ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE UPGRADE OF AN EXISTING GRAVEL ROAD TO A FUNCTIONAL HAUL ROAD AT THE LIONS HEAD PLATINUM MAREESBURG MINE, LIMPOPO

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Submitted to:
Department of Mineral Resources
70 Meintjies Street,
Sunnyside,
PRETORIA

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Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

AND

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

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

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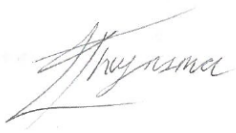
Signature			
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DISCLAIMER

1. IMPORTANT NOTICE

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

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

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

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

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices).

The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

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

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—-

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

  (ii) degree to which these impacts—

    (aa) can be reversed;

    (bb) may cause irreplaceable loss of resources, and

    (cc) can be avoided, managed or mitigated;

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

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

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

EXECUTIVE SUMMARY

Environmental Assurance (Pty) Ltd (ENVASS) as independent environmental consultant was appointed by Lions Head Platinum (Pty) Ltd to undertake the basic assessment process for the upgrade of an existing gravel road to a functional haul road. Eastplats proposes to develop a mine haul road to connect the existing Everest Platinum Mine to the Booysendal plant. The existing gravel road is envisaged to be upgraded to accommodate the movement of trucks amongst other vehicles to and from these mining facilities. In addition, the road will be an enabler for the new mining development. The road will be over 18km.

The project is envisaged to be located on the border between the Mpumalanga and Limpopo Provinces, near the towns of Lydenburg and Steelpoort. It is largely located in the Mpumalanga Provinces with some parts encroaching slightly into Limpopo. The project is situated in the Thaba Chweu Local Municipality, which forms part of the Enhlanzeni District Municipality.

Lions Head Platinum (Pty) Ltd (Mareesburg) is an existing mine owned by Eastern Platinum Limited. The three mine sections already has approved Environmental Management Programmes (EMPRs) and Environmental Authorisations (EAs) from the relevant competent authorities. The mine is located near Steelpoort and Burgersfort in the Limpopo Province. Currently there are no mining activities as the mining operation is in care and maintenance.

Lions Head Platinum (Pty) Ltd was granted a **mining right** LP 30/5/1/2/3/2/1/88MR and **approved EA (12/1/9-7/2-GS17)** for the existing Mareesburg Section.

Legislative Requirements

The most important legislation applicable to the proposed project are the following:

- Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended];
- National Environmental Management Act (No. 107 of 1998) [as amended];
- EIA Regulations, 2014 (Government Notices 982, 983, 984);
- Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) [as amended];
- Mine Health and Safety Act, 1996 (Act No. 29 of 1996) [as amended] and associated regulations;
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended];
- National Dust Control Regulations, 2013 (Government Notice 827 of 2013);

- Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended];
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [as amended];
- Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2016 in terms of NEMBA (Government Notice 864 of 2014);
- Conservation of Agricultural Resources Act (Act No. 43 of 1983);
- Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended];
- Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995); and
- All other relevant national, provincial, district and local municipality legislation and guidelines that may be applicable to the application. Some of these are discussed in the next section.

Need and Desirability

The main benefits of the approval of the Haul Road is listed below:

- The authorisation would ensure improved compliance of the operations;
- It contributes to the economic welfare of the surrounding community by creating working opportunities;
- It contributes to the upliftment of living standards and the health and safety of the local community;
- The net benefit to South Africa as a whole is a product produced for the world commodity market, earning South Africa the necessary foreign exchange and capital needed for a healthy economy and further capital investments in development projects for the long-term future of the country;
- The project is aligned with the objectives of key government guideline documents including inter alia the Tubatse Local Municipality Spatial Development Framework and the District and Local Integrated Development Plans.

Additional socio-economic needs and desirabilities include:

Aspect	Comment
Creation of residential and employment opportunities in close proximity to or integrated with each other	The project will create employment opportunities. The road construction will link residential communities.

Aspect	Comment
Reduction of the need for transport of people and goods	The project will significantly enhance the state of the transport of people and goods.
Access to public transport or enable non-motorized and pedestrian transport	The project will encourage the access to public transport and limit the current long-distance walking that the vulnerable population rely on.
Complimenting other uses in the area	Improved efficiency of the transport of people and goods.
Alignment with planning for the area	The proposed project is in alignment with the spatial objectives of the Thaba Chweu Local Municipality in the sense that this road will connect to the existing roads and enable connectivity to and from the rural hinterlands.
Use of underutilized land available (only for urban related development)	The proposed road will untap the potential of the underutilised surrounding land and aid the attraction of investment into the area. For instance, funds may be made available for agricultural commercialisation given that infrastructure conditions will have improved.
Optimization of the use of existing resources and infrastructure	The valuable resources in the area include arable land and mineral resources. The connectivity between the new and existing mine will enhance the socio-economic development of the area.
Discouragement of "urban sprawl" and contribute to compaction/densification	Road development will encourage compact development as other land uses may be attracted to the area with existing infrastructure as opposed to an area lacking in infrastructure.
Contribution to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current need	The road development rectifies the distorted spatial pattern of the primary study area, which is remote and disconnected from economic nodes. The existing gravel road will be upgraded and will thus have an optimised use.
Encouragement of environmentally sustainable land	The road development will sterilise a portion of cultivated land. However, it will not be a significant portion. In terms of land use

Aspect	Comment
development practices and processes	management, the road development is in alignment with required practices.
Consideration of special locational factors that might favor the specific location	The mining sites are the locational factors that will be linked through the construction of the road. In addition, the regional linkage between Limpopo and Mpumalanga will be promoted.
Generation of the highest socio-economic returns	The development of the road enhances socio-economic returns, whereas the lack of the road development perpetrates the development stagnation in the area.
Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area	The road does not impact on the sense of history and culture of the place. However, in the case of a portion wherein relocation will occur, the uprooting of the locals may disrupt their sense of history.
Promotion or contributing to create a more integrated settlement	The road development promotes integrated development through linking to local roads and across provinces.

The mine is currently in care and maintenance. There is no feasible alternative route for the haul road to travel. As the mining area is on an elevated hill, the opposite side (western and northern) slope is too steep to allow access. The area where the haul road is planned is mostly an existing road that will be upgraded for use by the surrounding community as well. The haul road will be required once the mine is operational.

The proposed development will enable Lions Head Platinum (Pty) Ltd to ensure processing of their ore products at the nearby processing plant belonging to an established platinum mine. It will therefore increase the benefits for South Africa as a whole, as well as for the local communities.

Alternatives

The following alternatives were investigated as feasible alternatives:

- Design alternatives;
- Recycling (Technology alternatives); and

- Not upgrading the existing gravel road (No – Go alternative).

Public Participation

A joint Public Participation Process is undertaken for the proposed and existing waste management facilities. The process is undertaken to ensure compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), the National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) [as amended] (NEMWA) and the National Water Act, 1998 (Act No. 36 of 1998) [as amended] (NWA), as well as the Environmental Impact Assessment Regulations (2014).

Tasks undertaken for the Public Participation Process (PPP):

- Identification of key interested and affected parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties);
- Formal notification of the application to interested and affected parties (including all affected and adjacent landowners) and other stakeholders; and
- Consultation and correspondence with I&APs and stakeholders.

Specialist studies

Exisitng specialist studies that are included for the Environmental Impact Assessment phase include the following:

- Archeological Impact Assessment (AIA);
- Socio-economic impact assessment (SEIA);
- Noise Baseline Assessment;
- Biodiversity Assessment;
- Soil Management Plan;
- Invasive Alien Species Management Plan;
- Air Quality Baseline Assessment.

Reasoned Opinion of the EAP

This EIA and EMPr focused only on the upgrade of the existing portion of gravel road (a public road) to a functional haul road and the construction of short sections of additional road sections (all gravel). Based on the findings of the environmental impact assessment, the EAP is of the opinion that the proposed development be approved, due to the positive social and economic impacts for the local and regional communities that may occur as a result of Mareesburg starting up operations. The potential negative impacts can be mitigated to acceptable levels, provided that the mitigation measures are strictly implemented and monitored.

In general, it is recognised that the existing and proposed haul road associated with the Mareebsurg Mine has the potential to pose various risks to the environment as well as to the residents or businesses in the surrounding area. However, based on the findings of this EIA documented in this report, all impacts can be mitigated to acceptable levels. Furthermore, the proposed activities will be located on previously disturbed land.

This report shows that the proposed development has the potential to provide many socio-economic benefits to the local and regional communities. The EAP therefore recommends that the proposed activities be approved on condition that the EMPR is strictly implemented and monitored for compliance. Should the activities not be approved, Lions Head Platinum (Pty) Ltd will not be able to commence mining and resources will not be utilised to its full economic potential , losing the ability of the mine to provide socio-economic benefits to the local and regional communities and the country as a whole.

Recommendations

It is recommended by the EAP that the following conditions be included in the authorisation:

- The EMPR is a contractual document and must be implemented at the Mareesburg Mine at all times;
- An independent environmental control officer (ECO) must be appointed to monitor the implementation of the EMPR and audit reports kept by the applicant;
- All contractors and employees of Mareesburg Mine, must be made aware of the EMPR and its requirements as well as the impact of not implementing the measures of the EMPR;
- Copies of the EMPR, Environmental Authorisation, Mining Right and Waste Management License, as well as the Water Use License and any emergency procedures and method statements, must be kept on site and be available on request of the Competent Authority.

Conclusion

A variety of mitigation and management measures have been identified that will serve to mitigate the scale, intensity, duration or significance of the potential negative impacts identified. These include guidelines to be applied during the construction, operational and closure phases of the proposed project. The Environmental Management Programme (EMPR) contains detailed mitigation measures. The proposed mitigation measures, if implemented, will reduce the significance of the majority of the identified impacts.

Framework of the report

The report is based on the template provided by the Department of Mineral Resources for Environmental Impact Assessment (EIA) Reports and Environmental Management Programmes (EMPRs). The report includes all the Requirements for EIAs / EMPRs listed in Appendix 3 and 4 of the EIA Regulations, 2014, Government Notice Regulation (GNR) 982, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 1998) [as amended] (NEMA).

Table 1: Framework of the EIA/EMPR

GNR 982 Appendix 3	Section	Page Number
Scope of assessment and content of Environmental Impact Assessment Report		
(a) details of- (i) the EAP who prepared the report; and (ii) the expertise of the EAP, including a curriculum vitae.	PART A: SECTION 1 (a) (i) and (ii)	1
(b) the location of the activity, including: (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	PART A: SECTION 1 (b) (i), (ii) and (iii)	24
(c) 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- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken.	PART A: SECTION 1 (c) (i) and (ii)	4

GNR 982 Appendix 3	Section	Page Number
(d) a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the associated structures and infrastructure related to the development.	PART A: SECTION 1 (d) (i) and (ii)	2
(e) 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.	PART A: SECTION 1 (e)	6
(f) a motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location.	PART A: SECTION 1 (f)	21
(g) a motivation for the preferred development footprint within the approved site.	PART A: SECTION 1 (g)	21
(h) a full description of the process followed to reach the proposed development footprint within the approved site, including: (i) details of the development footprint alternatives considered; (ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; (iii) 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;	PART A: SECTION 1 (h)	21

GNR 982 Appendix 3	Section	Page Number
(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; (vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks; vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; (viii) the possible mitigation measures that could be applied and level of residual risk; (ix) if no alternative development locations for the activity were investigated, the motivation for not considering such; and (x) a concluding statement indicating the preferred alternative development location within the approved site.		

GNR 982 Appendix 3	Section	Page Number
(l) a full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including- (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) 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 mitigation measures.	PART A: SECTION 1 (l) (i), (ii)	91
(j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated.	PART A: SECTION 1 (j) (i) – (vii)	103
(k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication	PART A: SECTION 1 (k)	132

GNR 982 Appendix 3	Section	Page Number
as to how these findings and recommendations have been included in the final assessment report.		
(l) an environmental impact statement which contains- (i) a summary of the key findings of the environmental impact assessment: (ii) 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 (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives.	PART A: SECTION 1 (l) (i), (ii) and (iii)	146
(m) 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 as well as for inclusion as conditions of authorisation.	PART A: SECTION 1 (m)	146
(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment.	PART A: SECTION 1 (n)	153
(o) 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.	PART A: SECTION 1 (o)	154
(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed.	PART A: SECTION 1 (p)	154

GNR 982 Appendix 3	Section	Page Number
(q) a 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.	PART A: SECTION 1 (q)	154
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised.	PART A: SECTION 1 (r)	155
(s) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) 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.	PART A: SECTION 1 (s) (i) - (iv)	156
(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts.	PART A: SECTION 1 (t)	156
(u) an indication of any deviation from the approved scoping report, including the plan of study, including-	PART A: SECTION 1 (u) (i) and (ii)	157

GNR 982 Appendix 3	Section	Page Number
(i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation.		
(v) any specific information that may be required by the competent authority.	PART A: SECTION 1 (v)	158
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	PART A: SECTION 1 (w)	160
Content of Environmental Management Programme		
(a) details of (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae.	PART B: SECTION 1 (b) (i) and (ii)	161
(b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	PART B: SECTION 1 (b)	161
(c) a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers.	PART B: SECTION 1 (c)	161
(d) 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- (i) planning and design;	PART B: SECTION 1 (d) (i) - (v)	161

GNR 982 Appendix 3	Section	Page Number
(ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities.		
(e) a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d).	PART B: SECTION 1 (e)	161
(f) a description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to – (a) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (i) comply with any prescribed environmental management standards or practices; (ii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iii) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	PART B: SECTION 1 (f) (a) (i), (ii) and (iii)	162
(g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	PART B: SECTION 1 (g)	206

GNR 982 Appendix 3	Section	Page Number
(h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f); management actions.	PART B: SECTION 1 (h)	208
(i) an indication of the persons who will be responsible for the implementation of the impact.	PART B: SECTION 1 (i)	208
(j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	PART B: SECTION 1 (j)	208
(k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	PART B: SECTION 1 (k)	208
(l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	PART B: SECTION 1 (l)	211
(m) an environmental awareness plan describing the manner in which- (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.	PART B: SECTION 1 (m) (i) and (ii)	211
(n) any specific information that may be required by the competent authority.	PART B: SECTION 1 (n)	211

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BIC	Bushveld Igneous Complex
BPG	Best Practice Guidelines
COM	Chamber of Mines
CSIR	Council of Scientific and Industrial Research
DEA	Department of Environmental Affairs
DEMC	Default Ecological Management Class
DESC	Default Ecological Status Class
DMR	Department of Minerals and Resources
DO	Dissolved Oxygen
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EIS	Environmental Importance and Sensitivity
EISC	Ecological Importance and Sensitivity Class
EMPR	Environmental Management Programme
ENVASS	Environmental Assurance (Pty) Ltd
FRAI	Fish Response Assessment Index
GN 704	Government Notice No. 704 of 4 June 1999
GN	Government Notice
GPS	Global Positioning System
Ha	Hectares
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IHAS	Invertebrate Habitat Assessment System
IHIA	Intermediate Habitat Integrity Assessment
IUCN	International Union for the Conservation of Nature
IWUL	Integrated Water Use Licence
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Waste Management Plan
LED	Local Economic Development
LHD	Load Haul Dump

LM	Local Municipality
LOM	Life of Mine
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MPRDA	Mineral Petroleum Resources Development Act (No. 28 of 2002) [as amended]
NEMA	National Environmental Management Act (No. 107 of 1998) [as amended]
NEMWA	National Environmental Management: Waste Act (No. 59 of 2008) [as amended]
NWA	National Water Act (No. 36 of 1998)
PCD	Pollution Control Dam
PES	Present Ecological Status
PESC	Present Ecological Status Class
PPP	Public Participation Process
ROM	Run of Mine
SAIAB	South African Institute for Aquatic Biodiversity
SANBI	South African National Biodiversity Institute
SANParks	South African National Parks
SANS	South African National Standard
SASS5	South African Scoring System
SLP	Social and Labour Plan
TDS	Total Dissolved Solids
TMM	Trackless Mobile Machine
TSF	Tailings Storage Facility
USCS	Unified Soil Classification System
WMA	Water Management Area
WQM	Water Quality Management
WRC	Water Research Commission
WULA	Water Use License Application
WUL	Water Use License

GLOSSARY OF TERMS

Activity: An activity is any development or expansion which requires an environmental authorisation in terms of GN 326 as contemplated in GN 324, 325, 327.

Applicant / Developer: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended (NEMA) as contemplated in the scheduled activities listed in Government Notice (GN) No R. 324, 325, 327.

Archaeological resources: This includes:

- Material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- Wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which the South African Heritage Resources Agency (SAHRA) considers to be worthy of conservation; features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Aspect: An element of an organisation's activities, products, or services that can interact with the environment. The element may cause a significant environmental impact, either beneficial or harmful. For example: Refrigerant use, wash water discharge, it could involve a discharge, an emission, or consumption or reuse of a material.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Catchment: The area from which any rainfall will drain into the watercourse or watercourses or part of the water course, through surface flow to a common point or common points.

Clean water: Clean water is any water that has not been in contact with carbonaceous material or other potential contaminants and includes run-off from areas unaffected by mining activities, as well as areas that have been rehabilitated.

Construction activities: Activities associated with physical disturbance to the land, including the storage, machinery, equipment and materials.

Construction phase: The construction phase is the period of commencement of physical disturbance to the land, excluding rehabilitation activities, such as re-vegetation and replacing of topsoil.

Container: Disposable or re-usable vessel in which waste is placed for the purposes of storing, accumulating, handling, transporting, treating or disposing of that waste and include bins, bin liners and skips.

Contaminated water: Means any water contamination by the Contractor or Applicant's activities, e.g. run-off from plant or personnel wash areas.

Contractor: Persons/organisations contracted by the Applicant to provide a service. The Contractor shall ensure compliance with this EMPr and shall request advice from the Environmental Assessment Practitioner where considered necessary and appropriate.

Corrective (remedial) action: Response required to addressing an environmental problem that is in conflict with the requirements of the EMPR. The need for corrective action may be determined through monitoring, audits or management review.

Degradation: The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.

Dirty water: Dirty water is any water that has been in contact with carbonaceous material or other contaminants (i.e. water containing waste), and of which the water quality has been affected and therefore has the potential to cause pollution of a water resource.

Disposal: The burial, deposit, discharge, abandoning, dumping, placing or release of waste into or onto any land.

Domestic waste: Waste (excluding hazardous waste) that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes (including garden and park wastes as well as municipal and food waste.

Ecology: The study of the interrelationships between organisms and their environments.

Emergency: An unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

Environment: The surroundings within which humans live and that consist of:

(i) The land, water and atmosphere of the earth;

(ii) Micro-organisms, plant and animal life;

(iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Existing lawful use: An existing lawful use means a water use which has taken place at any time during a period of two years immediately before the date of commencement of the National Water Act 1998, (Act 36 of 1998) or which has been declared an existing lawful water use under section 33 and which was authorised by or under any law which was in force immediately before the date of commencement of the National Water Act.

General waste: Waste that does not pose an immediate threat or hazard to health or to the environment, and includes:

(a) Domestic waste;

(b) Building and demolition waste;

(c) Business waste;

(d) Inert waste; and

(e) Any waste classified as non-hazardous waste in terms of the regulations made under section 69.

Groundwater: Water that occurs in the voids of saturated rock and soil material beneath the ground surface is referred to as groundwater and the body within which the groundwater is found is referred to as an aquifer.

Hazardous waste: Waste that contains organic or inorganic elements or compound that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environmental and includes hazardous substances, materials or object within business waste, residue deposits and residue stockpiles.

Holder of waste: Any person who imports, generates, stores, accumulates, transports, processes, treats or exports waste or dispose of waste.

Hydrogeological: The study of distribution and movement of groundwater.

Hydrological: The study of movement, distribution and quality of surface water and groundwater.

Impact: Any change to the environment, whether adverse or beneficial, wholly or partly resulting from an organization's activities, products, or services. For example: Ozone depletion, surface water quality degradation, impacts might include contamination of air or water, depletion of a natural resource or harm to human health.

Inert waste: waste that:

Does not undergo significant physical, chemical or biological transformation after disposal;

Does not burn, react physically or chemically, biodegrade or otherwise adversely affect any other matter or environment with which it may come into contact; and

Does not impact negatively on the environment because of its pollutant content and because the toxicity of its leachate is insignificant and which include discarded concrete, bricks, tiles and ceramics; discarded glass as well as discarded soil, stones and dredging spoil.

Infrastructure: The network of facilities and services that are needed for economic activities, e.g. roads, electricity, water, sewerage.

Integrated: Mixing or combining all useful information and factors into a joint or unified whole. See Integrated Environmental Management.

Integrated Environmental Management (IEM): A way of managing the environment by including environmental factors in all stages of development. This includes thinking about physical, social, cultural and economic factors and consulting with all the people affected by the proposed developments.

Interested and/or Affected Parties: Those individuals or organisations that have an interest in the proposed development or will be directly affected by the activities of the development, as identified in the Environmental Impact Assessment (EIA) process.

Mitigation measures: Measures designed to avoid, reduce or remedy adverse impacts.

Monitoring program: A program for taking regular measurements of the quantity and/or quality of a water resource, waste, wastewater discharge, or dust at specified intervals and at specific locations to determine the chemical, physical and biological nature of the water resource, waste or wastewater discharge.

Pollutant: A contaminant at a concentration high enough to endanger the environment or the public health.

Pollution:

- National Water Act, 36 of 1998: "Water pollution means the direct or indirect alteration of the physical, chemi-cal or biological properties of a water resource so as to make it –

(a) less fit for any beneficial purpose for which it may reasonably be expected to be used; or
(b) harmful or potentially harmful –
(aa) to the welfare, health or safety of human beings;
(bb) to any aquatic or non-aquatic organisms;
(cc) to the resource quality; or
(dd) to property".

- National Environmental Management Act, No. 107 of 1998:- "pollution means any change in the environment caused by –

(i) substances;
(ii) radioactive or other waves; or
(iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future."

Protection: in relation to a water resource, means –

1 (1) (xvii) (a): maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way;

1 (1) (xvii) (b): prevention of the degradation of the water resource; and

1 (1) (xvii) (c): the rehabilitation of the water resource;

Public Participation Process: A process of involving the public in order to identify issues and concerns, and obtain feedback on options and impacts associated with a proposed project, program or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to specific matters.

Recycle: A process where waste is reclaimed for further use, this process involves the separation of waste from a waste stream for further use and the processing of that separated materials as a product or raw material.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) in which it was before disruption.

Reserve: the quantity and quality of water required:

(a) To satisfy basic human needs by securing a basic water supply, as prescribed under the Water Services Act, 1997 (Act No. 108 of 1997), for people who are now or who will, in the reasonably near future, be -

(i) Relying upon;
(ii) Taking water from; or
(iii) Being supplied from, the relevant water resource; and

(b) To protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource.

Re-use: To utilise articles from the waste stream again for a similar or different purpose without changing the form or properties of the articles.

Runoff: Surface runoff is water that finds its way into a surface water body without infiltration into the soil and may include overland flow, return flow, interflow and base flow.

SANS 10234: Latest edition of the South African National Standard Globally harmonised System of the Classification and Labelling of Chemicals (GHS).

Significant Impact: The activity that results in substantial breach of statutory regulations under abnormal conditions.

Surface water: All water naturally open to the atmosphere (rivers, lakes, reservoirs, streams, impoundments, seas, estuaries, etc.); also refers to springs, wells, or other collectors that are directly influenced by surface water.

Storage: The accumulation of waste in a manner that does not constitute a treatment or disposal of that waste.

Storm water: Water that accumulates on land as a result of precipitation events, and includes runoff from areas such as roads and roofs.

Waste:

(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of NEMWA [as amended]; or

(b) any other substance, material or object that is not included in Schedule 3 of NEM:WA [as amended] that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste-

i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re- used, recycled or recovered;
ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;
iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

Waste generator: Any person whose actions, production processes or activities including waste management activities, results in the generation of waste.

Waste management: Classifying, recycling, treatment and disposal of waste generated during operational activities.

Watercourse is:

a) A river or spring;
b) A natural channel in which water flows regularly or intermittently;

c) A wetland, lake or dam into which, or from which, water flows; and

d) Any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.

Water quality: the physical, chemical, toxicological, biological (including microbiological) and aesthetic properties of water that determine sustained (1) healthy functioning of aquatic ecosystems and (2) fitness for use (e.g. domestic, recreational, agricultural, and industrial). Water quality is therefore reflected in (a) concentrations or loads of substances (either dissolved or suspended) or micro-organisms, (b) physicochemical attributes (e.g. temperature) and (c) certain biological responses to those concentrations, loads or physicochemical attributes.

Water resource: A water resource includes any watercourse, surface water, estuary or aquifer. Watercourses include rivers, springs, and natural perennial and non-perennial channels. Wetlands, lakes, dams, or any collection identified as such by the Minister in the Government Gazette.

Water Use Licence: An authorisation from the Department to a designated water user to use water. The authorisation will provide details on the time-frames and conditions for the designated water use.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Contact Person and correspondence address

a) Details of:

i) The EAP who prepared the report

Name of The Practitioner: Corrie Retief

Tel No.: 012 460 9768
Fax No.: 012 460 3071
e-mail address: corrie@envass.co.za

ii) Expertise of the EAP

(1) **The qualifications of the EAP**

(With evidence attached as Appendix 1)

- University of South Africa, BA Hons Geography - 2007
- University of South Africa, BA Environmental – 2005
- Registered with SACNASP as Pri.Sci.Nat – 2016

(2) **Summary of the EAP's past experience**.

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

Corrie Retief is an Environmental Scientist with more than 11 years of experience in applying the principles of Integrated Environmental Management, and in applying the Environmental Legislation to a number of development projects and initiatives in Southern Africa. He has co-ordinated and managed number of diverse projects and programs related to the Environment and Waste within both the public and private sectors and for national, multi-national and international companies. His interpersonal and organisational skills have enabled him to efficiently direct these projects from initiation to implementation. Furthermore his training in sustainability and sustainable project delivery has helped him to deliver profitable sustainability into customers operations throughout the asset lifecycle.

A significant element of public participation is required throughout the life cycle of an EIA process. Corrie has successfully liaised with interested and affected parties, ensuring that all communication procedures and dialogues are open and transparent, and that capacity building is conducted where necessary. His proficient report-writing skills have been utilised for the compilation of a wide variety of reports, which include but is not limited to Basic Assessment Reports, Scoping and Environmental Impact Assessment Reports, Environmental Management Plans (Planning, Construction, Operation and Closure), Environmental Audit Reports, Opportunities and Constraints Analyses, Feasibility studies, Waste License Applications, Water-Use Application Reports and Mining Right Applications.

The EAP have experience in the following disciplines:

- Environmental risk assessments;
- Environmental site screening, investigation and evaluations;
- Environmental legal screenings;
- Environmental feasibility studies;
- Environmental impact assessments;
- Basic assessments;
- Environmental compliance auditing;
- Compilation, implementation and monitoring of environmental management plans;
- Waste Management;
- Waste Disposal site selection screenings;
- Waste license applications;
- Water-Use License Applications;
- Mining Right applications; and
- Managing and facilitating public participation.

b) Description of the property

Table 1: Description of the property

Farm Name:	Portion 8 Vygenhoek 10 JT, Portion RE/3 Vygenhoek 10 JT, Portion 9 Schaapkraal 42 JT, Portion 7 Sterkfontein 53 JT, Portion 5 Sterkfontein 53 JT;

	Portion 2 Vygenhoek 10 JT, Portion 4 Vygenhoek 10 JT, Portion 11 Schaapkraal 42 JT, Portion 7 Vygenhoek 10 JT, Portion 2 Sterkfontein 53 JT, Portion 12 Schaapkraal 42 JT, Portion 1 Vygenhoek 10 JT, Portion 14 Sterkfontein 53 JT, Portion 8 Sterkfontein 53 JT, Portion 8 Schaapkraal 42 JT, Portion 5 Vygenhoek 10 JT, Portion 4 Sterkfontein 53 JT, Portion 1 Der Brochen 7 JT, and Portion 6 Mareesburg 8 JT.	
Application area (Ha)	Road length: 14 km (**No more than 14 Ha**).	
Magisterial district:	Thaba Chweu Local Municipality (Mpumalanga Side), Tubatse Local Municipality (Limpopo Side).	
Distance and direction from nearest town	Approximately 30 km south east of Steelpoort and approximately 30 km south west of Lydenburg (Mashishing).	
21-digit Surveyor General Code for each farm portion	**Farm and Portion**	**21-Digit SG Code**
	Portion 8 Vygenhoek 10 JT	T0JT00000000001000008
	Portion RE/3 Vygenhoek 10 JT	T0JT00000000001000003
	Portion 9 Schaapkraal 42 JT	T0JT00000000004200009
	Portion 7 Sterkfontein 53 JT	T0JT00000000005300007
	Portion 5 Sterkfontein 53 JT	T0JT00000000005300005
	Portion 2 Vygenhoek 10 JT	T0JT00000000001000002
	Portion 4 Vygenhoek 10 JT	T0JT00000000001000004
	Portion 11 Schaapkraal 42 JT	T0JT00000000004200011
	Portion 7 Vygenhoek 10 JT	T0JT00000000001000007
	Portion 2 Sterkfontein 53 JT	T0JT00000000005300002
	Portion 12 Schaapkraal 42 JT	T0JT00000000004200012
	Portion 1 Vygenhoek 10 JT	T0JT00000000001000001
	Portion 14 Sterkfontein 53 JT	T0JT00000000005300014

	Portion 8 Sterkfontein 53 JT	T0JT00000000005300008
	Portion 5 Vygenhoek 10 JT	T0JT00000000001000005
	Portion 4 Sterkfontein 53 JT	T0JT00000000005300004
	Portion 1 Der Brochen 7 JT	T0LU00000000000700001
	Portion 6 Mareesburg 8 JT	T0JT00000000000800006

c) Locality map

Please refer to Figure 1 below and Appendix 3 for an A3 copy of the Locality Map.

(Show nearest town, scale not smaller than 1:250000 attached as Appendix 3) The locality map is also appended in Appendix 3 on an A3 paper size in colour).

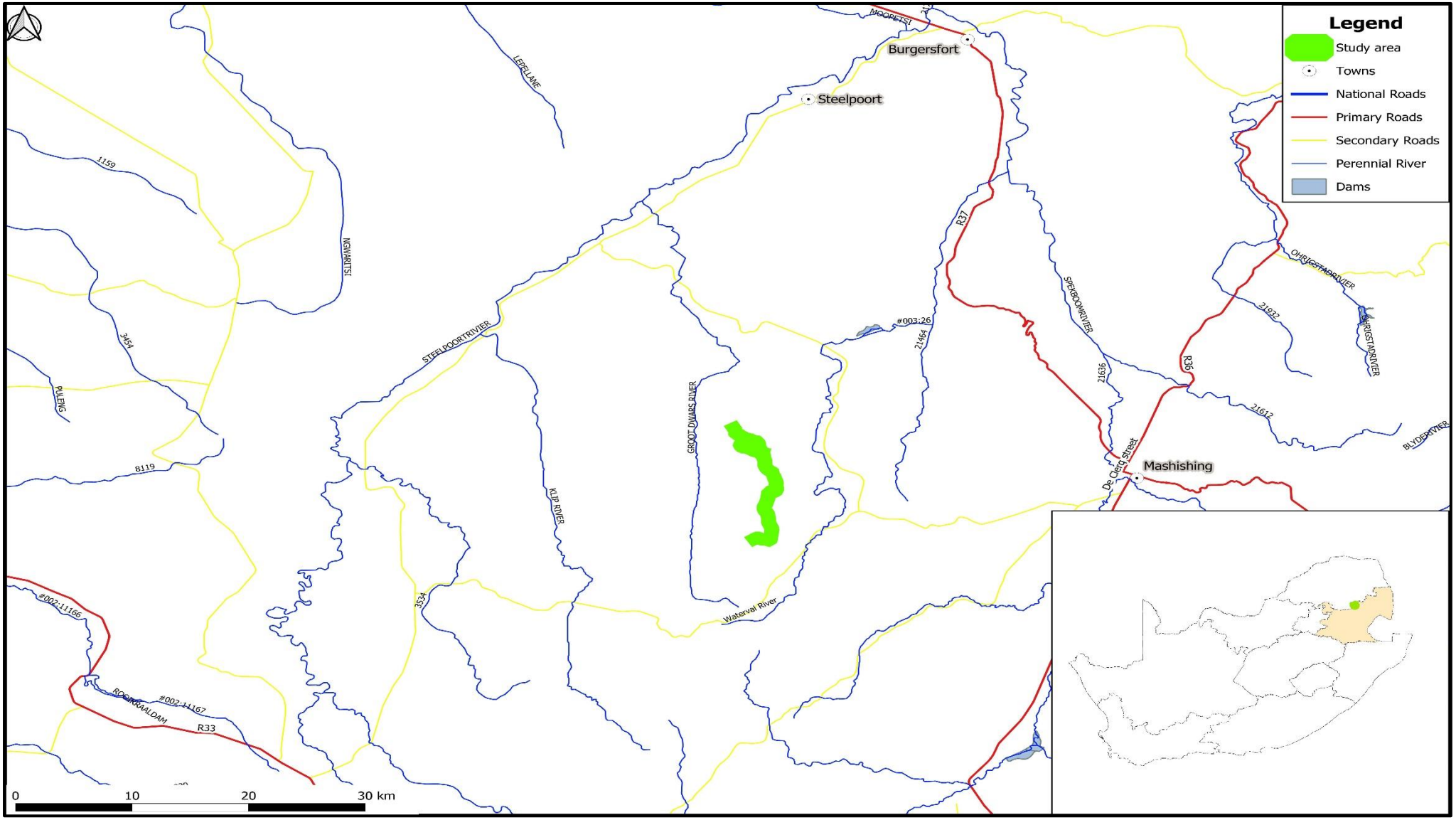


Figure 1: Regional Setting of the proposed haul road

d) Description of the scope of the proposed overall activity

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

(i) Listed and specified activities

Table 2: Listed and specified activities:

NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)	**Aerial extent of the Activity Ha or m²**	**LISTED ACTIVITY Mark with an X where applicable or affected.**	**APPLICABLE LISTING NOTICE (*GNR 983, GNR 984 or GNR 985 /NOT LISTED***	**WASTE MANAGEMENT AUTHORISATION (Indicate whether an authorisation is required in terms of the Waste Management Act)**
• L1:19 (infilling/depositing of material of more than 10m^3 from a watercourse).	Negligible	**X**	GNR983, Activity 19	NOT LISTED
• L1:24 (development of a road wider than 8m [no reserve] or wider than 13.5 [including reserve])	14 Ha Max (Proposed road is 14 km long)	**X**	GNR983, Activity 24	NOT LISTED
• L1: 56 (widening roads by more than 6m)	14 Ha Max (Proposed road is 14 km long)	**X**	GNR983, Activity 56	NOT LISTED
• L1:30 (any activity identified in terms of section 53(1) of NEMBA (2004)	14 Ha Max (Proposed road is 14 km long)	**X**	GNR983, Activity 30	NOT LISTED
• L1:48 and 49 (expansion of infrastructure or structure where physical footprint is expanded by 100 square metres or more within a watercourse)	14 Ha Max (Proposed road is 14 km long)	**X**	GNR983, Activities 48 and 49	NOT LISTED
• L1:56 (widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre)	14 Ha Max (Proposed road is 14 km long)	**X**	GNR983,Activity 56	NOT LISTED

ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be mined and for a linear activity, a description of the route of the activity)

Background Description Mining Operation

Lions Head Platinum (Pty) Ltd (Mareesburg) is an existing mine (currently in care and maintenance), owned by Eastern Platinum Limited. The mine already has approved EMPRs and EAs form the relevent competent authorities. Eastplats' mines are located near Steelpoort and Burgersfort in the Limpopo Province.

The deposit within the proposed mining area allows for both opencast and underground mining methods in order to extract the ore. Once the mine becomes operational, the open pit mining is proposed for the shallow areas near the outcrop and an underground method where the stripping ratio becomes uneconomic. The open pit area that will be disturbed is approximately 49.2 ha and the underground mining area will be approximately 124.37 ha.

The open pit areas that will be developed will disturb an area of 49.2 ha (please refer to Figure 2 below). The mining activity is planned to last for 12 years and an estimated 7.1 million tonnes of material will be mined and processed.

The estimated total area of the underground mine is approximately 125 ha. The ore extracted from the mining operation will be stockpiled on a Run of Mine (ROM) stockpile which will have the capacity of 100 000 tonnes. The ore will be transported off site for further processing.

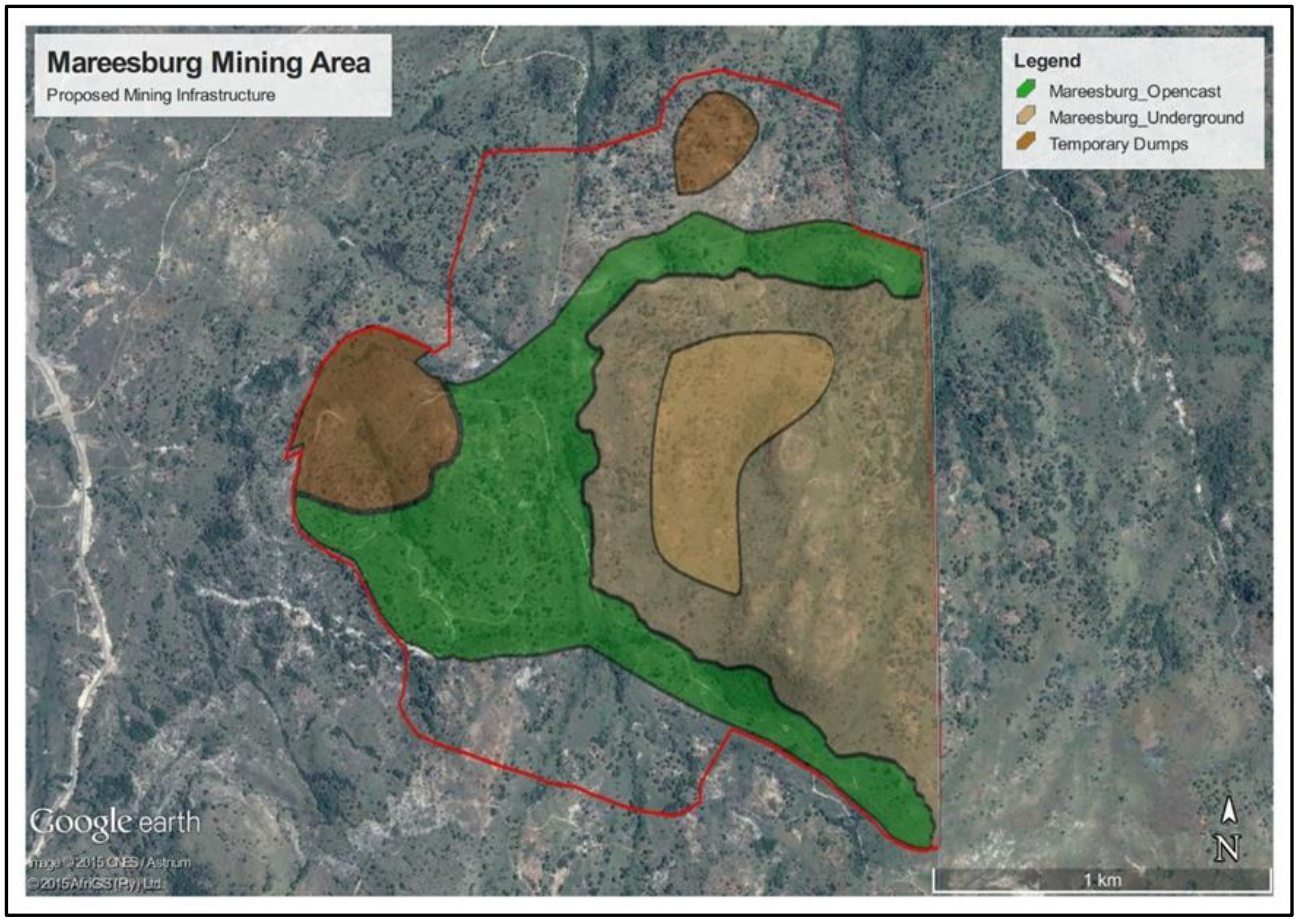


Figure 2: Proposed mining infrastructure (Google Inc., 2018)

Sewage from offices, workshops, change-house and ablution facilities will be piped using gravity sewage reticulation to a package sewage plant. The maximum monthly effluent flow is estimated to be 960 m^3/month. Treated effluent is pumped back to service water ponds for re-use.

The following other infrastructure development is planned:

- Workshops;
- Wash bays;
- Offices;
- Change house; and
- Haul roads.

Table 3: Mareesburg Existing Authorisations

Mine Section and activities	Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002)	Date Application Approved / Submitted	Reference number/s
Mareesburg– all activities included.	Environmental Authorisation – Approved EMPR.	2010	2002/012190/07
Mine Section and activities	**National Environmental Management Act, 1998 Act No. 107 of 1998) Listing Notice (GNR 983)**	**Date Application Approved / Submitted**	**Reference number/s**
Mareesburg - Infrastructure.	Environmental Authorisation in terms of NEMA: Development of infrastructure The original Record of Decision (ROD) was issued for portions 1, 2 and the remaining extent of the farm Mareesburg 8JT. As a result of subdivision of land the portion where the mine activities will be located is now known as Portion 6. A level 1 (non-substantive change) amendment of the ROD will be submitted.	2011	12/1/9-7/2-GS17
Mine Section and activities	**National Water Act, 1998 (Act No. 36 of 1998) Section 21 water uses**	**Date Application Approved / Submitted**	**Reference number/s**
Mareesburg – all water uses.	Integrated Water Use License Application.	Submitted 9 February 2016 – awaiting approval	-

Activities required for the proposed infrastructure:

Haul Road Layout Plan

- See Figure 3 on the next page.

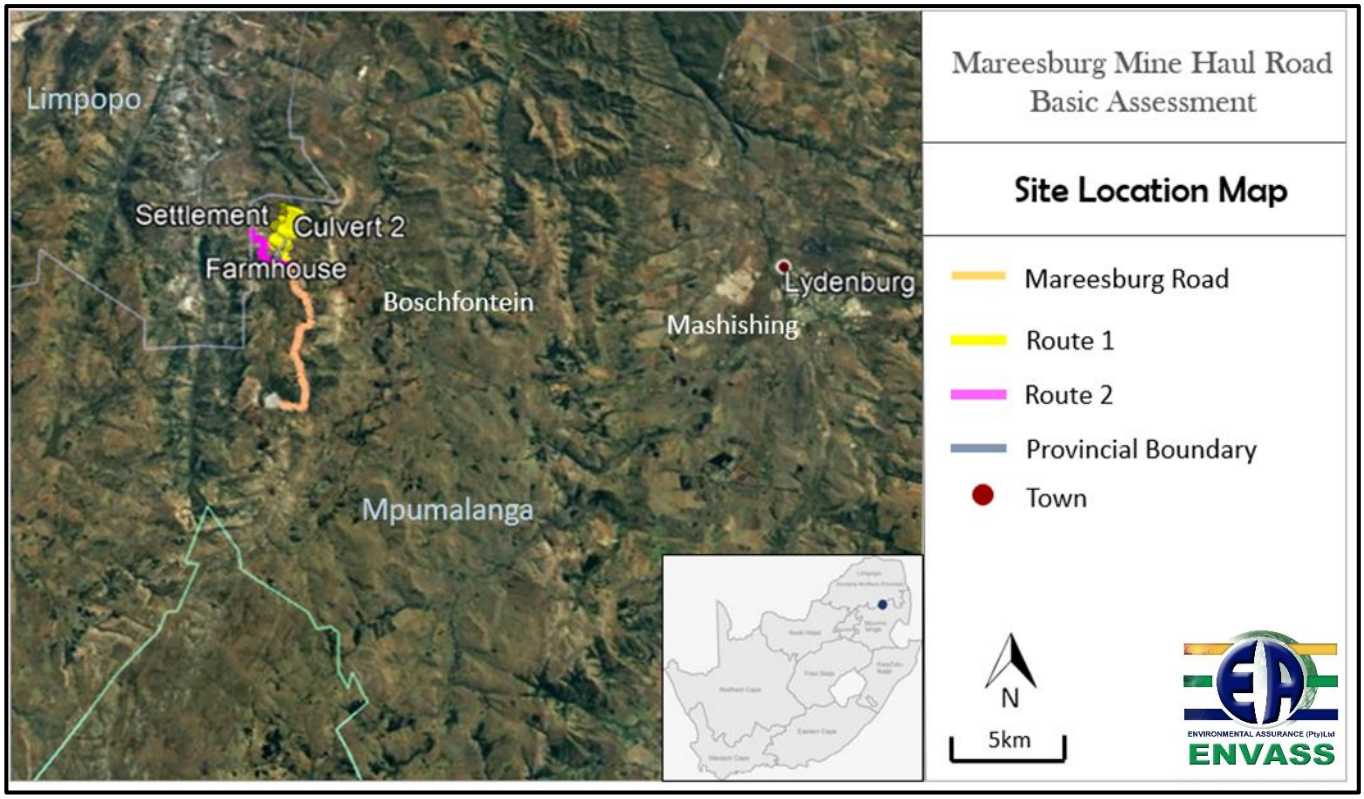


Figure 3: Locations of the proposed haul road at Mareesburg

The Site Plan is included in Appendix 4.

General description of the Haul Route

The original planned route to the pit was proposed to follow the main provincial road up to change 10.9 km and then tend eastwards and return back to the pit in a westerly direction. The total length of this route was approximately 20.4 km.

The first ~8 km of the route consists of a provincial gravel road which is ~12 m wide and in good condition. At end of this section which intersects with the Oshoek turnoff, the gravel road narrows to ~ 9 m wide up to chainage 10.9 km. Thereafter the route towards the pit is merely a jeep track.

Due to alignment and access problems along this original jeep track route, a site visit was proposed. From the site visit it was concluded that a shorter easier route was possible just south of the original jeep track route. This included two by-pass single access options south of the original jeep track route with a shortened haul route to the pit. This shortened the proposed haul distance route by ~ 4 km.

Considerations of Haul Options (By-passes)

Following on from section 1.2, at ~ chainage 10.9 km the two single lane bypasses will commence. The two bypass routes will be in one direction only. The first bypass route (north - up route) branches off in a westerly direction and then returns northwards to the proposed new main access road to the pit. This route is approximately 2.7 km long. The second bypass route (south –down route) extends from the intersection of the up route and branches off in an easterly direction and then changes to a southerly direction and terminates back at chainage 10.9 km. This route is approximately 2.25 km long. Both these bypass routes will be single lane and ~ 8 m wide. The total length of the haul road "up route" to the pit is ~ 15.3 km. The return route "down route" from the pit is ~ 14.85 km in length. At the northerly intersection of the two accesses, a dual haul road is planned to the pit boundary. It will be dual section ~12 m wide and ~ 1.7 km in length.

Road Width

Using the specifications of a 725 CAT for the proposed Coplan truck which is a 22 ton dump truck, the actual truck width is 2.877 m, the actual road width is calculated as follows:

- Road width = (2 x 2.87) + (0.5 x 2.877) = 7.2 m

Assuming a shoulder width of 1.5m either side of the road, the total width of the road is calculated as follows:

- 7.2 + 1.5 + 1.5 = 10.2 ~ 11m.

Therefore a 12 m road width is sufficient for the proposed haul road.
It is assumed that the road is one lane in both directions and an allowance of 0.5 m x truck width for passing safety.

Alignment

The existing alignment geometry had been assessed and is based on the proposed layouts as verified on site. The geometric design of the haul road is based on the standard TRH 17 Geometric Design of Rural Roads specifications and drawings have been drafted to indicate the proposed horizontal and vertical designs.
The design does not include the alignment of the existing provincial road i.e. up to chainage 8 km.

Cross Sections

A single carriageway comprising of two 3.7m wide travel lanes with a 1.25m gravel shoulders on either side. A 2% cross fall has been provided.

Side Slopes

The general recommendation from SANRAL on slope stability is that the cut and fill embankment slopes be to 1 in 2 slope and if warranted to a minimum of 1 in 1.5.

Sight Distances

Sight distances from all intersections and farm accesses comply with the minimum shoulder sight distance of 100m for the 60 km/h design speed section. The site distance for the 40 km/hr section is 52 m.

Blasting

Certain sections along the two bypasses will require rock excavation or blasting.

Pavement Structure

Generally, the haul road will be constructed from gravel materials whereas certain sections along schools and villages will be premixed to reduce dust emissions. The premixed sections will be limited in extent but will form part of the haul route. All structural road materials will be obtained from commercial sources.

Gravel Roads

The proposed haul road consists of three distinct sections along the route. From chainage 0 to 8 km (the provincial road which is 12 m wide) will be reinforced with an additional wearing course. Certain sections will be upgraded to premix surfacing (see 5.2 below). From chainage 9 to 10.9 km the existing gravel road is 6 m wide and will be increased in width from 6m to 12m. The two proposed by pass routes which are merely open veld and an existing jeep track route will be made into a 6 m wide single route accesses. The remaining route from chainage 13.6 m will be made into a 12m dual access haul road to the pit boundary.

Premix Roads

Premixed pavement surfacing will be provided at schools, villages and at certain facilities along the route. This will control dust suppression at these sections. At this stage, three potential areas have been identified at the following chainages:

- Position 1- chainage 1250 to 1750 m – 500 m section
- Position 2-chainage 2750 to 3550 m – 600 m section
- Position 3-chainage 6500 to 6850 m – 350 m section

Traffic Information and design criteria

The traffic information provided by Eastern Platinum assumes that 48 tonne trucks (Coplan) will be utilised for hauling ~ 90 000 tons per month i.e. 3000 tons per day resulting in 125 trips per day along the proposed new haul road.

Based on this, the following assumptions are made in the traffic calculations to design the pavement layerworks:

- Truck capacity 18 tonne trucks
- Loads per day 125 truck loads per day
- Growth factor (trucks) Not applicable
- Growth factor (LV) 15%
- Structural Design period 6 years

TRH4 and TRH 16 design manual were utilised for the calculation of E80's. As a back up to the design package "Rubicon" was utilised to verify the calculation of the layerworks thicknesses. The use of Rubicon was based on a CBR of 7.

Policy and Legislative Context

Table 4: Policy and Legislative Context

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)*	**REFERENCE WHERE APPLIED**
Constitution of South Africa, 1996 (Act No. 108 of 1996) [as amended] • *Section 24* *Environment.-Everyone has the right-* *(a) to an environment that is not harmful to their health or well-being; and* *(b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that-* *i) prevent pollution and ecological degradation;* *ii) promote conservation; and* *iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*	The proposed development has the potential to harm the environment and poses a risk to the health and wellbeing of people. The development however, also has the potential to secure sustainable development through reusing process products and thereby limiting the use of natural resources. The Applicant has the overall responsibility to ensure that the rights of people in terms of Section 24 of the Constitution is protected in terms of the proposed development activity
National Environmental Management Act (No. 107 of 1998) [as amended] • *Section 28 (1)* *Duty of Care and responsibilities to minimise and remediate environmental degradation.*	The Applicant is the developer and overall responsibility of the haul road rests with him, especially in terms of liabilities associated with the operational phase.
EIA *Regulations, 2014 (Government Notices 982)* ***[as amended 2017]*** *Chapter 6: Regulation 39 to 44: Public Participation;* *Chapter 4: Application for Environmental Authorisation:* *Part 2 Basic Assessment Report* *Appendix 4: Environmental Management Programme* *Appendix 5: Closure Plan* *Appendix 6: Specialist Reports* *Appendix 7: Environmental Audit Report*	The EIA Regulations, 2014 prescribes *inter alia*: the manner in which public participation needs to be conducted as well as the requirements of a basic assessment process and the content of a basic assessment report and environmental management programme. The content of specialist reports, closure plans and environmental audit reports are also provided.
Mineral and Petroleum Resources Development Act, 2002 (Act. 28 of 2002) [as amended]:	Sections 16 and 22.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] • *Section 16* *General duty in respect of waste management;*	The development activities will produce general and hazardous waste which need to be managed and disposed of according to best practices such as recycling, safe storage, etc.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)*	**REFERENCE WHERE APPLIED**
• *Section 17;* *Reduction, re-use, recycling and recovery of waste;* • *Section 18; and* *Extended producer responsibility; and* • *Section 21* *General requirements for storage of hazardous and general waste.*	
National Water Act, 1998 (Act No. 36 of 1998) [as amended] • *Section 3* *Regulation of flow and control of all water* • *Section 19* *Prevention of pollution to watercourses* • *Section 21* *The water use activities associated with the proposed development requires compliance with the requirements of the NWA as listed under GN No. 19182. An application for an integrated water use license is lodged in terms of Section 21 of the National Water Act, 1998 (Act 36 of 1998) [as amended] to undertake the following activities:* *Section 21: (c) and (i)*	Stormwater need to be managed properly in order to achieve prevention of pollution and hazards. The upgrade of existing culverts over natural stream sections need to be managed in accordance with modern acceptable practices.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996) [as amended] and associated regulations • *Chapter 2, Sections 2 – 4* *Responsibilities of owner* • *Chapter 2, Sections 5 – 13* *Responsibilities of manager;* • *Chapter 2, Sections 14 – 18;* *Documentation requirements;* • *Chapter 2, Section 19 – 20 and 22 to 24* *Employee's rights and duties; and* • *Chapter 2, Section 21* *Manufacturer's and supplier's duty for health and safety*.	The development activities will create an environment that is not safe and healthy for workers on and visitors to the site. The act provides for measures to prevent threats to the health and safety of humans in the development area.
National Heritage Resources Act, 1999 (Act No. 25 of 1999) • *Section 44 (1);* *Preservation and protection of heritage resources;* • *Section 3 Types and ranges of heritage resources (i) (i);*	Protection of indigenous heritage resources on the properties.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)*	**REFERENCE WHERE APPLIED**
Objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens.	
National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) [as amended] • *Section 32* *Control of dust* • *Section 34* *Control of noise*	Impacts on surrounding landowners need to be managed through dust and noise mitigation measures.
National Dust Control Regulations, 2013 (Government Notice 827 of 2013) • *Section 3* *Dust fall standard* • *Section 4* *Dust fall monitoring program* • *Section 6* *Measures for control of dust* • *Section 7* *Ambient air quality monitoring (PM10)* • *Section 8* *Offences* • *Section 9* *Penalties*	Dust fall out (PM10 and PM2.5) need to be monitored in accordance to the standards set out in the monitoring programme with the specified measures. Due to the Applicant being liable to offences and penalties associated with non-conformance to dust, employees and surrounding landowners may be influenced.
Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] • *Section 12 (1)* *Duty of the landowner to prevent fire from spreading to neighbouring properties.*	Cautionary steps in avoiding the spread of fires to and from neighbouring properties.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) [as amended] • *Section 9* *Norms and standards* • *Section 27* *Delegation of power and duties* • *Section 30* *Financial accountability* • *Section 43*	Indigenous vegetation need to be protected and managed in accordance with management measures set out in the management plans developed for the mine. The Applicant need to ensure he is aware of and covers his liabilities.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)*	REFERENCE WHERE APPLIED
Biodiversity management plans.	
Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 864 of 2016) • *Notice 2* *Exempted Alien Species in terms of Section 66 (1)* • *Notice 3* *National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11* • *Notice 4* *Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12*	It is the responsibility of the Applicant to ensure that all prohibited plant and animal species are eradicated as far as possible.
Conservation of Agricultural Resources Act, 1983(Act No. 43 of 1983) • *Section 5* *Prohibition of spreading of weeds* • *Section 12* *Maintenance of soil conservation works and maintenance of certain states of affairs* • *Section 16* *Regional Conservation Committees*	Listed invader/alien plants occurring on site that requires management measures to be implemented to strive to maintain the status quo environment, especially through the guidelines provided by the Regional Conservation Committee.
Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended] • *Section 2* *Declaration of grouped hazardous substances;* • *Section 4* *Licensing;* • *Section 16* *Liability of employer or principle* • *Section 9 (1)* *Storage and handling of hazardous chemical substances* • *Section 18* *Offences*	The Applicant must ensure the safety of people working with hazardous chemicals (specifically fuels), as well as safe storage, use and disposal of containers during the on-site operational phase together with the associated liability should non-compliance be at the order of the day.
Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995) • *Section 4* *Duties of persons who may be exposed to hazardous chemical substances* • *Section 9A (1)*	Hazardous substances will be stored and utilised on the site and non-compliance to management measures will result in prosecution of the Applicant in terms of his liabilities to the socio-economic environment.

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT *(a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process)*	REFERENCE WHERE APPLIED
Penalties	
All other relevant national, provincial, district and local municipality legislation and guidelines that may be applicable to the application. Some of these are discussed in the next section.	-

e) Need and desirability of the proposed activities

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

According to the Western Cape Department of Environmental Affairs and Development Planning's (WC DEADP) Guideline on Need and Desirability: EIA Guideline and Information Document Series (2011), to describe the need for a development, it must be determined whether it is the right time for locating the type of land use and/or activity being proposed. To describe the desirability for a development, it must be determined, whether it is the right place for locating the type of land use and/or activity being proposed. Need and desirability can be equated to the concept of wise use of land which can be determined through the question of what is the most sustainable use of land. In light of the above, the need and desirability of an application must be addressed separately and in detail answering *inter alia* the following questions:

Table 5: Need and desirability considerations

A) NEED (TIMING)		
QUESTION A1: Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority?		The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP) and will not compromise the integrity of these respective forward planning documents.
YES X	**NO**	
QUESTION A2: Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?		The proposed development will enable Lion's Head to operate effectively during the life of mine (LOM) and therefore benefit South Africa as a whole as well as for the local communities for e.g. employment provision and social upliftment will continue for longer.
YES X	**NO**	

<table>
<tr><td colspan="2">QUESTION A3: Does the community/area need the activity and the associated land use concerned (is it a societal priority)?</td><td rowspan="2">In light of the key sectors identified in Greater Tubatse Municipality LED Strategy advocates four programmes for economic development. This comprises (1) Sector Development, (2) Economic Infrastructure Support, (3) Social Development, and (4) Institutional/Governance Reform.

The projects that have been identified in the LED are aimed at economic development by ensuring that more job opportunities are created, skills development takes place and that opportunities are created for SMME development. Priority projects were identified based on the developmental goals identified below and the project prioritization methodology as articulated in

Mining plays an important part in the sector development of the LED strategy.</td></tr>
<tr><td>YES X</td><td>NO</td></tr>
<tr><td colspan="2">QUESTION A4: Are the necessary services with the adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?</td><td rowspan="2">All infrastructure for services and capacity is sufficient for the establishment of the haul road.</td></tr>
<tr><td>YES</td><td>NO X</td></tr>
<tr><td colspan="2">QUESTION A5: Is this development provided for in the infrastructure planning of the municipality, and if not, what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?</td><td rowspan="2">No municipal infrastructure will be required for the study area.</td></tr>
<tr><td>YES</td><td>NO X</td></tr>
<tr><td colspan="2">QUESTION A6: Is this project part of a national programme to address an issue of national concern or importance?</td><td rowspan="2">While in line with government's general plan of boosting the economy, uplifting our people from poverty and social wellbeing, this project does not form an official part of any formal national concern.</td></tr>
<tr><td>YES</td><td>NO X</td></tr>
<tr><td colspan="3">B) DESIRABILITY (PLACING)</td></tr>
<tr><td colspan="2">QUESTION B1: Is the development the best practicable environmental option for this land/site?</td><td rowspan="2">The study area has been transformed and was until recently been in care and maintenance. Through implementing good practice environmental management measures and mitigation measures, it will ensure that both human and environment are not negatively affected by the development.</td></tr>
<tr><td>YES X</td><td>NO</td></tr>
<tr><td colspan="2">QUESTION B2: Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF as agreed to by the relevant authorities?</td><td rowspan="2">The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP) and will not compromise the integrity of these respective forward planning documents.</td></tr>
<tr><td>YES</td><td>NO X</td></tr>
<tr><td colspan="2">QUESTION B3: Would the approval of this application compromise the integrity of the existing environmental management priorities of the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?</td><td rowspan="2">According to the Mpumalanga Biodiversity Conservation Plan, the untransformed vegetation on Mareesburg and adjacent farms is ranked as Highly Significant. These areas are considered important to conserve in order to meet provincial biodiversity targets.</td></tr>
<tr><td>YES</td><td>NO X</td></tr>
</table>

QUESTION B4: Do location factors favour this land use (associated with the activity applied for) at this place, etc.)?		No site alternatives for the haul road are applicable as the initial feasibility study by SRK (2018) indicates that the slope on both the northern, western and southern side will result in the need for more intense earthworks, blasting, shaping and consruction. The current option will require the least amount of invasive construction processes and is also the only cost-effective option. Lion's Head Platinum can't transport ore (and therefore, produce) if not connected to the Everest Platinum concentrator via this proposed haul road.
YES X	**NO**	
QUESTION B5: Will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?		In light of the key sectors identified in Greater Tubatse Municipality LED Strategy advocates four programmes for economic development. This comprises (1) Sector Development, (2) Economic Infrastructure Support, (3) Social Development, and (4) Institutional/Governance Reform. The projects that have been identified in the LED are aimed at economic development by ensuring that more job opportunities are created, skills development takes place and that opportunities are created for SMME development. Priority projects were identified based on the developmental goals identified below and the project prioritization. Mining plays an important part in the sector development of the LED strategy.
YES	**NO X**	
QUESTION B6: Will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?		Noise, dust and visual annoyances will slightly increase, but with the proper mitigation and good practice environmental management measures, it will result in minimal impacts.
YES X	**NO**	
QUESTION B7: Will the proposed land use result in unacceptable cumulative impacts?		As already mentioned, through the implementation of good practice environmental management measures as well as mitigation measures, all direct and cumulative impacts which may result from the proposed development will be addressed and ensure that the environment is affected to the minimum.

The main benefits of the Lions Head Mines are:

- It contributes to the economic welfare of the surrounding community by creating working opportunities;
- It contributes to the upliftment of living standards and the health and safety of the local community;
- The net benefit to South Africa as a whole is a product produced for the world commodity market, earning South Africa the necessary foreign exchange and capital needed for a healthy economy and further capital investments in development projects for the long-term future of the country; and
- The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP), as well as the Local Economic Development strategy including job creation, investment creation, rural and urban development, combating crime, skills development, combating the impact of HIV/AIDS and poverty alleviation. The Social and Labour Plan (SLP) drafted for the proposed project addresses all these priorities.

f) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

i) Details of the development footprint alternatives considered

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

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

According to the Western Cape Department of Environmental Affairs & Development Planning (WC DEADP) Guideline on alternatives: EIA Guideline and Information Document Series (2011) feasible and reasonable alternatives have to be identified for a development as required by the NEMA EIA Regulations and applicable to EIA. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. Alternatives forms a vital part of the initial assessment process through the consideration of modifications in order to prevent and/or mitigate environmental impacts associated with a particular development. Alternatives are to be amended when the development's scope of work is amended. It is vital that original as well as amended alternative identification, investigation and assessment together with the generation and consideration of modifications and changes to the development and activities are documented.

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, there must always be strived to seek alternatives that maximises efficient and sustainable resource utilisation and minimise any negative impacts on the bio-physical and socio-economic environments.

Feasible alternatives

The following alternatives were investigated as feasible alternatives:

- *Design alternatives;*
- Recycling *(Technology alternatives);* and
- Not implementing the activity *(No – Go alternative).*

Table 6 below contains the analysis of alternatives identified.

Table 6: Alternatives Analysis

TYPE OF ALTERNATIVE:	**ALTERNATIVE EXPLANATION:**
Location	**Develop on an alternative property** **Develop on alternative sites on the same property/properties**
No location alternatives for the proposed haul road are available due to the fact that the current design will have the smallest environmental impact, will be the most cost-effective and will serve the most communities as a public road.	
TYPE OF ALTERNATIVE:	**ALTERNATIVE EXPLANATION:**
Activity	**Develop an alternative activity e.g. Incineration of waste vs. landfill disposal, abstraction of water vs. re-use/recycling of water.**
No activity alternatives have been identified or are assessed as part of this application.	
TYPE OF ALTERNATIVE:	**ALTERNATIVE EXPLANATION:**
Design	**Adapt architectural and/or engineering designs.**
Design alternatives that have been identified and assessed as part of this application, include different designs for culverts, different materials for road compaction, different widths and different routes for the road to be built along. The current design will have the smallest environmental impact, will be the most cost-effective and will serve the most communities as a public road.	
TYPE OF ALTERNATIVE:	**ALTERNATIVE EXPLANATION:**
Layout	**Adapt spatial configurations of an activity on any particular site e.g. Locate manure dams away from water resources.**
As described under the "Design alternative" section, the current design of the proposed haul road considered the different available routes (and therefore, layouts) and the current design will have the smallest environmental impact, will be the most cost-effect and will serve the most communities as a public road.	
TYPE OF ALTERNATIVE:	**ALTERNATIVE EXPLANATION:**
Technological	**Adapt methods or processes that can be implemented to achieve the same goal e.g. Introduction of bacteria rather than chemicals to waste water.**

The current modern technologies used in road construction will be utilised and alternatives will only become available with time as new road construction technologies become available and affordable.	
TYPE OF ALTERNATIVE: **Demand**	**ALTERNATIVE EXPLANATION:** **The demand for products and/or services can be met by other means e.g. The demand for paper can be met through deforestation or rather by efficient and viable recycling.**
No alternatives to meet demand were identified or are assessed in this application.	
TYPE OF ALTERNATIVE: **Input**	**ALTERNATIVE EXPLANATION:** **Implement different input materials and/or sources e.g. Utilisation of woodchips for fuelling boilers rather than electricity.**
No input alternatives were identified or are assessed in this application.	
TYPE OF ALTERNATIVE: **Routing**	**ALTERNATIVE EXPLANATION:** **Implement alternative routes for linear developments such as power line servitudes, transportation and pipeline routes e.g. Elongate and divert a railway line to exclude a sensitive environment.**
As per the feasibility report and section ii of this report, several routing options were considered but the current design will have the smallest environmental impact, will be the most cost-effect and will serve the most communities as a public road.	
TYPE OF ALTERNATIVE: **Transport**	**ALTERNATIVE EXPLANATION:** **Method of transportation of product or ore.**
The objective of this application is to motivate the authorisation of an upgraded haul road that has been determined to be the best option to transport ore from the Mareesburg mine to the Everest concentrator.	
TYPE OF ALTERNATIVE: **Scheduling and Timing**	**ALTERNATIVE EXPLANATION:** **Adapt the order and/or scheduling of a number of measures which plays a part in a program as it will influence the overall effectiveness of the end result.**
This alternative is not applicable to the proposed development.	
TYPE OF ALTERNATIVE: **Scale**	**ALTERNATIVE EXPLANATION:** **Adapt the scale of an activity ex. 15 vs. 35 housing units, 12m2 vs. 0.5km2.** **P.S. Scale and magnitude is interrelated.**
At this stage, no alternatives in terms of scale have been identified or are assessed.	
TYPE OF ALTERNATIVE: **Magnitude**	**ALTERNATIVE EXPLANATION:** **Adapt the magnitude which is directly related to the extent of an activity.**

	P.S. Scale and magnitude is interrelated. An activity may be very small scale but can pose an extensive magnitude ex. Destroying an extremely sensitive wetland on a very small scale could result in a magnitude of such as destroying the whole wetland and/or ecological system.
At this stage, no alternatives in terms of magnitude have been identified or are assessed.	
TYPE OF ALTERNATIVE: **No-Go**	**ALTERNATIVE EXPLANATION:** **The option of not undertaking and implementing the activity at all.**
The existing gravel road, which is not in a good state, will never be upgraded and the local community (including schools) will never benefit from the upgraded infrastructure in the area not will they experience the economic stimulus brought about by mining in the area.	

ii) Details of the Public Participation Process Followed

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

A joint Public Participation Process is undertaken for the upgrade of this gravel road to a haul road. The process is undertaken to ensure compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) [as amended] (MPRDA), the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), and the National Water Act, 1998 (Act No. 36 of 1998) [as amended] (NWA) and the Environmental Impact Assessment Regulations (2014).

Tasks undertaken for the Public Participation Process (PPP)

This section of the report provides an overview of the tasks undertaken for the PPP to date. All PPP undertaken is in accordance with the requirements of the NEMA requirements and EIA Regulations (2014) [as amended]. It further provides an outline of the next steps in the PPP and makes recommendations for tasks to be undertaken during the environmental assessment phase of the environmental authorisation process.

The PPP tasks conducted for the proposed new plant development project to date includes:

IDENTIFICATION OF KEY INTERESTED AND AFFECTED PARTIES (AFFECTED AND ADJACENT LANDOWNERS) AND OTHER STAKEHOLDERS (ORGANS OF STATE AND OTHER PARTIES)

Public Participation is the involvement of all parties who are either potentially interested and or affected by the proposed development. The principle objective of public participation is to inform and enrich decision-making. This is also its key role in this Scoping and Environmental Impact Assessment (EIA) process.

Interested and Affected parties (I&APs) representing the following sectors of society has been identified:

- National, provincial and local government;
- Agriculture, including local landowners (affected and adjacent);
- Community Based Organisations;
- Non-Governmental Organisations;
- Water bodies;
- Tourism;
- Industry and mining;
- Commerce; and
- Other stakeholders.

FORMAL NOTIFICATION OF THE APPLICATION TO INTERESTED AND AFFECTED PARTIES (INCLUDING ALL AFFECTED AND ADJACENT LANDOWNERS) AND OTHER STAKEHOLDERS

The project was announced as follows:

- Newspaper advertisement.

Publication of media advertisement (English) in the **Steelburger on Friday, 14 September 2018** on page 13 (notices section).

Please refer to Appendix 6.1 for Proof of the media advertisement.

- Site notice placement

In order to inform surrounding communities, affected and adjacent landowners of the proposed development, two site notices were placed next to the gravel road to be upgraded (beginning of section

and end of section). Two more site notices were placed in the surrounding communities – one in Steelpoort and one in Mashishing. The site notices were erected on the same day the newspaper advertisement was published in the Steelburger. *Please refer to Appendix 6.2 for Proof of site notices.*

- Written notification

I&AP's and other key stakeholders, who included the above-mentioned sectors, were directly informed of the proposed development by e-mail on 14 September 2018. The public participation process will run for 60 days (concurrent with a water use licence application) during which time I&APs are given the time to comment and / or raise issues of concern regarding the proposed development. The commenting period will expire on Wednesday, 14 November 2018. *Please refer to Appendix 6.3 for Proof of written notice sent.*

CONSULTATION AND CORRESPONDENCE WITH I&APS AND STAKEHOLDERS

All I&AP registrations and comments that are received from stakeholders is formerly recorded in the Comments and Responses Report. *Please refer to (not yet updated in this draft)*

The NEMA Draft BAR (this report) will be released for comment on the 14th of October 2018.

Hardcopies of the draft BAR will be submitted to all organs of state and relevant authorities. In addition, copies will be placed at the Lydenburg / Mashishing public library for the public to peruse. The draft BAR will also be available for download from the ENVASS website.

THE PUBLIC PARTICIPATION PROCESS

All stakeholders and registered I&APs now have the opportunity to review and comment on all the documents released in the Basic Assessment Process. The BA / EMPR report is released for a period of 30 days from 14 October 2018 to 14 November 2018 for review and comment. Hardcopies and / or CDs of all reports and supporting documents are submitted to the organs of state and relevant authorities (Appendix 6.4). All the reports are placed in an area that is accessible to all I&APs and they will be notified of the location i.e. the Lydenburg Public Library (Appendix 6.5). The reports are also available for download from the ENVASS website (www.envass.co.za).

- Site notice placement

In order to inform surrounding communities, affected and adjacent landowners of the proposed development, 2 site notices were erected on site and at visible locations close to the site on 14 September 2018 (4 site notices in total). *Please refer to Appendix 6.5 for Proof of site notices.*

- Written notification

I&AP's and other key stakeholders, who included the above-mentioned sectors, were directly informed of the proposed development by e-mail on 14 October 2018. The EIA Report was also supplied to all parties. I&APs are given 30 days to comment and / or raise issues of concern regarding the proposed development. The commenting period will expire on 14 November 2018. *Please refer to Appendix 6.6 for Proof of written notice sent.*

- Public Forum Meeting

A meeting will be held if required by authorities or I&APs. The date of which will be confirmed and communicated to all I&AP's.

iii) Summary of issues raised by I&AP's

*(Complete the table summarising comments and issues raised, and reaction to those responses***)**

TO BE COMPLETED ONCE PROCESS ENDS ON 14 NOVEMBER 2018

iv) The Environmental attributes associated with the development footprint alternatives

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) Baseline Environment

The project is located mostly in the Mpumalanga province, but a short length crosses into the Limpopo province. The project area traverses over the following farm portions:

Portion 8 Vygenhoek 10 JT, Portion RE/3 Vygenhoek 10 JT, Portion 9 Schaapkraal 42 JT, Portion 7 Sterkfontein 53 JT, Portion 5 Sterkfontein 53 JT; Portion 2 Vygenhoek 10 JT, Portion 4 Vygenhoek 10 JT, Portion 11 Schaapkraal 42 JT, Portion 7 Vygenhoek 10 JT, Portion 2 Sterkfontein 53 JT Portion 12 Schaapkraal 42 JT; Portion 1 Vygenhoek 10 JT Portion 14 Sterkfontein 53 JT, Portion 8 Sterkfontein 53 JT, Portion 8 Schaapkraal 42 JT, Portion 5 Vygenhoek 10 JT Portion 4 Sterkfontein 53 JT, Portion 1 Der Brochen 7 JT, Portion 6, Mareesburg 8 JTThe study area falls within the Tubatse Local Municipality and the Sekhukhune District Municipality.

(a) Type of environment affected by the proposed activity.

(Its current geographical, physical, biological, socio- economic, and cultural character)

CLIMATE

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

Description of regional climate

The first-order South African weather station closest to the area of interest is the Lydenburg Station (0554816A7), which is approximately 35 km south-east of the proposed site. Mareesburg falls within the Highveld climatic region. The typical Highveld climate is characterised by dry winters and hot summers with very low rainfall and high evaporation levels, this will be discussed in more detail in the following sections.

Mean monthly and annual rainfall and precipitation

The average annual rainfall for this region varies from 900 mm in the east to 680 mm in the west and the average annual evaporation is 1731 mm, therefore a negative water balance exists for the area. Lydenburg receives an average annual rainfall of 737 mm. The rainfall occurs mostly in the form of thunderstorms and showers during the summer months, from October to March, with a maximum in January.

Rainfall intensities

Heavy, short lived showers of between 125 and 150 mm with lightning, gusty winds and some hail can occur on a single day. This climatic region has the highest occurrence of hail in South Africa. Snow occurs about 8 times per year, mostly in mid-winter, with the frequency decreasing to the north.

Mean monthly maximum and minimum temperatures

The average daily maximum temperatures for the climatic region are 27°C in January and 17°C in July. The average daily minimum temperatures vary from 13°C in January to 0°C in July. There are extreme temperatures and these vary from 38°C and 26°C to 1°C and -13°C respectively. Frosts occur for an average of 120 days per year in general from May to September and wind is mostly light, except during thunderstorms.

Mean monthly wind direction and speed

The wind field over the region generally reflects topographical flows. The prevailing wind directions on the site are north-westerly and south-easterly due to the topographical orientation of valleys and ridges in the area. Calm wind conditions occur on average 28% of the time, with no seasonal pattern observed. However, there is a distinct diurnal pattern, with over 50% of calm winds recorded during the night hours. The average surface wind speed is 2.5 m/s, with a maximum observed wind speed of 7.9 m/s. Winds are generally light to moderate, with over 85% of the hourly average wind speeds being < 3.5 m/s. Figure 4 depicts the wind direction frequencies for the area, deducted from the Lydenburg weather station (W0554816). The graph shows that the wind predominantly comes from a northerly or easterly direction.

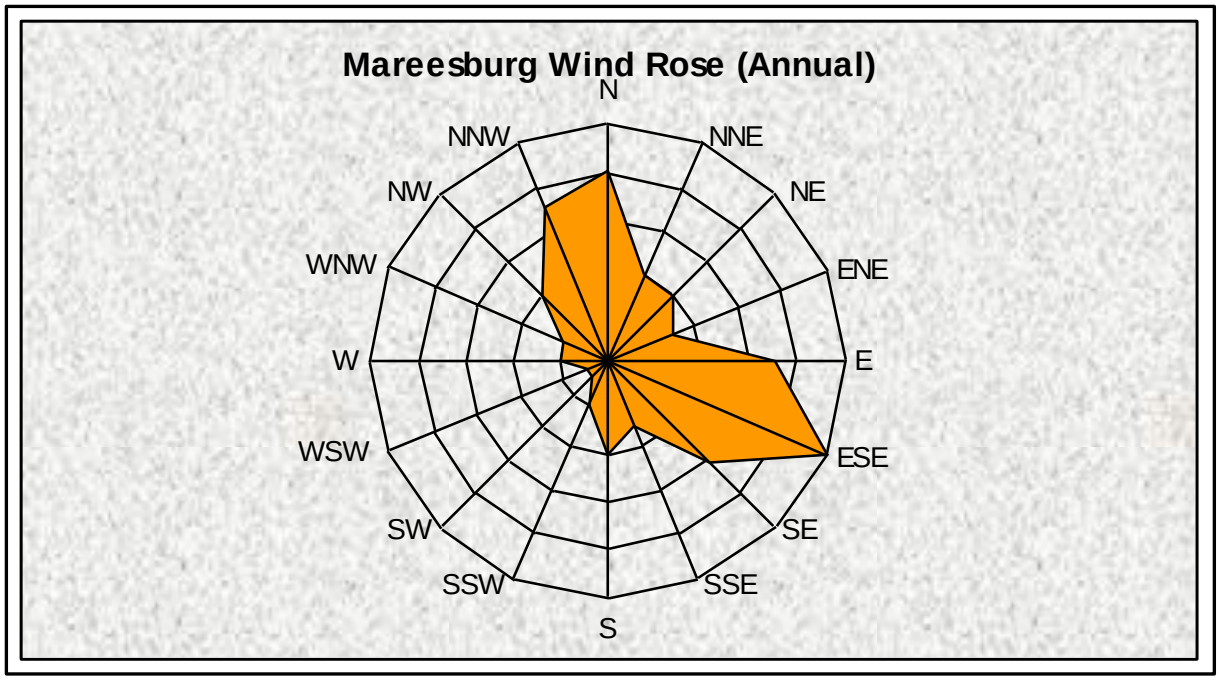


Figure 4: Graphic representation of the wind direction frequency (Digby Wells & Associates, 2008)

Mean monthly evaporation

The S-Pan was the evaporimeter used as the original standard in South Africa, and are still widely used by the South African Department of Water and Sanitation (DWS) to measure evaporation at dams under DWS control. An S-Pan is a square metal tank sunk into the ground. Daily evaporation is given by the change in water level from the previous day, after allowance has been made for precipitation.

The Mean Annual Evaporation (MAE) from a free-water surface for this area totals 1600 mm. This means that there is a negative water balance, with higher evaporation than rainfall and runoff. Mean monthly S-pan evaporation for the study area (WR90 evaporation zone 4A) and Lydenburg are presented in Table 7 below. The WR90 report is a reference for surface water resources in South Africa by providing access to long-term (79 years) rainfall, evaporation and flow data (Midgley *et. al*,1994).

Table 7: Mean Monthly S-pan evaporation (Digby Wells & Associates, 2008)

Source	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
WR90 (mm)	172.5	162.7	179.2	176.0	146.7	144.8	111.4	93.8	76.2	83.4	110.4	143.0	1600
Lydenburg (mm)	184.2	165.9	182.0	178.0	154.7	148.9	114.6	102.5	88.2	103.2	137.7	170.6	1730.6

Incidence of extreme weather conditions

The incidence of extreme weather conditions is summarised in below. As can be seen from Table 8 below, the frequency of extreme weather such as thunder and hail occur predominantly throughout the summer months between October and March and are at their highest at the height of summer. Snow occurs during the winter months between June and August, but snowfalls have been recorded as early as April and as late as October. Fog tends to occur throughout the year with higher occurrences during summer from October until February.

Table 8: Incidence of extreme weather conditions (Digby Wells & Associates, 2008)

No. of days with:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YR
Thunder	6.2	4.4	3.7	2.7	0.9	0.5	0.4	1.1	1.4	4.1	7.1	5.1	37.6
Hail	0.3	0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.5	0.2	1.9
Snow	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.6
Fog	1.9	1.3	1.1	0.9	0.4	1.1	0.8	1.1	0.8	2.6	1.6	1.6	15.2

TOPOGRAPHY

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

The general area is characterised by rugged topography and prominent north-south trending mountain ranges (Steenkampsberge). This topography is illustrated in Figure 5. Two deeply incised valleys extend in a north-south direction between the mountain ranges. Within these valley floors are the Groot-Dwarsrivier to the west of the proposed site and beyond this is the Klein-Dwarsrivier.

The Groot Dwarsrivier forms the western boundary between Mareesburg and Helena with a valley bottom elevation of 1063 mamsl. The Groot Dwars River drains in a northerly direction to join the Klein Dwars River north of Thorncliffe on the farm Dwarsrivier. The proposed mine is situated on the western flank of a steep hillside, with the mine are rising from 1200 mamsl to a peak of 1547 mamsl. Two drainage lines drain the proposed mine area to the west and the Groot Dwars River. Please refer to Figure 6.

Figure 5: Topography of the Mareesburg farm (Digby Wells & Associates, 2008)

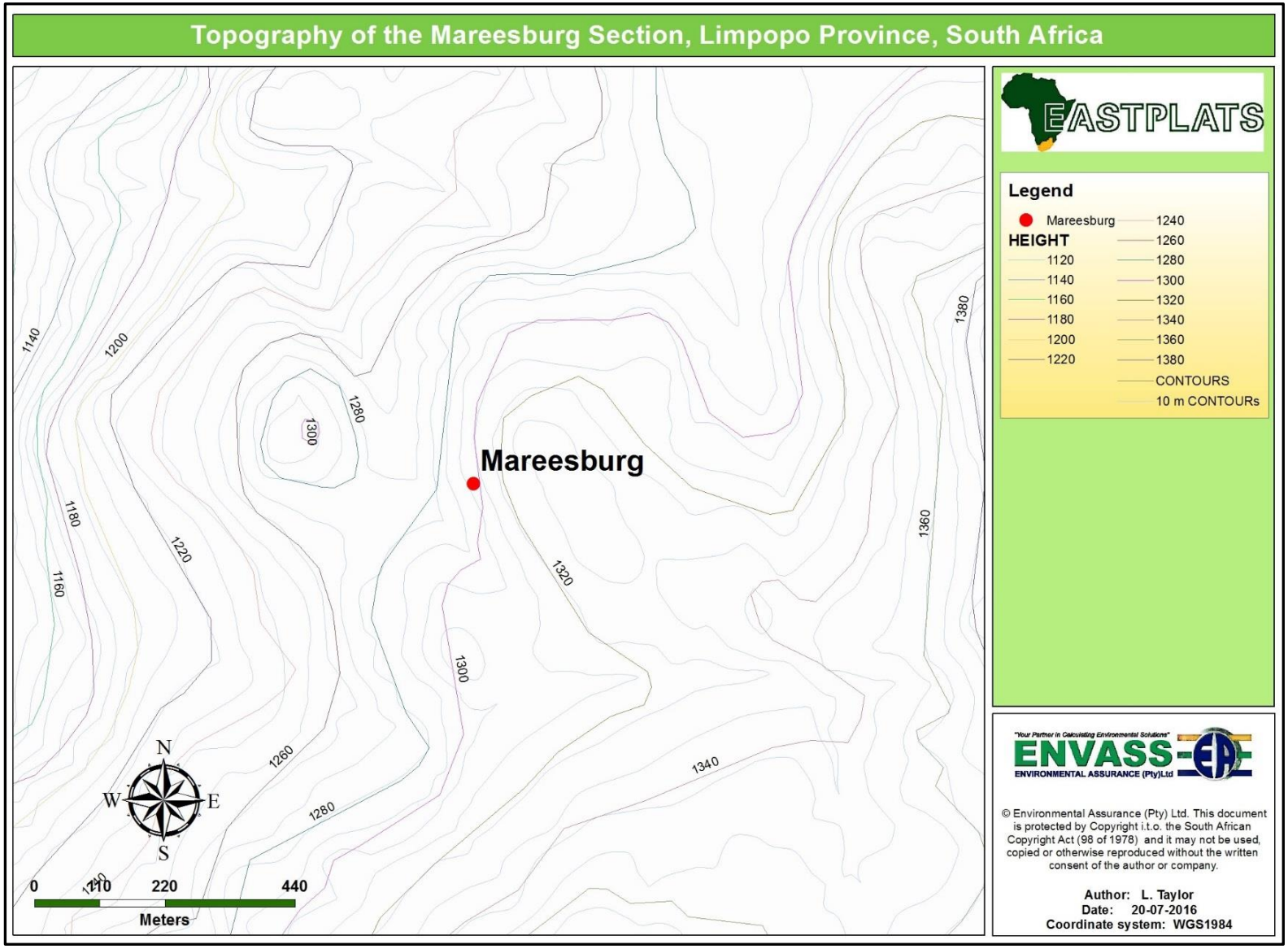


Figure 6: Topography of Mareesburg

Geology and Soils

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

Geology

The project area is located within the Southern Sector of the Eastern Bushveld Complex, to the west of the Anglo Plats Der Brochen project. Mareesburg is underlain by the lower- and upper parts of the Critical Zone of the Rustenburg Layered Suite (RLS). The main economic horizons in this part of the complex are the platinum group metals (PGMs) in the Merensky reef and the underlying UG2 chromitite reef. The two reefs in the area are relatively uniform and consistent. The reefs outcrop in the Groot-Dwarsrivier valley, strike north-south and dip to the west at angles varying from 5 to 16 degrees to the west, and inwardly into a synclinal trough. Potentially economic UG2 chromitite has been indicated from drilling data from the Implats exploration programme. Where roads have been constructed, there are areas where this reef can be seen (Figure 7).

Figure 7: Exposed UG2 seam on the Mareesburg farm

Soils (*Digby Wells & Associates, 2008)*

The crests and upper slopes tend to be occupied by shallow Mispah form soils, which consist of very shallow topsoil underlain by hard rock. The majority of the area was extremely rocky with very sparse layers of soil between the rocks and stones. Glenrosa form soils occur where weathering of the rock has occurred and a small pocket of Arcadia form soil is found in the middle of the study area. The crests also had small depressions and drainage lines where soils also occurred. Soils of pans, depressions, drainage lines and seepage areas occupy very small portions of this landscape and consist of soils which, owing to their position in the landscape, are seasonally or permanently wet. They may possess pale-coloured, leached, upper horizons which overlie gleyed, mottled or indurated subsoil horizons. A small pocket of Katspruit form soil occurred where water collected on a regular basis (refer to Plan 4 for soils).

The soil boundaries were established by augering the area on a grid of 150 x 150 m with a hand held soil auger to a depth of 1.2m (or shallower if a limiting layer was encountered). At each observation point the more important soil physical characteristics used to identify the soil i.e. depth, colour, texture and structure were noted. Soils were classified according to the Taxonomic System for South Africa.

The soils were also assessed in terms of their agricultural potential and suitability for rehabilitation. Due to the steep and rocky/stony terrain, none of the soil units were suitable for agricultural production, and only small pockets of soil could be utilised for rehabilitation. In addition, erodibility and natural fertility were evaluated. All the soil forms had a moderate erodibility i.e. they had stable physical and chemical properties and in the natural state, erosion should not be a problem. Soils which were low in macro and micro nutrients would require appropriate amelioration annually. In general, soils in the Mareesburg study area are eutrophic (slightly leached), and thus have a very high base status. Soil pH values are between 7.1 and 8.4; soils have a moderately low fertility status. Topsoil Phosphate (P) values are generally very low (0.6 – 1.20 mg/kg), while Potassium (K) values vary widely – from 15 mg/kg (low) to 137 mg/kg (fair). It should be noted that the presence of shrink-swell clays found in the Arcadia form soils could cause problems of cracking in buildings and poor traction with roads.

Mining activities

Locally, there are several mining and mining-related activities occurring in the Steelpoort area. These include:

- Xstrata's Project Lion ferrochrome smelter;
- Xstrata's Vantech site;
- Samancor's Eastern Chrome mine (Lannex); and
- The existing Kennedy's Vale shaft (Rhodium Reefs).

Communities/Residential

The following communities and community structures exist:

- Farm houses and outbuildings;
- Ga-Mampuru community;
- Ga-Phasha community (which includes Tukakgomo village);
- Ga-Magolego community (Dithamaga);
- Eerste Geluk;
- Tubatse village (Samancor);
- Steelpoort; and
- Small businesses (light industry, retail) in Steelpoort.

SURFACE WATER

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

Mareesburg is situated in the Groot-Dwarsrivier sub-catchment of the Olifants River. The existing Der Brochen dam, operated by the Groot-Dwarsrivier Irrigation Board, is situated in the central part of the valley, upstream of Mareesburg.

The surface water can be considered to be of good quality and provides suitable habitats for sensitive aquatic invertebrates. Chemical analysis of samples taken from the rivers in the catchment confirmed that the water is of near-pristine quality and suitable for all uses. This spring flowed for a while before seeping back into the earth. The water was clear and appeared to be off good quality.

There are several non-perennial rivers in the area that only flow during the wet seasons. Due to the steepness of the slopes, the rate of run-off can be high and should be a consideration when constructing infrastructure and roads.

Several dolerite/diabase dykes traverse the area. These appear to be associated with deeper weathering and, in certain locations, with drainage features. Recharge to groundwater along these features will probably be greater than in other parts of the mining area (SRK, 2002).

Surface water quantity

The watercourses in this area are non-perennial and will not in any way affect the proposed operations, their flows have therefore not been calculated.

The normal dry weather flow is defined as the flow that occurs 70% of the time in the three driest months (July, August and September) of the year. The watercourses do not flow during dry weather, and the dry weather flow in the unnamed tributary is therefore, nil.

Catchment boundaries

The catchment layout for the Groot-Dwarsrivier and its tributaries that will be affected by the proposed mine development, is indicated in Figure 8. Major watercourses have been highlighted as well as the five surface water catchment boundaries, namely:

- GD1 (Groot Dwarsrivier catchment 1);
- GD2 (Groot Dwarsrivier catchment 2);
- GD3 (Groot Dwarsrivier catchment 3);
- GD4 (Groot Dwarsrivier catchment 4); and
- Trib1 (Groot Dwarsrivier tributary 1).

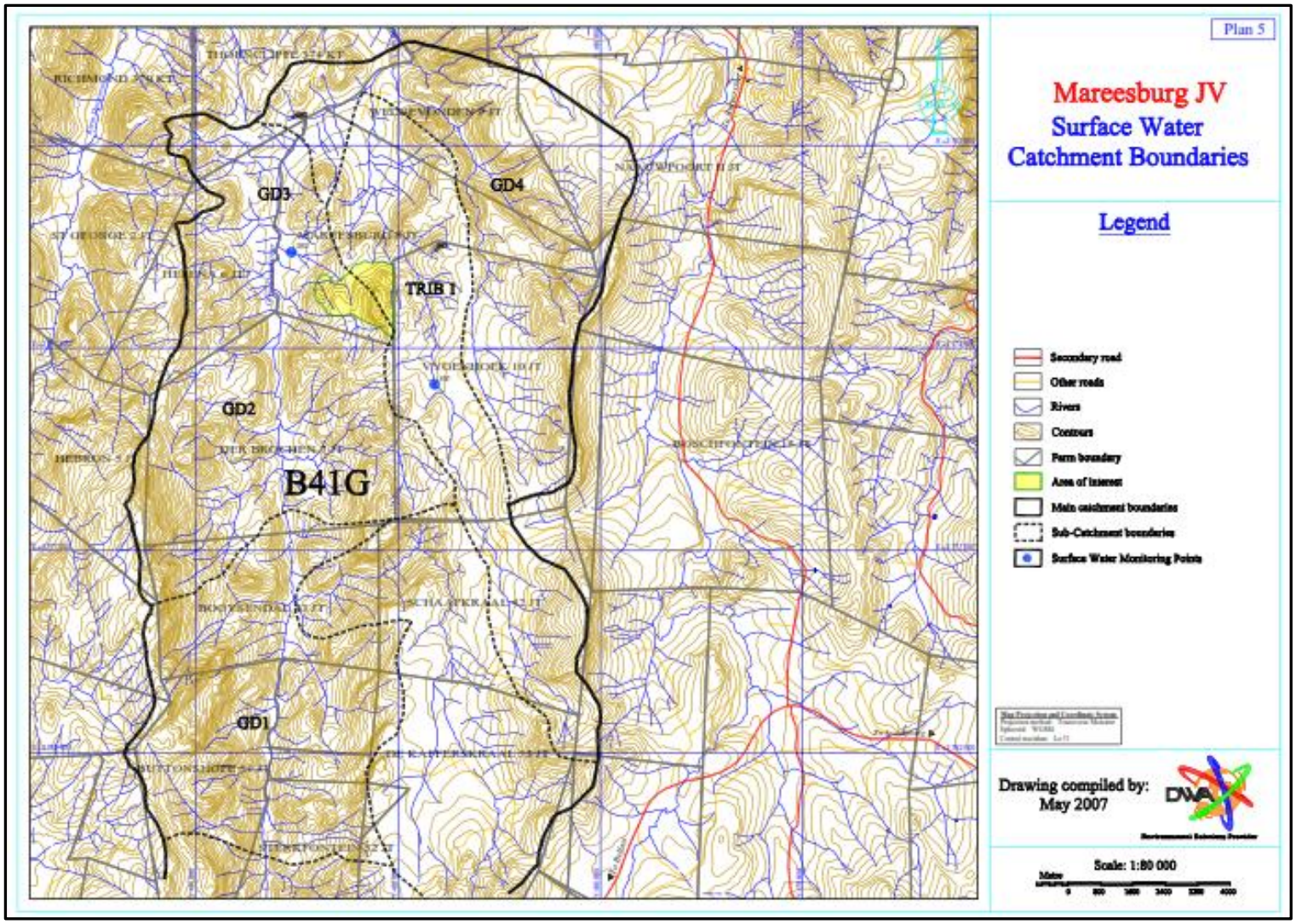


Figure 8 : Surface Water Catchment Boundaries (Digby Wells & Associates, 2008)

The project area falls with in the DWAF B4G catchment.

Mean annual runoff (MAR)

The mean annual runoff (MAR) for the streams is not gauged. It was therefore necessary to assume that the rainfall-runoff response of the catchment is the same as that of the regional rainfall-runoff response as determined in the WR90 project (Midgley et al, 1994). Using rainfall runoff response parameters from the WR90 project, the runoff was simulated for the sub-catchments of the Groot-Dwarsrivier using the WRSM90 model (SRK, 2002). The MARs for the five sub-catchments are presented in Table 10. Mareesburg falls within the same catchment as for the Der Brochen study.

Table 9: Mean Annual Run-off (Digby Wells & Associates, 2008)

Catchment Name	Catchment Area (Km^2)	Mean Annual Flow (Mm^3/a)	Normal Dry Weather Flow (Mm^3/month)
GD1	41	2.706	0.058
GD2	125	8.250	0.177
GD3	180	11.880	0.254
GD4	245.7	16.216	0.347
Trib1	32.1	2.119	0.045

Normal dry weather flow

The normal dry weather flow is defined as the flow that occurs 70% of the time in the three driest months (namely July, August and September). Values for the normal flow are shown in Table 9 above (SRK, 2002).

Flood volumes

The TR137, MIPI, CAPA and Rational methods were used to determine the flood peaks for the five sub-catchments. The peak flows and volumes are presented in Table 10 and Table 11 respectively. The Mareeesburg site is situated some distance from the Groot Dwarsrivier and is more than 200 m above the river. Due to this elevation, the 1:50 and 1:100 year floodlines pose no threat to the site or any of its infrastructure.

Table 10: Storm run-off flows for various recurrence intervals (Digby Wells & Associates, 2008)

Catchment Name	Area (Km^2)	Recurrence Interval (peak flows in m^3/s)			
		1:20	1:50	1:100	1:200
GD1	41	140	203	288	363

GD2	125	223	334	472	593
GD3	180	244	373	526	660
GD4	245.7	303	460	648	812
Trib1	32.1	78	124	176	223

Table 11: Storm run-off volumes for various recurrence intervals (Digby Wells & Associates, 2008)

Catchment Name	Area (Km^2)	Recurrence Interval (runoff volumes in Mm^3)		
		1:20	1:50	1:100
GD1	41	2.142	2.870	3.456
GD2	125	6.529	8.749	10.536
GD3	180	9.402	12.598	15.173
GD4	245.7	12.834	17.197	20.711
Trib1	32.1	1.677	2.247	2.706

Surface water quality

Surface water samples were taken at two locations around the Mareesburg site, MB S1 and MB S2 points (refer to Plan 5). Water quality was analysed using the most sensitive guideline concentration of all identified water uses according to DWAF standards. The water quality results returned from Regen Laboratories in Witbank are shown in Table 12 below.

Table 12: Water quality results for surface water sampling localities (Digby Wells & Associates, 2008)

Analysis Results mg/l	MB S1	MB S2	Target water quality range for domestic use
Total Dissolved Solids	110	424	0-450
Suspended Solids	1.2	2.8	-
Nitrate & Nitrite as N	0.13	<0.1	0-6
Chlorides as Cl	4	18	0-100
Total Alkalinity as $CaCO_3$	98	306	-
Fluoride as F	<0.20	<0.20	0-1
Sulphate as SO_4	5.1	49.2	0-200
Total Hardness as $CaCO_3$	88	378	-
Calcium as Ca	18.1	78.2	0-32
Magnesium as Mg	10.36	44.4	0-30
Sodium as Na	5.34	20.3	0-100
Potassium as K	0.81	0.75	0-50
Iron as Fe	<0.01	<0.01	0-0.1

Analysis Results mg/l	MB S1	MB S2	Target water quality range for domestic use
Manganese as Mn	<0.01	<0.01	0-0.05
Conductivity in mS/m	16.85	72.5	-
pH-Value at 25 ° C	8.05	8.10	6.0-9.0
Cation Balance	2.01	8.46	-
Anion Balance	2.19	7.65	-
% Difference	-4.30	5.0	-

From the above analysis it can be concluded that the water from sample MB S1 can be described as pristine as all concentrations are below the set guideline concentrations set for all types of water uses. This renders the water suitable for all uses and would not be limiting to the aquatic environment. The water from MB S2 can be described as water of generally good quality, but not suitable for all water uses as the guideline concentrations for Total Dissolved Solids (TDS), Calcium (Ca), Magnesium (Mg), and Conductivity all exceed the guideline concentrations. The TDS concentration does however still fall within domestic use standards which are set between 0 – 450, making it suitable for this water use. The high concentrations of calcium and magnesium are derived from the underlying geology of the area. The magnesium is present in the chromite and pyroxene and the calcium is present in the pyroxene and plagioclase feldspar minerals

Drainage density of areas to be disturbed

Table 13: Drainage Densities (Digby Wells & Associates, 2008)

Catchment Name	Drainage Density (Km per Km²)
GD 1	0.024
GD 2	0.176
GD 3	0.183
GD 4	0.147
Tributary 1	0.561

Surface water use

Water from the Groot-Dwarsrivier (Der Brochen dam) is used for irrigation and mining purposes. Water from Der Brochen dam is supplied to downstream farmers to irrigate 1222 ha. All farms adjacent to the Groot-Dwarsrivier and downstream of Der Brochen dam, but upstream of the confluence with the Steelpoort River, have water entitlement rights based on farm size. The majority of the water users in the area are however the mines. The distribution of water is managed by the Groot-Dwarsrivier Irrigation Board (SRK, 2002).

Water authority

The local water authority is the Department of Water and Sanitation (DWS) for Mpumalanga, which is situated in Nelspruit (a satellite office is located in Lydenburg).

Wetlands

There are no wetlands on the site delineated for mining.

GEOHYDROLOGY

***The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008 and* Groundwater Report for the Spitzkop area, Steelpoort Valley, Limpopo Province, Water Geosciences Consulting CC, 2007**

Apart from the existing geohydrological information in the Der Brochen EMP and the Scoping Report prepared for the MPJV by SRK, DWS gathered some geohydrological information (such as water levels) during the site visit (refer to Figure 9).

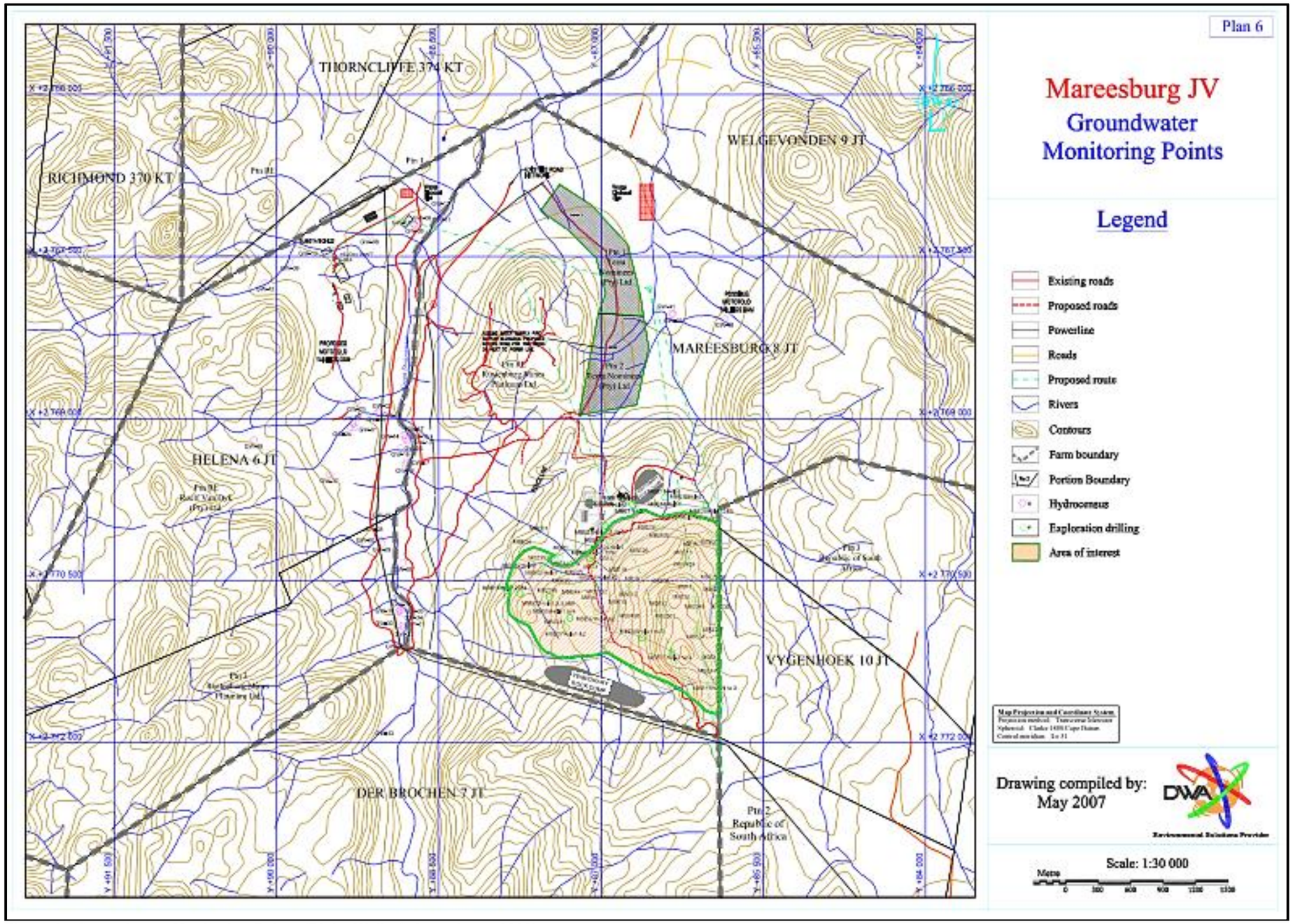


Figure 9 : Groundwater Monitoring Points (Digby Wells & Associates, 2008)

Depth of water table

The depth to the ground water table appears to vary from less than 5m below surface to 25m and probably more, but is mainly above the UG2 elevation (SRK, 2002). Water levels were measured in seven exploration boreholes during the site visit and the results are presented in Table 14.

Table 14: Water levels measured in 7 boreholes during the site visit (Digby Wells & Associates, 2008)

Borehole ID	Water level (mbgl)
MBE 04	4.4
MBE 07	20.1
MBE 08	10.4
MBE 10	6.5
MBE 11	9.5
MBE 12	10.1
MBE 21	10.1

Presence of boreholes and springs and their estimated yields

Apparently, no production boreholes are present on Mareesburg although 95 exploration diamond core holes were drilled Table 14 During the site visit one spring was identified of which the yield was estimated to be ~ 0.2 L/s. Approximately 50 percussion boreholes were drilled at the nearby Der Brochen Mine for proposed shaft sites and for the purpose of water supply (SRK, 2002).

Table 15: Diamond core exploration holes drilled on Mareesburg (Digby Wells & Associates, 2008)

BH ID	Y COLLAR	X COLLAR	Z COLLAR	DEPTH	BH ID	Y COLLAR	X COLLAR	Z COLLAR	DEPTH
MB2332	-2770537.81	-87032.50	1307.80	63.02	MBE11Hole2	-2771165.51	-86345.90	1409.20	24.11
MB2341	-2770841.52	-87292.06	1311.00	28.65	MBE11Hole3	-2771164.51	-86345.90	1409.20	23.48
MB2348	-2771273.05	-86003.13	1508.30	114.60	MBE11Hole4	-2771163.51	-86345.90	1409.20	23.45
MB2349	-2770677.91	-86129.53	1485.40	216.30	MBE12	-2770566.02	-86746.78	1342.01	90.09
MB2391	-2770345.11	-87538.27	1257.20	100.00	MBE13	-2770289.26	-86224.27	1473.45	233.15
MB2396	-2770645.08	-87483.71	1279.70	29.43	MBE14	-2771265.58	-86003.69	1508.16	93.76
MB2397	-2770950.87	-86108.59	1505.60	326.60	MBE15Hole1	-2771432.68	-85937.98	1490.44	25.41
MB2402	-2770016.44	-86456.93	1343.90	123.55	MBE15Hole2	-2771432.68	-85938.98	1490.44	24.25
MB2438	-2770772.18	-86815.14	1340.00	73.60	MBE15Hole3	-2771432.68	-85939.98	1490.44	24.30
MB2459	-2770287.97	-86224.90	1474.00	236.00	MBE16Hole1	-2770617.36	-87751.58	1260.30	15.54
MB2475	-2770132.87	-86919.44	1293.70	63.65	MBE16Hole2	-2770618.69	-87748.10	1260.58	12.35
MB2501	-2770766.84	-86401.39	1490.00	220.15	MBE16Hole3	-2770618.69	-87751.58	1260.58	10.54
MB14	-2770316.61	-87053.11	1292.38	283.90	MBE16Hole4	-2770619.69	-87748.10	1260.58	10.09
MB15	-2770298.95	-87083.17	1292.02	41.66	MBE17Hole1	-2769794.98	-86709.46	1294.99	31.50
MB16	-2770718.90	-87119.25	1332.82	83.70	MBE17Hole2	-2769793.01	-86709.74	1294.53	27.00
MB17	-2770494.20	-86219.65	1488.14	258.90	MBE17Hole3	-2769793.01	-86710.60	1295.07	28.57
MB18	-2770099.26	-86172.70	1414.51	172.90	MBE18Hole1	-2769729.62	-86408.32	1301.21	22.15
MB19	-2770535.31	-86744.00	1343.68	111.06	MBE18Hole2	-2769727.46	-86408.72	1300.91	20.75
MB20	-2770206.29	-87271.87	1269.72	77.70	MBE18Hole3	-2769728.38	-86407.44	1303.29	20.34
MBE01	-2770067.76	-87567.60	1227.94	49.50	MBE19	-2770345.12	-86890.29	1257.67	68.66
MBE02Hole1	-2770365.67	-87542.60	1257.67	71.19	MBE20Hole1	-2769798.65	-86029.47	1343.75	50.97
MBE02Hole2	-2770369.86	-87540.50	1258.10	52.60	MBE20Hole2	-2769798.65	-86030.47	1343.75	49.74
MBE03Hole1	-2770648.45	-87477.51	1279.87	19.36	MBE20Hole3	-2769798.65	-86031.47	1343.75	43.50
MBE03Hole2	-2770648.45	-87478.51	1279.87	21.17	MBE21Hole1	-2769993.64	-86963.76	1285.28	27.14
MBE03Hole3	-2770648.45	-87479.51	1279.87	17.11	MBE21Hole2	-2769993.13	-86961.69	1285.04	28.99
MBE03Hole4	-2770648.45	-87480.51	1279.87	16.89	MBE21Hole3	-2769994.64	-86963.76	1285.04	28.12
MBE03Hole5	-2770648.45	-87481.51	1279.87	16.00	MBE21Hole4	-2769994.13	-86961.69	1285.04	28.95
MBE04Hole1	-2770134.83	-86922.21	1294.00	47.45	MBE22	-2770760.92	-86399.74	1489.20	221.45
MBE04Hole2	-2770133.66	-86921.07	1295.15	44.20	MBE23AHole1	-2769967.47	-86267.12	1364.25	121.15
MBE05	-2770358.82	-87248.08	1306.70	70.12	MBE23AHole2	-2769967.47	-86267.12	1364.25	106.40
MBE06Hole1	-2770841.52	-87287.06	1311.00	30.19	MBE24	-2770202.02	-87688.48	1211.21	49.27
MBE06Hole2	-2770841.52	-87288.06	1311.00	28.77	MBE25	-2770439.49	-87361.51	1316.11	67.71
MBE06Hole3	-2770841.52	-87289.06	1311.00	27.67	MBE26	-2770160.77	-86642.19	1353.60	116.10
MBE06Hole4	-2770841.52	-87290.06	1311.00	27.17	MBE27Hole1	-2770932.69	-87320.45	1304.56	5.00
MBE07Hole1	-2770288.26	-87102.40	1293.27	31.79	MBE27Hole2	-2770932.69	-87319.45	1304.56	5.10
MBE07Hole2	-2770289.26	-87102.40	1293.27	31.89	MBE28	-2770006.82	-86457.86	1341.51	106.00
MBE07Hole3	-2770290.26	-87102.40	1293.27	32.19	MBE29	-2770518.00	-85968.42	1428.76	197.05
MBE07Hole4	-2770291.26	-87102.40	1293.27	32.17	MBE29D1	-2770518.00	-85968.42	1313.76	148.96
MBE07Hole5	-2770292.26	-87102.40	1293.27	32.33	MBE30	-2770082.48	-85995.47	1390.44	123.06
MBE08Hole1	-2770536.06	-87034.02	1307.99	49.33	MBE31	-2770668.51	-86134.88	1485.93	221.45
MBE08Hole2	-2770536.06	-87033.02	1307.99	45.10	MBE32	-2770282.09	-87378.65	1295.31	79.08
MBE09Hole1	-2771032.03	-86623.12	1375.36	30.32	MBE33	-2770538.74	-87223.80	1329.90	72.23
MBE09Hole2	-2771031.03	-86623.12	1375.36	29.26	MBE34	-2770956.48	-86119.05	1506.83	188.78
MBE09Hole3	-2771030.03	-86623.12	1375.36	30.37	MBE35	-2770800.68	-85954.23	1474.63	158.48
MBE09Hole4	-2771029.03	-86623.12	1375.36	28.35	MBE36	-2770442.42	-86447.75	1453.10	213.00
MBE09Hole5	-2771028.03	-86623.12	1375.36	28.36	MBE37Hole1	-2770792.28	-87043.28	1333.14	47.21
MBE10	-2770765.86	-86829.57	1339.37	60.69	MBE37Hole2	-2770792.28	-87042.30	1333.14	45.60
MBE11Hole1	-2771166.51	-86345.90	1409.20	26.97					

According to the 1:500 000 hydrogeological map (Sheet 2530 Nelspruit, DWAF, 1999), aquifers in the region are formed by undifferentiated rocks and mixed lithologies. Groundwater usually occurs along sedimentary/sedimentary or sedimentary/igneous rock contacts and is classed in a category where successful boreholes typically yield 2-5 litres/second. This would typically be along a fault or shear zone and diabase dykes.

No information regarding borehole yields on Mareesburg exists. Boreholes drilled on the nearby Der Brochen Mine delivered blow yields of up to 30 litres/second (SRK, 2002). One should, however, not

expect the same yields at Mareesburg due to the elevated topography. The prominent north-south striking fault may however yield significant groundwater when exploited. This however needs to be investigated.

Groundwater quality

No information regarding groundwater quality exists on Mareesburg. The groundwater quality should however be of the same nature as has been reported in the Der Brochen EMP due to similar geological conditions.

Water samples were recovered from 15 of the boreholes in the Der Brochen area in November 2001 and February 2002. The hydrochemical data shows that all the groundwater falls into one hydrochemical type irrespective of geographical locality and aquifer sub-types (samples were mainly valley bottom and intermediate elevation shallow weathered bedrock secondary aquifers). The environmental isotope data plots on the meteoric water line in a well defined cluster indicating regional continuity of the groundwater characterised by uniform natural areal recharge and infiltration. The dominant groundwater is a magnesium-calcium bicarbonate type with the following general water quality characteristics:

- pH 7-9
- TDS 120-780 mg/l
- EC 20 to 60 mS/m
- Ca and Mg are the major cations
- Total Alkalinity 200-400 mg/l
- Total Hardness 120-380 mg/l
- Low NO3 (< 1 mg/l)

The bicarbonate dominance suggests recently recharged water, with the source of the magnesium cation being attributed to the presence of magnesium silicates in the Bushveld rocks (viz. pyroxenite, olivine). The groundwater can be classified as being moderate to very hard in terms of the DWAF (1996) SA Water Quality Guidelines. Higher TDS and EC values are generally associated with very low yielding boreholes (< 0.2 l/s), indicative of stagnant flow conditions (SRK, 2002).

Groundwater use

Groundwater use in the regional area consist of use for domestic water supply or for industrial use (Der Brochen Mine). The lack of formal water supply infrastructure necessitate water supply from groundwater

as well as surface water where appropriate. Major structural features and the alluvial aquifers within the Groot Dwarsriver Valley can yield water volumes required for industrial use.

On site, one borehole is used for water supply to the residents of the farm, while the several springs in the area supply water to the game on the property.

Groundwater zone

The following section briefly examines the conceptual geohydrological model and then proceeds to identify the zone of influence from the proposed mining activities.

Conceptual Geohydrological Model

As discussed in the geological section, the Mareesburg property is underlain by the lower and upper parts of the critical zone of the Rustenburg Layered Suite. The critical zone is characterised by regular layering of cumulus chromite within the pyroxenite and olivine-rich rock.

The main aquifers within the region have been identified as the primary aquifer, shallow weathered bedrock secondary aquifer and the deep structural secondary aquifer (SRK, 2002).

The primary aquifer is confined to the river valleys and includes the material deposited within the Groot Dwarsriver Valley. The material accumulated exceeds 10 m in places, but is generally less than 6m in the Groot Dwarsriver valley. The alluvial material consists of boulders, cobbles, gravel and sand.

The shallow weathered bedrock secondary (weathered) aquifer consists of the in situ weathered host rock where enough porosity has developed to allow for the storage and transmission of water. The Der Brochen EMP (SRK, 2002) sub divided this aquifer into three sub types, valley bottom aquifers, intermediate elevation aquifers and high elevation aquifers. The interconnection between the three aquifer types were found to be poor due to the low transmissivities, limited weathering in places and closed fracture system underlying them. The highest aquifer potential is associated with low lying areas and areas of low gradient e.g. saddles and water shed areas.

The deep structural secondary (fractured) aquifer is mainly associated with the 1st order regional structures underlying the Groot Dwarsriver. Other structural features and dyke contacts are not significant features and sustainable yields are low due to limited storativity. These structures could play a role in local contaminant migration as they constitute the main flow paths underlying the weathered zone.

Groundwater levels measured within the exploration boreholes indicated a strong Bayesian correlation (R2=0.98) indicating that the groundwater flow will generally mimic surface water flow, surface watersheds therefore, will also act as groundwater sheds in the absence of pumping or mining. Water levels varied between 5 and 20 mbgl (meters below ground level). These water levels are above the UG2 elevations at these locations. Mining of the UG2 seam will therefore encounter saturated conditions where weathering allows the permeation of water.

Groundwater recharge is expected to vary between 3 and 5 % of MAP over the project area, according to the De Brochen investigation, literature available does not dispute this value. The historical permeability measurements over the area focused on the deep structural secondary aquifer and limited information is available on the shallow weathered bedrock aquifer and unweathered rock matrix. The permeability of the rock matrix is expected to be very low, this was confirmed by the calibration of observed water levels over the project area.

The Mareesburg project is located outside of the Groot Dwarsriver valley. Therefore no primary or deep structural secondary aquifers underlie the project area. The project area has also not been included in the further sub division of the weathered aquifer undertaken for the De Brochen project. From drilling data and observations made on site a localised weathered aquifer overlies the project area. The depth of total weathering is an average of 5m with a maximum of 24m. Weathered material was recorded underlying fresher material in a number of the boreholes potentially indicating preferential weathering due to the difference in mineralogy. The aquifer pinches out against underlying unweathered material on the steeper slopes as is evinced by the numerous seepages around the project area. The geological investigation has indicated that no major faulting exists within the Mareesburg deposit. The underlying fractured aquifer is poorly connected with the weathered aquifer due to the low permeability of the host rock, even where intruded by dykes. Three phases of dolerite dyke intrusion have been identified within the deposit. The dyke contacts and dykes have not been significantly fractured and localised fracturing is not well interconnected.

Surface seepage emanating around the project area will add to the recharge of the alluvial aquifer within the river valley further downstream and the little flow that is expected within the unweathered rock will contribute to the baseflow of the Groot Dwarsriver via the deep structural secondary aquifer and interconnectivity with the primary aquifer. The low permeability of the unweathered rock matrix increases the importance of preferential flow paths within the fractured zone.

Groundwater Boundaries

The groundwater boundaries for the project area are the various drainage lines that are below the mining elevation. These rivers and streams to the west, north (Groot Dwarsriver), east (Mareesburg drainage) and south (unnamed tributary), will act as area of groundwater convergence as is indicated by the Bayesian correlation.

The weathered aquifer is vulnerable to impacts from dewatering as well as contamination during the mining of the project area. Water make within the mine workings will primarily be due to the seepage from the weathered aquifer.

Current Water Quality Monitoring

ENVASS conducts current quarterly water quality monitoring at the Mareesburg Mine. A monitoring plan was put in place in June 2014. The sampling locations have since changed following a recommendation made by ENVASS. Regardless, all of the samples taken at all of the sampling locations showed pure, clean water. This means that the water can be described as being in a "pristine" state, as is the case with most headwater and secondary streams.

Slight upward changes in certain parameters is measured lower in the Dwars River, which means that mining and other activities from several operational sites in the Dwars River's drainage region is having an impact on the river.

The importance of monitoring surface water at Mareesburg lies herein:

- Technically;
    - To comply with commitments made in the EIA process (Digby Wells, approved EMPr).
    - To exercise the Duty of Care under the NEMA.
    - To comply with general conditions of the DWS.

- Scientifically;
    - The proposed development is in a high-lying area and drains water to lower-lying areas. This makes the cumulative impact of anything on water very significant.
    - Surface water in any stream, dam, lake, or other stream can never be seen to be in a "closed system" unless it has been deliberately and/or artificially isolated.

- The "open" nature of natural streams effectively means that the impacts on small streams will eventually impact on larger streams or dams it drains into, although dilution does play a factor.
- The impacts of any proposed development will always remain speculation until it is proven or disproven with unbiased baseline and continuous data.
- The integrity and validity of water quality data can never be doubted if similar results are repeatedly recorded over a long period of time.

Clarification of Sampling Layout at Mareesburg:

There are two perennial streams of importance in the area: The Dwars River and the "Mareesburg Mountain Stream". The Dwars River forms after the confluence with other perennial and non-perennial streams, around the bend toward the east of the northern extremities of the Farm Mareesburg. Consequently, there are three main clusters of sampling points in the area. These are explained below:

- *Cluster 1*

MSW1 is the upstream sampling point in the Dwars River. It is a benchmark against all impacts from other streams, the primary land user, all secondary land users and all other diffuse or point sources of influence on the river. MSW4 is a non-perennial stream that flows directly out of the Mountain from Eastplats' property. MSW6 & MSW7 are before and after (upstream and downstream) control samples for MSW4. MSW8 & MSW9 are before and after (upstream and downstream) control samples for MSW14. MSW14 is another non-perennial stream flowing directly out of the mountain from Eastplats' property's side.

- *Cluster 2*

MSW11 is a perennial stream with a source in the mountain within close proximity of the Eastplats property. MSW13 is the downstream control point for source water quality (compared to MSW11). MSW15 is a waterhole / dam in the stream, constructed artificially. The dam's impact is measured by comparing MSW15 with MSW13. MSW16 is the absolute downstream point for the perennial Mareesburg mountain stream. It is compared to two control sampling points: MSW11 to control for any deviations from source water quality and MSW15 to control for any impacts on water quality after the dam.

- *Cluster 3*

MSW17 is the downstream control point in the Dwars River. It is compared to control point further upstream, such as MSW18, MSW6 &7, MSW8 & 9 and MSW1. MSW18 is the upstream control point for the confluence of the Mareesburg perennial mountain stream and is also compared with all downstream control points and the final downstream point, MSW17.

The results of the water Quality Monitoring is included in

Table 16 below

Table 16: Mareesburg Surface Water

Eastplats Surface Water Monitoring - Mareesburg																			
		pH Value @ 25°C	Electrical Conductivity in mS/m @ 25°C	Total Dissolved Solids at 180°C (mg/l)	Total Alkalinity as $CaCO_3$ (mg/l)	Total Hardness as $CaCO_3$ (mg/l)	Ammonia as NH_3 (mg/l)	Nitrate as N (mg/l)	Sulphate as SO_4 (mg/l)	Fluoride as F (mg/l)	Sodium as Na (mg/l)	Calcium as Ca (mg/l)	Magnesium as Mg (mg/l)	Total Phosphate as P (mg/l)	Aluminium as Al (mg/l)	Chloride as Cl (mg/l)	Iron as Fe (mg/l)	Sodium Absorption Ratio (SAR) (mg/l)	Total Chromium (mg/l)
DWAF Domestic Class 1		**5-9.5**	**170**	**1200**	**-**	**-**	**1.5**	**11**	**500**	**1.5**	**200**	**150**	**70**	**-**	**0.3**	**300**	**0.3**	**-**	**-**
DWAF Domestic Class 2		**4.0-10.0**	**350**	**2400**	**-**	**-**	**2**	**20**	**600**	**1.5**	**400**	**300**	**150**	**-**	**0.5**	**600**	**2**	**-**	**-**
MSW1	May-16	7.90	13.35	68.00	68.00	64.00	0.10	0.20	2.50	0.15	3.50	12.50	8.00	0.10	0.76	2.50	1.14	0.20	<0.025
MSW7	May-16	7.95	44.10	270.50	247.00	235.75	0.35	0.35	11.13	0.13	12.75	46.75	29.00	0.10	0.13	6.13	0.11	0.35	0.01
MSW8	May-16	7.90	16.45	83.00	66.00	63.00	0.10	0.20	2.50	0.10	3.50	11.50	7.50	0.10	0.66	2.50	1.00	0.20	<0.025
MSW9	May-16	7.90	16.45	82.00	86.00	79.50	0.10	0.10	2.50	0.10	4.00	15.50	10.00	0.10	0.05	2.50	0.25	0.20	<0.025
MSW11	May-16	7.75	34.60	192.00	180.00	164.50	0.10	0.10	6.75	0.10	6.55	33.00	20.50	0.10	0.74	5.25	0.87	0.20	0.01
MSW13	May-16	7.75	31.95	199.00	186.00	165.50	0.10	0.10	6.75	0.10	8.50	31.00	20.50	0.10	0.77	5.25	0.86	0.30	0.01
MSW15	May-16	7.65	28.00	193.50	180.00	168.00	0.10	0.10	6.75	0.10	8.00	33.50	20.50	0.10	0.68	5.25	0.86	23.15	0.01
MSW18	May-16	7.75	28.30	194.00	176.00	169.50	0.10	0.10	6.75	0.10	8.00	34.00	20.50	0.10	0.66	4.10	0.84	0.25	0.01

TERRESTRIAL ECOLOGY

The following information was retrieved from the existing Bathusi Environmental Consulting (BEC), 2006 and the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

The flora study was conducted by Bathusi Environmental Consulting (BEC) in January 2006. The information below is a summary of their findings and other information gathered for the area.

The area falls on the transitional boundary between Sourish Mixed Bushveld and North-eastern Sandy Highveld (Acocks, 1988). It has also been classified as North-eastern Mountain Grassland by Low and Rebelo (1996).

Desktop study on floristic characteristics of the area

The Sourish Mixed Bushveld is generally an open savannah with Acacia caffra the dominant tree in fairly tall and dense grassveld. The North-eastern Sandy Highveld corresponds to the Cymbopogon-Themeda Veld and can be classified as Near-Bankenveld in this area.

Table 17 lists the principal trees, shrubs and grasses for these two vegetation types.

Table 17: The principal trees, shrubs and grasses for Sourish Mixed Bushveld and North-eastern Sandy Highveld (Digby Wells & Associates, 2008)

PRINCIPAL TREES AND SHRUBS		
Acacia caffra	*Acacia karroo*	*Acacia robusta robusta*
Acacia tortilis heteracantha	*Acacia gerrardii*	*Peltophorum africanum*
Rhus gueinzii	*Grewia spp.*	*Pappea capensis*
Dichrostachys cinerea africana	*Dombeya rotundifolia*	*Combretum zeyheri*
Sclerocarya birrea caffra	*Ziziphus mucronata*	*Burkea africana*
PRINCIPAL GRASSES		
Cymbopogon plurinodis	*Themeda triandra*	*Elionurus muticus*
Heteropogon contortus	*Aristida canescens*	*Eragrostis superba*
Brachiaria nigropedata	*Anthephora pubescens*	*Aristida stipitata graciliflora*
Tristachya leucothrix	*Trachypogon spicatus*	*Eragrostis racemosa*
Digitaria tricholaenoides	*Monocymbium ceresiiforme*	*Microchloa caffra*
Loudetia simplex	*Andropogon schirensis*	*Alloteropsis semialata*
Panicum natalense	*Ctenium concinnum*	*Brachiaria serrata*
Eragrostis plana	*Diheteropogon amplectens*	*Harpochloa falx*
Eragrostis sclerantha	*Rendlia altera*	*Tristachya rehmannii*
Diheteropogon filifolius	*Aristida aequiglumis*	*Aristida junciforms*
Sporobolus pectinatus	*Panicum ecklonii*	*Schizachyrium sanguineum*

Van Wyk and Smith (2001) refer to the area as Sekhukhuneland, an important centre of plant endemism which has never been studied in detail. The bushveld of this centre is unique with vegetation anomalies associated with heavily eroded soils being present throughout the region. There are also many apparently endemic floral species awaiting formal description. Families rich in endemics of the region include Anacardiaceae, Euphorbiaceae, Liliaceae, Lamiaceae and Vitaceae.

Succulents are found extensively in the hot arid valleys of the centre. The genus Aloe is particularly prolific, with the area around Burgersfort reputed to have the highest concentration of Aloe species in the world. Many individual Aloes were noted during the site visit (Figure 10), and were recorded in the detailed vegetation field survey.

Figure 10: Presence of Aloes on the slopes of Mareesburg (Digby Wells & Associates, 2008)

Efforts to conserve high-priority areas in the Sekhukhuneland Centre need to be increased when considering the unusual natural features of the area, such as the rich phytodiversity of the ultramafic soils in the Centre (Van Wyk and Smith, 2001). Endemic patterns within the Centre require closer study. At least three local foci of endemism exist in the region, namely the Roosenekal-Dwarsriver area, the Leolo Mountains and the Steelpoort-Burgersfort area.

Observed floristic characteristics of the area

Bushveld vegetation tends to have high species diversity. The tree, shrub, herb and grass layers appeared well developed, thus giving rise to different forms of vegetation. There appeared to be high

number of indigenous species at the site. Although there were patches of denser vegetation containing proportionally more trees, most of the area consisted of more open grassland.

This slight variation in vegetation appeared to coincide with differing geological features. Rocky outcrop areas were also noted, supporting a variety of plant species. There was a patch of denser forest vegetation on the south facing slope of the hill, which may be due to more shade/cooler conditions.

A total of 156 flora species were identified during this site investigation, containing a mixture of woody species, grasses and forbs. The vegetation of the study area is regarded as pristine and representative of the regional vegetation type.

Results of the investigation revealed the presence of the following vegetation communities:

- Open savanna;
- Rivers/ non-perennial streams;
- Rocky ledges/ Open rockface; and
- Wooded slopes.

The entire study area is considered extremely sensitive in terms of floristic attributes. The presence of several Red Listed flora species (Table 18), landscape sensitivity and high floristic diversity contribute significantly.

Open Savanna

This community is characterised by a dominant herbaceous layer with a varying (but not dominant) woody layer. It is characteristically present in areas where the slopes are not particularly high, and the available topsoil is relatively deep. Rockiness, however, may be high in the form of boulders, sheets and rocks.

The herbaceous layer is dominated by grasses, in terms of physiognomy, but a diverse layer of forbs are present. Prominent grass species may include *Andropogon schirensis, Brachiaria serrata, Diheteropogon filifolius, Elionurus muticus, Trachypogon spicatus and Themeda triandra*. Forb species frequently encountered include *Acalypha indica, Anomatheca grandiflora, Barleria prionitis, Berkheya insignis, Commelina africana, Clerodendrum triphyllum, Cyanotis speciosa, Cyphostemma woodii, Dicoma montana, Hibiscus trionum, Hypoxis rigidula, Indigofera species, Pearsonia sessilifolia, Sphedamnocarpus pruriens, Sphenostylis angustifolia, Triaspis glaucophylla, Turbina oblongata and Xerophyta retinervis*.

A noticeable variation that is present within this community is sheetrock areas. These variations are restricted in size, but nonetheless significant as the species composition is repeated across the area and is significantly different to surrounding areas. Topsoil is severely restricted in these areas and the vegetation utilises cracks between rocks. Species that are dominant include *Crassula alba, Euphorbia schinzii, Huernia hystrix, Myrothamnus flabellifolius, Rhus keetii, Selaginella dregei, Senecio oxyriifolius and Xerophyta schlechteri*.

The floristic status of this community is considered to be pristine, as the species composition is representative of the regional vegetation type with associated variations. Furthermore, no species were noted that are considered to represent aspects of degradation, infestation, and secondary or sub-climax floristic status.

Rivers/ Non-perennial Streams

This community is represented by areas where seasonal flooding occurs. The banks are relatively steep, but fairly narrow, while the stream-bed is generally less than 5 m wide. These areas are frequently wooded with an herbaceous layer that is adapted to moist and shaded conditions. Grasses are therefore not abundant, occurring mostly on the outer edges as part of the ecotonal zones between riparian and terrestrial communities.

Woody species dominate this community and the species composition includes *Acacia caffra, Cussonia transvaalensis, Ficus species, Hippobromus pauciflorus, Lydenburgia cassinoides, Rhus keetii and Vitex obovata ssp. wilmsii.* The herbaceous layer is relative poor in species, but nonetheless contains important species such as *Adianthum capillus, Anomatheca grandiflora, Blechnum species, Lapeirousia species, Lipparis bowkeri and Resnovus megaphylla.*

The floristic status of this community is considered to be pristine, because the species composition is representative of the regional vegetation type with associated variations. Furthermore, no species were noted that is considered to represent aspects of degradation, infestation, and secondary or sub-climax floristic status.

Rocky Ledges/ Open Rockface

This community represent the crests of the low mountains within the study area. Due to inaccessibility, these areas were not investigated, but extrapolation from surrounding areas suggests that the species composition might be fairly similar to the sheetrock variation that is found in the Open Savanna

community. Environmental conditions dictate large sheets of rock with limited vegetation, mostly situated within cracks and areas with some topsoil.

Likely, the floristic status of these areas is considered to be pristine and unaffected by human activities.

Wooded Slopes

This community represent areas where the vegetation physiognomy is dominated by trees (characteristically with a crown cover exceeding 30%), with a subdominant, but nonetheless diverse, herbaceous layer. Slopes are generally high (>10% - 100%) and the rockiness is high (>20 – 70%).

Woody species that are frequently encountered include *Senegalia caffra, Berchemia zeyheri, Combretum hereroense, C. zeyheri, Cussonia spicata, C. transvaalensis, Dombeya rotundifolia, Euclea crispa, Faurea saligna, Hippobromus pauciflorus, Kirkia wilmsii, Mundulea sericea, Ozoroa paniculosa, Ptaeroxylon obliquum, Rhus zeyheri, Vitex obovata ssp obovata and Ziziphus mucronata*.

The species composition of the forb layer and grass sward is similar to that of the Open Savanna community, but includes additional forb species such as *Abildgaardia ovata, Aloe cryptopoda, A. marlothii, Diplorhynchus species, Elephantorrhiza praetermissa, Gladiolus species, Rhynchosia minima, Zantedeschia albomaculata, Z. pentlandii* and grass species *Cymbopogon excavatus, Digitaria eriantha, Eragrostis capensis, Eustachys paspaloides, Loudetia flavida, Panicum maximum, Setaria incrassata and Tristachya leucothrix.*

The floristic status of this community is considered to be pristine as the species composition is representative of the regional vegetation type with associated variations. Furthermore, no species were noted that is considered to represent aspects of degradation, infestation, and secondary or sub-climax floristic status.

Endangered or rare species

The Interim Red Data List of South African Plant Species (Threatened Species Programme, 2004), indicates a total of 335 potential red data species for the Mpumalanga Province. Comparison of this list of red data species with the PRECIS list (429 species) for the relevant quarter degree grid (2530AA), revealed the presence of a minimum of 29 Red Data flora species within the relevant quarter degree grid.

The following red data flora species (Table 18) were observed within the Mareesburg study area:

Table 18: Red Data Flora species for Mareesburg study area (Digby Wells & Associates, 2008)

Taxon	Family	Description	SA endemic
Cotyledon orbiculata var. oblong	Crassulaceae	Least concern	
Dombeya rotundifolia var. rotundifolia	Sterculiaceae	Least concern	
Elephantorrhiza praetermissa	Fabaceae	Data deficient	Endemic, rare
Jamesbrittenia macrantha	Scrophulariaceae	Data deficient	Endemic, rare
Jamesbrittenia silenoides	Scrophulariaceae	Least concern	Endemic
Resnova megaphylla		Data deficient	
Rhynchosia nitens	Fabaceae	Data deficient	Rare
Triaspis glaucophylla	Malpighiaceae	Least concern	Endemic
Zantedeschia pentlandi Araceae		Near threatened	Endemic, rare

Alien and Invasive Plant Species

The following conventions and acts have relevance:

- The International Convention on Biodiversity Article 8 (h);
- The IUCN (International Union for Conservation of Nature); and
- The Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

No listed alien invasive species were recorded in the area. This supports the findings above with regard to the pristine state and integrity of the area with regard to vegetation.

Medicinal Plant Species

Taking the diversity of flora species of the study area into consideration, the plants listed in Table 19 are considered to exhibit value in terms of traditional medicinal use.

Table 19 : Culturally significant plants (Digby Wells & Associates, 2008)

Species Name	Application
Senegalia caffra	Dyes and tans
Vachellia karroo	Dyes and tans, food, dental care
Aloe cryptopoda	Dyes and tans
Aloe marlothii	Dyes and tans
Asparagus species	Pneumonia, tuberculosis, malaria, dehydration, etc.
Barleria prionitis	Toothache, ulcers
Chironia palustris	Colic & diarrhoea
Commelina africana	Menstrual cramps
Cotyledon orbiculata	Throat treatment, worms, boils & abscesses, epilepsy
Cyanotis speciosa	Menstrual cramps
Cyphostemma species	General pain & heal fractures

Species Name	Application
Dodonaea angustifolia	Fever, colds, throat infections, oral thrush, pneumonia, etc.
Elaeodendrum capense	Dyes & tans
Elephantorrhiza burkei	Dyes & tans
Euclea crispa	Epilepsy
Ficus species	Dyes & tans
Indigofera species	Women's health
Ipomoea species	Alkaloids
Lannea discolor	Convulsions & dizziness
Lippia javanica	Coughs, colds, fever, bronchitis
Mundulea sericea	Purifying emetic, infertility
Myrothamnus flabellifolius	Uterine pain, gingivitis
Ptaeroxylon obliquum	Headaches, rheumatism, arthritis, dyes & tans
Rhoicissus digitata	Female infertility
Rhoicissus tridentata	Menstrual cramps, female infertility
Sarcostemma viminale	Stimulating milkflow
Scabiosa columbaria	Colic & heartburn
Schkuhria pinnata	Arbortifacient
Selaginella dregei	Toothache
Tagetes minuta	Dyes & tans
Vernonia oligocephala	Health tonic, appetite stimulant, abdominal pains, diarrhoea, dysentery, rheumatism, anti-diabetic
Zantedeschia albomaculata	Prevent miscarriages
Zanthoxylum capense	Toothache
Ziziphus mucronata	Diarrhoea, dysentery, coughs, chest problems

Animal life

The detailed fauna study was conducted by Bathusi Environmental Consulting (BEC). The information below is a summary of their findings and other information gathered for the area.

The area of interest is a wilderness area and is fenced off. In addition to the mammals observed in the area during the official fauna surveys, some species of large mammals were spotted during the site visit, namely kudu, impala, blesbok and black-backed jackal. A number of leopard sightings (*Panthera pardus*) have also been reported in the area.

Species observed in the area

A total of 50 animals were identified during the site investigation (Table 20), including:

- 9 butterfly species;
- 3 frog species;
- 1 reptile species;
- 33 bird species; and
- 4 mammal species.

Table 20: Fauna species observed within the Mareesburg study area (Digby Wells & Associates, 2008)

Phylum	Class	Order	Family	Genus - Species	Common name
Arthropoda	Insecta	Lepidoptera	Nymphalidae	*Danaus chrysippus*	African Monarch
				Hamanumida daedalus	Guinea-fowl
				Byblia ilithyia	Spotted Joker
				Precis hierta	Yellow Pansy
			Lycaenidae	*Tarucus sybaris*	Dotted Blue
			Pieridae	*Catopsilla florella*	African Migrant
				Eurema brigitta	Broad-bordered Grass Yellow
				Belenois aurota	Brown-veined White
			Papilionidae	*Princeps demodocus*	Citrus Swallowtail
Vertebrata	Amphibia	Anura	Hyperoliidae	*Kassina senegalensis*	Bubbling Kassina
			Microhylidae	*Breviceps mossambicus*	Mozambique Rain Frog
			Ranidae	*Afrana angolensis*	Common River Frog
	Reptilia	Squamata	Cordylidae	*Platysaurus orientalis*	Sekukhune Flat Lizard
	Aves	Piciformes	Lybiidae	*Pogoniulus chrysoconus*	Yellow-fronted Tinkerbird
				Lybius torquatus	Black-collared Barbet
		Upupiformes	Phoeniculidae	*Phoeniculus purpureus*	Green Wood-Hoopoe
		Coraciiformes	Meropidae	*Merops apiaster*	European Bee-eater
		Coliiformes	Coliidae	*Colius striatus*	Speckled Mousebird
				Urocolius indicus	Red-faced Mousebird
		Cuculiformes	Cuculidae	*Cuculus solitarius*	Red-chested Cuckoo
				Cuculus clamosus	Black Cuckoo
				Chrysococcyx caprius	Diderick Cuckoo
		Apodiformes	Apodidae	*Apus apus*	Common Swift

Phylum	Class	Order	Family	Genus - Species	Common name
				Apus horus	Horus Swift
		Columbiformes	Columbidae	*Streptopelia semitorquata*	Red-eyed Dove
				Streptopelia capicola	Cape Turtle-Dove
				Streptopelia senegalensis	Laughing Dove
		Falconiformes	Accipitridae	*Elanus caeruleus*	Black-shouldered Kite
		Passeriformes	Oriolidae	*Oriolus larvatus*	Black-headed Oriole
			Dicruridae	*Dicrurus adsimilis*	Fork-tailed Drongo
			Malaconotidae	*Nilaus afer*	Brubru
				Dryoscopus cubla	Black-backed Puffback
				Tchagra senegala	Black-crowned Tchagra
				Laniarius ferrugineus	Southern Boubou
				Malaconotus blanchoti	Grey-headed Bush-Shrike
				Batis molitor	Chinspot Batis
			Hirundinidae	*Hirundo rustica*	Barn Swallow
			Cisticolidae	*Cisticola chinianus*	Rattling Cisticola
				Prinia subflava	Tawny-flanked Prinia
			Pycnonotidae	*Pycnonotus tricolor*	Dark-capped Bulbul
			Muscicapidae	*Muscicapa striata*	Spotted Flycatcher
			Sturnidae	*Onychognathus morio*	Red-winged Starling
			Nectariniidae	*Chalcomitra amethystina*	Amethyst Sunbird
			Ploceidae	*Ploceus capensis*	Cape Weaver
				Euplectes orix	Southern Red Bishop
			Fringillidae	*Emberiza tahapisi*	Cinnamon-breasted Bunting
	Mammalia	Insectivora	Macroscelididae	*Elephantulus myurus*	Rock Elephant-shrew
		Primates	Cercopithecidae	*Papio ursinus*	Chacma Baboon
		Perissodactyla	Equidae	*Equus burchellii*	Burchell's Zebra
		Artiodactyla	Bovidae	*Connochaetus taurinus*	Blue Wildebeest

Red Data and protected animals observed in the area

Seventy-four Red Listed animals are relevant to the study area. None of these have been observed in the area of interest. Red Listed status attributed to these species is:

- 18 are listed as Data Deficient;
- 34 are listed as Near Threatened;
- 18 are listed as Vulnerable;
- 1 are listed as Endangered; and
- 3 are listed as Critically Endangered.

Observation of any Red Data Status animal species on the properties to be affected by mining activities will require conservation and preservation action to be taken. Of particular importance will be the wintering or maternity roosts of the various Red Data Status bats, should these be present.

Animals of interest

The Mozambique Rain Frog (*Breviceps mossambicus*) can only be distinguished from *Breviceps adspersus* on the basis of its advertisement call structure. The species inhabits parts of the Savanna and Grassland biomes and occurs at higher altitudes along on the crest and slopes of the escarpment where soils are shallow, well drained, humus rich and often rocky. In the study area, it was observed in an extremely rocky area with shallow soils. The distribution within the study area represents the north-western limit of the species in Mpumalanga – to the west and north the species is seemingly replaced by *B. adspersus.*

The Sekhukhune Flat Lizard (*Platysaurus orientalis*) is found in the Mesic Savanna of the Mpumalanga escarpment. One of the two races recognized (*P. o. fitzsimonsi*) is restricted to eastern Sekhukhuneland (probably the race found in the study area). The species, especially the eastern race, is very limited in distribution and habitat preference and could easily be threatened by habitat destruction.

The area is known to support a rare cicada (*Pycna sylvia*), that was thought to be extinct. It has been found on neighbouring land (SRK Report, 2002). The distribution range of this cicada extends across the Groot Dwarsriver valley, the Klein Dwarsriver valley and areas of natural vegetation in the Roossenekal – Steelpoort district along the R555 road. The areas where they were found are densely vegetated riverine or closed Bushveld slopes, with a high dominance of the plant *Vitex obovata* subsp. wilmsii. The soil that they prefer is brownish in colour, has varying structure, is high in calcium and has a neutral to alkaline pH. A detailed soil and vegetation survey revealed that these species could occur on the Mareesburg site, however unfavourable survey conditions (rainy weather) prevented an in depth cicada

survey. It is recommended that a detailed and in depth study to the presence of this cicada (*Pycna sylvia*) in the study area be undertaken.

CULTURAL AND HERITAGE

The following information was retrieved from the existing The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008: Archaeological Impact Assessment (HIA) Mining Development on the Farm Mareesburg JT, District Steelpoort, MATAKOMA-ARM, 2005

Matakoma-ARM Heritage Consultants were contracted to conduct an Archaeological Impact Assessment for the proposed Mareesburg Joint Venture. The purpose of undertaking an Archaeological Impact Assessment is to identify any heritage sites, document, and assess their importance within local, provincial, and national context. Through this any discovered heritage resource can be managed in manner that aims to protect, preserve, and develop heritage resources within the framework provided by he National Heritage Resources Act of 1999 (Act 25 of 1999).

Although sites of cultural significance were found, none of these sites are significant enough to receive permanent protection status. Some mitigation in the form of small test excavations is necessary at site MHC001 and MHC004, before construction of the access routes can commence after which a destruction permit must be applied for from the South African Heritage Resources Agency.

The stone feature at Site MHC002 needs to be documented on a scaled layout plan relative to the location of site MHC001. Mitigation of Site MHC001 will suffice for documentation of the other less preserved sites.

It is further recommended that an archaeological brief be agreed upon where the area around site MHC001 and MHC004 is monitored during construction to document and re-asses further finds that might be uncovered. No culturally significant sites were located at the mine footprint or rock dumps and no mitigation is necessary for this aspect.

Sites of heritage significance falling within the development area were identified and evaluated according to the evaluation criteria of the National Heritage Resources Act. The following significant sites were identified:

- **2535AA-MHC001**

A highly eroded Iron Age site was identified at this location. Cultural material was found to be scattered over a large area and consisted of numerous lower grindstones of a roughly oval shape and a high density of weathered ceramics. Several dilapidated small stone foundations were visible along with low terrace walling. No distinctive markings were found on the ceramics classifying them as mostly un-diagnostic. Two highly fragmented shards were found with characteristic Early Moloko decoration. Early Moloko ceramics date to between 1200 and 1400 AD. Stonewalling is usually not found on Early Moloko sites therefore the site MHC001 can be a multi-component archaeological site. The relationship between the stonewall features and the Moloko ceramics is an important element of this site. This relationship needs to be clarified through small test excavations before the site is disrupted. Due to there being very few Early Moloko sites recorded and investigated in the surrounding area of the Dwarsrivier Valley, the site is of medium significance.

- **2530AA-MHC002**

A small circular shaped stone walled enclosure on a flat rock bed was identified at this location. This structure is also associated with the Iron Age. The enclosure is roughly one meter in diameter. The feature is highly dilapidated. Cultural material found in the area consists of an upper grinding stone. The site is of low significance on its own. If this structure can be linked to the other Iron Age site (MHC001) that was identified, then it will constitute a higher significance to the site.

- **2530AA-MHC004**

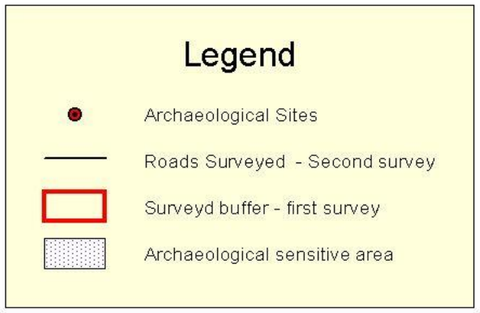
The site is characterised by numerous low stone walls forming low terraces and enclosures. The feature shows the same characteristics as some of the stone wall features found at site MHC001. Other features on the site are grain bin foundations, scatters of ceramic shards and upper grinding stones. If the site is impacted upon, the relationship between the stonewall features and the Moloko ceramics needs to be clarified through small test excavations. The site is of medium significance.

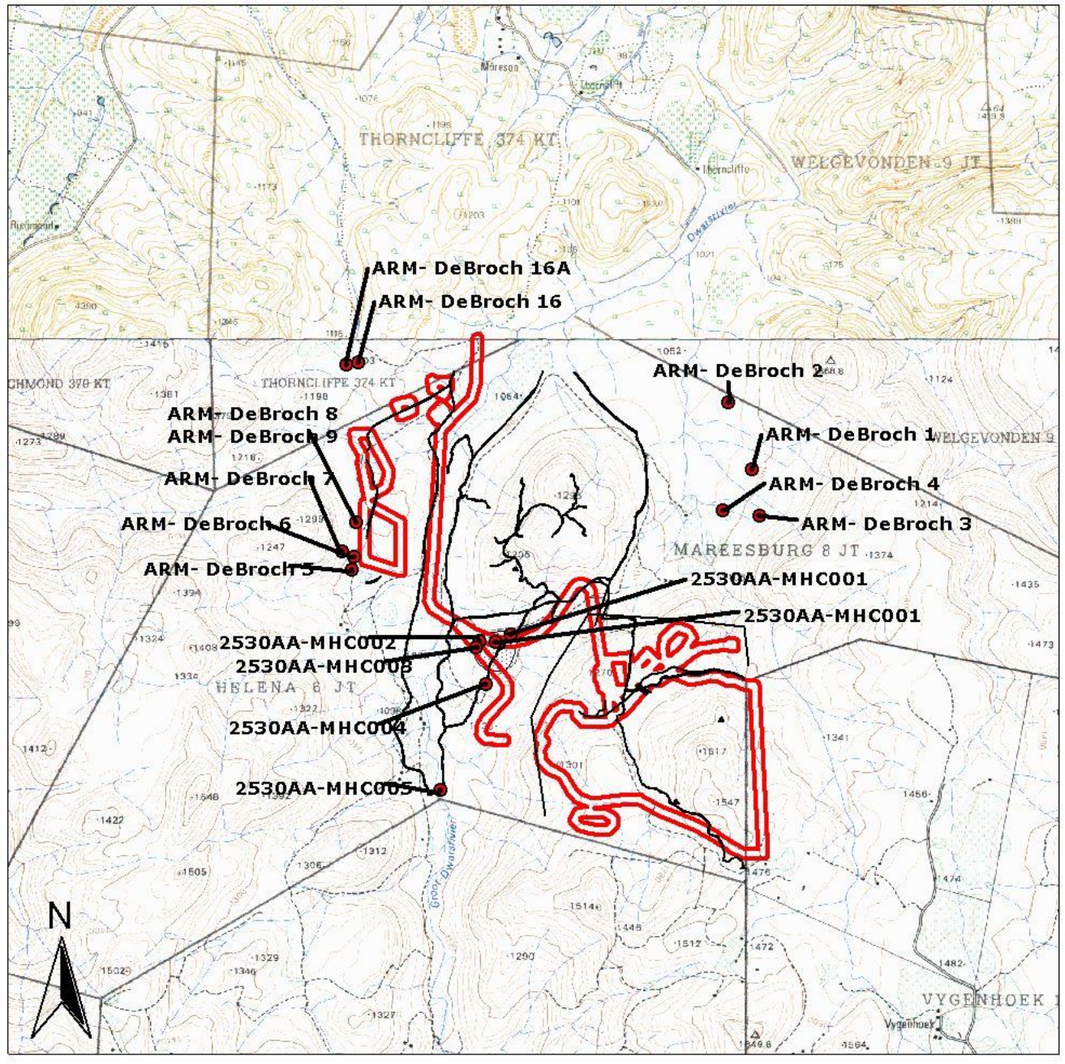
Due to the nature of archaeological and cultural remains occurring predominantly below surface, the possibility that some cultural remains may not have been discovered during the survey persists. Although Matakoma-ARM Heritage Consultants surveyed the area as thorough as possible, it is incumbent upon the developer to inform the relevant heritage agency should further cultural remains be unearthed or laid open during the process of development.

The aim of the archaeological impact assessment is to identify all heritage sites, document, and assess their importance within local, provincial, and national context. Sites recorded in this archaeological

assessment is illustrated in the below figure (Figure 11), which assists in managing the discovered heritage resource in a responsible manner to protect, preserve, and develop the heritage resources within the framework provided by he National Heritage Resources Act of 1999 (Act 25 of 1999).

Mareesburg JV
Archaeological Sites





MATAKOMA- ARM

Figure 11: Sites of archaeological and cultural interest in the proposed project area (Digby Wells & Associates, 2008)

Sensitive landscapes

The broader area as a whole can be seen as a sensitive landscape due to the high levels of species diversity, degree of endemism and low level of human disturbance. The biophysical specialist investigations commissioned by Anglo Platinum on its farms indicated high levels of ecological integrity and unspoilt environmental quality.

VISUAL

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

The proposed mining on Mareesburg will be on the slopes of one of the most prominent peaks in the area. This is not currently on a tourist route, but the area is considered by Limpopo Department of Agriculture Conservation and Environment to have a high tourist potential based on its scenic beauty, high diversity of plant species and populations of insects and mammals. This factor may constrain mining. There is a low population of residents in the area and thus mining activities will be visible predominantly to workers from neighbouring Anglo and Xstrata mines. Figure 12 and Figure 13 show the views from the top of the Koppie on the Mareesburg farm. The infrastructure from neighbouring mines can be seen in these photos. A visual impact assessment of the site has been completed and is attached in Annexure 8.

Figure 12: Views to the West from Mareesburg Kopje (Digby Wells & Associates, 2008)

Figure 13: Views to the south from the Mareesburg Koppie where roads have been constructed for Anglo operations (Digby Wells & Associates, 2008)

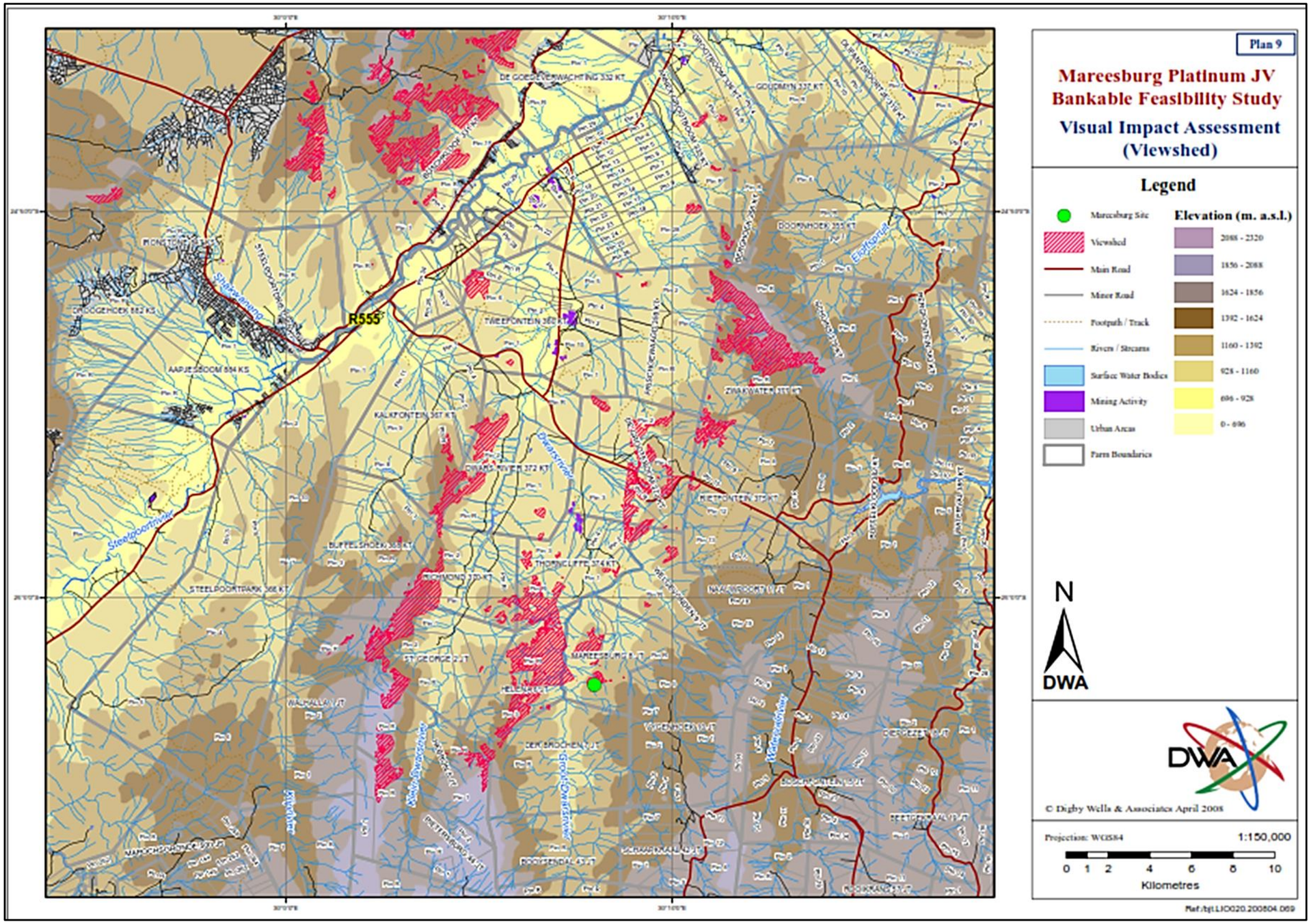


Figure 14: Viewshed (Digby Wells & Associates, 2008)

LANDUSE

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

Pre-mining land capability

According to a soil survey done by The Institute for Soil, Climate and Water (SRK, 2002) on neighbouring properties, only a minor portion of the area can be classified as having an arable land capability. The steep slopes were classified as having a wilderness capability and the gentle slopes were classified as having a grazing capability. These findings were confirmed during a field study conducted by Envirosoil. It was concluded that the majority of the site can be classed as having a land capability suited for wilderness, with smaller portions suited for grazing as the terrain is similar in topography and vegetation (Figure 15).

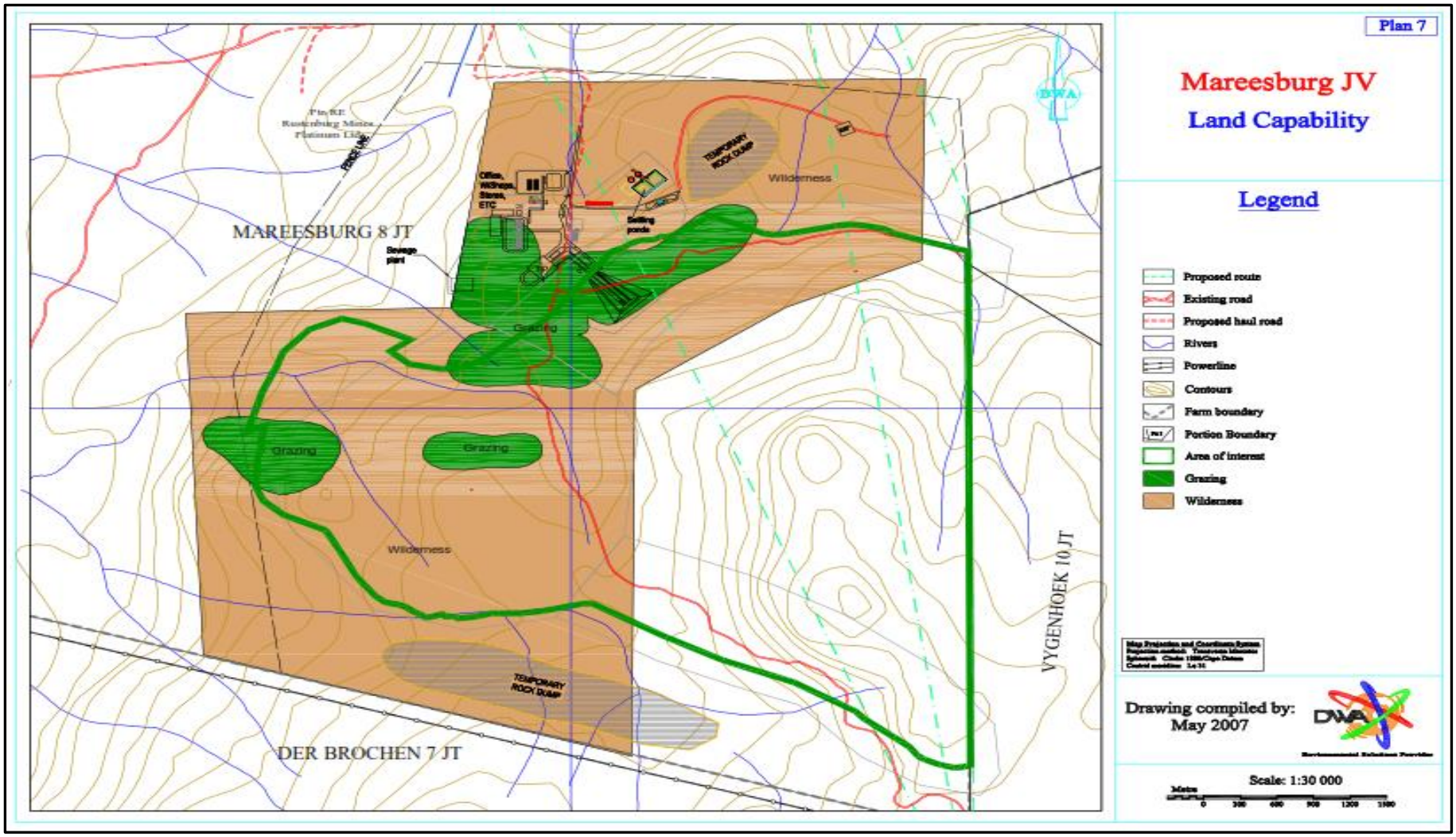


Figure 15 : Land Capability (Digby Wells & Associates, 2008)

There is currently no significant development or human occupation on the farm. This is primarily due to the shallow soils and poor access to the site.

Land use

Mareesburg is currently predominantly a wilderness area and is operated as a private game farm along with the adjoining Anglo Platinum farms of Der Brochen 7 JT and Vygenhoek 10 JT. During the site visit conducted by DWA on 25 August 2005, some species of wild game were noted. There is currently no significant development or human occupation on the farm other than one European family (Anglo Platinum land manager) and about twenty black people comprising the families of farm workers. The topography and nature of the soils does not lend itself to agricultural activities. A large proportion of the surrounding area is also currently utilised for mining activities.

Pre-mining land use

The pre-mining land use of the area to be mined is wilderness with game farming activities taking place. This area has poor soils and therefore dry-land and irrigation cropping is not well suited. Limited stock farming does take place in the surrounding areas.

Historical agricultural production

No reliable data is available.

Evidence of misuse

No evidence of misuse of the land is currently visible.

Existing structures

No structures exist in the area proposed to be mined.

Air quality

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

The proposed mining area lies within a predominantly secluded, sparsely inhabited valley where there has been very little cultivation of land. There are no major areas of agricultural activity that could give rise to dust pollution. There are, however, many haul roads created by mining activities which give rise to dust when traversed by a vehicle. Due to the nature of the area, and the lack of human settlements, this dust is not considered to be a nuisance factor.

A dust fall-out baseline assessment report was compiled for Mareesburg after an initial fallout dust sampling run of 15 days was conducted between the 30th of January and the 14th of February 2006. The results collected suggest that there are very low levels of naturally occurring fall-out material in the atmosphere on the proposed site at the end of summer. Directional dust samplers were used which record the fallout material from four directions separately, allowing us to pinpoint the direction where the major sources of dust are. From the results gathered the following conclusions can be made;

- Total fallout dust levels in the area are very low,
- There is a potential source of fall-out material to the west of the proposed site.

The sampling was conducted during the month of February which is at the end of summer, and the rainy season, which could be the reason for the very low levels of fall-out material collected on site (refer to Figure 16 for dust sampling points). Best practice for fallout dust monitoring suggests that a minimum of 12 months is required to gain accurate and reliable data, as the levels of dust in the atmosphere will differ considerably from season to season due to fluctuations in rainfall, wind speeds and

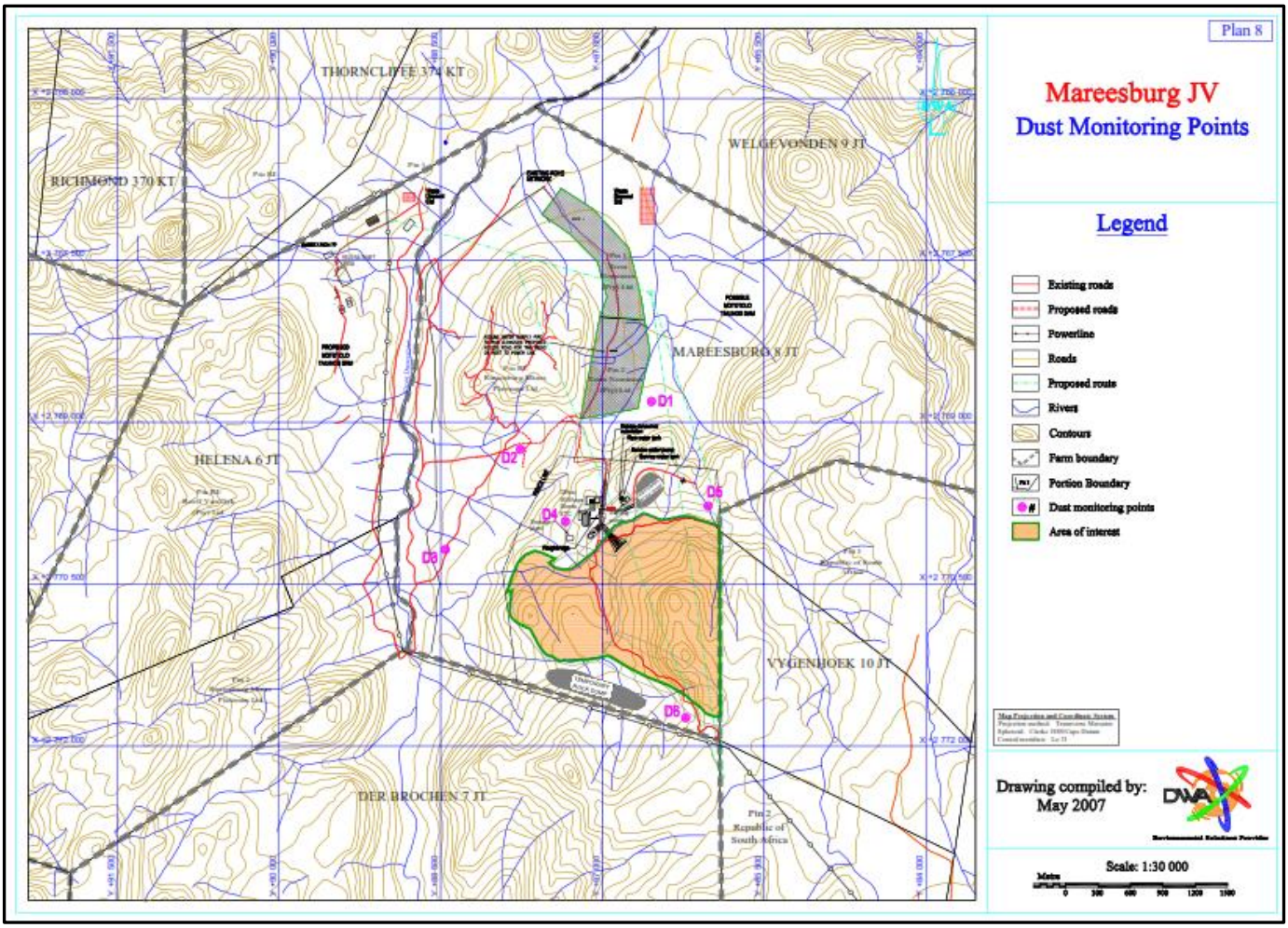


Figure 16 : Dust Monitoring Points (Digby Wells & Associates, 2008)

Current Dust Monitoring at Mareesburg

ENVASS conducts current dust monitoring at Mareesburg Mine. The Report for August indicated that Gravimetric dust fallout has increased at all of the monitoring points. The site values ranged from a low of 50 mg/m2/day at the Nr. 3 monitoring point (August 2016) to a high of 196 mg/m2/day at the Nr. 6 monitoring point (February 2016) during the last quarter. The three-month running average has decreased - from 157 mg/m2/day (February) to 115 mg/m2/day in August 2016. This value is far below even the residential limit, so no concerns can be reported as of year

Socio-Economic Environment

Population growth

The following information was retrieved from the existing ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN MAREESBURG PLATINUM JOINT VENTURE, Digby Wells & Associates, 2008

The project area affected by the proposed Mareesburg mine falls within the boundaries of the Greater Tubatse Local Municipality. It is anticipated that this municipality may be affected by the proposed development in respect of housing provision, roads, transport and delivery of municipal services. This will, however, largely depend on the location of the main labour sending areas. At the same time, it is likely that these local areas will benefit moderately through increased spending power and some business development.

The size of the Mareesburg operation labour force is estimated to be in the region of 34 permanent staff and 350 independent contractors. Since no local labour force exists, current planning anticipates a gate-wage system, while bussing could be provided to and from collection points from where public transport is available. This option will depend largely where the labour force will be sourced (main labour sending areas).

According to current planning no permanent housing will be provided on site, although temporary accommodation will be required on or near the mine site during the construction phase.

During 2002, SRK Consulting undertook a 'Regional Social Assessment' of the broader Eastern Limb region (SRK Report No. 309064-2002). The study was commissioned by Anglo Platinum and included the Greater Tubatse, Makhuduthamaga, Thaba Chweu, Groblersdal and Highlands areas. The study attempted to identify suitable labour sending areas in the absence of a potential workforce located near

the proposed Der Brochen mine site. This situation is also true for the Mareesburg Joint Venture. Therefore, the following regional description provides a summary of key findings from the SRK (2002) study:

- Dispersed settlement consisting of scattered villages and some urban centres.
- The general topography is mountainous, preventing efficient linkages between centres.
- There is a lack of infrastructure such as water, sanitation, electricity and communications.
- Service delivery is hampered by a dispersed settlement pattern and lack of local capacity
- Road infrastructure is degrading due to a lack of maintenance, while public transport is inadequate.
- Unemployment levels are high with around 67% of the population living in dire poverty.
- Population growth is high, with 60% of the population living in so-called rural areas.
- Average dependency ratio is high (4.81), with 40% of the population under the age of 15.
- Education levels are low, with 30% of the population without any formal education.
- Housing quality and delivery is generally poor, particularly in the so-called rural areas.

The SRK report identified the Jane Furse area of Makhuduthamaga Local Municipality (MLM) as a potential focus area for labour sourcing. The findings pointed to the availability of labour supplies, relative ease of recruitment, access to transport, and the potential for housing development. In addition, there was scope for expansion and development to address the socio-economic conditions in the broader area, given the existing infrastructure, services and institutions (SRK, 2002).

In summary, the proposed mining site is dominated by wilderness and lack of infrastructure. It is unlikely that the area will be used for human settlement (apart from a temporary construction camp) due to the nature of the area and lack of services.

Population density, growth and location

According to the Municipal Demarcation Board's information there are 230 203 people living in GTLM. It is estimated that 59% of the population in the region is classified as children, aged between 0-19, which indicates the need to make the necessary provision for basic infrastructure and services such as housing, education and health and welfare. At least half of the local municipal population falls within the economically active age group (15 – 64 years of age). Approximately 28 % of the population in GTLM has no formal educational qualification, 24% has primary qualifications and only 1% has tertiary educational qualifications.

Due to a lack of employment opportunities, a gender division exists in the GTLM area, with 45% of people being male and 55% being female. The dominant language in the Tubatse area is Sepedi, which is composes almost 90% of the total amount.

Major economic activities and sources of employment

Mining is one of the major sources of employment in the GTLM area. Consequently, Tubatse has experienced increased prosperity through mining and is currently one of the fastest growing towns in the country. According to the Greater Tubatse Spatial Development Framework (SDF), platinum resources within the Tubatse and surrounding areas are abundant, most of which are found in a north-south spine located along the R555 and R37. The mining sector contributes 15.2% to the GGP of the region and registered a growth rate of 5, 4% during the period of 1996 to 2001, which indicates a high potential for future development. (http://www.sekhukhune.gov.za, 2006).

The main agricultural activities in the region include timber plantations and commercial farming (e.g. maize, vegetables, stock farming and timber). The timber plantations export timber from the region in raw form, since there are no factories which produce by-products from timber in the area. Commercial farmers produce mainly dry-land produce such as maize, soya beans, dry beans, sunflower seeds and grazing crops in summer, as well as wheat in winter. Wool and milk are also produced in the area.

Unemployment estimate for the area

The majority (61%) of people in the GSDM are unemployed. Unemployment in the Sekhukhune District varies among municipalities from 52% (32 349 people) in Makhudutamaga to 34% (12 741 people) in Marble Hall. Employed people generally earn a negligible income considering the average size of households. Low income levels have led the population to become highly reliant on farming to achieve a subsistence existence.

Housing – demand and availability

The most dominant dwelling type in the GTLM area is formal accommodation, which currently reflects approximate 73% of the total number of houses. The relatively high percentage of informal dwellings of approximately 9% could be linked to the development of mines in the area, which attracts a large number of migrant labour.

Social infrastructure

The Tubatse municipality has 247 schools, 11 medical facilities, five police stations and one court. The infrastructure of Burgersfort, Steelpoort and Ohrigstad includes five pre-primary, three primary and one high school. There is a clinic in Burgersfort (nearest hospital is in Lydenburg). Burgersfort and Ohrigstad each have one police station, while Steelpoort has a satellite station. Steelpoort has a sports club, which is mine-owned.

Water supply

According to the Municipal Demarcation Board's information, 32% of people in the GTLM area obtain their water from natural sources, which include rivers, streams and rainfall.

Forty two percent of people obtain water from a public tap, 11% from a borehole and only 6% from an on-site tap. Thus, the majority of households currently obtain their water either from a communal stand further than 200 m away from their residence or from a natural source. According to the RDP standards, this is unacceptable and there is evidently poor water provision within the region.

Power supply

Only 37% of the people of Sekhukhune have access to full electricity supply, whilst the rest depend on other forms of energy like paraffin and gas. According to the Municipal Demarcation Board 62% of households in the GTLM region use candles for lighting purposes, compared to 20% using municipal electricity and 15% paraffin.

(b) Description of specific environmental features and infrastructure on the site

Environmental Features

From the description of the baseline environment above, it is that some significant sensitive environmental features occur on the study area.

From the description of the baseline environment above, it is clear that significant sensitive environmental features occur on the study area Results of the integrated sensitivity analysis clearly indicate the extremely sensitive nature of the entire study area. This is based on the presence of several Red Listed fauna species, pristine floristic and faunal habitat, high species diversity and the location of the study area in the Sekhukhuneland Centre of Endemism.

Existing Infrastructure on the study area and in close proximity

Roads

The Mareesburg mining site is on the farm Mareesburg 8 KT situated approximately 35 km south of Steelpoort and 32 km west of Lydenburg. The mining site is bordered by the provincial boundary between Limpopo and Mpumalanga provinces to the east. Mined material will be transported by means of trucks to Kennedy's Vale Section. Secondary farm roads, R577 and R555 roads will be used to haul the material (Approximate distance of 34 km).

Mining infrastructure Include:

Mareesburg mining area is a Greenfield development and no construction has commenced as of yet as shown in Figure 17 below.

Figure 17: Infrastructure on site

(c) Environmental and current land use map

(Show all environmental, and current land use features)

Refer to Appendix 7

(v) Impacts identified

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

Potential impacts that may be caused by the proposed development will be identified using input from the following:

- Views of I&APs;
- Existing information;
- Specialist investigations;
- Site visit with the project team; and
- Legislation.

The following potential major direct, indirect and cumulative impacts were identified:

- Contamination and compaction of soils;
- Erosion;
- Altered landforms;
- Limited loss of agricultural potential and land capability;
- Contamination of ground- and surface water quality and decline in quantity;
- Impacts on biodiversity;
- Loss and displacement of fauna;
- Impacts on existing land use of the study and surrounding area;
- Destruction or loss of heritage features including graves and other historical sites of importance that may be uncovered during excavations;
- Decreased aesthetic value and impact on “Sense of Place”;
- Poor air quality and decreased visibility due to dust pollution;
- Increased noise levels;
- Waste generation;
- Increased demand on service infrastructure and resources;
- Slight increase in traffic and need for maintenance of road infrastructure;
- Potential injury and loss of health and life of humans; and
- Altered Socio-Economic Environment (Positive or negative).

Please refer to the designs report and drawings attached in APPENDIX 5 for the general layout plans.

(d) Environmental and current land use map

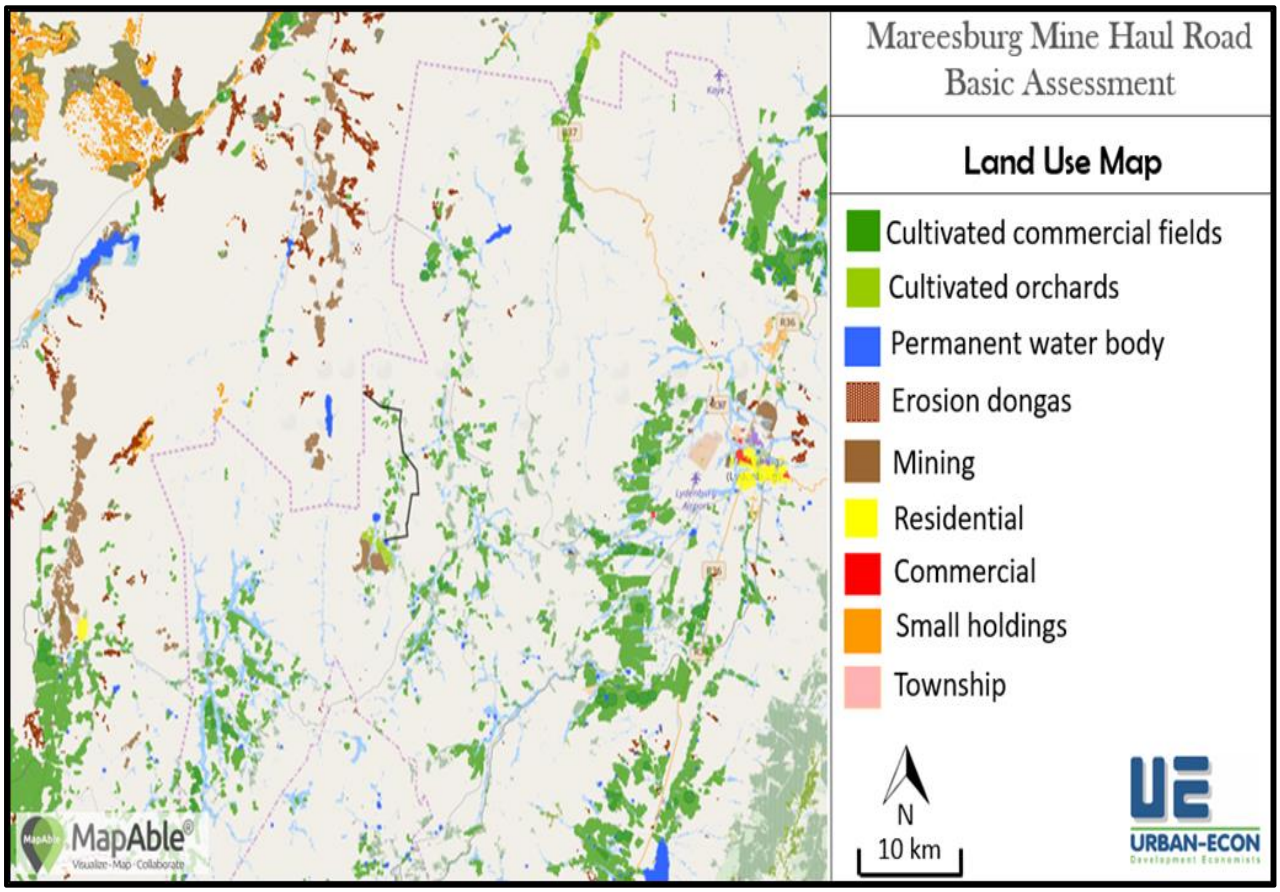


Figure 18: Land uses in the and around the Mareesburg haul road study area

v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Potential impacts that may be caused by the proposed development were identified using input from the following:

- Views of I&APs;
- Existing information;
- Specialist investigations;
- Site visit with the project team; and
- Legislation.

The following potential major direct, indirect and cumulative impacts were identified:

- Contamination and compaction of soils;
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- Contamination of ground- and surface water quality;
- Impacts on biodiversity;
- Loss and displacement of fauna;
- Impacts on existing land use of the study and surrounding area;
- Destruction or loss of heritage features including graves and other historical sites of importance that may be uncovered during excavations;
- Decreased aesthetic value and impact on “Sense of Place”;
- Poor air quality and decreased visibility due to dust pollution;
- Increased noise levels;
- Waste generation;
- Increased demand on service infrastructure and resources;
- Potential injury and loss of health and life of humans; and
- Altered Socio-Economic Environment (Positive or negative).

Please refer to Table 21, Table 22 and Table 23 below, for the complete list of identified impacts and impact assessment. Please refer to the following section for the methodology used in the impact assessment.

Table 21: Impact Significance Calculation – Construction Phase

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
GEOLOGY AND SOILS	Loss of topsoil	–	2	1	5	2	10	5	50	High	Please refer to Table 28	17	Certain	Low
	Contamination of soils through: • Indiscriminate disposal of construction waste; and • Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles and other chemicals from construction activities e.g. paints.	–	3	2	1	1	7	2	14	High	Please refer to Table 28	5	Sure	Low
	Vehicle and personnel as well as storage of materials, equipment and stockpiling compaction and degradation impacts.	–	3	2	1	1	7	5	35	Medium	Please refer to Table 28	18	Sure	Medium
HYDROLOGY GROUNDWATER SURFACE WATER	Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality during the construction phase.	–	4	3	1	2	10	2	20	High	Please refer to Table 28	7	Sure	Medium
	Contamination of stormwater runoff and ground water, caused by: - Spills and leaks of cement; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; and - Other chemicals from construction activities e.g. paints.	–	4	3	2	2	11	2	22	Medium	Please refer to Table 28	11	Sure	Medium
	Altered drainage patterns and stormwater runoff flows.	–	4	3	1	2	10	5	50	Medium	Please refer to Table 28	25	Sure	Medium
	The runoff from the plant area following rainfall may be contaminated due to the mining activities and may contaminate surface water.	–	5	4	4	1	14	2	28	High	Please refer to Table 28	9	Certain	Low
BIOLOGICAL FAUNA AND FLORA	Potential decrease in significant biodiversity on the study and surrounding area.	–	3	3	3	5	13	5	66	Low	Please refer to Table 28	40	Sure	Medium
	Spreading of alien invasive species and bush encroachment of indigenous species.	–	4	3	1	1	9	3	27	High	Please refer to Table 28	9	Sure	Medium
	Impact on natural migratory routes and faunal dispersal patterns.	–	4	3	3	3	13	5	65	Low	Please refer to Table 28	43	Certain	Medium
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	–	4	3	3	3	13	5	65	Low	Please refer to Table 28	43	Sure	Medium
	Potential loss of vegetation type, ecologically important species and species of conservation concern.	–	2	1	5	5	13	5	65	Low	Please refer to Table 28	43	Certain	Medium
EXISTING LAND USE	Loss of land for other purposes e.g. cultivation.	–	2	2	4	3	11	5	55	Low	Please refer to Table 28	37	Certain	Low

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
ARCHAEOLOGICAL/ HERITAGE RESOURCES	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	–	2	1	5	5	13	2	26	Low	Please refer to Table 28	17	Sure	Low
VISUAL	Visibility from sensitive receptors / visual scarring of the landscape as a result of the construction activities.	–	3	3	1	1	8	5	40	Low	Please refer to Table 28	27	Sure	Medium
NOISE AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of construction vehicles and equipment.	–	3	3	1	3	10	4	40	Medium	Please refer to Table 28	20	Sure	Low
	Added impact of security lighting on surrounding landowners and nocturnal animals.	–	3	3	1	2	9	4	36	Medium	Please refer to Table 28	18	Sure	Low
AIR QUALITY	Increased dust pollution due to vegetation clearance and construction vehicles and activities.	–	4	3	1	1	9	5	45	High	Please refer to Table 28	15	Sure	Medium
	Windborne dust (soil) and vehicle fumes and particulate matter PM10, altering air quality.	–	2	3	1	1	7	4	28	High	Please refer to Table 28	9	Sure	Medium
WASTE	Generation of additional general waste, litter and building rubble and hazardous material during the construction phase.	–	3	2	1	1	7	5	35	High	Please refer to Table 28	12	Certain	Low
SERVICES	Need for services i.e. water, electricity and sewerage systems during the construction phase causing additional strain on natural resources and service infrastructure.	–	2	3	1	1	7	5	35	Medium	Please refer to Table 28	18	Certain	Medium
TRAFFIC	The change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	–	3	3	1	1	8	3	24	Medium	Please refer to Table 28	12	Sure	Medium
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, busses and other heavy vehicles.	–	4	3	1	1	9	2	18	Medium	Please refer to Table 28	9	Sure	Low
HEALTH AND SAFETY	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life to construction workers and surrounding landowners, visitors and workers.	–	5	4	5	5	19	2	38	Medium	Please refer to Table 28	19	Sure	Medium
	Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.	–	4	3	5	5	17	2	34	Medium	Please refer to Table 28	17	Sure	Low
SOCIO-ECONOMIC	Positive: Potential creation of short term employment opportunities for the local communities, during the construction phase.	+	3	3	1	1	8	5	40	N/A	Please refer to Table 28	40	Certain	Low

Table 22: Impact Significance Calculation – Operational Phase

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
GEOLOGY AND SOILS	Soil erosion and soil compaction by heavy duty vehicles on site.	–	3	2	4	1	10	5	50	Medium	Please refer to Table 28	25	Sure	Medium
	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	–	3	2	4	1	10	3	30	High	Please refer to Table 28	10	Sure	Low
HYDROLOGY GROUNDWATER SURFACE WATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	–	3	4	4	3	14	3	42	High	Please refer to Table 28	14	Sure	Medium
	Contamination of stormwater runoff and ground water, caused by: - Sediment release; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; - Other chemicals from maintenance activities e.g. paints; and - Effluent discharges, due to a lack of stormwater management and system maintenance.	–	2	3	4	1	10	2	20	High	Please refer to Table 28	7	Sure	Low
	Groundwater contamination from short-term storage of contruction materials and hydrocarbons could result.	–	3	3	4	2	12	3	36	Medium	Please refer to Table 28	18	Sure	Low
	Surface water contamination from residue stockpiles.	–	3	3	4	2	12	3	36	Medium	Please refer to Table 28	18	Sure	Low
	The runoff from the plant area following rainfall may be contaminated due to the mining activities and may contaminate surface water.	–	3	4	4	2	13	2	26	High	Please refer to Table 28	9	Sure	Low
BIOLOGICAL FAUNA AND FLORA	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	–	2	3	4	1	10	2	20	Medium	Please refer to Table 28	10	Sure	Low
	Spreading of alien invasive species and bush encroachment of indigenous species.	–	4	3	4	1	12	3	36	High	Please refer to Table 28	12	Sure	Medium
EXISTING LAND USE	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	–	5	4	5	5	19	2	38	Medium	Please refer to Table 28	19	Sure	Medium
ARCHAEOLOGICAL/ HERITAGE RESOURCES	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	–	2	1	5	5	13	2	26	Low	Please refer to Table 28	17	Sure	Low

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
VISUAL	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the mining site including the waste management facilities and mining activities.	–	3	3	4	1	11	5	55	Low	Please refer to Table 28	37	Sure	Medium
	Visibility of solid domestic and operational waste.	–	3	3	4	1	11	5	55	Medium	Please refer to Table 28	28	Sure	Medium
NOISE, VIBRATION AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of the waste management activities and processing.	–	3	3	4	3	13	4	52	Medium	Please refer to Table 28	26	Sure	Low
	Disturbance due to vibrations caused by vehicles.	–	3	3	4	2	12	4	36	Medium	Please refer to Table 28	18	Sure	Low
	Impact of security lighting on surrounding landowners and animals.	–	3	3	4	2	9	4	36	Medium	Please refer to Table 28	18	Sure	Low
AIR QUALITY	Increased dust pollution (soil and ore fines), vehicles on gravel roads and storage of tailings and waste rock, as well as other re-mining activities.	–	4	3	4	1	9	5	45	High	Please refer to Table 28	15	Sure	Medium
	Increased windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10, altering air quality.	–	2	3	4	1	7	4	28	High	Please refer to Table 28	9	Sure	Medium
WASTE	Generation and disposal of additional general waste, litter and hazardous material during the operational phase and operational waste of the mine i.e. waste rock, tailings etc.	–	3	2	4	1	7	5	35	High	Please refer to Table 28	12	Certain	Low
SERVICES	Need for services e.g. water, electricity and sewerage systems, causing additional strain on natural resources and service infrastructure.	–	2	3	4	1	7	5	35	Medium	Please refer to Table 28	18	Certain	Medium
TRAFFIC	The change in the traffic patterns as a result of increased traffic entering and exiting the operations on the surrounding road infrastructure and existing traffic.	–	3	3	4	1	8	3	24	Medium	Please refer to Table 28	12	Sure	Medium
	Nuisance, health and safety risks caused by increased traffic on an adjacent to the study area including cars and heavy vehicles.	–	4	3	4	1	9	2	18	Medium	Please refer to Table 28	9	Sure	Low
HEALTH AND SAFETY	Possibility of mining activities and workers causing veld fires, which can potentially cause injury and or loss of life to mine workers and surrounding landowners, visitors and workers.	–	5	4	5	5	19	2	38	Medium	Please refer to Table 28	19	Sure	Medium
	Increased risk to public health and safety: Dangerous areas including the waste management activities and waste poses health risks and possible loss of life to mine workers and visitors to the site.	–	4	3	5	5	17	2	34	Medium	Please refer to Table 28	17	Sure	Low
SOCIO-ECONOMIC	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	–	4	4	4	3	15	3	45	Medium	Please refer to Table 28	23	Sure	Medium

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
	Economic impact should there be an incident of public health and safety.	–	4	3	5	3	15	3	45	High	Please refer to Table 28	15		
	Positive: Extended employment provision due to the implementation of the waste management activities, allowing mining activities and re-mining of tailings to continue for additional years.	+	4	4	4	1	13	5	65	N/A	Please refer to Table 28	65	Certain	Low
	Positive: Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	+	3	4	1	1	9	5	45	N/A	Please refer to Table 28	45	Certain	Low

Table 23: Impacts during the closure phase

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
GEOLOGY AND SOILS	Soil compaction by heavy duty vehicles on site.	_	3	2	2	1	10	5	50	Medium	Please refer to Table 28	25	Sure	Low
	Contamination of soils through: - Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	_	3	2	2	1	10	3	30	High	Please refer to Table 28	10	Sure	Low
HYDROLOGY GROUNDWATER SURFACE WATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	_	4	3	1	2	10	2	20	High	Please refer to Table 28	7	Sure	Medium
	Contamination of stormwater runoff and groundwater, caused by: - Sediment release; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy duty vehicles; - Effluent discharges, due to a lack of stormwater management.	_	4	3	2	2	11	2	22	Medium	Please refer to Table 28	11	Sure	Medium
	Seepage from waste management facilities could cause a contamination plume affecting the underground water resources.	_	3	3	4	2	12	3	36	Medium	Please refer to Table 28	18	Sure	Low
BIOLOGICAL FAUNA AND FLORA	Disturbance and loss of fauna through noise, light and dust pollution as well as hunting, trapping and killing of fauna.	_	2	3	4	1	10	2	20	Medium	Please refer to Table 28	10	Sure	Low
	Spreading of alien invasive species and bush encroachment of indigenous species.	_	4	3	1	1	9	3	27	High	Please refer to Table 28	9	Sure	Medium
VISUAL	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	_	3	3	1	1	8	5	40	Low	Please refer to Table 28	27	Sure	Medium
	Visibility of solid domestic and operational waste.	_	3	3	4	1	11	5	55	Medium	Please refer to Table 28	28	Sure	Medium
NOISE, VIBRATION AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	_	3	3	1	3	10	4	40	Medium	Please refer to Table 28	20	Sure	Low
	Disturbance due to vibrations caused by heavy duty vehicles.	_	3	3	1	2	9	4	36	Medium	Please refer to Table 28	18	Sure	Low
	Impact of security lighting on surrounding landowners and animals.	_	3	3	1	2	9	4	36	Medium	Please refer to Table 28	18	Sure	Low
AIR QUALITY	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	_	4	3	1	1	9	5	45	High	Please refer to Table 28	15	Sure	Medium

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
	Windborne dust (soil and ore fines) and vehicle fumes and particulate matter PM10, altering air quality.	–	2	3	1	1	7	4	28	High	Please refer to Table 28	9	Sure	Medium
WASTE	The haul road in itself is associated with the mining activities that it will serve and therefore it will serve to contribute to the spread of waste from mining activities (however small or large the scale).	–	3	3	4	2	12	4	48	Medium	Please refer to Table 28	24	Sure	Low
SERVICES	Need for additional services i.e. water, electricity and sewerage systems during the closure phase causing additional strain on natural resources and infrastructure.	–	2	3	1	1	7	5	35	Medium	Please refer to Table 28	18	Certain	Medium
TRAFFIC	The change in the traffic patterns as a result of traffic entering and exiting the proposed mine on the surrounding road infrastructure and existing traffic.	–	3	3	1	1	8	3	24	Medium	Please refer to Table 28	12	Sure	Medium
	Nuisance, health and safety risks caused by increased traffic on an adjacent to the study area including cars and heavy vehicles.	–	4	3	1	1	9	2	18	Medium	Please refer to Table 28	9	Sure	Low
HEALTH AND SAFETY	Possibility of closure activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners and visitors.	–	5	4	5	5	19	2	38	Medium	Please refer to Table 28	19	Sure	Medium
	Increased risk to public health and safety: Dangerous areas including the waste management facilities poses health risks and possible loss of life to mine workers and visitors to the site.	–	4	3	5	5	17	2	34	Medium	Please refer to Table 28	17	Sure	Low
	Increased risk to public and worker health and safety.	–	4	3	5	5	17	2	34	Medium	Please refer to Table 28	17	Sure	Low
SOCIO-ECONOMIC	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	–	4	4	4	3	15	3	45	Medium	Please refer to Table 28	23	Sure	Medium
	Economic impact should there be an incident of public health and safety.	–	4	3	5	3	15	3	45	High	Please refer to Table 28	15	Sure	Low
	Positive: Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	+	3	3	1	1	8	5	40	N/A	Please refer to Table 28	40	Certain	Low

Table 24: Impacts as a result of not implementing the proposed development

ENVIRONMENTAL ASPECT	NATURE OF THE IMPACT	IMPACT STATUS	MAGNITUDE	EXTENT	DURATION	REVERSIBILITY	IRREPLACEABILITY	PROBABILITY	SIGNIFICANCE PRE-MITIGATION	MITIGATION POTENTIAL	MITIGATION MEASURES	SIGNIFICANCE POST-MITIGATION	CONFIDENCE RATING	CUMULATIVE IMPACTS
SOCIO-ECONOMIC	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	–	3	3	4	3	13	5	65	High	Please refer to Table 28	22	Certain	Medium
	Reduced period of development and upliftment of the surrounding communities and infrastructure.	–	3	3	4	3	13	5	65	High	Please refer to Table 28	22	Certain	Medium
	Reduced period of development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	–	3	3	4	3	13	5	65	High	Please refer to Table 28	22	Certain	Medium
GENERAL	Positive: No additional negative impacts on the environment.	+	4	4	5	4	17	5	85	N/A	Please refer to Table 28	85	Sure	Medium

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

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

A "significant impact" is defined as it is defined in the EIA Regulations (2014): "an impact that may have an notable effect on one or more aspects of the environment or may result in non-compliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence". The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream. In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. For example, the removal of groundcover for the sloping or scraping of an embankment, can lead to higher amounts of water runoff which increases the rate of erosion. Further down in the river the amount of sediment increases because of the increased erosion. A number of fish species cannot endure the high amount of sediment and moves off. The habitat is thus changed or in the process of changing. Thus one needs to understand that the root of the problem (removal of groundcover) is assessed in terms of the degree of change in the health of the environment and/or components in relation to their conservation value. Thus if the impact of removal of groundcover of a definable system is high and the conservation value is also high then the impact of removal of groundcover is highly significant.

Environmental Impact Assessment (EIA) Regulations, 2014 requirements

The Environmental Impact Assessment (EIA) 2014 Regulations promulgated in terms of Sections 24 (5), 24M and 44 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended] (NEMA), requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2014) include the following:

- Nature of the impact;
- Extent of the impact;
- Duration of the impact
- Probability of the impact occurring;
- Degree to which impact can be reversed;
- Degree to which impact may cause irreplaceable loss of resources;
- Degree to which the impact can be mitigated; and
- Cumulative impacts.

ENVASS has developed an impact assessment methodology (as defined below) whereby the Significance of a potential impact is determined through the assessment of the relevant temporal and spatial scales determined of the Extent, Magnitude and Duration criteria associated with a particular impact. This method does not explicitly define each of the criteria but rather combines them and results in an indication of the overall significance.

ENVASS Impact Assessment Methodology

By considering the root cause of the issue in this way, the probability that the activity undertaken does or may result in an impact, can be determined. The associated impact can then be assessed in order to determine its significance and to define mitigation measures or management measures to address the impact.

The following definitions therefore apply:

- An activity is a distinct process or task undertaken by an organisation for which a responsibility can be assigned. Activities also include facilities or pieces of infrastructure that are possessed by an organisation;
- An environmental aspect is an 'element of an organisation's activities, products and services which can interact with the environment. The interaction of an aspect with the environment may result in an impact;
- Environmental impacts are the consequences of these aspects on environmental resources or receptors of particular value or sensitivity, for example, disturbance due to noise and health effects due to poorer air quality;
- Receptors can comprise, but are not limited to, people or human-made systems, such as local residents, communities and social infrastructure, as well as components of the biophysical environment such as aquifers, flora and palaeontology. Impacts on the environment can lead to changes in existing conditions; the impacts can be direct, indirect or cumulative;
- Direct impacts refer to changes in environmental components that result from direct cause-effect consequences of interactions between the environment and project activities. Indirect impacts result from cause-effect consequences of interactions between the environment and direct impacts; and
- Cumulative impacts refer to the accumulation of changes to the environment caused by human activities.

Assessment of Impact Significance

The accumulated knowledge and the findings of the environmental investigations form the basis for the prediction of impacts. Once a potential impact has been determined, it is necessary to identify which project activity will cause the impact, the probability of occurrence of the impact, and its magnitude and extent (spatial and temporal). This information is important for evaluating the significance of the impact, and for defining mitigation and monitoring strategies. The aspects and impacts identified are therefore described according to the following:

(a) Nature of the impact

The NATURE of an impact can be defined as: "a *brief description of the impact being assessed, in terms of the proposed activity or project, including the socio-economic or environmental aspect affected by this impact*".

(b) The status of the impact:

STATUS	Status	Description
	Positive (+)	A benefit to the holistic environment.
	Negative (-)	A cost to the holistic environment.
	Neutral (N)	No cost or benefit to the holistic environment.

(c) Magnitude of the impact

The MAGNITUDE of an impact can be defined as: "*a brief description of the intensity or amplitude of the impact on socio-economic or environmental aspects".*

Determining the magnitude of an impact			
MAGNITUDE Magnitude / intensity of impact (at the specified scale)	Magnitude	Score	Description
	Zero	1	Natural and/or social functions and/or processes remain unaltered.
	Very low	2	Natural and/or social functions and/or processes are negligibly altered.
	Low	3	Natural and/or social functions and/or processes are slightly altered.
	Medium	4	Natural and/or social functions and/or processes are notably altered.
	High	5	Natural and/or social functions and/or processes severely altered.

(d) Extent of the impact

The EXTENT of an impact can be defined as: "*a brief description of the spatial influence of the impact or the area that will be affected by the impact*".

Determining the extent of an impact			
EXTENT **Extent or spatial influence of impact**	**Extent**	**Score**	**Description**
	Footprint	**1**	**Only as far as the activity, such as footprint occurring within the total site area**
	Site	**2**	**Only the site and/or 500m radius from the site will be affected**
	Local	**3**	**Local area / district (neighbouring properties, transport routes and adjacent towns) is affected**
	Region	**4**	**Entire region / province is affected.**
	National	**5**	**Country is affected**

(e) Duration of the impact

The DURATION of an impact can be defined as: "*a short description of the period of time the impact will have an effect on aspects*".

Determining the duration of an impact			
DURATION **Duration of the impact**	**Extent**	**Score**	**Description**
	Short term	**1**	**Less than 2 years**
	Short to medium term	**2**	**2 – 5 years**
	Medium term	**3**	**6 – 25 years**
	Long term	**4**	**26 – 45 years**
	Permanent	**5**	**46 years or more**

(f) Degree to which impact can be reversed

The REVERSIBILITY of an impact can be defined as: *"the ability of an impact to be changed from a state of affecting aspects to a state of not affecting aspects*".

Determining the reversibility of an impact			
REVERSIBILITY	**Reversibility**	**Score**	**Description**
	Completely reversible	**1**	**Impacts can be reversed through the implementation of minimal mitigation measures and rehabilitation with negligible residual effects.**

	Nearly completely reversible	2	Impacts can nearly be completely reversed through the implementation of mitigation measures and rehabilitation, with marginal residual effects.
	Partly reversible	3	Impacts can be partly reversed through the implementation of mitigation measures and rehabilitation with moderate residual effects.
	Nearly irreversible	4	Impacts can be mitigated, but only marginally reversed through the implementation of mitigation measures and rehabilitation with severe residual effects.
	Irreversible	5	Impacts are permanent and can't be reversed by the implementation of mitigation measures or rehabilitation is not viable.

(g) Degree to which impact may cause irreplaceable loss of resources

The irreplaceability of an impact can be defined as "the amount of resources that can/can't be replaced".

Irreplaceability = Magnitude + Extent + Duration + Reversibility

Degree to which impact may cause irreplaceable loss of resources			
IRREPLACEABILITY	Irreplaceability	Score	Description
	No loss	0	No loss of any resources
	Very Low	1 - 5	
Irreplaceable loss of resources	Low	6 - 10	Marginal loss or resources
	Medium	11 - 15	Significant loss of resources
	High	16 - 20	Complete loss of resources

(h) Probability of the impact occurring

The PROBABILITY of an impact can be defined as: "the *estimated chance of the impact happening*".

Determining the probability of an impact			
PROBABILITY	Probability	Score	Description
	Unlikely	1	Unlikely to occur (0 – 15% probability of impact occurring)
	Possible	2	May occur (15 – 40% chance of occurring)
	Probable	3	Likely to occur (40– 60% chance of occurring)
	Highly Probable	4	Between 60% and 85% sure that the impact will occur
	Definite	5	Will certainly occur (85 - 100% chance of occurring)

(i) Significance of Impacts - Pre-Mitigation

The SIGNIFICANCE can be defined as:" *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*".

The significance of an impact is determined as follows:

Significance = Irreplaceability x Probability

The maximum value is 100 significance points (SP). Environmental impacts were rated as either of Very High (VH) High (H), Medium (M), Low (L) or Very Low (VL) significance on the following basis:

Table 25: Significance Rating (SR) Basis

Score	Significance
0	Neutral
1 to 20	Very low
21 to 40	Low
41 to 60	Medium
61 to 80	High
81 to 100	Very high

(j) Degree to which the impact can be mitigated

The degree to which an impact can be MITIGATED can be defined as: "the effect of mitigation measures on the impact and its degree of effectiveness".

MITIGATION POTENTIAL	Determining the mitigation potential of an impact		
	Degree	Calculation	Description
	High	Pre-mitigation SR / 3 = Post Mitigation SR	Impact 100% mitigated
	Medium	Pre-mitigation SR / 2 = Post Mitigation SR	Impact >50% mitigated
	Low	Pre-mitigation SR / 3 = x Then: Pre-mitigation SR – x = Post Mitigation SR	Impact <50% mitigated

(k) Significance of Impacts Post-Mitigation

The SIGNIFICANCE can be defined as:" *the combination of the duration and importance of the impact, in terms of physical and socio-economic extent, resulting in an indicative level of mitigation required*".

The significance of an impact is determined as follows:

Significance = Irreplaceability x Probability

Table 26: Significance Rating

Score	Significance
0	Neutral
1 to 20	Very low
21 to 40	Low
41 to 60	Medium
61 to 80	High
81 to 100	Very high

(l) Confidence rating

CONFIDENCE in the assessment of an impact can be defined as the:" *level of certainty of the impact occurring*".

Determining the confidence rating of an impact			
CONFIDENCE RATING	CONFIDENCE	Certain	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is unlimited and sound
		Sure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is reasonable and relatively sound
		Unsure	Amount of information on and/or understanding of the environmental factors that potentially influence the impact is limited

(m) Cumulative impacts

The effect of CUMULATIVE impacts can be described as:" the effect the combination of past, present and "reasonably foreseeable" future actions have on aspects".

Determining the confidence rating of an impact

CUMULATIVE RATING	**CUMULATIVE EFFECTS**	**Low**	**Minor cumulative effects**
		Medium	**Moderate cumulative effects**
		High	**Significant cumulative effects**

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

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

At this stage, there are no layout alternatives.

viii) The possible mitigation measures that could be applied and the level of risk.

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

TO BE COMPLETED ONCE PP PROCESS ENDS ON 14 NOVEMBER 2018.

Table 27: Mitigation measures

Source activities / processes	Environmental Impact:	Stakeholder comment	Mitigation Measures
			•

ix) Motivation where no alternative sites were considered

Alternatives were considered, as per the feasibility report by SRK (2018). The current route of the proposed haul road follows an existing gravel road, will be the most cost-effective and will have the smallest impact on the environment.

x) Statement motivating the alternative development location within the overall site. (Provide a statement motivating the final site layout that is proposed)

The proposed layout of the haul road is aligned with all public planning and will have the most beneficial socio-economic impacts. Seeing as the proposed layout will follow the path of an existing gravel road used by the community, it will also have the smallest environmental impact. The slope and soil type along the route also provides the most "buildability" – that is, the extent to which the construction of a road is possible without extreme, costly measures (like tunnelling or sloping).

g) 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 plan) through the life of the activity

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) 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 mitigation measures.)

- **Approach to the EIA**

An Environmental Impact Assessment (EIA) is a good planning tool. It identifies the environmental impacts of a proposed development and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the National Environmental Management Act (1998) (as amended) and the NEMA EIA Regulations (2014) and guidelines of the Department of Environmental Affairs (DEA). The guiding principles of an EIA are listed below.

- **Guiding principles for an EIA**

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be ongoing consultation with interested and affected parties representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

- **Information gathering**

Early in the EIA process, the Environmental Assessment Practitioner (EAP) identified the information that would be required for the impact assessment and the relevant data were obtained. In addition, available information about the receiving environment was gathered from reliable sources, interested and affected parties, previous documented studies in the area and previous EIA Reports. The project team visited the site to gain first-hand information and an understanding of the existing operations and the proposed project.

- **Specialist Assessments**

The following specialist studies have been included:

- Archeological Impact Assessment (AIA);
- Socio-economic impact assessment (SEIA);
- Noise Baseline Assessment;
- Biodiversity Assessment;
- Soil Management Plan;
- Invasive Alien Species Management Plan;
- Air Quality Baseline Assessment.

The main objective of the specialist studies is to provide independent scientifically sound information on issues of concern relating to the project proposal.

The impacts identified by the various specialist studies undertaken, were incorporated into the EIA.

- **Legislative Framework**

The legal requirements were described and assessed in detail.

- **Alternatives**

Site alternatives and layouts have been assessed to determine the feasible socio-economical and biophysical option.

- **Description and assessment of impacts identified**

A comprehensive list of all impacts as identified by the EAP and the specialists, are provided and are assessed.

- **Environmental management programme**

An Environmental Management Programme (EMPR) containing mitigation, management and monitoring measures and specifying roles and responsibilities was compiled with specialist input and are included in this report.

- **Stakeholder engagement**

Registered interested and affected parties including relevant organs of state, are consulted with during the process. All their comments will be formally responded to and incorporated into the final EIA Report and Environmental Management Programme that will be submitted to the competent authority.

h) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table 28: Assessment of Impacts of Specific Activities

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Preparation of areas to expand road footprint	Contamination of soils	Soil	Construction	Very Low (-)	**Prevent and reduce and remedy through management measures.** • All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; • All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and • The approved Integrated Water and Waste Management Plan to be implemented. ***Hydrocarbons and hazardous waste*** • All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and • All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area.	Very Low (-)
	Soil compaction and degradation through vehicles driving and employees walking	Soil	Construction	Low (-)	**Prevent and reduce and remedy through management measures.** • Activity should be limited to area of disturbance. Where required the compacted soils should be	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	over open areas, as well as compaction through stockpiling.				disked to an adequate depth and re-vegetated with indigenous plants; and • Soils compacted, should be deeply ripped at least to a depth of 300mm to loosen compacted layers and re-graded to even running levels.	
	Stormwater, erosion and siltation impacts	Surface water	Construction	Very Low (-)	**Prevent and reduce and remedy through management measures.** • The Site Manager (SM) should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system; • Appropriate measures, e.g. construction of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses should be taken; • No wastewater may run freely into any of the surrounding naturally vegetated areas; • The loss of topsoil must be minimised; • Erosion and subsequent siltation must be limited; • Any drainage channels shall be suitably designed to ensure that erosion does not occur; • All areas susceptible to erosion shall be protected and stabilisation measures implemented: • Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies; • Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• A stormwater management plan must be compiled and approved by DWS and implemented.	
	Contamination of stormwater runoff and ground water, caused by: • Spills and leaks of cement; • Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; and • Other chemicals from construction activities e.g. paints.	Surface water and groundwater resources	Construction	Low (-)	**Prevent and reduce through management measures.** In accordance with Government Notice 704 (GN 704), the onsite management should: • Keep clean and dirty water separated; • Contain any dirty water within a dirty water system; • Prevent the contamination of clean water. • Materials capable of resulting in poor quality leachate will not be used for the construction of haul roads. This will entail testing for acid generation potential if sourced locally. • Where possible, the disturbance of land during the construction phase will be confined to areas which are disturbed for the operation of the mine. • Soil stockpiles must be estabilised with vegetation to reduce erosion and siltation into streams and dams. • Hydrocarbon spills will require immediate attention and should be disposed of at a reputable hazardous waste facility. All used hydrocarbons will be collected and recycled. • Storm water drainage and pollution control facilities will be constructed to divert the flow of water and separate clean and dirty water on site. • All licenses and permits required as per the National Water Act will be applied for the relevant water uses.	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• All areas where diesel is unloaded and loaded will be concreted and bunded. In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum: • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the construction period; • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; • Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed throughout the site; • Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the site must in no way be contaminated; • Install recommended monitoring boreholes and monitor groundwater quarterly; • Ensure good housekeeping practices;	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and • Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications.	
	Altered drainage patterns and stormwater runoff flows.	Surface water	Construction	Medium (-)	**Control through management measures.** A stormwater management plan including stormwater management measures during all phases of the proposed development will be drawn up by a suitably qualified person. The plan is to include a detailed description of the stormwater management plan, incorporating appropriate maps; • Alternatively, should there be an existing stormwater management plan, this plan should be amended to include all phases of the haul road activities and facilities.	Low (-)
	Potential decrease in significant biodiversity on the study and surrounding area.	Biodiversity	Construction	High (-)	**Reduce through management measures.** • Only vegetation falling directly in demarcated access routes or project sites should be removed; • No further vegetation clearance except for the removal of alien invasive species will be allowed; and • All remaining indigenous vegetation should be conserved wherever possible	Medium (-)
	Potential loss of significant vegetation	Biodiversity	Construction	High (-)	**Prevent and reduce through management measures.**	Medium (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	type, ecologically important species and species of conservation concern.				• Remove and relocate any rare, endangered, protected and endemic species within the areas of activity and within 100 m of any activity. • Prevent the unnecessary destruction of the vegetation of sensitive areas outside the haul road footprint, such as wetlands and rocky outcrops, preferably by designating them as 'no go' areas and setting them up as conservation areas. • More detailed investigations should be undertaken in order to verify the presence/ status of P. sylvia and the new tiger beetle species that was identified in the area; • A comprehensive plant species list should be compiled that takes seasonality, flowering periods of certain Red Listed flora species and management activities, such as fire, into account. specimens; • Any stormwater cut-off channels should be kept as natural as possible with gentle slopes (45° angle or less) on the side away from mining activities. Channels should also have rough surfaces and rocks, less "curvature" on the walls to enable smaller animals to escape. A "step" in the slope of the walls and a "lip" on the edge of the channel will deter animals from entering the channels; • Only vegetation falling directly in demarcated access routes or project sites should be removed;	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• No further vegetation clearance except for the removal of alien invasive species will be allowed; and • All remaining indigenous vegetation should be conserved wherever possible.	
	Spreading of alien invasive species and bush encroachment of indigenous species.	Biodiversity Soils	Construction	High (-)	**Prevent and control through management measures.** • An alien vegetation management plan should be compiled and implemented; • Regular removal of invasive alien species should be undertaken. This should extend through to the closure phase of the project; and • No spreading of alien vegetation onto adjacent properties should be allowed.	Very Low (-)
	Impact on natural migratory routes and faunal dispersal patterns.	Biodiversity	Construction	High (-)	**Reduce and control through management measures.** • Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes, if any.	Medium (-)
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	Biodiversity	Construction	High (-)	**Reduce through controlling measures.** • Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; • Any animals rescued or recovered will be relocated in a suitable habitat away from the mining operations and associated infrastructure; • Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance. • No reptile should be intentionally killed, caught or collected during any phase of the project; and	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area.	
	Loss of land for other purposes e.g. cultivation.	Land use	Construction	Medium (-)	None	Low (-)
	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	Heritage	Construction	Low (-)	SAHRA provided recommendations during PP to be included in the final EMPR for the safeguarding of heritage resources.	Very Low (-)
	Visibility from sensitive receptors / visual scarring of the landscape as a result of the construction activities.	Aesthetic environment	Construction	Low (-)	**Reduce through controlling management measures.** • Housekeeping on all sites should be enforced; • Rehabilitation measures such to be undertaken; • Install lights that will not create a night sky glow; • Reduce the construction period through careful planning and productive implementation of resources; • Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing; • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads; • Ensure that rubble, litter and issued construction materials are managed and removed regularly;	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; and • Reduce and control construction dust through the use of approved dust suppression techniques.	
	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of construction vehicles and equipment.	Social and Health Ambiance "Sense of Place"	Construction	Low (-)	**Reduce through controlling measures.** • Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the Site Manager (SM) should liaise with local residents and how best to minimise impacts, and the local population should be kept informed of the nature and duration of intended activities; • The SM should take measures to discourage labourers from loitering in the area, causing noise disturbance; • Noise impacts should be minimised by restricting construction to Business hours on Monday to Friday, and Business Hours on Saturdays and	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					Sundays, during which the offending activities are carried out and, where possible; • Regular monitoring of noise levels at various, pre-determined locations. This will serve as the core of noise mitigation as it will enable the determination of problem areas; • Personal Protective Equipment to all persons working in areas where high levels of noise can be expected; Signs where it is compulsory; • Proper design of the plant areas and machinery where measures are taken to prevent noise generation such as silencers, mufflers and sound suppressing enclosures for parts/processes which can generate noise; • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise; • Noise breaking barriers can be erected such as netting; • Placement of noise generating activities can be planned as far away as possible from affected areas or persons.	
	Security lighting on surrounding landowners and nocturnal animals.	Fauna Social and health	Construction	Low (-)	• Unnecessary lights should be switched off during the day and / or night to avoid light pollution; • If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surrounding community; • Install lights that will not create a night sky glow; and • Security lighting should be designed in such a way as to minimise emissions onto undisturbed	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					areas on site and neighbouring properties. Light fittings should face downwards.	
	Increased dust pollution due to vegetation clearance and construction vehicles and activities.	Health and Social	Construction	Medium (-)	**Reduce through controlling measures.** • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) / when visible dust plume is present; • Ensure that shortest routes are used for material transport; • Ensure that stockpile height is kept to a minimum and that any stockpiling occurs downwind of the stockpiles; • Minimise travel speed on paved roads; • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Spray areas to be cleared with water. • Ensure minimum travel distance between working areas and stockpiles. • Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation. • Ensure graded areas are sprayed with water. • Minimise the amount of graded areas. • Load and offload material, as far as possible, downwind of stockpiles. •	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Windborne dust (soil) and vehicle fumes and particulate matter PM10, altering air quality.	Health and social	Construction	Low (-)	**Reduce through controlling measures.** • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) / when visible dust plume is present; • Ensure that shortest routes are used for material transport; • Ensure that stockpile height is kept to a minimum and that any stockpiling occurs downwind of the stockpiles; • Minimise travel speed on paved roads; • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Spray areas to be cleared with water. • Ensure minimum travel distance between working areas and stockpiles. • Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation. • Ensure graded areas are sprayed with water. • Minimise the amount of graded areas. • Load and offload material, as far as possible, downwind of stockpiles. • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed.	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	Generation of additional general waste, litter and building rubble and hazardous material during the construction phase.	Health and Safety and fauna and flora / ecosystems.	Construction	Low (-)	**Control through management measures.** • The conditions of the Integrated Water Use License (IWUL) and the IWWMP must be implemented. • A central waste storage and transition area shall be established within the site camp; • The central waste storage and transition area shall be surfaced and demarcated appropriately; • Portable wheelie bins shall be placed throughout the site camp as well as at the remainder of the site and at all working areas in the field; • Wheelie bins shall be colour coded and labelled to identify the waste stream for which it is intended; All portable wheelie bins and other containers shall be emptied at the central waste storage and transition area a minimum of once a week as to avoid waste build up; • The waste shall be removed (within 30 days) by a licensed waste service provider as shall be disposed of at a licensed waste landfill site and records of safe disposal (as required for hazardous wastes) shall be supplied to the Contractor. These records shall be kept on site by the ESM. • Wherever possible and practical, waste materials generated on site must be recycled; and • Waste specific (hazardous, timber, steel etc.) mitigation measures to be developed and included in the EMPR.	Very Low (-)
	Need for services i.e. water, electricity and	Natural resources	Construction	Low (-)	**Reduce through controlling management measures.**	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	sewerage systems during the construction phase causing additional strain on natural resources and service infrastructure.	including water and electricity.			• Energy savings measures to be implemented at the construction sites, e.g.: ➢ No lights to be switched on unnecessarily. Only security lights to be switched on at night; • Energy saving bulbs to be installed; and • Water should be recycled as far as possible to avoid any additional water usage.	
	The change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	Safety and Social	Construction	Very Low (-)	**Reduce through controlling management measures.** • Heavy vehicles should adhere to the speed limit of the road.	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, busses and other heavy vehicles.	Health and Safety	Construction	Very Low (-)	**Prevent through controlling management measures.** • Drivers will be enforced to keep to set speed limits. • Trucks will be in a road-worthy condition. • Roads and intersections will be signposted clearly. Only main roads should be used; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the mine will be allowed; • Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method;	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Mareesburg mine shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and • All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual	
	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life of construction workers and surrounding landowners, visitors and workers.	Health and Safety	Construction	Low (-)	**Prevent through controlling management measures.** • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; • The Applicant shall ensure that the basic fire-fighting equipment is available on the site; • Extinguishers should be located outside hazardous materials and chemicals storage containers; Fire response and evacuation • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the contractors and conveyed to all staff on the site' • Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff.	Very Low (-)
	Increased risk to public health and safety: Dangerous areas and construction activities poses health risks and	Health and Safety	Construction	Low (-)	**Prevent through controlling management measures.** • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	possible loss of life to construction workers and visitors to the site. If not fenced off, the public and workers may fall into excavated areas and trenches.				compiled and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the construction phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid facilities should be available on site at all times; • Workers have the right to refuse work in unsafe conditions; • Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. • Access to construction sites must be controlled; • Excavated areas should be temporarily fenced-off; and • Excavations, such as pipeline excavations, will be backfilled and landscaped as soon as possible.	
	Potential creation of short term employment opportunities for the local communities, during the construction phase.	Socio-economic environment	Construction	Low (+)	• Skills training to be in accordance with the approved Social and Labour Plan; • Labourers should initially be sought locally and only regionally if skills are not available; and • The approved Social and Labour Plan should be implemented.	Low (+)
Operational Phase:	Soil compaction and degradation through	Soil	Operational	Medium (-)	**Reduce and remedy through controlling management measures.**	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
Daily traffic on haul road Maintenance of the haul road Loading, hauling and transport	vehicles driving and employees walking over open areas, as well as compaction through stockpiling.				• The approved stormwater management plan must be implemented; • Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants; and • Soils compacted, should be deeply ripped at least to a depth of 300mm to loosen compacted layers and re-graded to even running levels.	
Dust Suppression Sewerage Treatment Plant: Treating sewage and waste water;	Contamination of soils.	Soil	Operational	Low (-)	**Prevent through controlling management measures.** • All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; • All leaks will be cleaned up immediately using an absorbent material and spill kits in the prescribed manner; and • The approved Integrated Water and Waste Management Plan to be implemented. ***Hydrocarbons and hazardous waste*** • All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and • All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area.	Very Low (-)
	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off	Surface water	Operational	Medium (-)	**Reduce and remedy through controlling management measures.** • The ESM should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system;	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	quantity and quality during the operational phase.				• Appropriate measures, e.g. construction of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses should be taken; • No wastewater may run freely into any of the surrounding naturally vegetated areas; • Erosion and subsequent siltation must be limited; • Any drainage channels shall be suitably designed to ensure that erosion does not occur; • All areas susceptible to erosion shall be protected and stabilisation measures implemented; • Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies; • Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and • A stormwater management plan must be compiled; and should be approved by DWS and implemented.	
	Contamination of stormwater runoff and groundwater, caused by: • Sediment release; • Chemicals such as hydrocarbon-based fuels and	Surface water and groundwater	Operational	Very Low (-)	**Prevent through controlling management measures.** In accordance with Government Notice 704 (GN 704), the onsite management should: • Keep clean and dirty water separated; • Contain any dirty water within a system; and • Prevent the contamination of clean water.	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	oils or lubricants spilled from construction vehicles; • Other checmicals from maintenance activities e.g. paints; and • Effluent discharges, due to a lack of stormwater management and system maintenance.				In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum: • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • The operation and maintenance of the stormwater and waste water containment facilities shall be done in accordance with the requirements of the Integrated Water Use License and Integrated Water and Waste Management Plan (IWWMP); • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; • Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed at varous locations along the haul road; • Use of bunds or traps to ensure full containment of hydrocarbons and other hazardous materials are mandatory during maintenance; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the haul road must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas	

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					or a combination thereof which is produced, used, stored, dumped or spilled on the premises; • During maintenance, all hazardous substances should be stored on impervious surfaces that allow for the containment of spills and leakages (e.g. bunded areas). Should spills occur, these should be reported to the ESM. • Liquid hazardous waste shall be contained and stored according to the prescribed measures where required; • Groundwater monitoring and surface water monitoring should be conducted in line with the WUL or general practice for water monitoring at haul roads; • Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and • Removal of spills, rainwater and waste produced during clean-up of the stormwater infrastructure – shall be done in accordance to relevant specifications.	
					•	
					•	
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	Biodiversity	Operational	Low (-)	**Prevent or reduce through management measures.** • Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; • Any animals rescued or recovered will be relocated in suitable habitat away from the traffic on the haul road and associated infrastructure;	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Any lizards, snakes or monitors encountered should be allowed to escape to suitable habitat away from disturbance. • No reptile should be intentionally killed, caught or collected during any phase of the project; and • General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area.	
	Spreading of alien invasive species and bush encroachment of indigenous species.	Biodiversity and soils	Operational	Low (-)	**Prevent and control through management measures.** • An alien vegetation management plan should be compiled and implemented; • Regular removal of invasive alien species should be conducted. This should extend right through to the closure phase of the project; and • No spread of alien vegetation onto adjacent properties should be allowed.	Very Low (-)
	Possibility of transport activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	Health, Safety and Economic environment and land use	Operational	Low (-)	**Prevent and control through management measures.** • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; • The Applicant shall ensure that the basic fire-fighting equipment is available in vehicles. Fire response and evacuation • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site during induction; and	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Identify major risks to minimise the environmental impacts e.g. air pollution and contaminated effluent runoff.	
	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	Heritage	Operational	Low (-)	SAHRA recommendations provided during PP to be included in the EMPR for the safeguarding of heritage resources.	Very Low (-)
	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the the haul road.	Aesthetic environment	Operational	Medium (-)	**Reduce through management measures.** • The structures need to be constructed in such a way that they are stable; • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way; and • Rehabilitation of disturbed areas and re-establishment of vegetation.	Low (-)
	Visibility of solid domestic and operational waste.	Aesthetic environment	Operational	Medium (-)	**Reduce and control through management measures.** • Housekeeping on the haul road should be enforced.	Low (-)
	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of the haul road and processing.	Health and Safety	Operational	Medium (-)	**Reduce and control through management measures.** • Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • The ESM should take measures to discourage labourers from loitering in the area and causing noise disturbance; • If there are any noise complaints, a noise impact assessment should be conducted to determine the noise impacts on that specific location and appropriate measures for mitigation proposed by the specialist implemented. • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise; • Noise breaking barriers can be erected such as netting, walls or high growing trees. •	
	Disturbance due to vibrations caused by heavy vehicles	Health, Social and biodiversity	Operational	Low (-)	**Reduce and control through management measures.** • Vehicles will be regularly serviced; • • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary vibrations.	Very Low (-)
	Impact of security lighting on surrounding landowners and animals.	Health, Social and biodiversity	Operational	Low (-)	**Reduce and control through management measures.** • Unnecessary lights should be switched off during the day and / or night to avoid light pollution; • If lighting is required, the lighting will be located in such a place and such a manner so as to	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					minimise any impact on the surrounding community and / or environment; • Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards; • Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer; • Shielding the sources of light by physical barriers (vegetation, or the structure itself); • Limiting mounting heights of lighting fixtures by specifying foot-lights or bollard level lights; • Making use of minimum lumen or wattage in fixtures; • Making use of down-lighters or shielded fixtures; and • Making use of energy efficient lighting or other types of low impact lighting.	
	Increased dust pollution (soil and ore fines), vehicles on haul roads	Health and Safety	Operational	Medium (-)	**Reduce and control through management measures.** • Dust suppression shall be implemented during dry periods and windy conditions; • Minimise travel speed on paved roads; • • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Ensure the access roads are all well maintained in terms of surface and especially dust suppression.	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					• Ensure that shortest routes are used for material transport. • Spray unpaved roads with water/dust binding materials and limit travel speed to a minimum. • Minimise travel speed on paved roads. •	
	Increased windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10, altering air quality.	Health and Safety	Operational	Low (-)	**Reduce and control through management measures.** Refer to mitigation measures above.	Very Low (-)
	Generation and disposal of additional general waste, litter and hazardous material during the operational phase and operational waste	Health and Safety and fauna and flora / ecosystems.	Operational	Low (-)	**Reduce and control through management measures.** • Implement monthly site inspection to check for possible areas of waste generation not addressed or not effectively managed; •	Very Low (-)
	Need for services e.g. water, electricity and sewerage systems, causing additional strain on natural resources and service infrastructure.	Natural resources: water and electricity	Operational	Low (-)	**Reduce and control through management measures.** • Energy savings measures to be implemented, e.g.: ➢ No lights to be switched on unnecessarily. Only security lights to be switched on at night; • Energy saving bulbs to be installed; and • Water should be recycled as far as.	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	The change in the traffic patterns as a result of increased traffic entering and exiting the operations on the surrounding road infrastructure and existing traffic.	Health and Safety	Operational	Low (-)	**Reduce and control through management measures.** • Heavy vehicles should adhere to the speed limits and other rules of the road.	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area.	Health and Safety	Operational	Very Low (-)	**Prevent through management measures.** • Trucks will be in a road-worthy condition. • Roads and intersections will be signposted clearly. Only main roads should be used; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the mine will be allowed; • Mareesburg shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties. •	Very Low (-)
	Possibility of activities and workers causing veld fires, which can potentially cause injury and or loss of life to mine workers and surrounding landowners, visitors and workers.	Health and Safety	Operational	Low (-)	**Prevent and control through management measures.** • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; • The Applicant shall ensure that the basic fire-fighting equipment is available trucks.	Very Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
					Fire response and evacuation • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on travelling on the haul road; and • Identify major risks to minimise the environmental impacts e.g. air pollution and contaminated effluent runoff.	
	Increased risk to public health and safety: Dangerous areas including the concrete construction areas poses health risks and possible loss of life to mine workers and visitors to the site.	Health and Safety	Operational	Low (-)	**Prevent through management measures.** • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be compiled and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid boxes should be available in trucks at all times; • Workers have the right to refuse work in unsafe conditions; and • Material stockpiles or stacks along the haul road should be stable and well secured to avoid collapse and possible injury to site workers.	Very Low (-)
	Socio-economic impact on farmers, labourers and surrounding	Socio-economic Environment	Operational	Medium (-)	**Reduce through management measures.** Refer to the above mentioned mitigation measures for noise, dust and other environmental impacts.	Low (-)

NAME OF ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated
	landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.					
					•	
Closure and Post-Closure Phases	Due to the closure phase overlapping with the operational phase, all of the impacts described above will be applicable to the closure phase.	All aspects as described above	Closure and Post-Closure Phases	Very Low – High (-)	Refer to the above mitigation measures for impacts during the operational phase.	Although it is expected that impacts can be mitigated to acceptable levels, there is still a very low to low overall risk for negative impacts on the bio-physical and socio-economic environment.
	Soil erosion	Soils and Vegetation	Closure and Post-Closure Phases	Medium (-)	**Prevent, reduce and remedy through management measures.** • Mine management will draw up all rehabilitation plans. After the plans are approved by the competent authority, they will be implemented.	Low (-)
	Groundwater pollution	Groundwater	Closure and Post-Closure Phases	High (-)	**Prevent through management measures.** • Mine management will compilell rehabilitation plans. After the plans are approved by the competent authority they will be implemented. •	Very Low (-)

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix.** ***Please note that the full impact assessment is provided in Tables 24 – 26 of this report and is not separately appended.***

i) Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

<table>
<tr><th>LIST OF STUDIES UNDERTAKEN</th><th>RECOMMENDATIONS OF SPECIALIST REPORTS</th><th>SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)</th><th>REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.</th></tr>
<tr><td>Conceptual and Final Design Report and Designs of stormwater management and structures and surface water study</td><td>Recommended 1:100 year flood peaks:
<table><tr><th>Culvert</th><th>1:100 Year m^3/s</th><th>1:50 Year m^3/s</th><th>Culvert</th><th>1:100 Year m^3/s</th><th>1:50 Year m^3/s</th></tr><tr><td>1</td><td>253</td><td>150</td><td>3</td><td>114</td><td>88</td></tr><tr><td>2</td><td>145</td><td>114</td><td>4</td><td>62</td><td>49</td></tr></table></td><td>X</td><td>Part B: EMPR</td></tr>
<tr><td>Socio-economic impact assessment</td><td>The unemployment in the area is notably high and employment opportunities are few. Twenty employment opportunities will be made during the 8-month construction period, however only six are planned to be filled by locals. This is dependent on the contractor. The significance of the employment impact is therefore negligible given the limited and temporary employment to be created in the primary study area. Nonetheless, individuals benefitting from employment will realize an improved standard of living and enhanced their skills.
The number of households to be relocated is not clear, but from the current layout, it is not a significant number considering that the development of the road will follow the route of an</td><td>X</td><td>Part B: EMPR</td></tr>
</table>

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	existing gravel road. In a situation that some cultivated land will be sterilised and livestock be relocated, people deriving their livelihoods from these resource-based activities will be negatively affected. It is of paramount importance that the relocation plan is developed and executed following the best practices in order to reduce the negative impacts on affected parties. Construction activities include site preparation along the path and road development. The effects of these activities include dust emissions, vehicular and personnel movement, and temporary disuse of road. The most common incidents in the project area include stock theft, drug-related crime, and crimen injuria. The construction activities pose a threat to the health and safety of the local community, albeit for a temporary period. The road will modify the remote status of the area and promote accessibility and connectivity. The needs and desirability assessment reveal the importance of the project as an enabler of socio-economic development. Therefore, the net effect of the proposed project is positive. Therefore, from a socio-economic perspective therefore, no objections are made with regard to the proposed project. The table below summarises the impact ratings. In conclusion, the analysis of the proposed project from a socio-economic perspective suggests that the project should be approved.		
Noise Baseline Assessment	General:	**X**	Part B: EMPR

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	Possible regular monitoring of noise generating activities could occur. This will serve as the core of noise mitigationas it will enable the determination of problem areas. If deemed necessary, the points indicating exceedances inthe current study could be re-measured. The current plan in place could possibly be expanded to identify andmeasure location / source specific noise generating activities to better understand and manage noise sources ofthe activity itself. Personal Protective Equipment must be provided to all persons working in areas where high levels of noise can beexpected. Major noise generating activities can be restricted to between 06h00 and 18h00 on Monday to Friday, and 06h00-13h00 on Saturdays and Sundays. Placement of noise generating activities can be planned as far away as possible from affected areas and/orpersons. Installation of acoustic enclosures for equipment to stop noise at the source. Ensure that all staff on the activity is provided with “noise sensitivity” training to ensure noise generation is limited. The efficiency of noise mitigation measures should be assessed on a regular basis. No amplified music should be allowed on the site. Good public relations are essential. The information provided to stakeholders should be factual and not setunrealistic expectations.		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	A clear line of communication should be in place where complaints can be lodged and response can be providedon. A clear commitment should be made on accommodating the local communities in preventing noise as far aspossible; and Should any complaints regarding noise be received from the adjacent community / staff, follow-up investigationsshould be conducted to determine and mitigate noise measured.Vehicle and vehicle movement: Limit vehicle movement to daylight hours as far as possible. Limit vehicle speeds. All vehicles must be fitted with low noise and frequency hooters. Ensure that vehicles are fitted with noise reduction measured such as mufflers, etc. Ensure that vehicles on the site are serviced on a regular basis to ensure that noise suppression mechanisms areeffective. Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise; and All vehicles should be switched off when not in use. Construction activities: A noise prevention barrier could be erected in areas where noise can travel to sensitive receptors. This barriershould be placed as close to the noise generating activity as possible.		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	Should the development footprint expend, the additional areas might require the same mitigation measures as already implemented. All construction equipment and machinery should be serviced on a regular basis. All construction equipment and machinery should be fitted with noise reduction technology to prevent noise generation as far as possible. All construction activities should be limited to daylight hours as far as possible. Generally, work should not be allowed on Sundays and Public Holidays. All noise generating activities/installations should be planned and placed as far away from sensitive receptors as possible. Should this not be possible, noise barriers should be installed at various positions around these noise generators. All equipment should be switched off when not in use. No workers should be allowed to stay on the site. Site workers must comply with the Provincial Noise Regulations. Appropriate directional and intensity settings are to be maintained on all hooters and sirens; and Excessively noisy machinery must only be used during regular operating hours and not after hours where possible.		
Biodiversity Asessment	The vegetation within the project area is mostly in pristine state with very little disturbance or human interference. The ecosystem forms part of the Sekhukhune land Centre of	**X**	Part B: EMPR

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	Endemism (SCE); it includes important sub-catchments, pans and wetlands and is important for grassland processes. The study project is also in close proximity to the Lydenburg Centre of Endemism (LCE) as well as the Wolkberg Centre of Endemism (WCE), due to the strong floristic connections between the SCE and WCE (species adapted to the ultramafic substrates), the sharing of species between these two areas may in future be considered as one centre of endemism with various sub-centres. The SCE and WCE flora is best described as being of Zambezian extraction, with Afromontane elements especially at higher altitude and shows floristic links to the Drakensberg, Pondoland, Waterberg and Limpopo valley. In excess of 2 200 species are believed to be in the SCE, two endemic/near endemic genera and more than 100 species are endemic/near endemic species (4.5%). The WCE is believed to have in excess of 2 500 species recorded of which more than 130 are endemic/near endemics (5.2%). The study area also falls within the Mpumalanga Mesic Grasslands National Protected Area Expansion Strategy (NPAES 2010) focus area. A high diversity of plant communities occurs on the study area. This is to be expected, given the diverse habitat characteristics in which the study area is situated, and this confirms its importance in terms of biodiversity management and conservation. Of the vegetation types found in the SCPE, the project area falls mainly within the Sekhukhune Mountain Bushveld. The Sekhukhune Mountain Bushveld vegetation is dry, open microphyllous and broad-leaved Savannah on hills and mountain slopes. The open		

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	Bushveld is associated with ultramafic soils (soils derived from manganese and iron-rich rocks) on southern aspects, with high diversity of edaphic (a nature related to soil) species while the Bushveld of the slopes is taller than that encountered in the valleys and has a well-developed herbaceous layer. The Bushveld has herbaceous layer comprising mostly of perennials. The dry habitats lead to a number of species with xerophytic adaptations. The vegetation type is regarded as least threatened despite the high endemism and only 0.4% being conserved of a target 24%. Some 15% is transformed by mining, cultivation and urban development. However the vegetation type forms part of the Sekhukhune Mountainlands ecosystem which is considered "Threatened". These areas are classified as "Highest Biodiversity Importance", in terms of the "Four categories of biodiversity priority areas in relation to their biodiversity importance and implications for mining" see Table 5. Threatened ecosystems are considered Highest Risk to Mining. Within the context of mining, the Mining and Biodiversity Guideline (2013), stipulates that these areas are of highest biodiversity value and EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licences, and environmental authorisations.		

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	Since the site is considered to be nearly pristine (see Figure 7) but the mining licence has been granted priority areas such as streams or areas where sensitive or important species occur should be identified first, and a buffer zone should be established around these areas, no further development or disturbance should be allowed in these areas. Infrastructure must be placed in such a way that medium to large size pockets of natural vegetation be retained on site to prevent fragmentation by roads and other infrastructure. In order to promote viable populations of plants and animals, corridors Error! Reference source not found.need to be established between fragmented vegetation pockets. Preventative easures such as the removal of alien invasive species, re-establishing natural vegetation, prevention of uncontrolled fires, controlling access to these areas, ensuring that no vehicles drive over vegetation in the area, preventing pollutions of soil and water, removal of linear barriers and creation of passages under or over roads or other infrastructure that cannot be moved to ensure save movement of animals should be put in place. Continuous vegetation areas should be managed as a unit.		
Air quality	The air quality measured in the proposed development area is in a relatively good condition as per the results obtained. It is however assumed that the construction of the proposed development will contribute to the total suspended load in the atmosphere but it is anticipated that the load increase and impact on the surrounding environment will not be significant. However, in order to ensure and prevent this possible outcome, pertinent	**X**	Part B: EMPR

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	measures are provided in this report to enable the proposed development to minimise the impact. No areas of the study are deemed as *no go* areas for the project and is not expected that the air quality will deviate greatly from the current condition should the mitigation measures be implemented on the site.		
Draft Feasibility Report (February 2018).	Still to be completed		Part B: EMPR
Heritage and Archaeology	The archaeological and historical landscape around Lydenburg/Steelpoort infers a rich and diverse cultural horizon. Therefore, the following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains in areas demarcated for development: • The two formal graveyards (H31 & H32) located along the provincial road are located just outside of the road reserve and should therefore not be impacted by the proposed development. The road along this section should be wide enough and should not require additional upgrades. However, it is recommended that the fence between the road and graveyard H31 be upgraded in order to prevent the accidental destruction of the graves. Graveyard H32 should be completely	X	Part B: EMPR

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	fenced-off to prevent damage to the graves. Should it not be possible to avoid impact on the affected sites, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased. The two stone cairns (H30 & H33) along the Mareesburg Road should be regarded as graves and should be avoided by construction activities. Should the need exist to upgrade the road sections next to these sites without avoiding impact, the stone cairns may be investigated and relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased if possible. The following recommendations are made for Route 1: Building H26 and building H27 most likely exceed 60 years of age, while building H37 is at least 62 years of age and therefore protected under the National Heritage Resources Act (25 of 1999). Should the need exist to demolish these sites or if impact is unavoidable, it is recommended that the sites be recorded via drawings and photographs by a qualified archaeologist and that a destruction permit be obtained from SAHRA. The recent structure along this section of the road (H28)		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	do not exceed 60 years of age and is therefore not protected under the National Heritage Resources Act (25 of 1999). Because of the high number of heritage sites associated with Route 2, excluding the section shared with Route 1, it is recommended that this route not be considered for the construction of the haul road. However, should this route be selected, it is recommended that the route be adjusted with the help of a qualified archaeologist in order to minimise the impact on heritage resources. This will include the mapping of heritage sites in the general surroundings of Route 2 when the vegetation is not as dense. • The following sites are located along the shared section between Routes 1 & 2 towards the north: H19-H25. These sites consist of six LIA / Farmer sites and one historical site. Because these sites are located in close proximity to the proposed haul road, they will most likely be impacted. Therefore, it is recommended that this section of the route be adjusted with the aid of a qualified archaeologist to avoid destruction of heritage resources. Should this not be possible a qualified archaeologist should properly record the sites via detailed site plans and photographic record. A destruction permit must also be obtained from SAHRA. • Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)). • Should the need arise to expand the development beyond the surveyed area mentioned in this study, the following applies: a qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated areas which will be affected by the expansion, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites. • From a heritage point of view, construction of the haul road may proceed, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.		
Soil Management Report	The soil and agricultural potential investigation identified that approximate 260ha of the Project footprint can be characterised as having soil with a moderate to high potential for		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	arable agriculture; however, utilisation of these soils for crop production is limited in the vicinity of the Project Site. It is anticipated that, due to the scale of soil removal and infrastructure establishment, the mining project will result in the highest negative impact to agricultural potential in the mining area. If proper mitigation measures (such as stockpiling and utilizing the minimum possible footprint) are put in place, the impact can be reduced, although a long-term reduction in agricultural potential is likely. Rehabilitation is a complicated and sometimes unpredictable process, with restoration of arable potential unlikely.		
Invasive Alien Management Plan	Follow-up inspections are required in order to establish whether follow-up operations are required. It is preferable to follow up on an area and remove all seedlings or treat resprouting plants, rather than treat a new area. Therefore, follow-up should commence as soon as the initial control has been done to prevent coppice and further infestation by other problematic plants. The rehabilitation measures such as replanting should be implemented. It is important that concurrent to alien plant species removal, the soil should be revegetated immediately. This is particularly important where large area is cleared. The revegetation should be a choice of indigenous vegetation compromise of herb layer, young and established indigenous trees and shrubs instead of seeds. Furthermore, the monitoring and maintenance is necessary to ensure that the indigenous plants are establishing themselves and no trace of alien re-infestation or new infestation is		

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
	observed at the site. This is important due to the ability of alien invasive plants being dormant in the soil until favourable conditions allow them to sprout and germinate. The removal methods herewith should be stringently undertaken to ensure that alien invasive plant species are effectively removed. N.B. Ensure that your operation has received approval from the relevant authority. Accurate records of maintenance actions and associated costs should be compiled to assist with future planning.		

Attach copies of Specialist Reports as appendices – ***Please refer to Appendix 8***

j) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

Table 29: Summary of Environmental Impacts

NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
PREFERRED ALTERNATIVE – CONSTRUCTION PHASE		
GEOLOGY AND SOILS	Loss of topsoil	Very Low (-)
	Contamination of soils through: • Indiscriminate disposal of construction waste; and • Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles and other chemicals from construction activities e.g. paints.	Very Low (-)
	Vehicle and personnel as well as storage of materials, equipment and stockpiling compaction and degradation impacts.	Very Low (-)
HYDROLOGY GROUNDWATER SURFACE WATER	Stormwater, erosion and siltation impacts due to a lack of implementing temporary measures to manage stormwater run-off quantity and quality during the construction phase.	Very Low (-)
	Contamination of stormwater runoff and ground water, caused by: • Spills and leaks of cement; • Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; and • Other chemicals from construction activities e.g. paints.	Very Low (-)
	Altered drainage patterns and stormwater runoff flows.	Low (-)
	The runoff from the haul road area following rainfall may be contaminated due to the transport activities and may contaminate surface water.	Very Low (-)
BIOLOGICAL FAUNA AND FLORA EXISTING LAND USE	Potential decrease in significant sensitive biodiversity on the study and surrounding area.	Medium (-)
	Spreading of alien invasive species and bush encroachment of indigenous species.	Very Low (-)
	Impact on natural migratory routes and faunal dispersal patterns.	Medium (-)
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	Very Low (-)
	Potential loss of vegetation type, ecologically important species and species of conservation concern.	Medium (-)

NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
EXISTING LAND USE	Loss of land for other purposes e.g. cultivation.	Low (-)
ARCHAEOLOGICAL/ HERITAGE RESOURCES	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	Very Low (-)
VISUAL	Visibility from sensitive receptors / visual scarring of the landscape as a result of the construction activities.	Low (-)
NOISE AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of construction vehicles and equipment.	Very Low (-)
	Added impact of security lighting on surrounding landowners and nocturnal animals.	Very Low (-)
AIR QUALITY	Increased dust pollution due to vegetation clearance and construction vehicles and activities.	Very Low (-)
	Windborne dust (soil) and vehicle fumes and particulate matter PM10, altering air quality.	Very Low (-)
WASTE	Generation of additional general waste, litter and building rubble and hazardous material during the construction phase.	Very Low (-)
SERVICES	Need for services i.e. water, electricity and sewerage systems during the construction phase causing additional strain on natural resources and service infrastructure.	Very Low (-)
TRAFFIC HEALTH AND SAFETY	The change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, busses and other heavy vehicles.	Very Low (-)
HEALTH AND SAFETY	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life to construction workers and surrounding landowners, visitors and workers.	Very Low (-)
	Increased risk to public and worker safety: If not fenced off, the public and workers may fall into excavated areas and trenches.	Very Low (-)
SOCIO-ECONOMIC	Positive: Potential creation of short term employment opportunities for the local communities, during the construction phase.	Low (+)
PREFERRED ALTERNATIVE – OPERATIONAL PHASE		
GEOLOGY AND SOILS	Soil erosion and soil compaction by heavy duty vehicles on site.	Low (-)
	Contamination of soils through:	Very Low (-)

NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
	- Indiscriminate disposal of waste; and - Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles and other chemicals from operational and maintenance activities e.g. paints.	
HYDROLOGICAL SURFACE WATER AND GROUNDWATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	Very Low (-)
	Contamination of stormwater runoff, caused by: - Sediment release; - Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles; - Other chemicals from maintenance activities e.g. paints; and - Effluent discharges, due to a lack of stormwater management and system maintenance.	Very Low (-)
BIOLOGICAL FAUNA AND FLORA	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	Very Low (-)
	Spreading of alien invasive species and bush encroachment of indigenous species.	Very Low (-)
EXISTING LAND USE	Possibility of transport activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	Very Low (-)
ARCHAEOLOGICAL/HERITAGE RESOURCES	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	Very Low (-)
VISUAL	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the haul road.	Low (-)
	Visibility of solid domestic and operational waste.	Low (-)

NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
NOISE, VIBRATION AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of the haul road..	Low (-)
	Disturbance due to vibrations caused by vehicles.	Very Low (-)
	Impact of security lighting on surrounding landowners and animals.	Very Low (-)
AIR QUALITY	Increased dust pollution (soil and ore fines), vehicles on gravel roads.	Very Low (-)
	Increased windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10, altering air quality.	Very Low (-)
WASTE (INCLUDING HAZARDOUS WASTE)	Generation and disposal of additional general waste, litter and hazardous material on or around the haul road.	Very Low (-)
SERVICES	Need for services e.g. water, electricity and sewerage systems, causing additional strain on natural resources and service infrastructure.	Very Low (-)
TRAFFIC	The change in the traffic patterns as a result of increased traffic entering and exiting the operations on the surrounding road infrastructure and existing traffic.	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on an adjacent to the study area including cars and heavy vehicles.	Very Low (-)
HEALTH AND SAFETY	Possibility of mining activities and workers causing veld fires, which can potentially cause injury and or loss of life to mine workers and surrounding landowners, visitors and workers.	Very Low (-)
	Increased risk to public health and safety: Dangerous areas including the waste management activities and waste poses health risks and possible loss of life to mine workers and visitors to the site.	Very Low (-)
SOCIO-ECONOMIC	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	Low (-)
	Economic impact should there be an incident of public health and safety.	Very Low (-)
	Positive: Extended employment provision.	High (+)
	Positive: Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Medium (+)
PREFERRED ALTERNATIVE – DECOMMISSIONING PHASE		
GEOLOGY AND SOILS	Soil compaction by heavy duty vehicles on site.	Low (+)
	Contamination of soils through: • Indiscriminate disposal of waste; and	Very Low (-)

NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
	• Accidental spillage of chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from vehicles.	
HYDROLOGY GROUNDWATER SURFACE WATER	Stormwater, erosion and siltation impacts due to a lack of implementing measures to manage stormwater run-off quantity and quality during the closure phase.	Very Low (-)
	Contamination of stormwater runoff and groundwater, caused by: • Sediment release; • Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from heavy duty vehicles; • Effluent discharges, due to a lack of stormwater management.	Very Low (-)
BIOLOGICAL FAUNA AND FLORA	Disturbance and loss of fauna through noise, light and dust pollution as well as hunting, trapping and killing of fauna.	Very Low (-)
	Spreading of alien invasive species and bush encroachment of indigenous species.	Very Low (-)
VISUAL	Visibility from sensitive receptors / visual scarring of the landscape as a result of the closure and rehabilitation activities.	Low (+)
	Visibility of solid domestic and operational waste.	Low (+)
NOISE, VIBRATION AND LIGHTING	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of heavy duty vehicles and equipment.	Very Low (-)
	Disturbance due to vibrations caused by heavy duty vehicles.	Very Low (-)
	Impact of security lighting on surrounding landowners and animals.	Very Low (-)
AIR QUALITY	Dust (soil and ore fines) pollution due to rehabilitation activities and heavy duty vehicles.	Very Low (-)
	Windborne dust (soil and ore fines) and vehicle fumes and particulate matter PM10, altering air quality.	Very Low (-)
WASTE	Temporary storage of construction materials and maintenance of the road (including but not limited to hydrocarbons) may contribute to groundwater contamination.	Low (+)
SERVICES	Need for additional services i.e. water, electricity and sewerage systems during the closure phase causing additional strain on natural resources and infrastructure.	Very Low (-)
TRAFFIC	The change in the traffic patterns on the surrounding road infrastructure and existing traffic.	Very Low (-)
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars and heavy vehicles.	Very Low (-)

NATURE OF IMPACT	DESCRIPTION OF IMPACT	SIGNIFICANCE POST-MITIGATION
HEALTH AND SAFETY	Possibility of closure activities and workers causing veld fires, which can potentially cause injury and or loss of life to workers and surrounding landowners and visitors.	Very Low (-)
	Increased risk to public health and safety: Dangerous areas including the waste management facilities poses health risks and possible loss of life to mine workers and visitors to the site.	Very Low (-)
	Increased risk to public and worker health and safety.	Very Low (-)
SOCIO-ECONOMIC	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	Low (+)
	Economic impact should there be an incident of public health and safety.	Very Low (-)
	Positive: Sourcing supplies from local residents and businesses boosting the local economy for an extended period of time.	Low (+)
NO-GO ALTERNATIVE		
SOCIO-ECONOMIC	Reduced period of providing employment for local residents and skills transfer to unskilled and semi-skilled unemployed individuals.	Low (-)
	Reduced period of development and upliftment of the surrounding communities and infrastructure.	Low (-)
	Reduced period of development of the economic environment, by job provision and sourcing supplies for and from local residents and businesses.	Low (-)
GENERAL	Positive: No additional negative impacts on the environment.	High (+)

The impact assessment showed that the potential negative impacts resulting from the construction phase are generally low in significance before mitigation with the exception of impact on biodiversity which was assessed as having a high significance.

After mitigation, most impacts have a low or medium significance.One positive impact with a low significance was identified i.e. the creation of short term employment opportunities.

During the operational phase, most negative impacts have a low significance with Biodiversity being high, with two having a very low significance, before mitigation. After mitigation, most negative impacts will have a medium and some impacts a low significance. Two positive socio-economic impacts have been identified, one with a high significance i.e. long term employment creation and one with a medium significance i.e. sourcing supplies from local and regional sources, boosting the economy in the region.

During the closure phase, most negative impacts will have the same significance rating before and after mitigation as for the operational phase.

(ii) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers.

Attach as Appendix 4

(iii) Summary of the positive and negative implications and risks of the proposed activity and identified alternatives;

All alternatives have been assessed and with the advantages and disadvantages of the various alternative options and preferred site layout option described. These positive and negative implications have been described in Table 7 of this report.

k) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr

(Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation).

The EMPr is compiled to provide recommendations and guidelines according to which compliance monitoring can be undertaken during all phases of the development, including the construction, operational and closure phases of the proposed haul road, as well as to ensure that all relevant factors are considered to ensure an environmentally responsible development.

This EMPr informs all relevant parties (the Authority, the Applicant, the Site Manager, the Environmental Site Manager (ESM), the Environmental Control Officer (ECO) and all other staff employed on site), as to their duties in the fulfilment of the legal requirements for the operation of the haul road, with particular relevance to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPR are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

The objectives of the EMPR are to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and / or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPR related activities (mitigation measures) are consistent with the significance of the project's impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or an insignificant level;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Identify measures that could optimise beneficial impacts;
- Create management structures that addresses the concerns and complaints of the Interested and Affected Parties (I&APs) with regards to the development;
- Establish a method of monitoring and auditing environmental management practises during all phases of the activity;
- Ensure that safety recommendations are complied with; and
- Specific time periods within which the measures contemplated in the final EMPR should be implemented, where appropriate.

The point of departure for the EMPR is to ensure a proactive rather than a reactive approach to environmental performance by addressing potential problems before they occur. This will limit corrective measures needed. Therefore the purpose of an EMPR is to provide management measures that should be implemented by the Applicant, the Site Manager, the Environmental Site Manager (ESM), the Environmental Control Officer (ECO) and all other staff employed on site, to ensure that the potential impacts of a proposed development are minimised. It should also be ensured that the EMPr is maintained and upheld as a dynamic document in order for the project team to add or improve on issues that might be considered left out or not relevant to the project. In such instances the approving authority may authorise the ECO to make such changes.

l) Final proposed alternatives

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment).

Proposed alternatives were discussed in PART A Section 3 (g) (i) of this document, and the positive and negative impacts of the alternatives and preferred option are described and assessed in Tables 24 – 26 of this report. The preferred infrastructure option is shown on the mining section layouts included in Appendix 4.The process followed by the EAP to assess, minimise and avoid impacts is provided in Part A Section 3 (h) of this report.

m) Aspects for inclusion as conditions of Authorisation

(Any aspects which have not formed part of the EMPR that must be made conditions of the Environmental Authorisation).

Please refer to Part A, Section 3, p) ii) of this report.

n) Description of any assumptions, uncertainties and gaps in knowledge

(Which relate to the assessment and mitigation measures proposed).

- All information provided to the environmental team by the applicant and I&APs was correct and valid at the time that it was provided;
- The investigations undertaken by specialists during the BA process, indicate the development site as suitable and technically acceptable;
- It is not always possible to involve all I&APs individually however, every effort has been made to involve as many affected stakeholders as possible;
- The information provided by the applicant and specialists was accurate and unbiased; and
- The scope of this investigation is limited to assessing the environmental impacts associated with the construction, operation and closure phases of the proposed activity.

o) Reasoned opinion as to whether the proposed activity should or should not be authorised

(i) Reasons why the activity should be authorised or not

Based on the findings of the environmental impact assessment, the EAP is of the opinion that the proposed development be approved, due to the positive social and economic impacts for the local and regional communities that may occur as a result of the Mareesburg Mine starting up operations and the upgrade of the existing gravel road. The potential negative impacts can be mitigated to acceptable levels, provided that the mitigation measures are strictly implemented and monitored.

In general, it is recognised that the proposed haul road associated with the Mareesburg Mine has the potential to pose various risks to the environment as well as to the residents or businesses in the surrounding area. However, based on the findings of this EIA documented in this report, all impacts can be mitigated to acceptable levels. Furthermore, the proposed activities will be located on previously disturbed land.

This report shows that the proposed development has the potential to provide many socio-economic benefits to the local and regional communities. The EAP therefore recommends that the proposed activities be approved on condition that the EMPR is strictly implemented and monitored for compliance. Should the activities not be approved, Mareesburg Mine will not be able to commence mining and resources will not be utilised to its full economic potential and losing the ability of the mine to provide socio-economic benefits to the local and regional communities and the country as a whole.

(ii) Conditions that must be included in the authorisation

(1) Specific conditions to be included into the compilation and approval of EMPR

- The EMPR is a contractual document and must be implemented at the Mareebsurg Mine at all times;
- An independent environmental control officer (ECO) must be appointed to monitor the implementation of the EMPR and audit reports kept by the applicant;
- All contractors and employees of Lions Head Platinum, must be made aware of the EMPR and its requirements as well as the impact of not implementing the measures of the EMPR;
- Copies of the EMPR, Environmental Authorisation, Mining Right and Waste Management License, as well as the Water Use License and any emergency procedures and method statements, must be kept on site and be available on request of the Competent Authority.

(2) Rehabilitation requirements

Mineral right holders (Holders) are currently required to comply with the financial provision requirements under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). In

November 2015 new Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, November 2015 (GNR 1147) were promulgated in terms of NEMA, regulations.

The requirements for a final rehabilitation, decommissioning and mine closure plan, are outlined in Appendix 4 of the Regulations (GNR 1147) are to identify a post mining land use that is feasible through the following:

(a) Providing the vision, objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;
(b) Outlining the design principles for closure;
(c) Explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
(d) Detailing the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
(e) Committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
(f) Identifying knowledge gaps and how these will be addressed and filled;
(g) Detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and
(h) Outlining, monitoring, auditing and reporting requirements.

q) Period for which the Environmental Authorisation is required.

The authorisation for the haul road is required for 32 years (2017 to 2049).

r) Undertaking

(Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme report).

s) The undertaking required in terms of this report is provided in the EMPR in Part B Section 2 of this document and is applicable to both the Environmental Impact Assessment Report (Part A) and the Environmental Management Programme report (Part B). **Financial Provision**

(State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation).

A closure assessment report was conducted in 2016. This report provided the closure liability of the Mareesburg operation, escalated with a Consumer Price Index (CPI) rate of 5.9% (as reported by Stats SA (www.statssa.gov.za) over 2015 – 2016, as at October 2016). This escalation is conducted in accordance with the requirements of the Minerals and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA) [as amended]. This assessment specifically reflects on 17.5 ha of opencast scheduled liability reported in the approved EMPR of planned Mareesburg operation as requested for by the DMR in 2015.

The methodology employed includes site visits, and the verification and updating of itemised components. This included the use of two approaches: firstly; the DMR rules based approach and secondly; an experiential approach adopted by Barplats in 2013. Two scenarios are therefore reported on which provides the bandwidth of required financial provisions, for the Mareesburg mining area only the DMR rule based approach is utilised. The 2016 liability calculated at R 1 111 149.04 based on the DMR rule based approached.

The full closure report is attached in XXX

(i) Explain how the aforesaid amount was derived

The financial provision amount was calculated utilising the methodology as prescribed by the Guideline Documents for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine issued by the DMR.

ii) Confirm that this amount can be provided for from operating expenditure.

(Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

It is confirmed that the amount for financial provision is anticipated to be an operating cost and is provided for as such in the Mine Works Programme for the Mareesburg Mines

t) Deviations from the approved scoping report and plan of study.

(i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks.

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation).

Not applicable. No deviations.

(ii) Motivation for the deviation

Not applicable.

u) Other Information required by the competent Authority

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

(1) Impact on the socio-economic conditions of any directly affected person.

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

The proposed activities will be undertaken on land owned by Lions Head Platinum (Pty) Ltd and is also the occupier of the land and therefore will have no direct impacts on the socio-economic conditions of any directly affected persons. There are also no land restitution claims on the properties where the existing and proposed activities applied for are and will be located.

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

Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated

in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as ***Appendix 2.19.2*** *and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).*

Sites of heritage significance falling within the mine area were identified and evaluated according to the evaluation criteria of the National Heritage Resources Act. The following significant sites were identified:

- **2535AA-MHC001**

A highly eroded Iron Age site was identified at this location. Cultural material was found to be scattered over a large area and consisted of numerous lower grindstones of a roughly oval shape and a high density of weathered ceramics. Several dilapidated small stone foundations were visible along with low terrace walling. No distinctive markings were found on the ceramics classifying them as mostly un-diagnostic. Two highly fragmented shards were found with characteristic Early Moloko decoration.

Early Moloko ceramics date to between 1200 and 1400 AD. Stonewalling is usually not found on Early Moloko sites therefore the site MHC001 can be a multi-component archaeological site. The relationship between the stonewall features and the Moloko ceramics is an important element of this site. This relationship needs to be clarified through small test excavations before the site is disrupted. Due to there being very few Early Moloko sites recorded and investigated in the surrounding area of the Dwarsrivier Valley, the site is of medium significance.

- **2530AA-MHC002**

A small circular shaped stone walled enclosure on a flat rock bed was identified at this location. This structure is also associated with the Iron Age. The enclosure is roughly one meter in diameter. The feature is highly dilapidated. Cultural material found in the area consists of an upper grinding stone. The site is of low significance on its own. If this structure can be linked to the other Iron Age site (MHC001) that was identified, then it will constitute a higher significance to the site.

- **2530AA-MHC004**

The site is characterised by numerous low stone walls forming low terraces and enclosures. The feature shows the same characteristics as some of the stone wall features found at site MHC001. Other features on the site are grain bin foundations, scatters of ceramic shards and upper grinding stones. If the site is impacted upon, the relationship between the stonewall features and the Moloko ceramics needs to be clarified through small test excavations. The site is of medium significance.

Procedures to be followed in the event of discovering new artefacts or features on the application properties are provided in the EMPR.

v) Other matters required in terms of sections 24 (4) (a) and (b) of the Act

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

The EAP included all aspects as required by the EIA regulations, 2014 for the BA and EMPR as described in the Executive Summary of this report. Please refer to Part A Section 3 (g) and Table 7, for a description and analysis of alternatives considered as part of this application.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme.

a) Details of the EAP

(Confirm that the requirement for the provision of the details and expertise of the EAP are already included in PART A, section 1(a) herein as required).

Please refer to Part A Section 3 a) i) and ii).

b) Description of the Aspects of the Activity

(Confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental management programme is already included in PART A, section (1) (h) herein as required).

Please refer to Part A Section 3 b) and d).

c) Composite Map

(Provide a map (Attached as an Appendix) 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)

The composite map is included as Appendix 4.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives.

(Ensure that the closure objectives are informed by the type of environment described in 2.4 herein)

Management objectives

- Creating a free draining post mining landscape that has been returned to a productive and safe post-mining land use;
- Creating a landscape that will prevent erosion in the long term;
- Creating a landscape that will reconnect fragmented habitats and increase biodiversity on the properties by rehabilitating and improve disturbed wetland and riparian areas;
- The closure objective regarding surface and groundwater is zero discharge of contaminated water to the environment and long term monitoring of water quality that may be impacted on by waste activities; and
- Creating post-mining employment opportunities for mine workers.

ii) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

The impacts of each activity are explained and described in Table 21– Table 24. Each identified potential impacts associated with each project phase and applicable management measures are provided, in order to ensure that risks and impacts are prevented or minimised. These management measures address the potential for environmental damage, pollution and treatment of water. The measures also include the process for managing extraneous water, which are also discussed in detail in the Integrated Water and Waste Management Plan submitted and to be approved by the Department of Water and Sanitation.

iii) Potential risk of Acid Mine Drainage.

(Indicate whether or not the mining can result in acid mine drainage).

The haul road will not result in acid mine drainage.

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage.

The construction and/or operation of the haul road will not result in acid mine drainage.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage.

The mining and/or construction of the haul road will not result in acid mine drainage.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage.

The mining and/or construction of the haul road will not result in acid mine drainage.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation.

Please refer to

Table **30** below.

Table 30: Section 21 Activities applied for in terms of the National Water Act (Mareesburg Section)

Water use in terms of Section 21 of the NWA	Purpose	Capacity/ Volume (m^3 , tonnes and/or m^3 /annum)	Property Description	Co-ordinates
Section 21 (c) and (i): impeding or diverting the flow of water in a watercourse; and altering the beds, banks, course or characetristics of a watercourse	Existing stream crossing which will form part of the road upgrade.	N/A	Portion 2 of the Farm Vygenhoek, 10 JT	25° 3'45.06"S 30° 9'43.69"E
	Existing stream crossing which will form part of the road upgrade.		Portion 4 of the Farm Vygenhoek, 10 JT	25° 4'20.67"S 30° 9'45.26"E
	Existing stream crossing which will form part of the road upgrade.		Portion 12 of the Farm Schaapkraal, 42 JT	25° 6'13.16"S 30°10'51.68"E
	Existing stream crossing which will form part of the road upgrade.		Portion 8 of the Farm Schaapkraal, 42 JT.	25° 6'45.49"S 30°10'35.07"E

viii) Has a water use licence has been applied for?

ENVASS as the independent consultant is currently engaged in Phase 2 of a water use licence application for Section 21 (c) and (i) under the NWA.

ix) Impacts to be mitigated in their respective phases

Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
(as listed in 2.11.1)	of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	(volumes, tonnages and hectares or m^2)	(describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	(A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.

Please refer to Table 27 for the above requested information.

Table 31: Measures to rehabilitate the environment affected by the undertaking of any listed activity, impact management outcomes, and impact management actions for Mareesburg

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
Construction Phase: **Site preparation:** Clearing of vegetation from Haul Road footprints; Installing required concrete stormwater management additions (such as culverts and roadside drainage regulators)	Loss of topsoil	**Prevent and reduce through management measures.** **Stripping of topsoil:** • Clearing of mining areas to take place a maximum of one month prior to intended mining in the area; • Stripping of topsoil will not take place during rain or excessive wind; and • The top 30 cm of vegetation and topsoil is to be stripped from the area to be mined. **Storage of topsoil / overburden:** • Topsoil (top 30cm) is to be stored in predetermined topsoil berms, (+/- 5m) outside the boundary of the specific area; • The topsoil berm must not be located in any area demarcated for future mining or haul roads; and • Topsoil stockpiles will be restricted to 1.5 to 2m in height. **Maintenance and monitoring of topsoil stockpiles:**	Impact avoided. All topsoil used in concurrent rehabilitation. Rehabilitation objectives and standards	Rehabilitation objectives and standards	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• The mine should aim to use the stored topsoil as soon as possible • Monthly visual inspections to be conducted.			
	Contamination of soils	**Prevent and reduce and remedy through management measures.** • All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks; • All leaks will be cleaned up immediately using an absorbent material and spill kits, in the prescribed manner; and • The approved Integrated Water and Waste Management Plan to be implemented. ***Hydrocarbons and hazardous waste*** • All hazardous waste generated shall be kept separate and shall not be mixed with general waste; and • All hazardous waste shall be stored within a sealed drum on an impermeable surfaced area within the central waste storage and transition area.	Impact avoided. No signs of soil contamination and loss of topsoil due to contamination. Meet rehabilitation objectives and standards.	Rehabilitation objectives and standards Spill procedure Approved IWWMP Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended] • Section 2 Declaration of grouped hazardous substances; - Section 9 (1) Storage and handling of hazardous chemical substances - Section 18 Offences Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995)	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
				- Section 4 Duties of persons who may be exposed to hazardous chemical substances SANS 10234: 2008: Globally Harmonized System of classification and labelling of chemicals (GHS)	
	Soil compaction and degradation through vehicles driving and employees walking over open areas, as well as compaction through stockpiling.	**Prevent and reduce and remedy through management measures.** • Activity should be limited to area of disturbance. Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants; and • Soils compacted, should be deeply ripped at least to a depth of 300mm to loosen compacted layers and re-graded to even running levels.	Impact avoided. No signs of compaction of soil. Meet rehabilitation objectives and standards.	Rehabilitation objectives and standards	Construction Phase
	Stormwater, erosion and siltation impacts	**Prevent, reduce and remedy through management measures.** • The Site Manager (SM) should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system; • Appropriate measures, e.g. construction of silt traps, or drainage retention areas to prevent silt	Temporary stormwater management measures in place during the construction phase. Silt traps and drainage retention areas constructed	Rehabilitation objectives and standards Approved IWWMP Approved Storm Water Management Plan	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		and sand entering drainage or watercourses should be taken; • No wastewater may run freely into any of the surrounding naturally vegetated areas; • The loss of topsoil must be minimised; • Erosion and subsequent siltation must be limited; • Any drainage channels shall be suitably designed to ensure that erosion does not occur; • All areas susceptible to erosion shall be protected and stabilisation measures implemented: • Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies; • Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and • A stormwater management plan must be compiled and approved by DWS and implemented.	and in working order. Cleaned regularly. Rehabilitation objectives and standards.	GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	
	Contamination of stormwater runoff and ground water, caused by: • Spills and leaks of cement;	**Prevent and reduce through management measures.** In accordance with Government Notice 704 (GN 704), the onsite management should: • Keep clean and dirty water separated; • Contain any dirty water within a system; and	Impact avoided. Surface water and ground water monitoring results show acceptable levels of parameters tested.	Rehabilitation objectives and standards Approved IWWMP	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	• Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; and • Other chemicals from construction activities e.g. paints.	• Prevent the contamination of clean water. In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum: • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • All temporary storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the construction period; • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented; • Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed throughout the site; • Use of bunds or traps to ensure full containment of hydrocarbon and other hazardous materials are mandatory; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited;	Meet rehabilitation objectives and standards	Approved Storm Water Management Plan GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998) Spill procedure	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Stormwater leaving the site must in no way be contaminated; • Ensure good housekeeping practices; • Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and • Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications.			
	Altered drainage patterns and stormwater runoff flows.	**Control through management measures.** A stormwater management plan including stormwater management measures during all phases of the proposed development will be compiled by a suitably qualified person. The plan is to include a detailed description of the stormwater management plan, incorporating appropriate maps; Alternatively, should there be an existing stormwater management plan, this plan should be amended to include all phases of the of the existing and proposed waste management activities and facilities.	Rehabilitation objectives and standards Meet objectives of storm water management plan.	Rehabilitation objectives and standards Approved IWWMP Approved Storm Water Management Plan GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	Construction Phase
	Runoff from the plant area following rainfall may be contaminated due to the mining activities and may contaminate surface water.	**Contamination of stormwater runoff and ground water, caused by:** In accordance with Government Notice 704 (GN 704), the onsite management should: • Keep clean and dirty water separated; • Contain any dirty water within a system; and • Prevent the contamination of clean water.	Rehabilitation Objectives and Standards Meet objectives of storm water management plan.	Rehabilitation objectives and standards Approved IWWMP Approved Storm Water Management Plan	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		Also refer to mitigation measures above regarding storm water management.		GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	
	Potential decrease in biodiversity on the study and surrounding area.	**Reduce through management measures.** • Only vegetation falling directly in demarcated access routes or project sites should be removed; • No further vegetation clearance except for the removal of alien invasive species will be allowed; and • All remaining indigenous vegetation should be conserved wherever possible	Rehabilitation Objectives and Standards Alien and invasive vegetation management plan implemented and outcomes achieved. Proof of alien vegetation control. No listed species visible on the site.	Alien and Invasive Species Management Plan Rehabilitation Objectives and Standards Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014) - Notice 2 Exempted Alien Species in terms of Section 66 (1) - Notice 3 National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11 - Notice 4	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
				Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12	
	Potential loss of vegetation type, ecologically important species and species of conservation concern.	**Prevent and reduce through management measures.** • Should the Southern African Python, Giant Bullfrogs or herpetological species be found, these should be relocated to a natural area. This is to be done by a suitably qualified herpetologist; • Any sensitive herpetofauna inadvertently killed during earth moving activities, should be preserved as museum voucher specimens; • Any stormwater cut-off channels should be kept as natural as possible with gentle slopes (45° angle or less) on the side away from mining activities. Channels should also have rough surfaces and rocks, less "curvature" on the walls to enable smaller animals to escape. A "step" in the slope of the walls and a "lip" on the edge of the channel will deter animals from entering the channels; • Only vegetation falling directly in demarcated access routes or project sites should be removed; • No further vegetation clearance except for the removal of alien invasive species will be allowed; and	Rehabilitation Objectives and Standards Alien and invasive vegetation management plan implemented and outcomes achieved. Proof of alien vegetation control. No listed species visible on the site.	Alien and Invasive Species Management Plan Rehabilitation Objectives and Standards Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 599 of 2014) - Notice 2 Exempted Alien Species in terms of Section 66 (1) - Notice 3 National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11 - Notice 4 Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• All remaining indigenous vegetation should be conserved wherever possible.			
	Spreading of alien invasive species and bush encroachment of indigenous species.	**Prevent and control through management measures.** • An alien vegetation management plan should be compiled and implemented; • Regular removal of invasive alien species should be undertaken. This should extend through to the closure phase of the project; and • No spreading of alien vegetation onto adjacent properties should be allowed.	Rehabilitation Objectives and Standards Alien and invasive vegetation management plan implemented and outcomes achieved. Proof of alien vegetation control. No listed species visible on the site.	Alien and Invasive Species Management Plan Rehabilitation Objectives and Standards Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 864 of 2016) - Notice 2 Exempted Alien Species in terms of Section 66 (1) - Notice 3 National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11 - Notice 4 Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	Impact on natural migratory routes and faunal dispersal patterns.	**Reduce and control through management measures.** Reduce the levels of disturbance on areas indicated by the Environmental Control Officer (ECO) as migratory routes, if any.	Migratory routes, if any, maintained. Rehabilitation Objectives and Standards	Rehabilitation Objectives and Standards	Construction Phase
	Disturbance and loss of fauna through noise, light and dust pollution and hunting, trapping and killing of fauna.	**Reduce through controlling measures.** • Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; • Any animals rescued or recovered will be relocated in a suitable habitat away from the mining operations and associated infrastructure; • Any lizards, snakes or monitors encountered should be allowed to escape to a suitable habitat away from disturbance. • No reptile should be intentionally killed, caught or collected during any phase of the project; and • General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area.	Rehabilitation Objectives and Standards. No incidents of unnatural fauna mortalities.	Environmental Awareness Plan	Construction Phase
	Loss of land for other purposes e.g. cultivation.	Rehabilitation measures to ensure a suitable post-mining land use.	Meet Rehabilitation Objectives and Standards.	Rehabilitation standards and objectives	Construction Phase
	Alteration of archaeological, historical and palaeontological resources	• Should culturally significant material or skeletal remains be exposed during development and construction phases, all activities must be suspended pending further investigation by a	No loss of newly discovered material.	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations.	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	that may be discovered during earthworks.	qualified archaeologist (Refer to the National Heritage and Resources Act, 25 of 1999 section 36 (6)); • Should any objects of archaeological or palaeontological remains be found during construction activities, work must immediately stop in that area and the Environmental Control Officer (ECO) must be informed; • The ECO must inform SAHRA and contact an archaeologist and / or palaeontologist, depending on the nature of the find, to assess the importance and rescue them if necessary (with the relevant SAHRA permit). No work may be resumed in this area without the permission of the ECO and SAHRA; and • If the newly discovered heritage resource is considered significant, a Phase 2 assessment may be required. A permit from the responsible authority will be required.		South African Heritage Resources Agency Guidelines.	
	Visibility from sensitive receptors / visual scarring of the landscape as a result of the construction activities.	**Reduce through controlling management measures.** • Housekeeping on site should be enforced; • Rehabilitation measures such as re-vegetation and plan to be implemented; • Install lights that will not create a night sky glow;	Rehabilitation objectives and standards	Rehabilitation objectives and standards	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Reduce the construction period through careful planning and productive implementation of resources; • Plan the placement of lay-down areas and any potential temporary construction camps in order to minimise vegetation clearing; • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads; • Ensure that rubble, litter and issued construction materials are managed and removed regularly; • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way; and • Reduce and control construction dust through the use of approved dust suppression techniques.			
	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of construction vehicles and equipment.	**Reduce through controlling measures.** • Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible; • Heavy vehicle traffic should be routed away from noise sensitive areas where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable	Impact reduced. Records of service of all operational vehicles. Silencers utilised where applicable. All employees wears PPE where required.	Meet the South African National Standard SANS 10103:2008 Meet South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites.	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the Site Manager (SM) should liaise with local residents and how best to minimise impacts, and the local population should be kept informed of the nature and duration of intended activities; • The SM should take measures to discourage labourers from loitering in the area, causing noise disturbance; • Proper design of the plant areas and machinery where measures are taken to prevent noise generation such as silencers, mufflers and sound suppressing enclosures for parts/processes which can generate noise; • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise; • Noise breaking barriers can be erected such as netting, walls or high growing trees; and • Placement of noise generating activities can be planned as far away as possible from affected areas or persons.		Meet the requirements of the Mine Health and Safety Act (Act 29 of 1996)	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	Security lighting on surrounding landowners and nocturnal animals.	• Unnecessary lights should be switched off during the day and / or night to avoid light pollution; • If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surrounding community; • Install lights that will not create a night sky glow; and • Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards.	Lights installed according to the design report.	Design Report	Construction Phase
	Increased dust pollution due to vegetation clearance and construction vehicles and activities.	**Reduce through controlling measures.** • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) / when visible dust plume is present; • Ensure that stockpile height is kept to a minimum and that any stockpiling occurs downwind of the stockpiles; • Minimise travel speed on paved roads;	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site.	South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution Meet the requirements of the National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Spray areas to be cleared with water. • Ensure minimum travel distance between working areas and stockpiles. • Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation. • Ensure graded areas are sprayed with water. • Minimise the amount of graded areas. • Ensure that shortest routes is used for material transport. • Load and offload material, as far as possible, downwind of stockpiles. •			
	Windborne dust (soil) and vehicle fumes and particulate matter PM10, altering air quality.	**Reduce through controlling measures.** • Dust suppression shall be implemented during dry periods and windy conditions; • All exposed surfaces should be minimised in terms of duration of exposure to wind and stormwater; • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions (excess of 35km/hr) / when visible dust plume is present; • Ensure that shortest routes are used for material transport;	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site.	South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution Meet the requirements of the National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Ensure that stockpile height is kept to a minimum and that any stockpiling occurs downwind of the stockpiles; • Minimise travel speed on paved roads; • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Spray areas to be cleared with water. • Ensure minimum travel distance between working areas and stockpiles. • Ensure that topsoil for stockpiles is sprayed with water before tipping to prevent dust generation. • Ensure graded areas are sprayed with water. • Minimise the amount of graded areas. • Load and offload material, as far as possible, downwind of stockpiles. •		the National Environmental Management: Air Quality Act 39 of 2004	
	Generation of additional general waste, litter and building rubble and hazardous material during the construction phase.	**Control through management measures.** • The conditions of the Integrated Water Use License (IWUL) and the IWWMP must be implemented. • A central waste storage and transition area shall be established within the site camp; • The central waste storage and transition area shall be surfaced and demarcated appropriately;	Waste management on site visible.	Waste management on site visible. Waste Classification and Management Regulations and Norms and Standards for the assessment of for landfill disposal and for disposal of waste to landfill, 2013 (Government Notice 634 – 635	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Portable wheelie bins shall be placed throughout the site camp as well as at the remainder of the site and at all working areas in the field; • Wheelie bins shall be colour coded and labelled to identify the waste stream for which it is intended; All portable wheelie bins and other containers shall be emptied at the central waste storage and transition area a minimum of once a week as to avoid waste build up; • The waste shall be removed (within 30 days) by a licensed waste service provider as shall be disposed of at a licensed waste landfill site and records of safe disposal (as required for hazardous wastes) shall be supplied to the Contractor. These records shall be kept on site by the ESM. • Wherever possible and practical, waste materials generated on site must be recycled; and • Waste specific (hazardous, timber, steel etc.) mitigation measures to be developed and included in the EMPR.		of 2013) promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] and: Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R. 632 of 2015) SANS 10234: 2008: Globally Harmonized System of classification and labelling of chemicals (GHS)	
	Need for services i.e. water, electricity and sewerage systems during the construction phase causing additional strain on natural	**Reduce through controlling management measures.** • Energy savings measures to be implemented at the mine, e.g.:	Impact avoided. Recycling of used and contaminated water through waste water and sewage treatment and reuse.	-	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	resources and service infrastructure.	➢ No lights to be switched on unnecessarily. Only security lights to be switched on at night; • Energy saving bulbs to be installed; and • Water should be recycled as far as possible to avoid any additional water usage.			
	The change in traffic patterns as a result of traffic entering and exiting the site on the surrounding road infrastructure and existing traffic.	**Reduce through controlling management measures.** • Heavy vehicles should adhere to the speed limit of the road.	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site.	Reduce through controlling measures Set Speed Limits South African Road Signs Manual	Construction Phase
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area including cars, busses and other heavy vehicles.	**Prevent through controlling management measures.** • Drivers will be enforced to keep to set speed limits. • Trucks will be in a road-worthy condition. • Roads and intersections will be signposted clearly. Only main roads should be used; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the mine will be allowed;	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site. South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution Meet the requirements of the National Dust Control	Reduce through controlling measures Set Speed Limits South African Road Signs Manual South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Single directional traffic shall be controlled through a stop-go system or any other appropriate traffic control method; • Mareesburg shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and • All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual	regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004	National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004 Approved dust fall monitoring programme	
	Possibility of construction activities and workers causing veld fires, which can potentially cause injury and or loss of life of construction workers and surrounding landowners, visitors and workers.	**Prevent through controlling management measures.** • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; • The Applicant shall ensure that the basic fire-fighting equipment is available in trucks; Fire response and evacuation • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the contractors and conveyed to all staff on the site'	Mine Health and Safety Act (Act 29 of 1996) An Emergency Plan (including Fire Protection, Response and Evacuation Plan) Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] - Section 12 (1) Duty of the landowner to prevent fire from spreading to neighbouring properties.	Impact avoided. No incidents of fires occurring on site. No one smoking in unauthorised areas. Proof / records of training in terms of the risk of fire and of the emergency management plan.	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Identify major risks to minimise the environmental impacts e.g., air pollution and contaminated effluent runoff.		Basic fire-fighting equipment located in the correct locations on site.	
	Increased risk to public health and safety: Dangerous areas and construction activities poses health risks and possible loss of life to construction workers and visitors to the site. If not fenced off, the public and workers may fall into excavated areas and trenches.	**Prevent through controlling management measures.** • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be drawn up and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid facilities should be available on site at all times; • Workers have the right to refuse work in unsafe conditions; • Material stockpiles or stacks should be stable and well secured to avoid collapse and possible injury to site workers. • Access to excavation must be controlled;	Mine Health and Safety Plan available on site and proof that it is being implemented. Proof of training in awareness of health and safety procedures. Proof / records of health and safety audits available on request. No health and safety incidents reported. Proof / record of stockpile and stacks inspections taking place. Health and safety signs on site at appropriate locations.	Health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996)	Construction Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Excavated areas should be temporarily fenced-off; and • Excavations, such as pipeline excavations, will be backfilled and landscaped as soon as possible.			
	Potential creation of short term employment opportunities for the local communities, during the construction phase.	• Skills training to be in accordance with the approved Social and Labour Plan; • Labourers should initially be sought locally and only regionally if skills are not available; and • The approved Social and Labour Plan should be implemented.	Meet the requirements of the Social and Labour Plan	Social and Labour Plan	Construction Phase
Operational Phase: Transportation/transfer of the waste rock from the shafts Maintenance Loading, hauling and transport Dust Suppression Storage of waste i.e. residue stockpiles	Soil compaction and degradation through vehicles driving and employees walking over open areas	**Reduce and remedy through controlling management measures.** • The approved stormwater management plan must be implemented; • Where required the compacted soils should be disked to an adequate depth and re-vegetated with indigenous plants; and • Soils compacted, should be deeply ripped at least to a depth of 300mm to loosen compacted layers and re-graded to even running levels.	Rehabilitation Objectives and Standards	Rehabilitation Objectives and Standards	Operational Phase
	Contamination of soils.	**Prevent through controlling management measures.** • All vehicles and machinery will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks;	Rehabilitation objectives and standards Approved IWWMP Approved Storm Water Management Plan	Rehabilitation objectives and standards Spill procedure Approved IWWMP	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• All leaks will be cleaned up immediately using an absorbent material and spill kits in the prescribed manner; and • The approved Integrated Water and Waste Management Plan to be implemented. •	GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	Hazardous Substances Act, 1973 (Act 15 of 1973) [as amended] Section 2 Declaration of grouped hazardous substances; - Section 9 (1) Storage and handling of hazardous chemical substances - Section 18 Offences Hazardous Chemical Substances Regulations, 1995 (Government Notice 1179 of 1995). - Section 4 Duties of persons who may be exposed to hazardous chemical substances. SANS 10234: 2008: Globally Harmonized System of classification and labelling of chemicals (GHS)	
	Stormwater, erosion and siltation impacts due to a	**Reduce and remedy through controlling management measures.**	Rehabilitation objectives and standards	Rehabilitation objectives and standards	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	lack of implementing measures to manage stormwater run-off quantity and quality during the operational phase.	• The Site Manager (SM) should ensure that excessive quantities of sand, silt and silt-laden water do not enter the stormwater system; • Appropriate measures, e.g. maintenance of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses should be taken; • No wastewater may run freely into any of the surrounding naturally vegetated areas; • Erosion and subsequent siltation must be limited; • Any drainage channels shall be suitably designed to ensure that erosion does not occur; • All areas susceptible to erosion shall be protected and stabilisation measures implemented; • Packing of sandbags, gabions, straw bales or brush to reduce the speed of water flow where water is scouring the topsoil and results in the formation of erosion gullies; • Any surface runoff generated which has a high suspended solid content shall be collected at the point source in an appropriate containment facility, then be allowed to settle before discharge into the environment; and • A stormwater management plan must be compiled; and should be approved by DWS and implemented.		Approved IWWMP Approved Storm Water Management Plan GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	Contamination of stormwater runoff and groundwater, caused by: • Sediment release; • Chemicals such as hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles; • Other checmicals from maintenance activities e.g. paints; and Effluent discharges, due to a lack of stormwater management and system maintenance.	**Prevent through controlling management measures.** In accordance with Government Notice 704 (GN 704), the onsite management should: • Keep clean and dirty water separated; • Contain any dirty water within a system; and • Prevent the contamination of clean water. In order to achieve these objectives, the following stormwater management measures must be implemented on the site to ensure that that potential stormwater impacts are kept to a minimum: • Clean and dirty stormwater needs to be separated. Dirty stormwater may not be released into the environment and should be contained and treated on site; • The operation and maintenance of the stormwater and waste water containment facilities shall be done in accordance with the requirements of the Integrated Water Use License and Integrated Water and Waste Management Plan (IWWMP); • All storm water infrastructure (if any) on-site shall be maintained and kept clean throughout the operational period; • Immediate reporting of any polluting or potentially polluting incidents so that appropriate measures can be implemented;	Rehabilitation objectives and standards Approved IWWMP Approved Storm Water Management Plan GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	Rehabilitation objectives and standards Approved IWWMP Approved Storm Water Management Plan GN704 Regulations in terms of the National Water Act, 1998 (Act No 36 of 1998)	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Fuel and oil spills shall be treated immediately by appropriate mop-up products. Several hydrocarbon absorption/remediation products (i.e. Spill kits) must be placed at areas along the haul road; • Any contaminated material is disposed of in an appropriate manner and the potential risks associated with such spills are limited; • Stormwater leaving the site must in no way be contaminated by any substance, whether such substance is a solid, liquid, vapour or gas or a combination thereof which is produced, used, stored, dumped or spilled on the premises; • GroundWater monitoring to be conducted in line with the WUL. • Increased runoff should be managed using berms and other suitable structures as required to ensure flow velocities are reduced; and • Removal of spills, rainwater and waste produced during clean-up of the bunds – shall be done in accordance to relevant specifications.			
		•			
		•			
	Disturbance and loss of fauna through noise, light and dust pollution and	**Prevent or reduce through management measures.** • Should the sensitive species be found, these should be relocated to a natural area. This is to be done by a suitably qualified specialist;	Environmental Awareness Plan	Environmental Awareness Plan	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	hunting, trapping and killing of fauna.	• Environmental awareness training should include that no hunting, trapping or killing of fauna are allowed; • Any animals rescued or recovered will be relocated in suitable habitat away from the haul road and associated infrastructure; • Any lizards, snakes or monitors encountered should be allowed to escape to suitable habitat away from disturbance. • No reptile should be intentionally killed, caught or collected during any phase of the project; and • General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area.			
	Spreading of alien invasive species and bush encroachment of indigenous species.	**Prevent and control through management measures.** • An alien vegetation management plan should be compiled and implemented; • Regular removal of invasive alien species should be undertaken. This should extend right through to the closure phase of the project; and • No spreading of alien vegetation onto adjacent properties should be allowed.	Rehabilitation Objectives and Standards Alien and invasive vegetation management plan implemented and outcomes achieved. Proof of alien vegetation control. No listed species visible on the site.	Alien and Invasive Species Management Plan Rehabilitation Objectives and Standards Alien and Invasive Species Regulations (Government Notice 598 of 2014) and Alien and Invasive Species List, 2014 in terms of NEMBA (Government Notice 864 of 2016)	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
				- Notice 2 Exempted Alien Species in terms of Section 66 (1) - Notice 3 National Lists of Invasive Species in terms of Section 70(1) – List 1, 3-9 & 11 - Notice 4 Prohibited Alien Species in terms of Section 67 (1) – List 1, 3-7, 9-10 & 12	
	Possibility of mining activities and workers causing veld fires destroying veld and animals on the study area and on adjacent land, impacting on the livelihood of surrounding land owners and users.	**Prevent and control through management measures.** • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; • The Applicant shall ensure that the basic fire-fighting equipment is available in trucks; and Fire response and evacuation • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff utilizing the haul road; and	Impact avoided. No incidents of fires occurring on site. No one smoking in unauthorised areas. Proof / records of training in terms of the risk of fire and of the emergency management plan. Basic fire-fighting equipment located in the correct locations on site.	Mine Health and Safety Act (Act 29 of 1996) An Emergency Plan (including Fire Protection, Response and Evacuation Plan) Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] - Section 12 (1) Duty of the landowner to prevent fire from spreading to neighbouring properties.	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Identify major risks to minimise the environmental impacts e.g. air pollution and contaminated effluent runoff.			
	Alteration of archaeological, historical and palaeontological resources that may be discovered during earthworks.	• Should culturally significant material or skeletal remains be exposed during development and construction phases, all activities must be suspended pending further investigation by a qualified archaeologist (Refer to the National Heritage and Resources Act, 25 of 1999 section 36 (6)); • The ECO must inform SAHRA and contact an archaeologist and / or palaeontologist, depending on the nature of the find, to assess the importance and rescue them if necessary (with the relevant SAHRA permit). No work may be resumed in this area without the permission of the ECO and SAHRA; and • If the newly discovered heritage resource is considered significant, a Phase 2 assessment may be required. A permit from the responsible authority will be required.	No loss of newly discovered material.	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations. South African Heritage Resources Agency Guidelines.	Operational Phase
	Visibility from sensitive receptors / visual scarring of the landscape and impact on 'Sense of Place' as a result of the visibility of the mining	**Reduce through management measures.** • The structures need to be constructed in such a way that they are stable; • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way; and	Rehabilitation objectives and standards	Rehabilitation objectives and standards	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	site including the haul road and mining activities.	• Rehabilitation of disturbed areas and re-establishment of vegetation.			
	Visibility of solid domestic and operational waste.	**Reduce and control through management measures.** Housekeeping on along the haul road should be enforced.	Rehabilitation objectives and standards	Rehabilitation objectives and standards	Operational Phase
	Nuisance and health risks caused by an increase in the ambient noise level as a result of noise impacts associated with the operation of the haul road's traffic.	**Reduce and control through management measures.** • Vehicles will be regularly serviced to ensure acceptable noise levels are not exceeded. Silencers will be utilised where possible; • Noise levels should be kept within acceptable limits. All noise and sounds generated should adhere to South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies; • The Site Manager (SM) should take measures to discourage labourers from loitering in the area and causing noise disturbance; • Should noise complaints be received, the Applicant must conduct a noise impact assessment;	Impact reduced. Records of service of all operational vehicles. Silencers utilised where applicable. All employees wears PPE where required.	Meet the South African National Standard SANS 10103:2008 Meet South African Bureau of Standards (SABS) specifications for maximum allowable noise levels for construction sites. Meet the requirements of the Mine Health and Safety Act (Act 29 of 1996)	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary noise; • Noise breaking barriers can be erected such as netting, walls or high growing trees; and •			
	Disturbance due to vibrations caused by heavy vehicles	**Reduce and control through management measures.** • Vehicles will be regularly serviced; • Heavy vehicle traffic should be routed away from sensitive areas, where possible; • Regular inspections and maintenance of equipment, vehicles and machinery to prevent unnecessary vibrations.	Impact reduced. Records of service of all operational vehicles.	Meet the requirements of the Mine Health and Safety Act (Act 29 of 1996)	Operational Phase
	Impact of security lighting on surrounding landowners and animals.	**Reduce and control through management measures.** • Unnecessary lights should be switched off during the day and / or night to avoid light pollution; • If lighting is required, the lighting will be located in such a place and such a manner so as to minimise any impact on the surrounding community; • Security lighting should be designed in such a way as to minimise emissions onto undisturbed areas on site and neighbouring properties. Light fittings should face downwards;	Lights installed according to the design report.	Design Report	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer; • Shielding the sources of light by physical barriers (vegetation, or the structure itself); • Limiting mounting heights of lighting fixtures by specifying foot-lights or bollard level lights; • Making use of minimum lumen or wattage in fixtures; • Making use of down-lighters or shielded fixtures; and • Making use of energy efficient lighting or other types of low impact lighting.			
	Increased dust pollution (soil and ore fines), vehicles on gravel roads and storage of waste rock	**Reduce and control through management measures.** • Dust suppression shall be implemented during dry periods and windy conditions; • Minimise travel speed on paved roads; • Implement monthly site inspection to check for possible areas of dust generation not addressed or not effectively managed; • Ensure the access roads are all well maintained in terms of surface and especially dust suppression. • Ensure that shortest routes are used for material transport. • Spray unpaved roads with water/dust binding materials and limit travel speed to a minimum.	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site. Dust fallout and Particulate Matter (PM) levels may not exceed the limits as set out in the Dust Control Regulations above.	South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Minimise travel speed on paved roads. •			
	Increased windborne dust (soil and ore fines), vehicle fumes and particulate matter PM10, altering air quality.	**Reduce and control through management measures.** Refer to mitigation measures above.	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site. Dust fallout and Particulate Matter (PM) levels may not exceed the limits as set out in the Dust Control Regulations above.	South Africa National Standard 1929:2005: Ambient Air Quality: Limits for common pollution National Dust Control regulations, 2013, as published in the Government Gazette (No. 36974) of 1 November 2013 (GNR 827 of 1 November 2013), in terms of the National Environmental Management: Air Quality Act 39 of 2004	Operational Phase
	Generation and disposal of additional general waste, litter and hazardous material during the operational phase	**Reduce and control through management measures.** • Mine management will compile all rehabilitation plans. After the plans are approved by the competent authority, they will be implemented. • The closure strategy will be re-assessed. •	Waste management on site visible. Waste Classification and Management Regulations and Norms and Standards for the assessment of for landfill disposal and for disposal of waste to landfill,	Approved IWWMP Waste Classification and Management Regulations and Norms and Standards for the assessment of for landfill disposal and for disposal of waste to landfill, 2013 (Government Notice 634 – 635	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
			2013 (Government Notice 634 – 635 of 2013) promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] and: Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R. 632 of 2015) SANS 10234: 2008: Globally Harmonized System of classification and labelling of chemicals (GHS) Above standards achieved.	of 2013) promulgated in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) [as amended] and: Regulations regarding the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R. 632 of 2015)	
	Need for services e.g. water, electricity and sewerage systems, causing additional	**Reduce and control through management measures.**	Impact avoided. No groundwater abstraction for activities.	-	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	strain on natural resources and service infrastructure.	• Energy savings measures to be implemented along the haul road, e.g.: ➢ No lights to be switched on unnecessarily. Only security lights to be switched on at night; • Energy saving bulbs to be installed; and • Water should be recycled as far as possible to avoid any additional water usage.			
	The change in the traffic patterns as a result of increased traffic entering and exiting the operations on the surrounding road infrastructure and existing traffic.	**Reduce and control through management measures.** • Heavy vehicles should adhere to the speed limit of the road.	Impact reduced. Speed limit roads signs, complying with the South African Road Signs Manual on site.	Legal speed limits South African Road Signs Manual	Operational Phase
	Nuisance, health and safety risks caused by increased traffic on and adjacent to the study area.	**Prevent through management measures.** • Drivers will be enforced to keep to set speed limits. • Trucks will be in a road-worthy condition. • Roads and intersections will be signposted clearly. Only main roads should be used; • Vehicles should adhere to the speed limit of the road; • Heavy vehicles should always travel with their head lights switched on; • Heavy vehicles should not stop on the road to pick up hitchhikers – No stopping on the road approaching the mine will be allowed;	See standard above.	Legal speed limits South African Road Signs Manual	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
		• Mareesburg shall be responsible for ensuring that suitable access is maintained for public traffic to all relevant businesses and properties; and • All traffic accommodation measures are to conform to the latest edition of the South African Road Signs Manual.			
	Possibility of mining activities and workers causing veld fires, which can potentially cause injury and or loss of life to mine workers and surrounding landowners, visitors and workers.	**Prevent and control through management measures.** • All workers will be sensitised to the risk of fire; • Smoking is only allowed in designated smoking areas and disposal of cigarette butts safely in sand buckets; The Applicant shall ensure that the basic fire-fighting equipment is available on all trucks. Fire response and evacuation • An Emergency Plan (including Fire Protection, Response and Evacuation Plan) is to be prepared by the Applicant and conveyed to all staff on the site; and • Identify major risks to minimise the environmental impacts e.g. air pollution and contaminated effluent runoff.	Mine Health and Safety Act (Act 29 of 1996) An Emergency Plan (including Fire Protection, Response and Evacuation Plan) Veld and Forest Fire Act, 1998 (Act No. 101 of 1998) [as amended] - Section 12 (1) Duty of the landowner to prevent fire from spreading to neighbouring properties.	Impact avoided. No incidents of fires occurring on site. No one smoking in unauthorised areas. Proof / records of training in terms of the risk of fire and of the emergency management plan. Basic fire-fighting equipment located in the correct locations on site.	Operational Phase
	Increased risk to public health and safety: Dangerous areas including the open haul road and	**Prevent through management measures.** • A health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996) should be	Mine Health and Safety Plan available on site and proof that it is being implemented.	Health and safety plan in terms of the Mine Health and Safety Act (Act 29 of 1996)	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	increased traffic associated with it.	compiled and implemented to ensure worker safety; • A health and safety control officer should monitor the implementation of the health and safety plan for the operational phase; • Regular health and safety audits should be conducted and documented; and a record of health and safety incidents should be kept on site and made available for inspection; • Any health and safety incidents should be reported to the Site Manager (SM) immediately; • First aid facilities should be available on site at all times; • Workers have the right to refuse work in unsafe conditions. •	Proof of training in awareness of health and safety procedures. Proof / records of health and safety audits available on request. No health and safety incidents reported. Proof / record of stockpile and stacks inspections taking place. Health and safety signs on site at appropriate locations.		
	Socio-economic impact on farmers, labourers and surrounding landowners and residents due to negative impacts on groundwater, dust pollution, noise pollution etc.	**Reduce through management measures.** Refer to the above mentioned mitigation measures for noise, dust and other environmental impacts.	Please refer to the above standards for noise, dust and water pollution.	Please refer to the above standards for noise, dust and water pollution.	Operational Phase
	Economic impact should the haul road not be well managed or maintained.	**Prevent through management measures** Refer to the mitigation measures above.	Buffer area maintained.	Regulations regarding the planning and management of	Operational Phase

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
			Proof / records of regular inspections conducted by a qualified engineer available upon request.	residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation (GN R. 632 of 2015)	
Closure and Post-Closure Phases	Due to the closure phase overlapping with the operational phase, all of the impacts described above will be applicable to the closure phase.	Refer to the above mitigation measures for impacts during the operational phase.	Please refer to the above standards	Please refer to the above standards	Closure and Post-Closure Phases
	Soil erosion	**Prevent, reduce and remedy through management measures.** • Mine management will draw up all rehabilitation plans. After the plans are approved by the competent authority, they will be implemented.	Please refer to the above standards	Please refer to the above standards	Closure and Post-Closure Phases
	Seepage from road contruction materials and surface water runoff potentially contaminated with hydrocarbons from vehicles regularly travelling theron can cause groundwater contamination.	**Prevent through management measures.** • Should water quality deteriorate, mitigation measures as specified by a specialist shall be implemented; •	Please refer to the above standards	Please refer to the above standards	Closure and Post-Closure Phases

Activity Including Size/ scale	Aspects and potential impacts	Mitigation type and Measures	Standards to be achieved	Compliance with standards	Phase and / or time period for implementation
	Residual groundwater contamination may occur.				
	Groundwater pollution	**Prevent through management measures.** • Mine management will draw up all rehabilitation plans. After the plans are approved by the competent authority they will be implemented. • The closure strategy will be re-assessed.	Please refer to the above standards	Please refer to the above standards	Closure and Post-Closure Phases

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph ( );

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads,**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**ASPECTS AFFECTED**	**PHASE** In which impact is anticipated **(e.g. Construction, commissioning, operational Decommissioning, closure, post-closure)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through (e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.**	**STANDARD TO BE ACHIEVED** **(Impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**

pipelines, power lines, conveyors, etc…etc…etc.).				• **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** • **Remedy through rehabilitation..**	

Please refer to Table 31 for the above requested information.

Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

ACTIVITY whether listed or not listed. **(E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.)**.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc….etc…)**	**MITIGATION TYPE** **(modify, remedy, control, or stop) through** **(e.g. noise control measures, storm-water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity etc. etc)** **E.g.** • **Modify through alternative method.** • **Control through noise control** • **Control through management and monitoring** **Remedy through rehabilitation..**	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-..	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)

			Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.	

Please refer to Table 31 for the above requested information.

i) Financial Provision

(1) Determination of the amount of Financial Provision.

(a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.

- Creating a free draining post mining landscape that has been returned to a productive and safe post-mining land use;
- Creating a landscape that will prevent erosion in the long term;
- Creating a landscape that will reconnect fragmented habitats and increase biodiversity on the properties by rehabilitating and improve disturbed wetland and riparian areas;
-
- Creating post-mining employment opportunities for mine workers.

(b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

Interested and Affected Parties will be provided with the opportunity to review tis BAR/EMPR and to provide comments, to which the EAP will respond. Information on the following will be provided:

- The project description (site layout, alternatives investigated) and a description of the baseline environment;
- Findings from the specialist studies undertaken;
- Potential biophysical and socio-economic impacts during construction, operations, closure and phases of the project;
- Mitigation measures to prevent, minimise and manage environmental impacts;
- The closure objectives and financial provision; and
- Details on how stakeholders can comment on the BAR/EMPR.

(c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

Mineral right holders (Holders) are currently required to comply with the financial provision requirements under the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA). In

November 2015 new Financial Provision for Prospecting, Exploration, Mining or Production Operations Regulations, November 2015 (GNR 1147) were promulgated in terms of NEMA, regulations.

However, due to the significant issues arising from the 2015 Regulations and legislative amendments required to resolve this, the DMR has communicated that the deadline to comply with the new regulations of 2019.

The requirements for a final rehabilitation, decommissioning and mine closure plan, are outlined in Appendix 4 of the Regulations (GNR 1147) are to identify a post mining land use that is feasible through the following:

(a) Providing the vision, objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;
(b) Outlining the design principles for closure;
(c) Explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
(d) Detailing the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
(e) Committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
(f) Identifying knowledge gaps and how these will be addressed and filled;
(g) Detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and
(h) Outlining, monitoring, auditing and reporting requirements.

(d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The rehabilitation plan will assist the applicant to meet closure objectives, which will also be applicable to the existing and proposed waste management activities and facilities. These include:

Management objectives

- Creating a free draining post mining landscape that has been returned to a productive and safe post-mining land use;
- Creating a landscape that will prevent erosion in the long term;

- Creating a landscape that will reconnect fragmented habitats and increase biodiversity on the properties by rehabilitating and improve disturbed wetland and riparian areas;
- Creating post-mining employment opportunities for mine workers.

(e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.

The consultant is in the process of updating the closure provisions.

(f) Confirm that the financial provision will be provided as determined.

It is confirmed that the financial provision for rehabilitation and closure requirements, is reviewed annually for sufficiency and will be amended to include requirements for new activities. During the annual review, confirmation will be provided that this amount can be provided for from operating expenditure.

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

f) Monitoring of Impact Management Actions
g) Monitoring and reporting frequency
h) Responsible persons
i) Time period for implementing impact management actions
j) Mechanism for monitoring compliance

Table 32: Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
CONSTRUCTION PHASE				
Construction Phase: Site preparation: Clearing of vegetation from haul road footprint area.	Groundwater pollution	Monitoring Boreholes at the haul road area to be monitored as required by the approved WUL Water quality parameters to be monitored as required by the WUL. •	Environmental Specialist	Frequency as required by the approved WUL.
	Surface water pollution	Monitoring Boreholes at the haul road area to be monitored as required by the approved WUL	Environmental Specialist	Frequency as required by the approved WUL.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		Water quality parameters to be monitored as required by the WUL.		
	Dust and air quality pollution	Should any dust or air quality complaints be received, the Applicant to appoint an independent specialist conduct an air quality assessment. Recommendations for monitoring and mitigation must be implemented as soon as practically possible. •	Environmental Specialist	As required by the air quality specialist.
	Spreading of alien invasive vegetation and impacts on habitat and vegetation.	Specialist monitoring on Faunal and Floral aspects include the monitoring of effects operational processes have on vegetation and accompanied animal life within the immediate or surrounding areas of the operations. • Alien vegetation control and management; • Habitat and vegetation management; • Rehabilitation services include the rehabilitation of operational disturbed areas and hydrocarbon spill areas; • Sloping and re-vegetation of disturbed area to surrounding landscape; and • Remediation of soil at spill sites.	Environmental Specialist	Visual inspections during all phases of the activities.

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
OPERATIONAL PHASE				
Operational Phase: Transportation/transfer of the waste rock from the shafts to the concentrator at Everest Loading, hauling and transport Dust Suppression	Monitoring during the operational phase will be the same as during the construction phase.			
Closure and Post-Closure Phases	Monitoring during the operational phase will be the same as during the construction phase.			

k) Indicate the frequency of the submission of the performance assessment report.

A Performance Assessment Review of the EMPR should be conducted biennually (once every two years) and the environmental audit report will be submitted annually (once every year).

l) Environmental Awareness Plan

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

Please refer to Appendix 9 for the existing Environmental Awareness Plan of Mareesburg Mine.

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

The procedure for dealing with environmental risk including the objectives, identification and calculation of environmental risks is described in the existing approved EMPR. An Environmental Risk Report in accordance with the financial provision regulations in GNR 1147 in terms of NEMA, will be submitted to DMR before the published deadline.

m) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually)

The financial provision for the Mareesburg Mine, will be reviewed annually. No specific information has been required by the Competent Authority at this point in time.

2) UNDERTAKING

The EAP herewith confirms

a) the correctness of the information provided in the reports ☒

b) the inclusion of comments and inputs from stakeholders and I&APs ; ☒

c) the inclusion of inputs and recommendations from the specialist reports where relevant; ☒and

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

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