedule 12 (Protected Plants) of LEMA, was observed in this habitat unit. | The habitat within the Transformed Habitat unit has been notably degraded from a floral species perspective. Anthropogenic activities over the years have led to a decreased habitat integrity and low species diversity. Human disturbance and presence within this habitat have led to the proliferation of AIPs and the subsequent loss of floral diversity. |
| **Faunal description** | The proposed developments are unlikely to contribute to the loss of species diversity and abundance, and although the developments will lead to the loss of habitat, the small size and already disturbed nature of the sites is not likely to influence faunal populations in the region. The development will further not lead to any loss of habitat connectivity, nor will they impact upon any migrations or corridors of movement as it predominantly adjacent existing roads or infrastructure. | | |
| **Sensitivity status** | The Rocky habitat and Watercourse habitat units have been assigned the highest sensitivity, that of moderately high ecological sensitivity | The Degraded Bushveld unit and Encroached Habitat unit have a moderately low sensitivity. | This habitat unit is given a low sensitivity. |

| | Rocky habitat and Watercourse habitat units | Degraded Bushveld and Encroached habitat Unit | Transformed habitat unit |
|---|---|---|---|
| **Project components** | The proposed water pipeline, powerlines and TSF pipeline intersect areas associated with these habitat units. | The proposed water pipeline, powerlines, TSF pipeline and ventilation shafts intersect areas associated with these habitat units. | All project components intersect areas of this habitat unit. |

The upgrades to the existing services and infrastructure at V5, V6 and V7, product stockpile, the Eskom substation and the Clapham Shaft upgrades are associated with the transformed habitat unit and are all located within existing complex areas where natural vegetation has been removed. It follows that the impact associated with these project components is expected to be **NEGLIGIBLE** and is therefore not assessed further.

The proposed new ventilation shafts are in areas that are no longer considered to be a good representation of the Sekhukhune Plains Bushveld vegetation type (endangered). A lack of important ecological processes within these areas has led to a degraded system. Given the degree of degradation and overgrazing within the area identified for development of the ventilation shafts, the area is not anticipated to provide suitable habitat for other indigenous species. In the incremental unmitigated scenario, the intensity of the impact associated with the development of the ventilation shafts is medium and reduces to low with mitigation. In the unmitigated scenario, the loss of biodiversity and related functionality is long term and will continue after the life of the mine. In the mitigated scenario the biodiversity and related functionality may restored during the closure phase, will successful rehabilitation. Given that biodiversity processes are not confined to the project site, the spatial scale of impacts will extend beyond the site boundary in both the mitigated and unmitigated scenarios. The spatial scale is therefore medium in both the unmitigated and mitigated scenarios. Without mitigation, the probability associated with the impact is possible and reduces with emphasis placed on avoiding the removal of protected species. The incremental significance rating is **MEDIUM** in the unmitigated scenario and reduces to **LOW** with mitigation. The impact further reduces at closure in the mitigated scenario where infrastructure has been removed and rehabilitation is successful.

The proposed powerlines, water pipelines and the TSF pipeline intersect areas of the Rocky Habitat and Watercourse habitat units and as such will result in the loss of floral habitat, protected floral species (as per Schedule 12 of LEMA), and species diversity. The incremental unmitigated intensity is high and reduces to medium with mitigation, prior to closure. At closure the impact can be further reduces with successful rehabilitation. In the unmitigated scenario, the loss of biodiversity and related functionality is long term and will continue after the life of the mine. In the mitigated scenario the biodiversity and related functionality may restored during the closure phase, will successful rehabilitation. The duration is therefore high in the unmitigated and medium to high in the mitigated scenarios. Given that biodiversity processes are not confined to the project site, the spatial scale of impacts will extend beyond the site boundary in both the mitigated and unmitigated scenarios. The spatial scale is therefore medium in both the unmitigated and mitigated scenarios. Without mitigation, the probability is definite. With mitigation, the probability will be reduced because emphasis will be placed on conserving and restoring areas and related biodiversity. The incremental significance rating is **MEDIUM** in the unmitigated scenario and reduces to **LOW** with mitigation. The impact further reduces at closure in the mitigated scenario with successful rehabilitation.

The cumulative significance of the physical destruction of biodiversity for the current operation, which was assessed in the approved EIA and EMPr (Metago, 2012), was rated high in the unmitigated scenario and was reduced to medium in the mitigated scenario. When considered cumulatively in the context of the existing operations, the proposed project contributes to the cumulative impacts on the floral communities within the surrounding areas through bush encroachment, overgrazing, and the continued proliferation of AIP species, resulting in the overall loss of native floral communities within the local area. Due to the small scale of the project, these additional sources are however not expected to significantly contribute to cumulative impacts. The cumulative rating therefore remains **HIGH** without mitigation and reduces to **MEDIUM** with mitigation.

| **Issue: Physical Destruction of Biodiversity affecting habitat, species diversity and SCC** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: New ventilation shafts** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Medium | Low (Very low at closure) |
| **Duration** | Very high | High |
| **Extent** | Medium | Medium |
| **Consequence** | High | Medium |
| **Probability** | Medium | Low |
| **Significance** | Medium (High for cumulative) | Low (Medium for cumulative)<br>Very Low (closure for incremental) |
| **Project components: Proposed water pipelines, powerlines and TSF pipeline** | | |
| **Severity** | High | Medium (low at closure) |
| **Duration** | Very high | High |
| **Extent** | Medium | Medium |
| **Consequence** | High | Medium |
| **Probability** | Very high | Low |
| **Significance** | Medium (High for cumulative) | Low (Medium for cumulative)<br>Very Low (closure for incremental) |
| | | |
| **Nature of cumulative impacts** | When considered cumulatively in the context of the existing operations, the proposed project contributes to the cumulative impacts on the floral communities within the surrounding areas through bush encroachment, overgrazing, and the continued proliferation of AIP species, resulting in the overall loss of native floral communities within the local area | |
| **Degree to which impact can be reversed** | Unlikely until the closure phase with focus on rehabilitation. | |
| **Degree to which impact can be avoided** | Although the area of disturbance will be minimised, habitat will be lost due to the establishment of surface infrastructure. Therefore, impact avoidance is unlikely even with mitigation. | |
| **Degree to which impact may cause irreplaceable loss** | Loss where mitigation measures are not correctly implemented. | |
| **Degree to which impact can be mitigated** | Medium until the closure phase which focusses on rehabilitation and restoration of habitats. | |

### RESIDUAL RISK

While mitigation measures focus on rehabilitation, it is important to note that even with successful rehabilitation, it is not possible to replicate the exact pre-mining state.

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to prevent, as far as is possible, the unacceptable loss of biodiversity and related functionality through physical destruction.

### MANAGEMENT ACTIONS

During all mine phases, the mine will implement a biodiversity action plan, refine it and implemented in consultation with the biodiversity expertise and resources of an ecological specialist and the Limpopo Parks Board. This action plan will aim at preserving and restoring the natural ecology at the mine. This action plan will be in place prior to the commencement of the project, and it will include additional detail on the following management actions:

- the mine will limit mine activities, infrastructure, and disturbance to those specifically identified and with controlled access and zero tolerance of disturbances to identified sensitive habitats and associated species of the rocky hills/outcrops and natural dongas/natural drainage line;
- special care will be given to the natural drainage lines and rocky hills/outcrops – disturbance to these areas will be avoided as far as possible; where disturbance cannot be avoided structures will be established to minimise the impact on these areas; and
- all new pipelines will be lifted off the ground to prevent the establishment of a movement barrier for fauna species and to allow movement of smaller organisms.

*Prior to the construction phase, Marula will:*

- *Minimise loss of indigenous vegetation where possible through adequate planning and, where necessary, by incorporating the sensitivity of the biodiversity report as well as other specialist studies;*
- *Implement an AIP Management/Control Plan as outlined in Section 28;*
- *Species protected under NFA and Schedule 12 of the LEMA were recorded on site. Suitable habitat for such species is present, especially in the Degraded Bushveld and Rocky Habitats. A walkdown of the footprint area is required before construction activities commence where anticipated floral SCC/protected species are searched and marked (if encountered); and*
- *If SCC/protected species are encountered and will be affected by the construction activities, these species must be marked and where possible, relocated to suitable habitat surrounding the disturbance footprint. Suitable habitat is available in nearby surrounding locations. A licence from the DEFF is required for the removal of NFA protected tree species (Boscia albutruncia). For the removal, destruction, or relocation of protected flora in terms of the LEMA (Schedules 11 and 12), a license is required from the LEDET.*

*Management actions specific to the construction and operational phases include:*

- *The construction footprint must be kept as small as possible to minimise impact on the surrounding environment (edge effect management);*
- *Removal of vegetation must be restricted to what is necessary and should remain within the approved development footprint;*

- *Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the construction activities. Additional road construction should be limited to what is necessary, and the footprint thereof kept to a minimal;*
- *No collection of indigenous floral species must be allowed by construction personnel, especially with regards to floral SCC (if encountered).*
- *Care should be taken during the construction and operation of the proposed development to limit edge effects to surrounding natural habitat. Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC outside of the proposed development footprint area. This can be achieved by:*
    - *Demarcating all footprint areas during construction activities;*
    - *Manage the spread of AIP species, which may affect remaining natural habitat within surrounding areas. Category 1b and 2 species were identified within the development footprint areas;*
    - *Rubble is to be disposed of on the existing waste rock dump (WRD) whilst cleared alien invasive plant species are to be taken to a registered waste disposal facility;*
    - *All soils outside of the operational area that have been compacted as a result of construction activities should be ripped and profiled and reseeded;*
    - *No dumping of waste is allowed on site. Rcoek material and any rubble removed as a result of the construction activities should be disposed of on the WRD. No temporary dump sites should be allowed in areas with natural vegetation. Waste disposal containers and bins should be provided during the construction phase for all construction rubble and general waste. Vegetation cuttings must be carefully collected and disposed of at a separate waste facility.*
- *If any spills occur, they should be immediately cleaned up to avoid soil contamination that can hinder* floral rehabilitation later down the line. Spill kits should be kept on-site within workshops. In the event *of a breakdown, maintenance of vehicles must take place with care, and the recollection of spillage should be practised, preventing the ingress of hydrocarbons into the topsoil; and*
- *Upon completion of construction activities, where bare / disturbed areas remain that are not part of the everyday operations/functions of the mine, these areas are to be revegetated with indigenous species.*
- *Ongoing alien and invasive plant monitoring and clearing/control should take place throughout the construction and operational phase of the development as outlined in Section 28;*
- *No illicit fires must be allowed during the construction of the proposed development; and*
- *Floral monitoring should be implemented as outlined in the monitoring programme (Section 28).*

*During the decommissioning and closure phases the following management actions apply:*

- *No additional habitat outside of the footprint areas is to be disturbed during the closure phase;*
- *Edge effects arising from the proposed development, such as erosion and alien plant species proliferation, which may affect adjacent natural areas, need to be strictly managed. Specific mention in this regard is made of Category 1b and 2 AIP species (as listed in the NEMBA Alien species lists, 2020), in line with the NEMBA Alien and Invasive Species Regulations (2014). Edge effect control needs to be implemented to prevent further degradation and potential loss of floral SCC/protected species or suitable habitat for such species outside of the proposed development footprint;*

- *Alien vegetation that is removed must not be allowed to lay on unprotected ground as seeds might disperse upon it. All cleared plant material to be disposed of at a licensed waste facility, which complies with legal standards. Ongoing alien and invasive plant monitoring should continue during the decommissioning phase as outlined in the monitoring programme (Section 28);*
- *Any natural areas beyond the direct footprint, which have been affected by the construction or operational activities, must be rehabilitated using indigenous species;*
- *Areas that have been disturbed as a result of mining activities must be rehabilitated as soon possible.*
- *This will not only reduce the total disturbance footprint but will also reduce the overall rehabilitation effort and costs associated with it;*
- *All infrastructure and footprint areas should be rehabilitated in accordance with the rehabilitation plan;*
- *All rehabilitated areas should be rehabilitated to a point where natural processes will allow the ecological functioning and biodiversity of the area to be re-instated;*
- *Due to the impacts on ESA 1, ESA 2 and an endangered ecosystem, rehabilitation must be to the pre-mined condition. Where possible, vegetation condition should be improved through bush encroachment and AIP management; and*
- *Monitoring of rescued and relocated floral SCC should continue during the Decommissioning & Closure Phase until it is evident that the species have successfully established. Where possible, these species should be reintroduced into rehabilitation sites.*

## ISSUE: GENERAL DISTURBANCE OF TERRESTRIAL BIODIVERSITY

Information in this section was sourced from the Biodiversity Study prepared for the project (Scientific Terrestrial Services, 2022) and from the approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

There are several activities/infrastructures that have the potential to directly disturb fauna and flora in all project phases, particularly in the unmitigated scenario. In the construction and decommissioning phases these activities are temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long-term occurrences. The closure phase will present rehabilitated areas, where activities/infrastructure that has the potential to disturb biodiversity has been removed.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

### RATING OF IMPACT

In the unmitigated scenario, biodiversity may be disturbed in the following ways:

- Lighting can attract large numbers of invertebrates which become easy prey for predators. This can upset the invertebrate population balances;
- Powerlines can lead to bird kills;
- People may kill various types of species for food, for sport and for firewood;
- People may illegally collect and harvest vegetation (some of which may be SCC), vertebrate, and invertebrate species;
- Noise and vibration pollution may scare off vertebrates and invertebrates. In some instances, the animals may be deterred from passing close to noisy activities which can effectively block some of their migration paths. In other instances, vertebrates and invertebrates that rely on vibration and noise senses to locate for, and hunt, prey may be forced to leave the vicinity of noisy, vibrating activities;
- The presence of vehicles in the area can cause road kills especially if drivers speed;
- Pollution emissions and general litter may directly impact on the survival of individual plants, vertebrates, and invertebrates.

The upgrades to the existing services and infrastructure at V5, V6 and V7, product stockpile, the Eskom substation and the Clapham Shaft upgrades are all located within existing complex areas where natural vegetation has been removed and is absent of faunal species. It follows that the impact associated with these project components is expected to be **NEGLIGIBLE** and is therefore not assessed further.

In the incremental unmitigated scenario, the impact is long term because where biodiversity is compromised, killed, or removed from the area this impact is likely to exist beyond the life of the project. With mitigation, it may be possible to prevent impacts or reverse them within the life of the project which is a medium duration. Given that biodiversity processes are not confined to the project area, the spatial scale will extend beyond the project site in the unmitigated and mitigated scenario. Without any mitigation the probability of negatively impacting on biodiversity through multiple disturbance events is possible (medium), given the degraded nature of the proposed project areas and limited presence of faunal species. With mitigation, the probability will be reduced to low because some of the disturbances can be controlled through implementation and enforcement of practices, policies, and procedures but for some of the disturbances like noise and vibration the mitigation options are limited. In the incremental unmitigated scenario, the significance of this potential impact is rated as **LOW**. In the mitigated scenario, the significance rating is reduced to **VERY LOW**.

The cumulative significance of the physical destruction of biodiversity for the current operation, which was assessed in the approved EIA and EMPr (Metago, 2012), was rated high in the unmitigated scenario and was reduced to medium in the mitigated scenario. When considered cumulatively in the context of the existing operations, the proposed project presents additional sources of biodiversity disturbance to the cumulative impacts. Due to the small scale of the project, these additional sources are not expected to significantly contribute to cumulative impact. The cumulative rating therefore remains **HIGH** without mitigation and reduces to **MEDIUM** with mitigation.

| Issue: General Disturbance of Terrestrial Biodiversity | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: New ventilation shafts (V8 and V9), proposed powerlines, water pipelines and TSF pipeline** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Medium | Low |
| **Duration** | High | Medium |
| **Extent** | Medium | Medium |
| **Consequence** | Medium | Low |
| **Probability** | Medium | Low |
| **Significance** | Low (high cumulative) | Very low (medium cumulative) |
| | | |
| **Nature of cumulative impacts** | Low contribution to cumulative impact. | |
| **Degree to which impact can be reversed** | Serious injury or killing of species cannot be reversed. | |
| **Degree to which impact can be avoided** | While some types of disturbance can be avoided e.g. harvesting of species, others such as lighting, noise and vibration disturbance are unlikely to be totally avoided. | |
| **Degree to which impact may cause irreplaceable loss** | Likely where mitigation measures are not correctly implemented and protected, threatened and vulnerable species are lost within the project area of influence. | |
| **Degree to which impact can be mitigated** | Medium. | |

## RESIDUAL RISK

While mitigation measures focus on rehabilitation, it is important to note that even with successful rehabilitation, it is not possible to replicate the exact pre-mining state.

## MANAGEMENT OBJECTIVE

The objective is to prevent unacceptable disturbance of biodiversity and related ecosystem functionality.

## MANAGEMENT ACTION

Management actions specific to the construction and operational phases include:

- *No collection of indigenous floral species must be allowed by construction personnel, especially with regards to floral SCC (if encountered);*
- *No illicit fires must be allowed during the construction of the proposed development;*
- The use of light is kept to a minimum, and where it is required, yellow lighting is used where possible;
- Vertebrates should be kept away from the illuminated areas with appropriate fencing where feasible;
- There is training for workers on the value of biodiversity and the need to conserve the species and systems that occur within the proposed project areas;
- There is zero tolerance of the killing or collecting of any biodiversity *within project areas* by anybody working for or on behalf of Marula;
- Noisy and/or vibrating equipment will be well maintained to control noise and vibration emission levels;
- Dust control measures will be implemented (see Section 28); and

- Pollution and litter prevention measures will be implemented (see section 7.2.3 and 7.2.7).

During the decommissioning and closure phases the following management actions apply:

- *No vehicles are allowed to indiscriminately drive through sensitive habitat and natural areas;*
- No dumping of litter must be allowed on-site; and
- *As far as possible, no collection of floral SCC/protected or medicinal floral species within the study area or adjacent natural habitat must be allowed during the decommissioning and closure phase of the proposed development.*

## ISSUES: DESTRUCTION AND DISTURBANCE OF AQUATIC BIODIVERSITY

Information in this section was sourced from Watercourse Assessment (SAS, 2020) prepared for the proposed project and the approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

There are several activities/infrastructures that have the potential to directly disturb aquatic biodiversity in all project phases, particularly in the unmitigated scenario. In the construction and decommissioning phases these activities are temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long-term occurrences. The closure phase will present rehabilitated areas, where activities/infrastructure that has the potential to disturb biodiversity has been removed.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8) and refrigeration infrastructure<br>• Upgrades at V7<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

### RATING OF IMPACT

The proposed project has the potential to influence the aquatic environments located within the Marula MRA. In this regard, the proposed powerlines, water pipelines and the TSF pipelines intersect the Moopesi River, unnamed tributaries of the Moopesi River, the Tshwenyane River, and an unnamed tributary of the Mogompane River, while the Ventilations Shaft (V8 and V7) are located near an unnamed tributary of the Mogompane River (Refer to Figure 21 and Figure 22). The proposed project has the following potential impacts towards aquatic environments:

- Run-off from exposed areas has the potential to result in sedimentation of aquatic environments that can lead to suffocation of vegetation, destroying sensitive freshwater habitats;
- The loss of terrestrial habitat and soils has the potential to result in the loss of ecoservices such as maintenance, flood attenuation and nutrient assimilation;
- Unnatural ponding can result in the change to the water retention and distribution in the landscape;

- Changes to the water quality can result in toxic environments which in turn affects the survival of aquatic life thereby changing the riparian ecology.

The remaining project components are not associated with the aquatic environments. It follows that the impact associated with these project components is expected to be **NEGLIGIBLE** and is therefore not assessed further.

With reference to Section 7.3.1.5, all riparian non-perennial and ephemeral watercourses associated with the proposed project area have undergone significant levels of transformation because of historical and current agricultural practices, and to a slightly lesser extent because of mining activities. It follows that in the incremental unmitigated scenario, the intensity is low, as the proposed project is not anticipated to materially change the existing aquatic environment. Due to the nature of the project the duration of the impact is expected to be limited to the life of the project in both the unmitigated and mitigated scenarios. Given that biodiversity processes are not confined to the project area, the spatial scale will extend beyond the project site in the unmitigated and mitigated scenario. Without any mitigation the probability of negatively impacting on the aquatic environments is high. With mitigation, the probability reduces. In the incremental unmitigated scenario, the significance of this potential impact is rated as **LOW**. In the mitigated scenario, the significance rating is reduced to **VERY LOW**.

The approved EIA and EMPr (Metago, 2012) did not assess the cumulative impact towards aquatic environments. When considered cumulatively in the context of the existing operations, the proposed project presents additional disturbances to aquatic environments. The cumulative rating for the Marula MRA is **MEDIUM** without mitigation and reduces to **LOW** with mitigation.

| **Issue: Destruction and disturbance of aquatic biodiversity** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: New ventilation shaft (V8), upgrades to V7, proposed powerlines, water pipelines and TSF pipeline** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Low | Very Low |
| **Duration** | Low | Low |
| **Extent** | Medium | Medium |
| **Consequence** | Low | Low |
| **Probability** | High | Medium |
| **Significance** | Low (Medium cumulative) | Very low (Low cumulative) |
| | | |
| **Nature of cumulative impacts** | Low contribution to cumulative impact. | |
| **Degree to which impact can be reversed** | Serious injury or killing of species cannot be reversed. | |
| **Degree to which impact can be avoided** | While some types of disturbance can be avoided e.g. harvesting of species, others such as lighting, noise and vibration disturbance are unlikely to be totally avoided. | |
| **Degree to which impact may cause irreplaceable loss** | Likely where mitigation measures are not correctly implemented and protected, threatened and vulnerable species are lost within the project area of influence. | |

| Issue: Destruction and disturbance of aquatic biodiversity | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: New ventilation shaft (V8), upgrades to V7, proposed powerlines, water pipelines and TSF pipeline** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Degree to which impact can be mitigated** | Medium. | |

## RESIDUAL RISK

While mitigation measures focus on rehabilitation, it is important to note that even with successful rehabilitation, it is not possible to replicate the exact pre-mining state.

## MANAGEMENT OBJECTIVE

The objective is to prevent unacceptable disturbance of aquatic environments and related ecosystem functionality.

## MANAGEMENT ACTION

*Management actions applicable to the construction and operational phases include:*

- *All development footprint areas should remain as small as possible and should not encroach into the freshwater areas unless essential and part of the proposed development. It must be ensured that the freshwater habitat is off-limits to construction vehicles and non-essential personnel;*
- *The boundaries of footprint areas, including contractor laydown areas, are to be clearly defined and it should be ensured that all activities remain within defined footprint areas. Edge effects will need to be extremely carefully controlled;*
- *Planning of temporary roads and access routes should avoid freshwater areas and be restricted to existing roads where possible;*
- *Appropriate sanitary facilities must be provided for the life of the pre-construction and construction phase and all waste removed to an appropriate waste facility;*
- *All hazardous chemicals as well as stockpiles should be stored on bunded surfaces and have facilities constructed to control runoff from these areas;*
- *It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage;*
- *No fires should be permitted in or near the construction area;*
- *Ensuring that an adequate number of waste and "spill" bins are provided will also prevent litter and ensure the proper disposal of waste and spills;*
- *All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into the topsoil;*
- *In the event of a vehicle breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil and subsequent habitat loss;*
- *All spills should they occur, should be immediately cleaned up and treated accordingly.*
- *Proliferation of alien and invasive species is expected within any disturbed areas. Whilst not considered severe at this time, the vegetation component within the freshwater environment is already transformed to an extent because of alien plant invasion; therefore, these species should be eradicated and controlled to prevent their spread beyond the project footprint;*

- *Removal of the alien and weed species encountered within the freshwater resources must take place to comply with existing legislation (amendments to the regulations under the Conservation of Agricultural Resources Act, 1983 and Section 28 of the National Environmental Management Act, 1998). Removal of species should take place throughout the construction, operational, and maintenance phases;*
- *Species specific and area specific eradication recommendations:*
- *Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;*
- *Footprint areas should be kept as small as possible when removing alien plant species;*
- *No vehicles should be allowed to drive through designated sensitive wetland areas during the eradication of alien and weed species;*
- *Sheet runoff from access roads should be slowed down by the strategic placement of berms;*
- *As far as possible, all construction activities should occur in the low flow season, during the drier winter months;*
- *As much vegetation growth as possible (of indigenous floral species) should be encouraged to protect soils;*
- *No stockpiling of topsoils is to take place within close proximity to the river, and all stockpiles must be protected with a suitable geotextile to prevent sedimentation of the river;*
- *All soils compacted as a result of construction activities as well as ongoing operational activities falling outside of project footprint areas should be ripped and profiled; and*
- *A monitoring plan for the development and the immediate zone of influence should be implemented to prevent erosion and incision.*

*The following management actions need to be implemented during the decommissioning and closure phase:*

- *Construction rubble must be collected and disposed of at a suitable landfill site;*
- *All soils compacted because of construction activities falling outside of project footprint areas should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. Alien and invasive vegetation control should take place throughout all construction and rehabilitation phases to prevent loss of floral habitat;*
- *Rehabilitate all drainage line and riparian habitat areas to ensure that the ecology of these areas is re-instated during all phases;*
- *Edge effects of activities including erosion and alien/ weed control need to be strictly managed in these areas;*
- *As far as possible, all rehabilitation activities should occur in the low flow season, during the drier winter months;*
- *As much vegetation growth as possible should be promoted within the proposed development area to protect soils;*
- *All alien vegetation in the riparian zone should be removed upon completion of construction and reseeded with indigenous grasses as specified by a suitably qualified specialist (ecologist);*
- *All areas affected by construction should be rehabilitated upon completion of the construction phase of the development;*
- *Bank vegetation cover should be monitored to ensure that sufficient vegetation is present to bind the bankside soils and prevent bankside erosion and incision; and*

- *All alien vegetation in the footprint area as well as immediate vicinity of the proposed development activities should be removed. Alien vegetation control should take place for a minimum period of two growing seasons after rehabilitation is completed.*

## SURFACE WATER

### ISSUE: ALTERATION OF SURFACE DRAINAGE PATTERNS

The discussion provided below follows a qualitative assessment approach through the review of topographical data and information sourced from the approved EIA and EMPr (Metago, 2012)).

### INTRODUCTION

Natural drainage across the site is via sheet flow and/or non-perennial preferential flow paths (drainage lines). Mining related infrastructure and activities have the potential to alter drainage patterns either by reducing the volume of run-off into the downstream catchments (through the construction of containment structures such as stormwater controls) or through their location within watercourses. This in turn has the potential to cause water supply impacts on downstream human and biodiversity users (the impact on biodiversity is discussed under the relevant biodiversity section in this appendix). During the construction, operational and decommissioning phases, these activities will continue until such time as mine and project infrastructure can be removed, and the areas rehabilitated. During the closure phase rehabilitation will allow for the restoration of drainage patterns.

The product stockpile, the Eskom substation and the Clapham Shaft upgrades are all located within existing shaft complexes and as such any run-off from the areas is contained within existing stormwater management areas. The remaining project components (new ventilation shafts, powerlines, water pipelines and the TSF pipeline) are unlikely to result in a substantial deterioration in the water reserve and downstream water uses due to the small scale of these project components. Further to this, there is limited use of surface water with most communities reliant on groundwater resources due to the non-perennial nature of the watercourses within the proposed project area. Taking this into consideration, the loss of run-off to downstream catchments is expected to be negligible for the proposed project. It follows that the assessment below, focusses on the alteration of natural drainage patterns through the location of infrastructure within watercourses only.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines | • Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

The product stockpile, the Eskom substation and the Clapham Shaft upgrades are all located within existing complexes and as such do not intersect any surface water resources. In addition to this, the proposed new ventilation shafts are located more than 100 m from non-perennial watercourses. It follows that the impact associated with these project components is expected to be **NEGLIGIBLE** and is therefore not assessed further. The proposed water pipelines, powerline and the TSF pipeline will intersect numerous watercourses. It follows that the assessment below focusses on the intersection of watercourses associated with the proposed water pipelines, powerline and the TSF pipeline only.

When considered incrementally, in the unmitigated scenario, the proposed project has the potential to result in a change to the natural characteristics of the non-perennial watercourses that will be intersected by the proposed project. In the mitigated scenario, with proper design, the powerlines will cross over the non-perennial watercourses and the powerline disturbance will be limited. In the unmitigated scenario, the alteration of drainage patterns will extend beyond closure. In the mitigated scenario, the duration of the impact reduces at closure when all infrastructure is removed the areas are rehabilitated. In the mitigated and unmitigated scenarios, the physical alteration of drainage patterns is limited to the Marula MRA. Given the small scale of the project, the non-perennial nature of the watercourses and limited third party reliance, the unmitigated probability of the impact is conceivable as it is unlikely that any physical alteration would result in noticeable flow reduction impacts that could influence third party users. In the mitigated scenario, the probability further reduces as the pipeline and powerline infrastructure will not alter the physical characteristics of the watercourses. The incremental unmitigated significance is **LOW** and reduces to **INSIGNIFICANT** with mitigation.

The cumulative impacts associated with the alteration of natural drainage patterns was assessed as having a high significance in the unmitigated scenario and low in the mitigated scenario in the approved EIA and EMPr (Metago, 2012). The proposed project is not anticipated to result in a significant contribution to the alteration of natural drainage patterns when considered in the context of the existing operations. It follows that the cumulative rating remains unchanged when compared to the approved EIA and EMPr (Metago, 2012).

| **Issue: Alteration of Natural Drainage Patterns through the location within watercourses** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: Proposed water pipelines, powerlines and the TSF pipeline** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Medium | Very Low |
| **Duration** | High | H (VL at closure) |
| **Extent** | Medium | Medium |
| **Consequence** | Medium | Low (very low at closure) |
| **Probability** | Low | Very Low |
| **Significance** | Low (high cumulative) | Insignificant (low cumulative) |
| | | |
| **Nature of cumulative impacts** | Insignificant contribution to cumulative impacts. | |
| **Degree to which impact can be reversed** | Likely with mitigation. | |
| **Degree to which impact can be avoided** | The impact can fully be avoided. | |
| **Degree to which impact may cause irreplaceable loss** | Low due to the limited infrastructure footprint when compared to the catchment area. | |

| | |
|---|---|
| **Degree to which impact can be mitigated** | High. |

### RESIDUAL RISK

None as all infrastructure will be removed and the area rehabilitated.

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to prevent unacceptable alteration of drainage patterns and related reduction of downstream surface water flow.

### MANAGEMENT ACTIONS

Management actions include the following:

- The necessary exemptions/approvals will be obtained from the DHSWS where pipeline and powerline infrastructure crosses non-perennial drainage patterns.
- The detailed designs of the pipeline/powerline crossings associated will be in accordance with the requirements of Regulation 704, the requirements as stipulated in the IWUL, and will be done by an appropriately qualified engineer.
- In these designs, considerations will be given to the biodiversity and rehabilitation requirements.

### EMERGENCY SITUATIONS

None identified.

## ISSUE: CONTAMINATION OF SURFACE WATER RESOURCES

### INTRODUCTION

There are several pollution sources in all phases that have the potential to pollute surface water, particularly in the unmitigated scenario. In the construction and decommissioning phases these potential pollution sources are temporary in nature. Although these sources may be temporary, the potential pollution may be long term. The operational phase will present more long-term potential sources that may have the potential to contaminate surface water through long term seepage and/or run-off. During the closure phase, project related infrastructure should be removed, and the areas rehabilitated, thereby removing sources of contamination.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of water pipelines<br>• Use of Clapham shaft upgrades | | |

### RATING OF IMPACT

In the unmitigated scenario, surface water may collect contaminants (hydrocarbons, salts, chemicals, metals, and bacteria). At elevated pollution concentrations these contaminants can exceed the relevant limits outlined in the mines IWUL and can be harmful to humans and livestock if ingested directly and possibly even indirectly through contaminated vegetation, vertebrates, and invertebrates (impacts on biodiversity have been assessed in biodiversity impact section and will not be reassessed in this section).

In the incremental mitigated scenario, clean water will be diverted away from the project site and contaminated run-off and process water will be contained and re-used in the normal course. In the unmitigated scenario, the contamination of surface water resources will occur for periods longer than the life of mine. With mitigation, contamination can be prevented and/or managed and as such the impacts can be reversed or mitigated within the life of mine. In the unmitigated scenario, contaminants will travel off site. In the mitigated scenario contaminated water will be contained on site. The probability of the impact occurring relies on a causal chain that comprises three main elements:

- Does contamination reach surface water resources?
- Will people and animals utilise this contaminated water?
- Is the contamination level harmful?

The first element is that contamination reaches the surface water resources adjacent to project site. The proposed project components are located in close proximity to watercourses and as such contaminates could reach surface water resources, particularly in the unmitigated scenario. The second element is that third parties and/or livestock use this contaminated water for drinking purposes. With reference to Section 7.3.1.6, there is limited use of surface water with most communities reliant on groundwater resources, however livestock and small-scale farming make use of surface water resources when available. The probability of this impact occurring is therefore linked to the frequency of possible use. In this regard, the watercourses near the processed project areas are non-perennial in nature and are often dry. The third element is that it is likely that some contaminants will be at a level which is harmful to humans and livestock. This is influenced both by the quality of any discharged water and by the diluting effect of any rainwater in the rainy season. As a combination, it is possible that third parties and/or livestock can be exposed to levels of contamination in the unmitigated scenario. With the implementation of mitigation measures together with the non-perennial nature of the surface watercourses near the proposed project area, the probability reduces. In the unmitigated scenario, the incremental significance of this potential impact is rated as **LOW**. In the mitigated scenario, the significance rating is reduced to **VERY LOW**.

The cumulative impact was assessed as having a high significance in the unmitigated scenario and medium in the mitigated scenario in the approved EIA and EMPr (Metago, 2012). When considering the proposed project's impact cumulatively with the current and approved operations, the proposed project presents additional sources of contaminates to those already present on site. Due to the nature of the project and limited surface water flow, these additional sources are not expected to significantly contribute to cumulative impacts. It follows that the cumulative rating remains unchanged when compared to the approved EIA and EMPr (Metago, 2012).

| **Issue: Contamination of Surface Water Resources** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Medium | Low |
| **Duration** | High | Medium |
| **Extent** | Medium | Low |
| **Consequence** | Medium | Low |
| **Probability** | Medium | Low |
| **Significance** | Low (High for cumulative) | Very Low (Medium for cumulative) |
| | | |
| **Nature of cumulative impacts** | Low contribution to cumulative impacts due to the limited river flow. | |
| **Degree to which impact can be reversed** | Likely with mitigation. | |
| **Degree to which impact can be avoided** | Likely with mitigation. | |
| **Degree to which impact may cause irreplaceable loss** | Loss where mitigation measures are not correctly implemented. | |
| **Degree to which impact can be mitigated** | High | |

### RESIDUAL RISK

None as all infrastructure will be removed and the area rehabilitated.

### MANAGEMENT OBJECTIVE

The objective is to prevent pollution of surface water resources.

### MANAGEMENT ACTIONS

Management actions include:

- Marula will ensure that the soil/erosion management, pollution prevention and management, and waste management; the procedures, practices and actions included in Table 39 and Table 40 will be implemented.
- The clean and dirty water systems as depicted in the mine's water balance will be designed, implemented, and managed in accordance with the provisions of Regulation 704 for water management on mines. In this regard:
    - Clean water will be diverted around operational areas; and

  - Areas in which polluting substances can be spilled will be minimised and contained on impermeable floors with bund walls and sumps with traps. These bunded areas will be capable of holding 110% of the volume of the hazardous/polluting substances that could be spilled therein.
- The mine will continue monitoring surface water in the vicinity of its operations and when possible (during the rainfall season) this will include surface water sampling points both up and downstream of the mining operations in the following water courses: the Moopetsi, potentially affected tributaries of the Moopetsi, the Tshwenyane and the Mogompane.
- Should any contamination be detected the mine will immediately notify DHSWS. The mine, in consultation with DHSWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and the long term) and then implement these measures.
- The site wide water balance is refined on an on-going basis with the input of actual flow volumes and used as a decision-making tool for water management and impact mitigation; and
- where monitoring results indicates that third party water supply has been polluted by Marula, Marula will ensure that an alternative equivalent water supply will be provided.

### EMERGENCY SITUATIONS

Contamination incidents such as burst water pipes will be handled in accordance with the Marula emergency response procedure in Section 29.2.

## GROUNDWATER

The discussion provided below follows a qualitative assessment approach through the review of monitoring data and information sourced from the approved EIA and EMPr (Metago, 2012).

### ISSUE: CONTAMINATION OF GROUNDWATER RESOURCES

### INTRODUCTION

There are several pollution sources in all phases that have the potential to pollute groundwater, particularly in the unmitigated scenario. In the construction and decommissioning phases these potential pollution sources are temporary in nature. Although these sources may be temporary, the potential pollution may be long term. The operational phase will present more long-term potential sources (product stockpile) that may have the potential to contaminate groundwater through long term seepage and/or run-off. During the closure phase, project related infrastructure should be removed, and the areas rehabilitated, thereby removing sources of contamination.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | | |

## RATING OF IMPACTS

The project presents several groundwater contaminations sources. These include:

- accidental spills and leaks from vehicles, non-mineralised waste and equipment which have the potential to reach shallow groundwater during the construction, operational and decommissioning phases;
- the product stockpile has the potential to impact upon groundwater during all project phases prior to closure through run-off and seepage; and
- the TSF pipeline has the potential to pollute groundwater where damages to the pipeline could result in spillage of tailings material.

Groundwater monitoring data has indicated that (refer to Section 7.3.1.7) the groundwater quality at the mine has been influenced by both mining and community related activities. In the absence of a groundwater model for the proposed project and updated geochemical data, a precautionary approach to the assessment has been taken. It follows that in the incremental unmitigated intensity is assumed to be high and reduces to medium with mitigation. In the unmitigated scenario, groundwater contamination and the potential related health impacts are long term in nature, occurring for periods longer than the life of project. With mitigation the pollution and related impacts can be prevented or mitigated during the life of all the project. Given that communities reside within the Marual MRA, groundwater contamination is likely to extend beyond the project boundaries to the nearby communities. The probability of the impact occurring relies on a causal chain that comprises three main elements:

- Does contamination reach groundwater resources?
- Will people and animals utilise this contaminated water?
- Is the contamination level harmful?

The first element is that contamination reaches the ground water resources. Based on monitoring data for the mine, contaminants reach groundwater resources. The second element is that third parties and/or livestock use this contaminated borehole water for drinking purposes. With reference to Section 7.3.1.7, groundwater is primarily used for domestic and livestock watering purposes by communities residing in the

Marula MRA. The third element is that some contaminants will be at a level which is harmful to humans and livestock. As per the monitoring data for the mine, groundwater is not deemed suitable for human consumption due to elevated nitrate concentrations. As a combination, the unmitigated impact probability is definite, and reduces to low with mitigation measures focused on pollution prevention measures. The unmitigated incremental significance is rated as **HIGH** and the mitigated significance rating reduces to **LOW**.

The cumulative impact was assessed as having a high significance in the unmitigated scenario and medium in the mitigated scenario in the approved EIA and EMPr (Metago, 2012). When considering the proposed project's impact cumulatively with the current and approved operations, the proposed project presents additional sources of contaminates to those already present on site. It follows that the cumulative rating remains unchanged when compared to the approved EIA and EMPr (Metago, 2012).

| Issue: Contamination of Groundwater Resources | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | High | Medium |
| **Duration** | High | Medium |
| **Extent** | Medium | Medium |
| **Consequence** | High | Medium |
| **Probability** | Very high | Low |
| **Significance** | High (High cumulative) | Low (Medium cumulative) |
| | | |
| **Nature of cumulative impacts** | Low contribution to cumulative impacts | |
| **Degree to which impact can be reversed** | Likely with mitigation | |
| **Degree to which impact can be avoided** | Likely with mitigation | |
| **Degree to which impact may cause irreplaceable loss** | Possible where mitigation measures are not correctly implemented | |
| **Degree to which impact can be mitigated** | High | |

### RESIDUAL RISK

None as all infrastructure will be removed and the area rehabilitated.

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to prevent pollution of groundwater resources and related harm to water users.

### MANAGEMENT ACTIONS

Management actions during all project phases include:

- With regard to soil/erosion management, pollution prevention and management, and waste management; the procedures, practices and actions included in Table 39 and Table 40will be implemented;
- The clean and dirty water systems will be designed, implemented, and managed in accordance with the provisions of Regulation 704 for water management on mines. In this regard:
    - clean water will be diverted around operational areas;
    - areas in which hazardous and/or polluting substances can be spilled will be minimised and contained on impermeable floors with bund walls and sumps with traps. These bunded areas will be capable of holding 110% of the volume of the hazardous/polluting substances that could be spilled therein; and
    - all other dirty water will be contained in the dirty water run-off and/or process water system at the mine that comprises dirty water pipes, channels, berms, and dams, and from which dirty water will be reused rather than discharged to the environment. These systems will be routinely inspected to detect possible breaches and implement preventative or corrective action.
- The mine will continue monitoring groundwater in accordance with the existing monitoring programme (Section 28);
- Where monitoring results indicates that third party water supply has been polluted by Marula, Marula will ensure that an alternative equivalent water supply will be provided; and
- *Prior to the establishment of the product stockpile, Marula is required to undertake a geochemical analysis on the project material. This information must be used to inform the liner requirements for the product stockpile. Alternatively, the product stockpile area should be concrete lined with suitably sized bunded areas to prevent any seepage and/or run-off.*

### EMERGENCY SITUATIONS

Any significant pollution incident will be handled in accordance with Marula's emergency response procedure as outlined in Section 29.2.2.

## ISSUE: POSITIVE IMPACT OF THE IMPLEMENTATION OF REMEDIATION MEASURES TO REDUCE THE UG TAILINGS CONTAMINATION PLUME

The information contained in this section was sourced from the approved EIA and EMPr (Metago, 2012) the Integrated Water and Waste Management Plan (SRK, November 2019) and takes cognisance of the proposed project components as detailed in Section 3.2.3.

### INTRODUCTION

There is currently a contamination plume which extends to the north and north-west of the UG Tailings Facility. The plume is migrating from the TSF westward toward the Moopetsi River. Routine groundwater monitoring around the TSF indicates a deterioration of groundwater water quality from monitoring boreholes around the Moopetsi River and in community supply boreholes. The abstraction of water by third-party users and the dewatering of underground workings (predominantly around Driekop Shaft) as part of the current mining operations, influences the direction of the contamination plume. To date, Marula has developed a conceptual strategy for the treatment of seepage water that will be abstracted from the groundwater plume resulting from the operation of the TSF.

## PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| N/A | Rehabilitation, maintenance and aftercare | Rehabilitation, maintenance and aftercare | Rehabilitation, maintenance and aftercare |

## RATING OF IMPACT

Given the low rate of basic service delivery within the local municipality, third-party users such as nearby communities are reliant on the community supply boreholes for water supply. The uncontrolled and unmitigated migration of the contamination plume emanating from the TSF threatens to further contaminate water supply aquifers which may result in severe health impacts on third parties if consumed. Provisions for the management and mitigation of this contaminate source is therefore required to reduce the negative impact.

Marula has investigating various methods of managing the contamination plume, but now proposes to formally amend their approved EIA and EMPr (Metago, 2012) to accommodate the investigation and implementation of specific rehabilitation measures for the contamination plume. The investigation and implementation of feasible mitigation and management measures for the plume remediation will result in a positive impact for third party groundwater users. The positive impact of investigating and implementing feasible measures to reduce the contamination plume is rated as high positive in both mitigated and unmitigated scenarios. In the unmitigated and mitigated scenario, the duration of the positive impact is rated as very high because additional enhancements are limited to change the duration of the impact. The extent of the impact will be affecting the local area and extend beyond the site in both scenarios. The consequence of the positive impact is rated as high for the mitigated and unmitigated scenarios. The probability of a positive impact concerned with the reduction of the pollution plume is possible in the unmitigated scenario. This positive impact can be enhanced to probable by ensuring that suitably qualified specialists are engaged to investigate feasible measures and if the mine commits to adopting said measure as part of their on-going monitoring and mitigation measures to reduce the negative impacts of groundwater contamination. The significance is rated as **POSITIVE MEDIUM** and is enhanced to **POSITIVE HIGH** in the mitigated scenario.

| Issue: Positive impact of the implementation of remediation measures to reduce the UG Tailings contamination plume | | |
|---|---|---|
| Phases: Operation, Decommissioning and Closure | | |
| Project components: Implementation of remediation measures to reduce the UG Tailings Contamination Plume | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | High+ | High+ |
| **Duration** | Very high | Very high |
| **Extent** | High | High |
| **Consequence** | High | High |
| **Probability** | Medium | High |
| **Significance** | Medium+ (incremental and cumulative) | High+(incremental and cumulative) |
| | | |

| Issue: Positive impact of the implementation of remediation measures to reduce the UG Tailings contamination plume | |
|---|---|
| Phases: Operation, Decommissioning and Closure | |
| **Nature of cumulative impacts** | High contribution to cumulative impacts. |
| **Degree to which impact can be reversed** | This is a positive impact. |
| **Degree to which impact can be avoided** | This is a positive impact. |
| **Degree to which impact may cause irreplaceable loss** | Possible where mitigation measures are not correctly implemented. |
| **Degree to which impact can be mitigated** | High. |

### RESIDUAL RISK

Possible residual contamination risk.

### MANAGEMENT OBJECTIVE

The objective is to reduce the groundwater contamination associated with the migration of the contamination plume.

### MANAGEMENT ACTION

- The mine will continue monitoring groundwater in accordance with the existing monitoring programme (Section 28);
- *Marula should Investigate and implement monitoring and remediation measures to reduce the contamination plume emanating from the UG Tailings Facility. The management measures should aim to reduce negative impacts to 3rd party groundwater users and the environment; and*
- *Marula must ensure that these monitoring and remediation measures are investigated with input from a suitably qualified geohydrologist or equivalent specialist.*

### EMERGENCY SITUATIONS

Any significant pollution incident will be handled in accordance with Marula's emergency response procedure as outlined in Section 29.2.2.

## AIR QUALITY

### ISSUE: AIR POLLUTION

The information contained in this section was sourced from the Basic Air Quality Assessment undertaken for the proposed ventilation shafts by Airshed (August 2020), approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

The significant pollutants associated with mining related operations are total suspended particulate (TSP) and inhalable particulate matter less than 10 microns in size ($PM_{10}$ and $PM_{2.5}$). There are several activities in all phases that have the potential to contribute to the pollution of air. In the construction and decommissioning phases these activities are usually temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long-term activities and the closure phase will present final rehabilitated areas. Sources of atmospheric emissions in the region include:

- Gaseous and particulate emissions from mining operations;
- Miscellaneous fugitive dust sources including vehicle entrainment on roads and windblown dust from open areas;
- Gaseous and particulate emissions from vehicles;
- Gaseous and particulate emissions from household fuel burning;
- Gaseous and particulate emissions from biomass burning/veld fires (e.g., wildfires); and
- Air pollution related impacts on biodiversity are discussed in the biodiversity section of this appendix and therefore this section focuses on the potential for human health impacts.

## PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

## RATING OF IMPACT

Significant sources of air pollution at the Marula Mine arise from crushing, screening and stockpiling processes and give rise to $PM_{10}$ and TSPs. Other main contributing sources include wind erosion of exposed areas, materials handling, paved roads, current ventilation shafts (only $PM_{10}$) and unpaved roads. These inhalable components can cause human health impacts at high concentrations over extended periods, while the larger particulate component can cause nuisance dust impacts such as soiling of grazing veld at high fallout quantities over extended periods.

The construction activities such as general site preparation land clearing and demolition activities, excavation, material handling activities, wheel entrainment and operation of diesel or petrol engines will result in considerable air emissions. If not properly mitigated, these emissions can cause high levels of dust which may travel large distances. Combustion engines from the movement of plant material will also negatively impact on the air quality by contributing CO, HC, NOx, and $CO_2$ into the atmosphere during the construction phase. During decommissioning and closure, dust sources will emanate through removal, stripping and demolition of structure and through some rehabilitation activities. Impacts during the decommissioning and closure phase are largely similar to construction impacts. These impacts are applicable to the establishment of all proposed infrastructure when considering the proposed project incrementally.

The impact of air pollution and primarily dust fallout will be short lived during the construction phase and closure and decommissioning phases. The severity of the impact is rated as medium in the unmitigated scenario because the impacts will be short lived and dust sources contributed through erosion may cause moderate disturbances due to the clearing and stripping activities. The severity can be reduced to low with mitigation. The duration in both scenarios is rated as low in bow scenario because it will be restricted to the time required for construction and decommissioning. Because emissions are influence by the prevailing meteorological conditions, the extent is beyond the site boundary in an unmitigated scenario. The mitigated scenario will limit air blown dust particles through implementation of measures such as dust suppression. The consequence is rated as medium in an unmitigated scenario and low in the mitigated scenario. The probability is rated as probable during the construction phase and reduces to low with mitigation. The significance in the unmitigated scenario is **LOW** and reduces to **VERY LOW** in the mitigated scenario.

During the operational phase the ventilation shafts, refrigeration infrastructure and product stockpile are likely to produce in operational air emission. Other projects components are not sources of operational emissions (additional TSF pipeline, powerlines, and change house), whilst the water supply pipelines will be buried. An air quality assessment was undertaken by Airshed (2020) to determine the air quality impact of the establishment of additional ventilation shafts (Driekop Ventilation Shaft 9 and Clapham Ventilation Shaft 8). An emission inventory was first compiled and formed the basis for the assessment of the air quality impacts from the proposed vents on the receiving environment, a summary of the stack emission is shown in Table 42 below.

**Table 41: Stack emission summary (Airshed, 2020)**

| Source Name | Pollutant Name | Per Vent | Number Vents at Shaft | Total | Source Name |
|---|---|---|---|---|---|
| Driekop Ventilation Shaft 9 | $PM_{10}$ | 1.32 | 2 | 2.65 | 84 |
| | $PM_{2.5}$ | 0.40 | 2 | 0.79 | 25 |
| Clapham Ventilation Shaft 8 | $PM_{10}$ | 1.61 | 3 | 4.83 | 152 |
| | $PM_{2.5}$ | 0.48 | 3 | 1.45 | 46 |

A level 1 screening model was used to model the dispersion of pollutants at sensitive receptors (see Section 7.3.18) and the ground level concentrations were obtained see Table 43 and Table 44. The assessment concluded that $PM_{10}$ and $PM_{2.5}$ were likely to be released by the proposed operations and likely to result in human health impacts. However, the ground level pollutant concentrations at the selected sensitive receptors were well within NAAQS both in the short and long term at all selected AQSRs, as such the emissions from the vent shafts have a low significance on health impacts due to emissions and will not result in exceedances of NAAQS at the closest sensitive receptors. It is important to note that mitigation measures are not available for the ventilation shafts and therefore only the mitigated scenario applies.

The proposed product stockpile will be a source of emissions during transport of the material and handling and stockpiling, this is mainly due to wind-blown dust in an unmitigated scenario. However, the operation of the product stockpile will be undertaken within an existing mining area with sensitive receptors in proximity mainly being mine employees. The severity of the ventilation shaft and product stockpile is therefore considered low in an unmitigated scenario and remains low with mitigation. The duration is long term in both scenarios and will occur at the end of the operational life of mine. The extent of the operational impacts for both components are medium and cannot be reduced for the ventilation shaft. with mitigation the extent can be reduced for impact related to the product stockpile to a part of the site with frequent dust suppression. The consequence is rated as medium in the mitigated scenario and in the unmitigated scenario. For the ventilation shaft the probability was rated as possible and the product stockpile probability is probable in the unmitigated scenario. No mitigation is possible for the ventilation shaft but with mitigation the product stockpile can be reduced to possible. The significance is rated as LOW -MEDIUM in the unmitigated scenario and LOW in a mitigated scenario.

**Table 42: Simulated ground level concentrations at the nearest AQSRs (Driekop) (Airshed, 2020)**

| AQSR | $PM_{10}$ daily concentration (µg/m³) | $PM_{10}$ annual concentration (µg/m³) | $PM_{2.5}$ daily concentration (µg/m³) | $PM_{2.5}$ annual concentration (µg/m³) |
|---|---|---|---|---|
| 1 | 25 | 5.0 | 8 | 1.5 |
| 2 | 24 | 4.8 | 7 | 1.4 |
| 3 | 30 | 6.0 | 9 | 1.8 |
| 4 | 37 | 7.4 | 11 | 2.2 |
| 5 | 38 | 7.7 | 12 | 2.3 |
| 6 | 39 | 7.8 | 12 | 2.4 |
| 7 | 21 | 4.2 | 6 | 1.3 |
| 8 | 25 | 5.1 | 8 | 1.5 |
| 9 | 24 | 4.9 | 7 | 1.5 |
| 10 | 21 | 4.2 | 6 | 1.3 |
| **NAAQS** | **75** | **40** | **40** | **20** |

**Table 43: Simulated ground level concentrations at the nearest AQSRs (Driekop) (Airshed, 2020)**

| AQSR | $PM_{10}$ daily concentration (µg/m³) | $PM_{10}$ annual concentration (µg/m³) | $PM_{2.5}$ daily concentration (µg/m³) | $PM_{2.5}$ annual concentration (µg/m³) |
|---|---|---|---|---|
| 1 | 49 | 9.8 | 15 | 2.9 |
| 2 | 40 | 8.0 | 12 | 2.4 |
| 3 | 28 | 5.5 | 8 | 1.6 |
| 4 | 28 | 5.6 | 8 | 1.7 |
| 5 | 37 | 7.4 | 11 | 2.2 |
| 6 | 49 | 9.7 | 14 | 2.9 |
| 7 | 32 | 6.4 | 10 | 1.9 |
| 8 | 28 | 5.5 | 8 | 1.6 |
| 9 | 28 | 5.5 | 8 | 1.6 |
| 10 | 27 | 5.4 | 8 | 1.6 |
| **NAAQS** | **75** | **40** | **40** | **20** |

| **Issue: Air Pollution** | | |
|---|---|---|
| **Phases: Construction, Decommissioning and Closure** | | |
| **Project components: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | Medium | Low |
| **Duration** | Low | Low |
| **Extent** | Medium | Low |
| **Consequence** | Medium | Low |
| **Probability** | High | Low |
| **Significance** | Medium | Very Low |
| **Phase: Operation** | | |
| **Project components: Ventilation shafts and refrigeration infrastructure and product stockpile** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | Low | Low |
| **Duration** | High | High |
| **Extent** | Medium | Medium - Low |
| **Consequence** | Medium | Medium |
| **Probability** | Medium - High | Medium |
| **Significance** | Low – Medium | Low |
| | | |
| **Nature of cumulative impacts** | Low contribution to cumulative impacts. | |

| | |
|---|---|
| **Degree to which impact can be reversed** | Likely with mitigation. |
| **Degree to which impact can be avoided** | Likely with mitigation. |
| **Degree to which impact may cause irreplaceable loss** | Possible where mitigation measures are not correctly implemented. |
| **Degree to which impact can be mitigated** | High. |

## RESIDUAL RISK

None as infrastructure will be removed and the site rehabilitated.

## MANAGEMENT OBJECTIVE

The objective is to prevent air pollution health impacts.

## MANAGEMENT ACTION

The following measures as part of the approved EIA and EMPr (Metago, 2012) remain applicable:

- The following measures will be implemented including updating the mine's current monitoring programme and the related dust monitoring points:
  - construction activities – target dust control efficiency of 50% – achieved through effective water sprays and managed blasting techniques;
  - unpaved roads – target dust control efficiency of 75% – achieved by applying 0.058 litres of water per square meter of road every hour that it is in use by vehicles. In addition, the access road to the Merensky shaft will be tarred. The monitored fallout must be below 600mg/m$^2$/day near residential areas;
  - Marula will investigate options for achieving the targeted dust control efficiency on the top surface. This will be verified by perimeter dust fallout monitoring.
  - topsoil stockpiles – target dust control efficiency of 60% – achieved by vegetation establishment on the stockpiles. This will be verified by perimeter dust fallout monitoring. Dust fall immediately downwind to be less than 1200mg/m$^2$/day and 600mg/m$^2$/day near residential areas; and
  - crushing and screening and materials handling (including stockpiles) target dust control efficiency of 60% – achieved by adding water sprays at all crushers. This will be verified by visual inspection to ensure that there is no plume and perimeter dust fallout monitoring. Dust fall immediately downwind must be less than 1200mg/m$^2$/day and 600mg/m$^2$/day near residential areas.
- The mine will develop and implement other key elements of an air quality control system. This system will include:
  - monitoring at sensitive receptors around the mine area; and
  - if monitoring determines that unacceptable dust emissions is occurring, immediate steps will be taken to address the issue in consultation with a suitable air quality specialist.
- Establish a meteorological station where there is no influence from infrastructure or topography.
- *The mine should continue with the dust fallout monitoring programme (Section 28).*

### EMERGENCY SITUATIONS

Upset conditions and related unmitigated emission incidents will be addressed in accordance with the Marula's emergency response procedure.

## NOISE

Information presented in this section was sourced from the Noise Specialist Study for the new ventilation infrastructure for the Marula Platinum Mine (Airshed, November 2020).

### ISSUE: INCREASE IN DISTURBING NOISE LEVELS

### INTRODUCTION

Two types of noise are distinguished: noise disturbance and noise nuisance. The former is noise that can be registered as a discernible reading on a sound level meter and the latter, although it may not register as a discernible reading on a sound level meter, may cause nuisance because of its tonal character (e.g. distant humming noises). Noise related impacts are associated with all mine phases prior to closure. At closure noise sources will be removed.

Mine activities/infrastructure present the possibility of generating both noise disturbances and noise nuisance in all phases prior to closure. Refer to the biodiversity section in this appendix for the potential noise impacts on biodiversity. This section will only focus on the potential human related noise impacts.

The section below specifically focused on the potential impact on the acoustic environment for and noise sensitive receptors because of the proposed ventilation shafts and additional bulk air coolers. The remaining project components are not anticipated to significantly contribute to disturbing noise levels that will influence sensitive receptors.

### PROJECT PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | N/A |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7) | • Operation of ventilation shafts and refrigeration infrastructure | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | |

### RATING OF IMPACT

Potential noise receptors within the project area include the residential areas of Winnarshoek (~80 m from project activities), Diphale (~600 m from project activities) and Galane (~300 m from project activities). Wither reference to Section 7.3.1.9, daytime and night-time noise levels are within the IFC guidelines for residential, institutional, and educational receptors. As part of the proposed project, noise levels likely to be associated with the proposed ventilation shafts and additional bulk air coolers was simulated. In this regard the simulated noise levels were assessed according to guidelines published by the IFC. To assess annoyance at nearby places of residence, the increase in noise levels above the baseline at NSRs were calculated and compared to guidelines published in SANS 10103. The unmitigated simulated operational phase results are tabulated below. **In terms of the simulated noise modelling, it is important to note that a conservative approach was followed, whereby buildings were not included in the propagation modelling. Buildings (such as the refrigeration plant and motors to drive the surface fans) will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses.**

| Noise sensitive receptor | Day-time (operational phase) | | | Night-time (operational phase) | | |
|---|---|---|---|---|---|---|
| | Simulated noise levels due to project operations (dBA) | Increase in noise levels above baseline(c) (dBA) | Expected Community Response due to Maximum Increase Above Baseline of more than 3 dBA[(d)(e)] | Simulated noise levels due to project operations (dBA) | Increase in noise levels above baseline(c) (dBA) | Expected Community Response due to Maximum Increase Above Baseline of more than 3 dBA[(d)(e)] |
| Winnaarshoek | 52 | 6.8 | | 53[(b)] | 16.7 | ✓ |
| Diphale | 46 | 5.5 | | 44 | 16.7 | ✓ |
| Galane | 60[(a)] | 13.6 | | 60[(b)] | 20.3 | ✓ |

a. Exceeds daytime IFC guidelines of 55 dBA for residences.

b. Exceeds night-time IFC guideline of 45 dBA for residences.

c. Based on measurements obtained during the survey undertaken on 17 and 18 August 2020

d. Likely community response

| | |
|---|---|
| | 3 to 5 dBA – There will be 'little' reaction with 'sporadic complaints'. |
| | 5 to 10 dBA – There will be 'little' to 'medium' reaction with 'sporadic' to 'widespread' complaints. |
| | 10 to 15 dBA – There will be a 'strong' reaction with 'threats of community action'. |
| | > 15 dBA – There will be a 'very strong' reaction with 'vigorous community action'. |

e. Noise levels greater than 7dBA indicated with a tick.

With reference to the simulated operation noise results, the IFC guideline day-time and night-time noise levels will be exceeded. The level of increase is simulated to be greater than 7dBA and as such will result in a significant change to the baseline conditions. This is a high intensity for the operational phase as widespread complaints are anticipated from nearby sensitive receptors when considered incrementally in the unmitigated scenario. In the incremental unmitigated scenario, construction and decommissioning phase noise levels are expected to be lower than simulated noise impacts of the operational phase. The duration of the constriction and decommissioning noise levels is expected to be short-term, lasting for a few months for both the unmitigated and mitigated scenarios. The operational phase will present more long-term disturbing noise levels that will last for the duration of the project for both the unmitigated and mitigated scenarios. In all project phases prior to closure, in both the mitigated and unmitigated scenarios, noise levels will extend to nearby communities. Without mitigation the impact on sensitive receptors is definite, particularly in the operational phase. With mitigation measures focussed on noise attenuation, the impact reduces. The incremental unmitigated significance is **MEDIUM** and reduces to **VERY LOW** for the construction and decommissioning phases with mitigation. The incremental unmitigated significance is

**HIGH** in the operational phase and reduces to **MEDIUM** with mitigation. **This is taking a conservative approach, in the absence of modelling a mitigated scenario with the mitigation actions outlined in the section below. With the implementation of the management actions (particularly noise berms), the mitigated incremental impact is expected to lower. This will need to be confirmed through on-site monitoring as outlined in the management actions below.**

The cumulative impact was assessed as having a medium significance in the unmitigated and mitigated scenarios in the approved EIA and EMPr (Metago, 2012). When considering the proposed project's impact cumulatively with the current and approved operations, the proposed project presents additional noise sources that will impact on sensitive receptors. It follows that the cumulative rating changes to **HIGH** in the unmitigated scenario and reduces to **MEDIUM** with mitigation when compared to the approved EIA and EMPr (Metago, 2012).

| **Issue: Increase in Disturbing Noise Levels** | | |
|---|---|---|
| **Phases: Construction, Operation and Decommissioning** | | |
| **Project components: Proposed ventilation shafts and additional bulk air coolers** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Intensity** | Medium (construction and decommissioning)<br>High (operation) | Low (construction and decommissioning)<br>Medium (operation) |
| **Duration** | Low (construction and decommissioning)<br>High (operation) | Low (construction and decommissioning)<br>High (operation) |
| **Extent** | Medium (construction and decommissioning)<br>Medium (operation) | Low (construction and decommissioning)<br>Medium (operation) |
| **Consequence** | Medium | Low (construction and decommissioning)<br>Medium (operation) |
| **Probability** | Medium (construction and decommissioning)<br>High (operation) | Medium (construction and decommissioning)<br>High (operation) |
| **Significance** | Medium (construction and decommissioning)<br>High (operation)<br>High (cumulative) | Very Low (construction and decommissioning)<br>Medium (operation)<br>Medium (cumulative) |
| | | |
| **Nature of cumulative impacts** | Contributes to cumulative impacts. | |
| **Degree to which impact can be reversed** | Impact can only be reversed at the closure phase when mining related activities cease and all infrastructure has been removed from site. | |
| **Degree to which impact can be avoided** | Impact cannot be avoided until closure when mining related activities cease. | |
| **Degree to which impact may cause irreplaceable loss** | Not applicable. | |
| **Degree to which impact can be mitigated** | Medium. Even with mitigation measures, IFC guideline limits will be exceeded at sensitive receptors, particularly in the operational phase. | |

### RESIDUAL RISK

None, as all mine related infrastructure will be removed.

### MANAGEMENT OBJECTIVE

To prevent unacceptable noise impacts.

### MANAGEMENT ACTIONS

*For general activities, the following good engineering practice should be applied to all project phases:*

- *Equipment with lower sound power levels must be selected. Vendors should be required to guarantee optimised equipment design noise levels.*
- *Where possible, other non-routine noisy activities such as construction, decommissioning, start-up and maintenance, should be limited to day-time hours.*
- A noise complaints register must be kept.

*The specifications and equipment design and enclosures include:*

- *Equipment to be employed should be reviewed to ensure the quietest available technology is used. Equipment with lower sound power levels must be selected in such instances and vendors/contractors should be required to guarantee optimised equipment design noise levels;*
- *As far as is practically possible, sources of significant noise should be enclosed. The extent of enclosure will depend on the nature of the machine and their ventilation requirements. Pumps and motors are examples of such equipment;*
- *The compressors will also be enclosed in the refrigeration plant building. This will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses;*
- *It should be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise should be directed into a partial enclosure and not out of it, there should not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure.*
-

*The use and sitting of equipment and noise sources:*

- *As far as is practically possible, sources of significant noise should be enclosed. The extent of enclosure will depend on the nature of the machine and their ventilation requirements. Pumps and motors are examples of such equipment;*
- *The compressors will also be enclosed in the refrigeration plant building. This will provide acoustic shielding to the outside through absorption of acoustic energy and transmission losses;*
- *It should be noted that the effectiveness of partial enclosures and screens can be reduced if used incorrectly, e.g. noise should be directed into a partial enclosure and not out of it, there should not be any reflecting surfaces such as parked vehicles opposite the open end of a noise enclosure;*
- *Regular and effective maintenance of equipment are essential to noise control. Increases in equipment noise are often indicative of eminent mechanical failure. Also, sound reducing equipment/materials can lose effectiveness before failure and can be identified by visual inspection.*
- *Implement the monitoring programme as outlined in Section 28.*

*In terms of controlling the spread of noise using barriers or berms the following applies:*

- *If noise can be controlled at the source to meet IFC guidelines at the NSR, then no further attenuation measures will be required. However, if IFC guidelines are still exceeded at the NSR after source attenuation has been implemented, noise reduction screens, barriers, or berms must be installed.*
- *The effectiveness of a noise barrier is dependent on its length, effective height, and position relative to the source and receiver as well as material of construction. To optimize the effect of screening, screens should be located close (within 50 m) to either the source of the noise, or the receiver.*
- *The careful placement of barriers such as screens or berms can significantly reduce noise impacts but may result in additional visual impacts. Although vegetation such as shrubs or trees may improve the visual impact of construction sites, it will not significantly reduce noise impacts and should not be considered as a control measure.*
- *Earth berms can be built to provide screening for large scale earth moving operations and can be landscaped to become permanent features once construction is completed. Care should be taken when constructing earth berms since it may become a significant source dust.*
- If exceedances of IFC guidelines are measured at the NSR, the following earth berm construction is recommended:
  - *Clapham Shaft Complex:*
    - *Height of earth berm preferably 10 m*
    - *Constructed not more than 50 m from the main noise sources at the Clapham Shaft Complex*
  - *Driekop Shaft Complex:*
    - *Height of earth berm preferably 15 m*
    - *Constructed not more than 50 m from the main noise sources at the Driekop Shaft Complex*
- *Berms can be constructed from waste rock material. It is recommended that noise sampling be undertaken at the NSRs once the berm is constructed to understand the effectiveness of the noise barrier. If IFC guidelines are still exceeded, the berm should be covered with topsoil and then vegetated. The vegetated berms will reduce their acoustic "hardness" and increase their attenuation potential. An unvegetated berm constructed solely from waste rock could compound impacts by reflecting noise.*

### EMERGENCY SITUATIONS

None identified.

## TRAFFIC

### ISSUE: ROAD DISTURBANCE AND TRAFFIC SAFETY

The information contained in this section was sourced from the approved 2012 EMPr (Metago, 2012).

### INTRODUCTION

Traffic impacts can occur during the construction, operational and decommissioning phases when trucks, buses, and private vehicles make use of the private and public transport network in and adjacent to the Marula Mine. The key potential traffic related impacts are on road capacity and public safety. The Marula Mine is accessed via the Mine Access Road situated of the R37 (a primary arterial road). The existing traffic volumes are attributed to public sources (taxis, buses, and private vehicles such as school drop offs) and Marula employees (Marula Mine feeder shuttles and private vehicles). Safety risks associated with mining traffic making use of public road infrastructure include pedestrian accidents and vehicle accidents. Traffic will be generated during all project phases when trucks, buses, and private vehicles make use of the private and public transport network in and adjacent to the proposed project sites. The location of the proposed Driekop Ventilation Shaft 9, Clapham Ventilation Shaft 8 and associated refrigeration and ventilation infrastructure and most of the water and power line route will be located outside of the fenced area of the Marula Mine. The proposed product stockpile (within the Concentrator Plant), the Eskom substation upgrade, structural upgrades to the compressed air main ring and the change house (within the Clapham Shaft Complex) will be located within the fenced area of the Marula Mine.

### MINE PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | N/A |
| Transport systems | Transport systems | Transport systems | |

### RATING OF IMPACT

The impact of road disturbance and traffic safety was assessed as part of the approved EIA and EMPr (Metago, 2012) as having a **HIGH** overall significance, reducing to **MEDIUM** with management actions. Mitigation measures included the monitoring of the traffic situation at situation at the intersection of the main mine access road and R37. If the service levels proved to be unacceptable, a solution would be identified by the mine in consultation with a traffic specialist and the Limpopo Roads Department. A traffic assessment was undertaken by JG Afrika (2020) showed an improvement to the level of service, and that the intersection operates at low average delays from a capacity point of view. The proposed project components are not expected to generate additional traffic. When considering the road capacity, the additional traffic from proposed project components is expected to have a minimal impact on road conditions given that the proposed project is expected to create an average of 250 temporary jobs (during the construction phase). The additional workers are expected to be transported to and from site using buses or private vehicles on surfaced roads. As such the existing traffic network would be sufficient. When considering the safety of roads users (pedestrians and vehicle accidents) impacts may be expected during the construction phase when trucks transport equipment and machinery to site. This additional traffic may result in potential safety risks to pedestrians and other road users outside of the traffic controlled, fenced areas of the Marula Mine. However, this is expected to be negligible when considered cumulatively because the mine implements measures to manage traffic and road safety in accordance with the approved EIA and EMPr (Metago, 2012). The impact rating (when considered cumulatively) therefore remains unchanged for the overall mine as per the approved EIA and EMPr (Metago, 2012).

| Issue: Road Disturbance and Traffic Safety | | |
|---|---|---|
| **Phases: Construction, Operation and Decommissioning** | | |
| **Project components: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | Medium | Low |
| **Duration** | High | Low |
| **Extent** | Medium | Medium |

| | | |
|---|---|---|
| **Consequence** | High | Low |
| **Probability** | High | Low |
| **Significance** | High (incremental and cumulative) | Medium (incremental and cumulative) |
| | | |
| **Nature of cumulative impacts** | No significant contribution to cumulative impacts. | |
| **Degree to which impact can be reversed** | Permanent injury or death cannot be reversed. | |
| **Degree to which impact can be avoided** | High as mitigation measures should achieve impact avoidance. | |
| **Degree to which impact may cause irreplaceable loss** | Permanent injury or death would be an irreplaceable loss. | |
| **Degree to which impact can be mitigated** | High as mitigation measures should achieve impact avoidance. | |

### RESIDUAL RISK

None as no mine traffic related activities take place after closure.

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to prevent transport related accidents and/or injury to people and livestock.

### MANAGEMENT ACTIONS

Management actions to mitigate traffic impacts are:

- The mine will record and respond, appropriately and without delay, to any complaints about the usage of roads by mine vehicles.

### EMERGENCY SITUATIONS

If a person or animal is injured by transport activities this must be handled in accordance with the Marula's emergency response procedure.

## VISUAL

### ISSUE: VISUAL IMPACTS

The information contained in this section was sourced from the approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

Visual impacts on this receiving environment may be caused by activities and infrastructure in all mine phases. During the construction, operation and decommissioning phases, the more significant visual impacts relate to the larger infrastructure components (shafts and buildings). At closure all infrastructure will be removed, however visual impacts can extend post closure where rehabilitation has not been successful.

### MINE PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

### RATING OF IMPACT

The severity of visual impacts is determined by assessing the change to the visual landscape as a result of mine and project related infrastructure and activities. In this regard, the Marula surface use area has a varied visual landscape with hills and koppies in the west and south together with residential developments around the mine operations. When considering the potential change to the visual landscape the key issues are visual exposure, visual intrusion, and sensitivity of receptors. For the proposed project components, the following is relevant when considering visual exposure, visual intrusion and sensitivity of receptors. Visual exposure is the extent to which infrastructure and activities will appear in the various views. It follows that the closer the infrastructure and activities, the greater the visual exposure. This in turn relates to the visual intrusion into the landscape. The more significant impacts are expected during the construction and decommissioning phases.

The following discussion is related to the visual impact when considering the proposed project incrementally:

- The severity in both the unmitigated and mitigated scenarios during the construction and decommissioning phases will be medium and during the operation phase low. During the construction and decommissioning phases, the duration is expected to be low in both mitigated and unmitigated scenarios because the main activities likely to affect visual landscape (infrastructure removal and demolition and site preparation for rehabilitation) will likely last for more than a year but less than 5 years. The duration of impacts during the operational phases is rated as high in both scenarios because the established structures will remain throughout the operational life of the mine. The extend of the impact is medium in all phases in both the mitigated and unmitigated scenarios. During construction and decommissioning the consequence is rated as Medium in both scenarios. The consequence of the operational phase is rated as Medium in the unmitigated scenario and reduces to low with mitigation. The unmitigated probability is high in all the phases. With mitigation, prior to closure, this remains high for the construction and decommissioning phases as limited measures exist to reduce this impact but reduces to low for the operational phase. The significance is rating of the proposed project during construction and decommissioning is rated as **MEDIUM** with and without mitigation measures. During the operational phase the significance rating is **MEDIUM** and reduces to **VERY LOW** with mitigation measures.

The following discussion is related to the visual impact when considering the proposed project cumulatively within the existing mining operation:

- The ventilation shafts will be located away from the main mine facilities and Marula intends to place as much of the infrastructure as possible below surface limiting the infrastructure located above ground. The refrigeration infrastructure will be located above ground but will be established close to surface ventilation structures. The water pipelines will be buried underground and will therefore not contribute to long term visual disturbance. The proposed OHT line will follow existing servitudes as far as possible thereby limiting negative visual impacts closer to the shaft complexes, but the OHT lines will pose a minor change in the visual landscape further away from the main mining area. The proposed Eskom substation upgrade, TSF pipeline, structural upgrades at the Clapham Shaft Complex (change house and air compressed main ring) and the establishment of an additional product stockpile will be undertaken within existing developmental footprints. It is expected that the ventilation shafts and the OHT lines, will be visible from the nearest local community and people making use of the road network. At closure, all infrastructure will be removed, and disturbed areas rehabilitated. In terms of sensitivity of receptors, the surrounding communities and road users have been exposed to mining related infrastructure since the construction of the mine in 2002. Given this and the localized nature of the proposed project components, visual receptors are expected to be less sensitive to the potential change. The overall visual impact was assessed as part of the approved EIA and EMPr amendment (Metago, 2012) as having a **MEDIUM** significance in the unmitigated scenario which reduced to **MEDIUM/LOW** in the mitigated scenario. When considering the proposed project cumulatively with the current and approved operations, the significance rating for the overall mine remains unchanged from the approved EIA and EMPr (Metago, 2012) in the unmitigated and mitigated scenario.

| **Issue: Visual Impacts – Proposed project incrementally** | | |
|---|---|---|
| **Phases: Construction and Decommissioning** | | |
| **Project components: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | Medium | Medium |
| **Duration** | Low | Low |
| **Extent** | Medium | Medium |
| **Consequence** | Medium | Medium |
| **Probability** | High | High |
| **Significance** | Medium | Medium |
| **Phases: Operation** | | |
| **Severity** | Low | Very low |
| **Duration** | High | High |
| **Extent** | Medium | Medium |
| **Consequence** | Medium | Low |
| **Probability** | High | Low |
| **Significance** | Medium | Very Low |
| | | |
| **Nature of cumulative impacts** | Minor change. | |
| **Degree to which impact can be reversed** | Low. | |
| **Degree to which impact can be avoided** | Low, the impact cannot be avoided, but mitigation measures can reduce the significance of the impact during the operational phase. | |
| **Degree to which impact may cause irreplaceable loss** | Low. | |
| **Degree to which impact can be mitigated** | High as mitigation measures should achieve reduction of the impact. | |

## RESIDUAL RISK

None as all infrastructure will be removed and the site rehabilitated.

## MANAGEMENT OBJECTIVE

The objective is to limit negative visual impacts.

## MANAGEMENT ACTIONS

Management measures as per the approved EMPr will remain relevant, and are as follows:

- During the construction and operational phases, the mine will ensure that the absolute minimum amount of vegetation and land is disturbed during site development and operation.
- Implement the air pollution control system to avoid plumes of dust that can reduce visibility.
- Paint structures and buildings in colours (browns and greens) that reflect and compliment the natural landscape – whites, blacks and bright colours will be avoided.

- To reduce the amount of glare, external surfaces of buildings and other structures should be articulated or textured to increase the interplay of light and shade.
- Night lighting will be: fitted with fixtures to prevent light spillage an focus the light on precise mine activities and infrastructure, fitted as low to the ground as is practicable, and security lights will be activated with movement sensors.
- In the decommissioning phase Marula will implement its closure plan which involves the removal of infrastructure, and the rehabilitation and re-vegetation of cleared areas and any final landforms that will remain post closure. These final landforms should be rehabilitated in a manner that both achieves landscape functionality and limits and/or enhances the long-term visual impact.
- At closure, final landforms will be managed through an aftercare and maintenance programme to limit and/or enhance the long-term post closure visual impacts.

### EMERGENCY SITUATIONS

None identified.

## HERITAGE AND PALAEONTOLOGICAL RESOURCES

### ISSUE: LOSS OF HERITAGE AND PALAEONTOLOGICAL RESOURCES

Information in this section was based on the Request for Exemption of any Palaeontological Impact Assessment for the proposed project (Marion Bamford, 2020) and the Phase I Heritage Impact Assessment (HIA) Study for the proposed project (Limpopo Province) (Julius CC Pistorius, January 2022).

### DISCUSSION

With reference to Section 7.3.2.1 no palaeontological resources are located within the proposed project footprint. From a cultural heritage perspective, various resources are located within the Marula MRA, however, the proposed project components are not located in close proximity to these resources. It follows that the assessment of the loss of heritage resources and palaeontological resources is not applicable to the proposed project. It is however important that the chance find procedure is followed in the unlikely event that any resources are exposed.

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to protect and preserve heritage and cultural resources.

### EMERGENCY SITUATIONS

If any heritage resources of significance are exposed, SAHRA should be notified immediately. All development activities must be stopped, and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notified to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.

## SOCIO-ECONOMIC

### ISSUE: ECONOMIC IMPACTS

The information contained in this section was sourced from the approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

In the broadest sense, all activities associated with the mine contribute towards a positive economic impact in all phases. Mining has a positive net economic impact on the national, local, and regional economy. Direct benefits are derived from wages, taxes, and profits. Indirect benefits are derived through the procurement of goods and services, and the increased spending power of employees. The proposed project comprises of components are aimed at optimizing the current mining operations and will result in an extension of the current LOM by an additional 17 years, thereby supporting the continuation and potential increase of these positive impacts.

### MINE PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

### RATING OF IMPACT

The following discussion is related to the economic impact when considering the proposed project incrementally:

- The proposed project components will have a net positive impact on the local, provincial, and national economy because it will support optimization of existing operations and extend the future LOM as follows:
  - Ventilation shafts and associated support infrastructure
    - The ventilation shafts will provide the current and future underground mining activities with the necessary ventilation thereby ensuring continued safe operations at the mine. The water supply and distribution pipelines will support this aim by providing make up water to the refrigeration infrastructure, and a return pipeline will transport excess water to the existing Plant Dam as part of the closed water system at the mine. The OHT line (as part of the expansion of the

existing transmission network) will also support the operations at the proposed ventilation shafts (including associated infrastructure).
    - The power supply upgrade of the Eskom substation will provide the additional power required for current and future mining operations and will accommodate the operation of the proposed ventilation shafts (and associated infrastructure) if approved.
    - The propose structural upgrades at the Clapham Shaft Complex will ensure that workers are adequately accommodated at the mine facilities for the LOM.
    - The establishment of an additional TSF and product stockpile will enable optimization of existing mining activities and assist with future capacity constraints. The optimization of existing infrastructure supports the continued operation of the mine and the direct and indirect positive benefits it brings.
- The severity of the impact is considered medium before and after mitigation. The positive economic impact will vary during different phases of the project. During the construction phase a peak estimation of 600 additional workers may be employed where a small number of people will experience benefits, whilst the operation and decommissioning stages will have a less significant impact on direct employment. This duration is therefore assessed as medium in both the mitigated and unmitigated scenarios. In both the mitigated and unmitigated scenarios, the spatial scale of the impact extends beyond the site boundary. The probability of the positive impact being realized is possible for both scenarios, as the enhancement measures are not likely to cause significant changes. The significance is rated as **POSITIVE MEDIUM** before and after mitigation.

The implementation of the proposed project will extend the LOM by 17 years because the proposed components will be assimilated within the existing mine operations and will last for the life of the mine, thereby benefiting many people and the larger economy. The overall economic impact was assessed as part of the approved EIA and EMPr amendment (Metago, 2012) as having a medium positive significance in both the mitigated and unmitigated scenarios. Due to the small-scale nature of the project the cumulative rating remains unchanged even though the LOM is extended.

| **Issue: Economic impacts** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project components: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | High + | High + |
| **Duration** | Medium | Medium |
| **Extent** | Medium (incremental)<br>High (cumulative) | Medium (incremental)<br>High (cumulative) |
| **Consequence** | High + (incremental)<br>High + (cumulative) | High + (incremental)<br>High + (cumulative) |
| **Probability** | Medium (incremental)<br>High (cumulative) | Medium (incremental)<br>High (cumulative) |
| **Significance** | Medium + (incremental and cumulative) | Medium + (incremental and cumulative) |
| | | |

| | |
|---|---|
| **Nature of cumulative impacts** | High contribution to cumulative impacts. |
| **Degree to which impact can be reversed** | Not Applicable. This is a positive impact. |
| **Degree to which impact can be avoided** | Not Applicable. This is a positive impact. |
| **Degree to which impact may cause irreplaceable loss** | Not Applicable. This is a positive impact. |
| **Degree to which impact can be mitigated** | Not Applicable. This is a positive impact. |

### RESIDUAL IMPACT

Possibility of residual impact post closure where job opportunities cease.

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to enhance the positive economic impacts and limit the negative economic impacts. Part of this objective is to enhance the contribution to the local economy.

### MANAGEMENT ACTIONS

In the approved EIA and EMPr (Metago, 2012) it is outlined that Marula will continue to implement the commitments in its Social and Labour Plan (SLP) in accordance with the employment, procurement, and social investment principles of the Mining Charter. These measures will be applied to the project components, where applicable.

### EMERGENCY SITUATIONS

None identified.

## ISSUE: INWARD MIGRATION

The information contained in this section was sourced from the approved EIA and EMPr (Metago, 2012).

### INTRODUCTION

Mining projects often cause an influx of people in search of employment. This inward migration causes a range of secondary impacts such as increased pressure on infrastructure and services such as clinics and water supply, housing etc., as well as the potential development of informal settlements. Other secondary impacts include social ills such as an increase in crime and the spread of diseases such as HIV/Aids. It is crucial that employment expectation be effectively managed. This has been started through the public consultation process for the Khwara EIA and for the project in that the information distributed to I&APs clearly states that no significant new employment opportunities will be available for this project.

### MINE PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |

| Construction | Operational | Decommissioning | Closure |
| --- | --- | --- | --- |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

## RATING OF IMPACT

The project could contribute to inward migration where people are in search of opportunities from the project. The effects of inward migration can be significant. These effects could include, but to be limited to:

- Potential establishment or expansion of informal settlements;
- Increased pressure on housing, water supply infrastructure, sanitation and waste management systems and infrastructure, health care and community services and infrastructure;
- Potential for increased pressure on natural resources such as water, fauna, flora, and soils;
- Increase in the level of crime and community unrest; and
- Spread of disease, most notably HIV/Aids and tuberculosis.

The proposed projects will be undertaken as an extension of the current mining operations. It is not possible to predict how significant the inward migration may be, however an average of 250 contract job opportunities (with a possible peak of 600 people) during the construction phase is anticipated. These job opportunities will be restricted to the construction phase and limited to the small scale of the proposed project. The potential still exists for inward migration to occur as a result of of people seeking employment and associated social issues and pressures prevalent in the area. The severity of the unmitigated impact is rated as medium and reduced to low with mitigation measures. It may be possible to mitigate this impact by managing expectations with regard to employment through existing communication structures at the mine. The duration of negative social impacts generally continues beyond the closure of the mine and is therefore rated as high in the unmitigated scenario and can be reduced to medium in the mitigated scenario. In both the unmitigated and mitigated scenarios, the impacts of inward migration could extend beyond the proposed project areas/sites and into surrounding communities. The consequence is medium in both scenarios. The probability in the unmitigated scenario is possible and reduces to conceivable with mitigation measures. The negative impact associated with inward migration because of the proposed project is rated as **LOW** in both the mitigated and unmitigated scenarios.

The project forms part of an existing approved mine and the establishment of additional facilities and that the proposed activities will not generate significant additional long term employment opportunities. Mitigating factors such as the monitoring of workers' living conditions, recruitment disciplines and HIV/Aids awareness and management already exist. As a result, the potential for increased social risks due to the proposed project activities is limited when considering the impact cumulatively. The approved EIA and EMPr (Metago, 2012) rated the significance of the cumulative impact of inward migration as **MEDIUM** in the unmitigated scenario and **MEDIUM/LOW** in the mitigated scenario and therefore remains unchanged.

| **Issue: Inward Migration** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project component: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | Medium | Low |
| **Duration** | High | Medium |
| **Extent** | Medium | Medium |
| **Consequence** | Medium | Medium |
| **Probability** | Medium | Low |
| **Significance** | Low (incremental)<br>Medium (cumulative) | Low (incremental)<br>Medium/Low (cumulative) |
| | | |
| **Nature of cumulative impacts** | Medium contribution to cumulative impacts. | |
| **Degree to which impact can be reversed** | Likely with mitigation. | |
| **Degree to which impact can be avoided** | Likely with mitigation. | |
| **Degree to which impact may cause irreplaceable loss** | Possible where mitigation measures are not correctly implemented. | |
| **Degree to which impact can be mitigated** | High. | |

### MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to limit inward migration and related social impacts.

### MANAGEMENT ACTIONS

The measures outlined in the approved EIA and EMPr (Metago, 2012) (with refence to the mines approved SLP) can be implemented for the proposed project as follows.

<u>Recruitment and relationships with surrounding communities</u>

The mine will ensure that its recruitment process incorporates the following:

- Clear communication that employment of exclusively local people for the proposed project cannot be guaranteed but the mine will aim to realize their employment target as per the approved SLP.
- Effective and timeous communication with community leaders.
- The precise number of job opportunities (permanent and temporary) will be made public together with the required skills and qualifications by mine management and the relevant communities.

- The duration of temporary work will be clearly indicated, and employees provided with regular reminders and revisions throughout the employment period.
- Good communication with all job seekers will be maintained throughout the recruitment process, to ensure that the process is seen and understood to be fair and impartial by all involved.
- Selection of young local people for assistance with furthering their education.
- Urging people to get all their documents and certificates, including valid driving licenses, in order prior to recruitment.
- Facilitating the recognition of prior learning of those job applicants who do not possess formally documented qualifications.
- Encouraging the Department of Labour and Local Economic Development Forums to educate potential workers about the recruitment process and helping with the organisation of the necessary documentation, as well as keeping an up-to-date database of unemployed people who are looking for work.

<u>Influx of workers including stress on housing related infrastructure and crime</u>

The focus of these actions is to prevent the establishment of informal settlements.

- The mine recognizes the importance of its workforce (including that of its contractors) residing in decent housing which is of an adequate size and serviced with basic infrastructure in terms of water, sanitation and electricity, in line with the Constitution of the country. As such the key principles guiding the mine's strategic planning during the life of the mine include the following:
  - Marula Platinum Mine's core business should remain that of mining and not the provision of housing.
  - It is not the mine's intention to become a land owner or landlord in the local area without a clear strategy of transferring land or housing stock to individual owners (i.e. the workforce).
  - Hostel accommodation is not an acceptable solution to the housing needs of its workforce, and whilst this may be necessary in the short term during the establishment of alternative housing accommodation, will not be utilized as a long term strategy.
  - Local recruitment is a key objective of the mine with a view to ensuring a fully localized labour force at the mine.
  - The housing policy at the mine must work in conjunction with the mine's recruitment, remuneration and local economic development programmes to ensure a holistic approach to the issue during the life of the mine.
  - The housing policy will take cognizance of the business plan of the mine and its related projected workforce requirements in good time for effective planning mechanisms to be implemented.
  - The mine endeavours, through its company housing policy, to prevent squatting in the vicinity of the mine development.
- All contractors and sub-contractors working on behalf of the mine must comply with the recruitment process. If possible, other developers and employers in the immediate area should adhere to the same process. The following additional points must be adhered to in the mine's recruitment process:
  - There will be no recruitment at the construction site. All recruitment will take place on set dates and at an arranged venue-preferably a formal gathering place in a nearby community.

  - There will be no ad hoc hiring of temporary casual labour, no matter how small and temporary the job (washing of vehicles or litter clearance). A sign clearly indicating that there will be no recruitment at the construction site will be erected at the entrance to the site. Also, a list of available temporary workers in the area will be drawn up and kept by the mine in the event that temporary labour is required. If it is not possible to draw up such a list, information will be distributed through existing community related communication structures.
  - Recruitment will take place during a prescribed 1-2 day period. Subsequent recruitment of replacement staff will take place at discrete, well-advertised intervals during the year.
  - Once the recruitment process is complete, unsuccessful job seekers must be clearly informed as such and understand that there is absolutely no reason to remain in the vicinity of the development;
- Local authorities will be requested to remove any informal settlements in the vicinity of the mine that are occupied by people who are there in the hope of obtaining employment. This must be carried out immediately.
- There will be no worker accommodation at the construction site.
- In regard to crime, the mine will communicate with its own security team and the local police force particularly in the context of developing strategies for combating crime in the vicinity of the mine, surrounding communities and surrounding land users/owners.

<u>Influx of workers, hygiene/disease - HIV/AIDS</u>

- The mine will ensure that its employees and contractors are made aware of the issues surrounding the spread of HIV and AIDS in the area. This awareness will be promoted by initiatives such as training and development, peer education, community interventions and visual awareness campaigns. Prevention and management strategies also need to be introduced.
- Voluntary Counselling and Testing (VCT) is a vital aspect to any HIV/Aids management programme. All stakeholders at the mine need to agree to a rigorous VCT programme. Once a high level of VCT is taking place it is possible to define the magnitude of the problem and begin to develop appropriate strategies for dealing with it.

These measures will be applied to the project components, where applicable.

### EMERGENCY SITUATIONS

The establishment of any informal settlements is considered to be an emergency situation that will be handled in accordance with the Marula emergency response procedure.

## LAND USE

### ISSUE: CHANGE IN LAND USES

The information contained in this section was sourced from the approved EIA and EMPr (Metago, 2012) and takes cognisance of the proposed project components as detailed in Section 3.2.3.

### INTRODUCTION

Mining-related activities and infrastructure have the potential to affect land uses both within the mine area and in the surrounding areas in all mine phases. This can be caused by physical land transformation and through direct or secondary impacts such as a loss of land use and loss of water supply. The Marula mining operations have already changed the land use within the mining area and some of the proposed project components have the potential to impact on land uses during all project phases. This section focuses on potential impacts affecting land use on and surrounding the project sites.

### MINE PHASE AND LINK TO PROJECT SPECIFIC ACTIVITIES/INFRASTRUCTURE

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| | | | |
| • Construction of ventilations shafts (V8 and V9) and refrigeration infrastructure<br>• Upgrades of infrastructure and services at ventilations shafts (V5, V6 and V7)<br>• Expansion of Eskom substation<br>• Construction of product stockpile<br>• Construction of TSF pipeline<br>• Construction of powerlines<br>• Construction of water pipelines<br>• Clapham shaft upgrades | • Operation of ventilation shafts and refrigeration infrastructure<br>• Operation of Eskom substation<br>• Use of product stockpile<br>• Operation of TSF pipeline<br>• Operation of powerlines<br>• Operation of water pipelines<br>• Use of Clapham shaft upgrades | • Demolition (removal of infrastructure from site)<br>• Rehabilitation | • Maintenance and aftercare of rehabilitated areas |

### RATING OF IMPACT

It is important to consider the potential area of new disturbance (as a result of the proposed project) when considering the impact of land use changes. Project components which are located within an already disturbed area are not expected to cause an impact on the land use because the component will be assimilated within a compatible area of the current mining operations. These components include the following:

- The structural upgrades to the change house and the compressed air main ring will be undertaken within the existing footprint of the Clapham Shaft Complex.
- The proposed establishment of the product stockpile will be located within an already disturbed footprint of the Concentrator Plant.
- The upgrade to the Eskom substation will be undertaken at the existing Eskom yard situated at the Concentrator Plant.
- The proposed establishment of Ventilation Shaft 9 (Driekop) will be within the existing footprint of the Driekop Ventilation Shaft 6.
- The proposed upgrades to ventilation and refrigeration infrastructure at Driekop Ventilation Shaft 6 and Clapham Ventilation Shaft 5 will be located within already disturbed footprints.

The main land use activities within the MRA include residential, mining, and agricultural (subsistence farming and livestock grazing) activities. The reduction in available land could affect the livelihood of the farmers, because their herds would have to survive on smaller areas of land. This may result in loss of livestock condition, reduction in herd sizes, and over grazing. The main components which may cause a loss of land include the proposed establishment of the Clapham Ventilation Shaft 8, proposed establishment of a bulk air cooler at Clapham Ventilation Shaft 7 and the proposed establishment of water pipelines and the proposed expansion of the OHT lines.

When considering the project incrementally, the proposed disturbance due to the establishment of the Clapham Ventilation Shaft 8 and bulk air cooler at Clapham Ventilation Shaft 7 is approximately 2.3 ha. The estimated linear disturbance of both OHT lines is approximately 7.1 km. The proposed Clapham Ventilation Shaft 8 and bulk air cooler is located on soil categorized as grazing land capability. The majority of the powerline and pipeline route is also situated on soil categorized as grazing land capability. However, the soil assessment (Appendix H) concluded that the proposed project area has low agricultural viability which limits the cultivation potential (Zimpande Research Collective, January 2022). The proposed water pipelines and powerlines will cross the Tshwenyane River and the unnamed tributary of the Moopetsi River, however the impact of this activity on the watercourse was assessed as low by SAS (SAS, January 2022) provided mitigation and management measures are implemented. When considering surrounding land uses, these land uses may be affected by one or more of the following potential environmental and social impacts: hazardous excavations and structures, dust generation, noise pollution, traffic related impacts, visual and negative socio-economic impacts. The severity of the impact in the unmitigated scenario is medium and recues to low in the mitigated scenario. The duration of the impact will continue for the life of the project without mitigation and is rated high, this can be reduced with management measures to medium. The extent of the impact is medium as the impact can extend beyond the site boundary. The consequence of the proposed project is medium in both scenarios. In the unmitigated scenario the environmental and social impacts are considered uncontrolled, the probability of a change in land is possible in the mitigated scenario the probability is rated as conceivable. The significance of this impact is rated as **MEDIUM** and reduces to **LOW** with mitigation.

The approved EIA and EMPr (Metago, 2012) rated the significance of the cumulative impact of land use changes as **HIGH** in the unmitigated scenario and **MEDIUM** in the mitigated scenario. The proposed project is not expected to contribute significant cumulative impact on land use because many of the project components will be established within existing and compatible uses within the mining area. It is expected that the infrastructure which will be located away from the mining area will have a low cumulative impact o surrounding land uses provided mitigation and management measures are implemented. At closure these sites will be rehabilitated, and the pre-project land uses will return. The cumulative impact therefore remains unchanged.

| **Issue: Land use changes** | | |
|---|---|---|
| **Phases: Construction, Operation, Decommissioning and Closure** | | |
| **Project component: All** | | |
| **Criteria** | **Without Mitigation** | **With Mitigation** |
| **Severity** | Medium | Low |
| **Duration** | High | Medium |

| | | |
|---|---|---|
| **Extent** | Medium | Medium |
| **Consequence** | Medium | Medium |
| **Probability** | Medium | Low |
| **Significance** | Medium (incremental)<br>High (cumulative) | Low (incremental)<br>Medium (cumulative) |
| | | |
| **Nature of cumulative impacts** | Low contribution to cumulative impacts. | |
| **Degree to which impact can be reversed** | Likely with mitigation. | |
| **Degree to which impact can be avoided** | Likely with mitigation. | |
| **Degree to which impact may cause irreplaceable loss** | Possible where mitigation measures are not correctly implemented | |
| **Degree to which impact can be mitigated** | Medium. | |

## MANAGEMENT OBJECTIVE

The objective of the mitigation measures is to prevent unacceptable negative impacts on surrounding land uses.

## MANAGEMENT ACTIONS

The measures outlined in the approved EIA and EMPr (Metago, 2012) can be implemented for the project as follows:

- Land disturbance by mine activities will be limited to those activities and areas that are described in the EIA and EMP reports.
- For its current operations, Marula has agreements in place with crop field owners regarding compensation for lost land. The same will apply to the Merensky areas. As part of the above process, the mine will keep a record of affected farmers including the type and size of their farming operations.
- Solutions will also be investigated for loss of grazing land, where required, in consultation with the *Department of Agriculture, Land Reform and Rural Development (DALRRD)* and affected farmers.
- Rehabilitation will commence as soon as mine activities cease. Where possible, areas will be rehabilitated on an ongoing basis.
- All rehabilitation initiatives will ensure that current land capabilities are restored through the conservation and replacement of soil and the re- establishment of vegetation that naturally occurs in the mine area.
- Land not required for the mining and process operations and associated infrastructure will not be disturbed. These rehabilitation efforts must be limited to the measures provided in the biodiversity section.
- Marula will implement the EMP commitments with a view not only to prevent and/or mitigate the various environmental and social impacts, but also to prevent negative impacts on surrounding land uses.
- Where there is a risk of damage to existing infrastructure, this will be diverted and/or relocated in consultation with the relevant landowners/ stakeholders.
- Closure planning will incorporate measures to achieve the future land use plans for the land within the Marula surface use area.

## EMERGENCY SITUATIONS

None identified.

# Appendix E: DFFE Screening Tool
# Attached Separately

## Appendix F: Composite map
## Attached Separately

## Appendix G: Marula Training Plan
## Attached Separately

# Appendix H: Specialist studies Attached Separately

# RECORD OF REPORT DISTRIBUTION

| | |
|---|---|
| SLR Reference: | 710.09002.00016 |
| Title: | PROPOSED CHANGES TO THE APPROVED LAYOUT AT THE MARULA PLATINUM MINE: BASIC ASSESSMENT REPORT (BAR) AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EMPr) |
| Report Number: | 01 |
| Client: | Marula Platinum (Pty) Ltd |

| Name | Entity | Copy No. | Date Issued | Issuer |
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