FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT and DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR

THE PROPOSED "TGME MINE DEVELOPMENT PROJECT (10161)": GOLD MINING PROJECT IN TERMS OF PRE-MINED RESIDUE AND HARD ROCK MINING NEAR SABIE, MPUMALANGA PROVINCE

PREPARED FOR:

TRANSVAAL GOLD MINING ESTATES (Pty) Limited

COMPILED BY:

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mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

PART A

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

DMR REFERENCE NUMBER MP 30/5/1/2/3/2/1 10161 MR Mining Right Application

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

NAME OF APPLICANT: Transvaal Gold Mining Estates Limited

TEL NO: 013 768 1271/3

FAX NO: 013 768 1272

POSTAL ADDRESS: PO Box 21 Pilgrim's Rest Mpumalanga 1290

PHYSICAL ADDRESS: Grootfontein Farm, Pilgrim's Rest, Mpumalanga 1290

FILE REFERENCE NUMBER SAMRAD: MP 30/5/1/2/2/10161 MR

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 valuation 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 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 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.

PART A

SCOPE OF ASSSSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3) Contact Person and correspondence address

a) Details of: Ferdi Pieterse

i. **The EAP who prepared the report**

Name of the Practitioner: **Ferdi Pieterse**

Company: **Globesight PTY LTD**

Tel No.: 0823381465

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E-mail address: Ferdi@globesight.co.za

Physical address: 10 Musketeer Street, Helderkriun, 1724

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ii. Expertise of the EAP

1) The qualifications of the EAP

(With evidence attached as Appendix 1)

Educational qualifications (evidence attached as **Appendix 1**):

- B.Sc Geography, Environmental Science and Informatics: Rand Afrikaans University, Johannesburg, South Africa
- B.Sc Hons Geography and Environmental Management: Rand Afrikaans University, Johannesburg, South Africa

2) Summary of the EAP's past experience.

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

Environmental & Social Permitting related project experience (EAP's CV attached as **Appendix 2**):

- PMG Mining (Pty) Ltd – Paling Manganese Mine, Prefeasibility Study and environmental & social permitting (2016)
- Energizer Resources – Molo Graphite Mine, Fotadrevo, Madagascar (2014-2015)
- Scorpion Mineral Processing – AEMR Iron Ore Mine, Huila Province, Angola (2012-2013)
- Gem Diamonds, Letseng Diamond Mine – Project Kholo – TSF Site Selection and Environmental Sensitivity Study (2011-2012)
- Simmer & Jack Mines Limited – Tau Lekoa Gold Mine, North West Province (2009)
- Exxaro, Matla Colliery (coal) EMPR Amendment for Underground shortwall mining and E'Tingweni Section, Mpumalanga (2004 – 2007)
- TGME – Hermansburg Opencast Gold Mine, Mpumalanga, (2009)

- TGME – Rietfontein Underground Gold Mine, Mpumalanga (2009-2010)
- TGME – Glynn's Lydenburg Heap Leach Pad Project, Mpumalanga (2009)
- TGME - Pilgrems Trend Deposits, Mpumalanga (2009)
- TGME – EIA/EMP Amendment (Pad 1), Mpumalanga (2009)
- Simmer & Jack – Tau Lekoa Mine Section 11, Section 102 & EIA/EMP, North West Province (2009)
- First Uranium – Mine Waste Solutions: Tailings Reclamation Project, North West Province, (2009-2010)
- TGME – Integrated Water Use License Application, Rietfontein Underground Gold Mine, Mpumalanga (2011)
- TGME – Integrated Water Use License Application, Glynn's Lydenburg Heap Leach Pad Project, Mpumalanga (2011)
- TGME – Integrated Water Use License Application, Pad 1 & Pilgrems Trend Deposits, Mpumalanga (2011)
- TGME – Integrated Water Use License Application, Beta Mine, Mpumalanga (2011)
- Shanduka, Springlake Colliery, Consolidated EIA/EMP and IWULA, Kwazulu-Natal (2010/2011)

b) Description of the property.

Table 1: Property Information

Farm Name	This new Mining Rights at Sabie are located on the following farms: • Vertroosting 218JT; • OlifantsGeraamte 198JT; • Grootfontein 196JT; • Remaining Extent and Portion 1 of the farm Hendriksdal 216JT; • Sheba 219JT; • Spitskop 195JT; • Waterval 168JT; and • Rietfontein 193JT.
Application area (Ha)	18 152.8691 ha
Magisterial district:	Thaba Chweu Local Municipality and within the greater Ehlanzeni District Municipality
Distance and direction from nearest town	13km South and 6 km North of the town of Sabie in Mpumalanga, South Africa
21 digit Surveyor General Code for each farm portion	TJT000000000218000000; TJT000000000198000000; TJT000000000196000000; TJT000000000216000000; TJT000000000219000000; TJT000000000195000000; TJT000000000168000000; TJT000000000193000000

c) Locality map

(show nearest town, scale not smaller than 1:250 000 attached as Appendix 3).

The study area is situated on various farms located approximately 13 kilometres South and 6 kilometres North of the town of Sabie. The mineral rights area extends over 18 152.8691 hectares and will extend over the following farms:

- Vertroosting 218JT;
- Olifantsgeraamte 198JT;
- Grootfontein 196JT;
- Remaining Extent and Portion 1 of the farm Hendriksdal 216JT;
- Sheba 219JT;
- Spitskop 195JT;
- Waterval 168JT; and
- Rietfontein 193JT.

Access to these areas are via tar roads, gravel roads and forestry gravel roads which are used to a larger or lesser extent – depending on the geographical location. Please see below the locality map of the study area in relation to Sabie. A3 locality map is attached as Appendix 3.

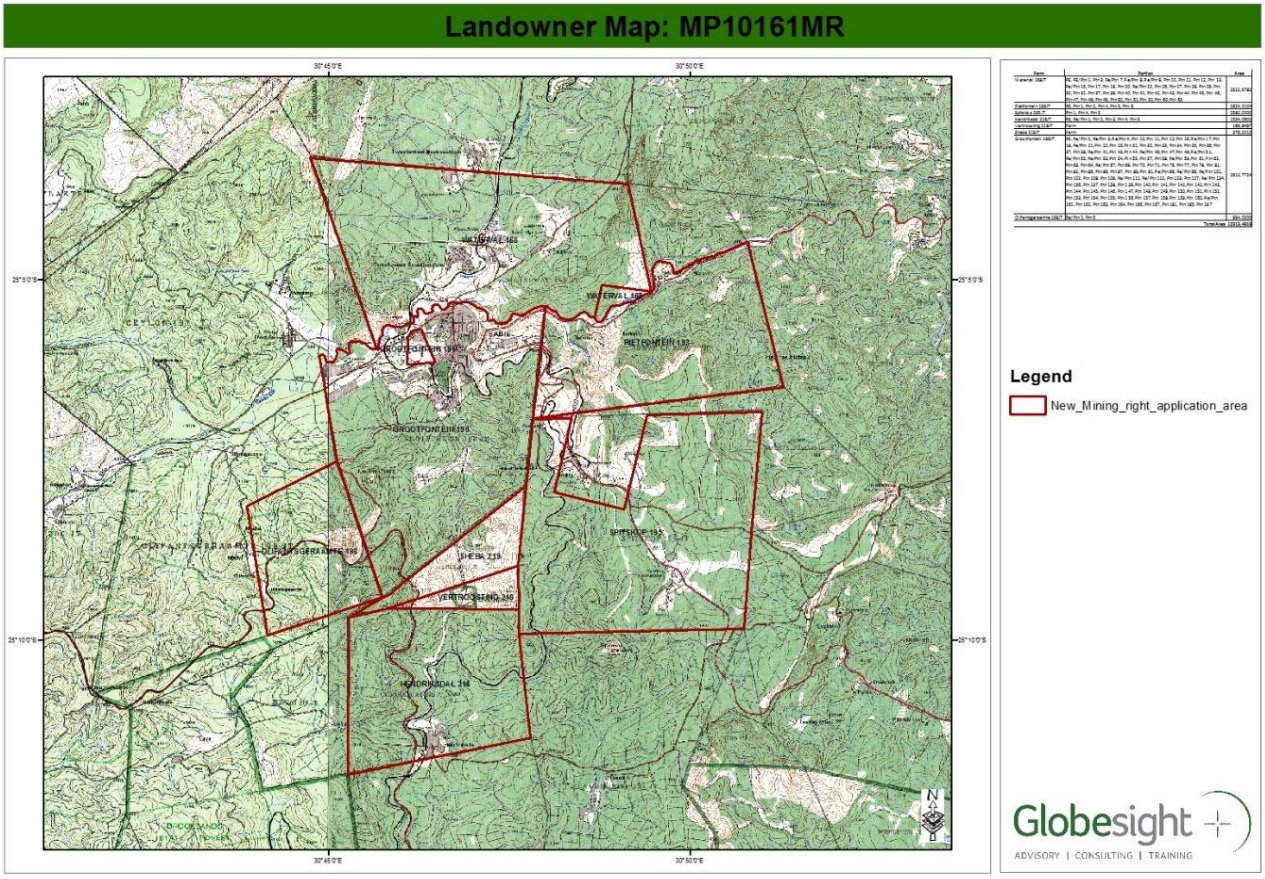


Figure 1a: Locality Map

d) Description of the scope of the proposed overall activity.

i. Listed and specified activities

(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 and attach as Appendix 4.)

Please refer to Appendix 4 for the plan showing all listed proposed and planned activities as listed in Table 2 below. Also refer to Appendix 4 and 18 for all associated maps.

The greater TGME/Sabie areas are covered by various Prospecting and Mining rights. TGME and Sabie Mines holds 3 Mining Rights in the same geographical are – these are 198MR for these are 198MR for the Elandsdrift Heap Leach Pad, 43MR for the Glynn's Lydenburg Heap Leach Pad and 358MR for the Rietfontein underground Mine.

The proposed new 10161 mining application will allow TGME to mine for, Zinc ore, Copper ore, Bismuth ore, Stone Aggregate (from Waste dump), Iron ore, Silver ore and Gold ore

The company's current focus is to bring the Pre-Mined Residue (PMR) resource into production to provide a solid production platform from which the company can launch further planning and execution strategies to expand the production profile in the following general resource areas (also note that TGME is undertaking a similar application referred to as Pilgrims Rest 10167 and submission of these two applications will happen at the same time):

- Further PMR operations at Sabie as per the farm positions listed in Table 1;
- Future Hard Rock Mining (HRM) in Sabie region as per the farm portions listed in Table 1;

All of the PMR/HRM mines scheduled for mining are covered under these rights and there is a requirement for the inclusion of some of the prospecting rights into the existing mining rights for mining from year three onwards. These amendments will form part of the normal operational requirements for the maintenance of rights and licences.

The following activities are being applied for (also refer to Table 9 for the NEMA listed activities:

Table 2: Listed 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 of affected.	**APPLICABLE LISTING NOTICE** (GNR 983, GNR 984 OR GNR 985)/NOT LISTED
This is for mining and Of materials at each Sections as per Table 3 Order to extract the			**Listing Notice 1: GNR 983** Activity 27 and 28

The process involved			**Listing Notice 2: GNR984** Activity 17, 19 and 21 **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Mining Area: Offices; Temporary Ablution; Temporary Stores; Temporary Workshops; Berms; Roads; Pipelines	Clearance of more Than 2h vegetation Storage of dangerous Goods. Construction of Roads wider than 13,5 meters Treatment of waste Infrastructure for Electricity Water pipes to be installed and expansion of roads	X	**Listing Notice 1: GNR 983** Activity 9, 11,14, 24, 27, and 28, 56 **Listing Notice 2: GNR984** Activity 4, 17, 19, 21 and 25 **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Processing related Plant	Pre-conditioning Centre 2ha per mining section	X	**Listing Notice 1: GNR 983** Activity 27, 28 and 24 **Listing Notice 2: GNR984** Activity 15, 17, 19 and 21 **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Underground Conveyors; Winches; Pumping Infrastructure; Ventilation Fans; Power such as Compressed Air; Communication Lines	Mining and winning Of minerals Facility for the Generation of Electricity	X	**Listing Notice 1: GNR 983** Activity 11 **Listing Notice 2: GNR984** Activity 9, 17, 19 and 21 **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Development at Lamp Rooms; Change Houses; Offices; Minor Store Facilities; Compressors for section; Incoming power reticulation	Mining and winning of minerals Decommissioning Clearance of vegetation	X	**Listing Notice 1: GNR 983** Activity 9, 27 and 28 **Listing Notice 2: GNR984** Activity 17, 19 and 21 **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Processing;	Mining and	X	**Listing Notice 1: GNR 983**

Blasting; Explosive Magazine; Underground High Pressure Water Waste Rock Dumps Transportation Recycling of Water Transportation with Overhead conveyor Diesel tanks Generators by diesel Ventilation fans	winning of minerals as defined in MWP Clearance of vegetation Facilities for the storage or storage and handling of dangerous goods		Activity 9, 10, 27 and 28 **Listing Notice 2: GNR984** Activity 4, 6, 17, 19, 21 and 25. **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Clean and dirty water systems: Recycling of water Pumping of water from river and underground resources Settling and water treatment pond Storm water dam Water distribution pipeline		X	**Listing Notice 1: GNR 983** Activity 12 and 14 **Listing Notice 2: GNR984** Activity 4, 6, 15 17, 24 and 24 **Listing Notice 3: GNR985** Activity 4 (a) (ee), 12 (c) (i) (ii), 14 (a), 18 (a) (ee), 15 (b) 10 (a) (ee).
Laboratory		X	
Engineering Plant (PCC)		X	
Security Gate and Guarding House			
Construction of the following: Fuel storage facility Refuel and lube		X	**Listing Notice 1: GNR 983** Activity 12 and 14
Salvage Yard Waste disposal site and Topsoil storage area		X	

Please refer to Appendix 4 for the maps of each mining section as listed in Table 2 above, showing the location and area of all the main listed activities to be placed on site.

ii. Description of the activities to be undertaken

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

PROJECT BACKGROUND:

Transvaal Gold Mining Estates Limited (TGME) is applying to rework pre-mined residue (PMR) and subsequently undertake hard rock mining (HRM), from historical mining sections in the Sabie area, which forms part of a larger project named the TGME Mine Development project (Project 10161).

For the PMR mining and Hard Rock mining (HRM) Projects to be part of the Life of Mine Plan, a rapid build-up of tons that could be sustained for at least the first 5 years would be developed. The planned strategy is to open-up the entrances/portals to the historical mines and mine sections.

This will be followed by ensuring that these portals and access ways are safe to use, to access the PMR and HRM sources via equipping and eventual extraction of the resource.

The application for a Mining Right is thus an outcome of the prospecting completed over the past 8 years. TGME is applying for a Mining Right to mine, Zinc ore, Copper ore, Bismuth ore, Stone Aggregate (from Waste dump), Iron ore, Silver ore and Gold ore on the farms, identified in Figure 1:

The relevant mining sections include the adits and shafts on the farms Nestor; Glynn's Lydenburg; Rietfontein; Elandsdrift; Olifants Geraamte; Ross Hill Mine; Hendriksdal; and Leader Hill Mines.

MINING SECTIONS

Various mining sections (mining areas) have been identified by TGME where mining related infrastructure and ancillary activities will be developed. The infrastructure that will be developed at each individual mining section will be purposefully built for optimal re-use at the next mining section, following in sequence. This approach has been selected to assist with optimisation of upfront capital spend and efficient rehabilitation once the section has been mined out. Therefore, many of the structures will be pre-fabricated and temporary in nature, resulting in a limited initial disturbance and impact. The life span of each mining section differs. Please refer to the mine plan showing the sequins as to which mining sections will be mined first, attached to Appendix 17.

The proposed new mining sections are the following, also represented in Figure 1b:

- Nestor;
- Glynn's Lydenburg (East and West) which includes:
    - Leader Hill;
    - Werf;
    - Mill Hill;
    - Monument Hill;
    - South Hill;
    - Malieveld; and
    - Sheba.
- Rietfontein (extension onto the farm from underground workings)

- Olifantsgeraamte;
- Ross Hill Mine; and
- Hendriksdal *(please note that no infrastructure will be placed at Hendriksdal -only extension of underground workings are applicable)*

Please refer to Tables 3 to 7 which provide a detailed description of each mining section. These mines will share infrastructure, where applicable, as part of the entire Sabie Project. The existing metallurgical plant has been approved under 83MR, but reference will be made to the plant as the ROM will be transported to this facility located near Pilgrim's Rest.

TGME is thus planning to reopen the historic mines at the position of the old main entrances. They will exploit the PMR gold resources of the historic mines defined above. This would lead the way to open-up, make safe, equip and continue with hard rock mining (HRM) on the reef to exploit the reserves.

A pre-planning phase would commence once authorisation be granted. The life span for the individual mining sections ranges from 11 months to some 84 months (average of 7 years) at a production rate of 22 kton/month. The mines are planned to deliver the monthly volumes in a 3 x 8-hour shift operating day. The mine will operate three eight hours shifts per day with a fourth shift rostered off to allow for a 7-day week of operations.

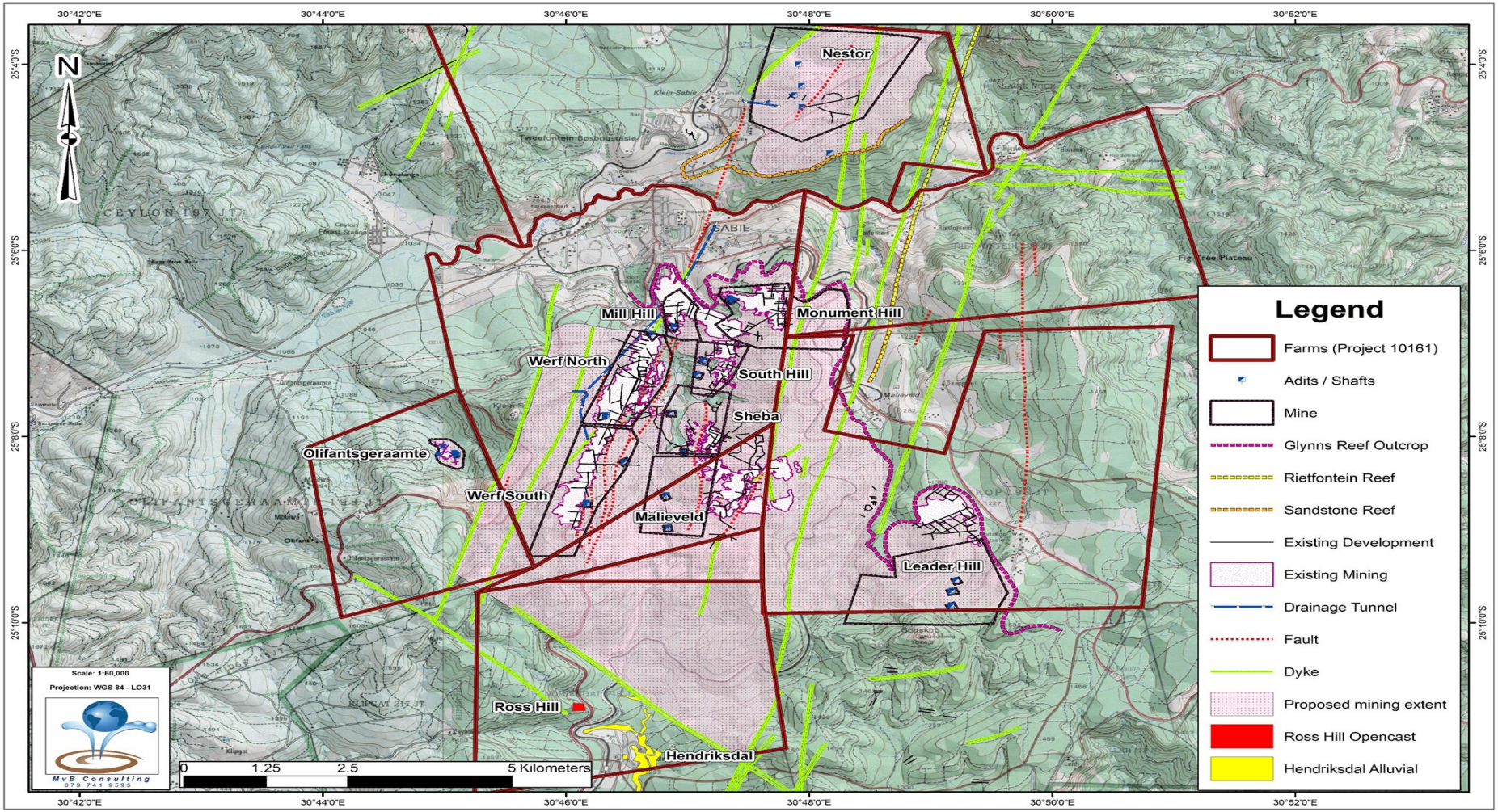


Figure 1b: Proposed mining sections

Nestor Mining Section

The following table provides an outline of the Nestor Section and the activities associated with this section of the project.

Table 3: Nestor Section

Nestor Section	
Farm and Location	Waterval farm 168 JT North east of the town of Sabie and east of Simile and the industrial area, next to the R532 (Sabie / Graskop / Pilgrim's Rest Road) Property Owners: Thaba Chweu Local Municipality and SAFCOL
Mining	Underground mine Entrance into Nestor U/G mine from Waterfall Farm on the R532 (Sabie / Graskop / Pilgrim's Rest Road) Access proposed via ± 2 adits
Processing	The Pre-conditioning Centre (PCC) would aim to reduce the tonnage load that would be transported to the metallurgical plant at TGME (Pilgrim's Rest). During the initial stages, only the cyclone and sludge tank of the PCC will be installed. The Run of Mine (ROM) stockpiles to be indicated within battery limits of PCC There will be no proper rock stock piles in Phase 1. Provision is made for emergency stocks and included in the designs Solids (sludge, as well as gold bearing rock) would be transported via trucks to the TGME (Pilgrim's Rest) Metallurgical Plant for processing. All rock will be dumped in loading bins at the various rock shafts and then loaded in dump trucks for transportation to the Metallurgical Plant. Processing would take place at the existing approved TGME (permitted under 83MR) Metallurgical Plant at Pilgrim's Rest. A new Metallurgical Plant, which will be located in the Sabie geographical area, is only planned for Phase II or III. It is thus not included as part of Phase I.
Transport/Logistics	The ROM will be trucked via public roads (e.g. R532) to the existing approved TGME Metallurgical Plant. Access roads from the public roads to the various shafts have been identified. These internal roads are proposed on privately owned property, as well as on properties belonging to the Thaba Chweu Local Municipality Public roads as approved in the 358MR – Rietfontein will be used to transport the product
Waste Rock, TSF, Reject materials	Waste rock dumps will be developed at Adits 1 and 2. Provision will only be made for emergency stock as no proper rock piles will be developed as part of Phase I. Tailings will be at the existing approved TGME Tailings Facility (TSF)
Infrastructure	Shaft Head Infrastructure;

Nestor Section	
	Access Roads; Offices; Change House; Loading Zone; Sewage treatment; Diesel Storage; and Workshop
Water	Water will be sourced from public streams and boreholes
Power	Eskom servitudes will be utilised Diesel generators to be used as back-up option
Fuel Storage	Fuel will be stored on site and will be included in the Engineering Workshops

Glynn's Lydenburg Mining Section

The following table provides an outline of the Glynn's Lydenburg Section and the activities associated with this section of the project.

Table 4: Glynn's Lydenburg Section

Glynn's Lydenburg Section1	
Farm and Location	Located on the following farms: Grootfontein 196 JT Sheba 219 JT Vertroosting 218 T Hendriksdal 216 JT Spitskop 195 JT Rietfontein 183 JT Olifantsgeraamte 198 JT
Mining	Underground mine with east and west sections Access via multiple adits on eastern and western sections, to be mined from 5-10 adits at a time The "East Section" includes the following projects: Leader Hill

[1] Stonewall Mining (Pty) Ltd. / Transvaal Gold Mining Estates. 2017. Project Description – 10161 Mining Right Application Project ("Sabie")

Glynn's Lydenburg Section1	
	Located on the farm Spitskop 195 JT and Elandsdrift 220 JT2; 7-8 km south of Sabie, west of the R537 Property Owner: SAFCOL (farm Spitskop) Mill Hill Located on the farm Grootfontein 196 JT; just south of Sabie, and west of the main road Property Owner: York Timbers (Pty) Ltd. Monument Hill Located on the farm Grootfontein 196 J, Spitskop 195 JT and Rietfontein 193 JT3; southeast of Sabie and south of Harmony Hill and the R537 Property Owner: York Timber (Pty) Ltd., SAFCOL and Thaba Chweu Local Municipality South Hill Located on the farm Grootfontein 196 JT; just south of Sabie, and south of Mill Hill area Malieveld Located on the farm Sheba 219 KT and Grootfontein 196 JT; Approximately 3-4 km south of Sabie and south of South Hill area Property Owners: Thaba Chweu Local Municipality and York Timber (Pty) Ltd. Sheba Located on the farm Grootfontein 196 JT; Approximately 2-3 km south of Sabie and south of South Hill area and north of Malieveld area Property Owner: York Timbers (Pty) Ltd. The "West Section" includes the following projects: Werf North Located on the farm Grootfontein 196 JT; south of Sabie and west of Spitskop; Property Owner: York Timbers (Pty) Ltd. Werf South
	Located on the farm Grootfontein 196 JT; south of Werf North and south of the town of Sabie
	Property Owner: York Timbers (Pty) Ltd.
Processing	The Pre-conditioning Centre (PCC) would aim to reduce the tonnage load that would be transported to the metallurgical plant at TGME (Pilgrim's Rest). During

[2] The farm Elandsdrift 220 JT does not form part of the application, as rights have already been granted for the farm Elandsdrift

[3] Portion 6 of the farm Rietfontein 193 JT forms part of another application.

Glynn's Lydenburg Section1	
	the initial stages, only the cyclone and sludge tank of the PCC will be installed. The PCC is a pre-requisite to economic transportation and cost of the Glynn's project. However, it will only be required in Phase II of the Glynn's mining program. The space required for the additional components of the PCC (Phase II) is included in the ROM stockpiles layout. The Run of Mine (ROM) stockpiles to be indicated within battery limits of PCC There will be no proper rock stock piles in Phase 1. Provision is made for emergency stocks and included in the designs. Solids (sludge, as well as gold bearing rock) would be transported via trucks to the TGME (Pilgrim's Rest) Metallurgical Plant for processing. All rock will be dumped in loading bins at the various rock shafts and then loaded in dump trucks for transportation to the Metallurgical Plant. Processing would take place at the existing approved TGME (permitted under 83MR) Metallurgical Plant on the farm Grootfontein 562KT A new Metallurgical Plant, which will be located in the Sabie geographical area, is only planned for Phase II or III. It is thus not included as part of Phase I.
Transport/Logistics	The ROM will be trucked via public roads to the existing approved TGME Metallurgical Plant. Access roads from the public roads to the various shafts have been identified. During Phase II, it is planned to rehabilitate and use the Transnet Freight Rail (TFR) line from site (Ross Hill section) to the Metallurgical Plant in Sabie Alternative transport routes for the initial works is a gravel road between the east and west sections, or from the No. 2 vertical shaft via the "Old Lydenburg Road" to the west of Sabie
Waste Rock, TSF, Reject materials	Waste rock dumps will be developed at Various Adits and No 2 Vertical Shaft. Provision will only be made for emergency stock as no proper rock piles will be developed as part of Phase I. Tailings will be at the existing approved TGME TSF
Infrastructure	Shaft Head Infrastructure; Access Roads;
	Offices;
	Change House; Loading Zone; Sewage treatment; Diesel Storage; and Workshop
Water	Water will be sourced from public streams and boreholes
Power	Eskom servitudes will be utilised

Glynn's Lydenburg Section1	
	Diesel generators to be used as back-up option
Fuel Storage	Fuel will be stored on site and will be included in the Engineering Workshops

Olifantsgeraamte Mining Section

The following table provides an outline of the Olifantsgeraamte Section and the activities associated with this section of the project.

Table 5: Olifantsgeraamte Section

Olifantsgeraamte Section4	
Farm and Location	Farm Olifantsgeraamte 198JT Approximately 4 km southwest of Sabie, to the west of the R532 (Sabie / Graskop / Pilgrim's Rest Road). Property Owner: Thaba Chweu Local Municipality
Mining	Underground mining sections Entrance into Olifantsgeraamte U/G mine from Olifantsgeraamte Farm at Adits 1 and 2
Processing	The Pre-conditioning Centre (PCC) would aim to reduce the tonnage load that would be transported to the metallurgical plant at TGME (Pilgrim's Rest). During the initial stages, only the cyclone and sludge tank of the PCC will be installed. The PCC is a pre-requisite to economic transportation and cost of the Olifantsgeraamte project. However, it will only be required in Phase II of the Vaalhoek Mining program. The space required for the additional components of the PCC (Phase II) is included in the ROM stockpiles layout. The Run of Mine (ROM) stockpiles to be indicated within battery limits of PCC There will be no proper rock stock piles in Phase 1. Provision is made for emergency stocks and included in the designs. Solids (sludge, as well as gold bearing rock) would be transported via trucks to the TGME (Pilgrim's Rest) Met Plant for processing. All rock will be dumped in loading bins at the various rock shafts and then loaded in dump trucks for transportation to the Metallurgical Plant. Processing would take place at the existing approved TGME (permitted under 83MR) Metallurgical Plant on the farm Grootfontein 562KT A new Metallurgical Plant, which will be located in the Sabie geographical area, is only planned for Phase II or III. It is thus not included as part of Phase I.
Transport/Logistics	The ROM will be trucked via public roads to the existing approved TGME Metallurgical Plant. Access roads from the public roads to the various shafts have been identified.

[4] Stonewall Mining (Pty) Ltd. / Transvaal Gold Mining Estates. 2017. Project Description – 10161 Mining Right Application Project ("Sabie")

Olifantsgeraamte Section4	
Waste Rock, TSF, Reject materials	Waste rock dumps will be developed at Adit No 1. Provision will only be made for emergency stock as no proper rock piles will be developed as part of Phase I. Tailings will be at the existing approved TGME TSF
Infrastructure	Shaft Head Infrastructure; Access Roads; Offices; Change House; Loading Zone; Sewage treatment; Diesel Storage; and Workshop
Water	Water will be sourced from public streams and boreholes
Power	Eskom servitudes will be utilised Diesel generators to be used as back-up option
Fuel Storage	Fuel will be stored on site and will be included in the Engineering Workshops

Ross Hill Mining Section

The following table provides an outline of the Ross Hill Section and the activities associated with this section of the project.

Table 6: Ross Hill Section

Ross Hill Section5	
Farm and Location	Farm Hendriksdal 216 JT Approximately 8 – 10 km south of the town of Sabie, east and west of the R37. Property Owners: York Timber (Pty) Ltd.
Mining	Mining at Ross Hill will only entail the removal of on-surface gold baring material as concurrent rehabilitation in order to improve on the status quo of the area at present.
Processing	The Pre-conditioning Centre (PCC) would aim to reduce the tonnage load that would be transported to the metallurgical plant at TGME (Pilgrim's Rest). During the initial stages, only the cyclone and sludge tank of the PCC will be installed. The PCC is a pre-requisite to economic transportation and cost of the Ross Hill

[5] Stonewall Mining (Pty) Ltd. / Transvaal Gold Mining Estates. 2017. Project Description – 10161 Mining Right Application Project ("Sabie")

Ross Hill Section5	
	project. However, it will only be required in Phase II of the Ross Hill Project. The space required for the additional components of the PCC (Phase II) is included in the ROM stockpiles layout. The Run of Mine (ROM) stockpiles to be indicated within battery limits of PCC There will be no proper rock stock piles in Phase 1. Provision is made for emergency stocks and included in the designs. Solids (sludge, as well as gold bearing rock) would be transported via trucks to the TGME (Pilgrim's Rest) Met Plant for processing. All rock will be dumped in loading bins at the various rock shafts and then loaded in dump trucks for transportation to the Metallurgical Plant. Processing would take place at the existing approved TGME (permitted under 83MR) Metallurgical Plant on the farm Grootfontein 562KT A new Metallurgical Plant, which will be located in the Sabie geographical area, is only planned for Phase II or III. It is thus not included as part of Phase I.
Transport/Logistics	The ROM will be trucked via public roads to the existing approved TGME Metallurgical Plant. Access roads from the public roads to the various shafts have been identified.
Waste Rock, TSF, Reject materials	Waste rock dumps will be developed at Adit No 1. Provision will only be made for emergency stock as no proper rock piles will be developed as part of Phase I. Tailings will be at the existing approved TGME TSF
Infrastructure	Shaft Head Infrastructure; Access Roads; Offices; Change House; Loading Zone; Sewage treatment; Diesel Storage; and Workshop
Water	Water will be sourced from public streams and boreholes
Power	Eskom servitudes will be utilised Diesel generators to be used as back-up option
Fuel Storage	Fuel will be stored on site and will be included in the Engineering Workshops

Hendriksdal Mining Section

The following table provides an outline of the Hendriksdal Section and the activities associated with this section of the project. (However please refer to the NOTES below)

Table 7: Hendriksdal Section

Hendriksdal Section[6]	
Farm and Location	Farm Hendriksdal 216 JT Approximately 8 – 10 km south of the town of Sabie, east and west of the R37. Property Owners: York Timber (Pty) Ltd.
Mining	Only underground mining will be opted as the preferred mining method.
Transport/Logistics	The ROM will be trucked via public roads to the existing approved TGME Metallurgical Plant. Access roads from the public roads to the various shafts have been identified.

Amendments at Hendrikdal mining section:

As part of the base case, the information contained in Table 7 above was provided by TGME as the initial project definition for the Henriksdal Section. However, based on the initial outcome of the specialist studies, TGME reconsidered the feasibility of the proposed alluvial mining activities associated with Hendriksdal.

Mining of the alluvials is therefore not included in this application. TGME could however opt to undertake further feasibility work to determine if said alluvials could be mined sustainably, and only if so, would a future application for mining of the alluvial be considered, but for this application, alluvial mining at Hendriksdal is excluded from the final mine plan. No infrastructure will be constructed at Hendriksdal. Only underground mining will be opted as the preferred mining method.

General Amendments to the base case:

Where initial infrastructure localities (linked directly to the historical adits) inadvertently encroached the 1:100 year flood line, these localities were amended to ensure that infrastructure placement will remain outside of the delineated buffer zones linked to water bodies or sensitive areas. Please refer to Appendix 4 and 18 for the layouts of each mining section as amended.

MINING PROCESS:

The mining process will be based on a two-phased approach:

- *First Phase: Pre-Mined Residue (PMR)*
- *Second Phase: Hard Rock Mining (HRM)*

Pre-Mined Residue

Detailed sampling and analysis was carried out which indicated that the material carried significant grade, and that the bulk of the gold could be concentrated up into the finer size fractions. Several more mines were accessed and it was discovered that there were significant quantities of PMR available in these mines and the PMR project was born. The

[6] Stonewall Mining (Pty) Ltd. / Transvaal Gold Mining Estates. 2017. Project Description – 10161 Mining Right Application Project (“Sabie”)

planned strategy is to open-up the historical entrances/portals to the mines. This will be followed by ensuring that these portals and access ways are safe to use, to access and extract the resource.

Hard Rock Mining Process

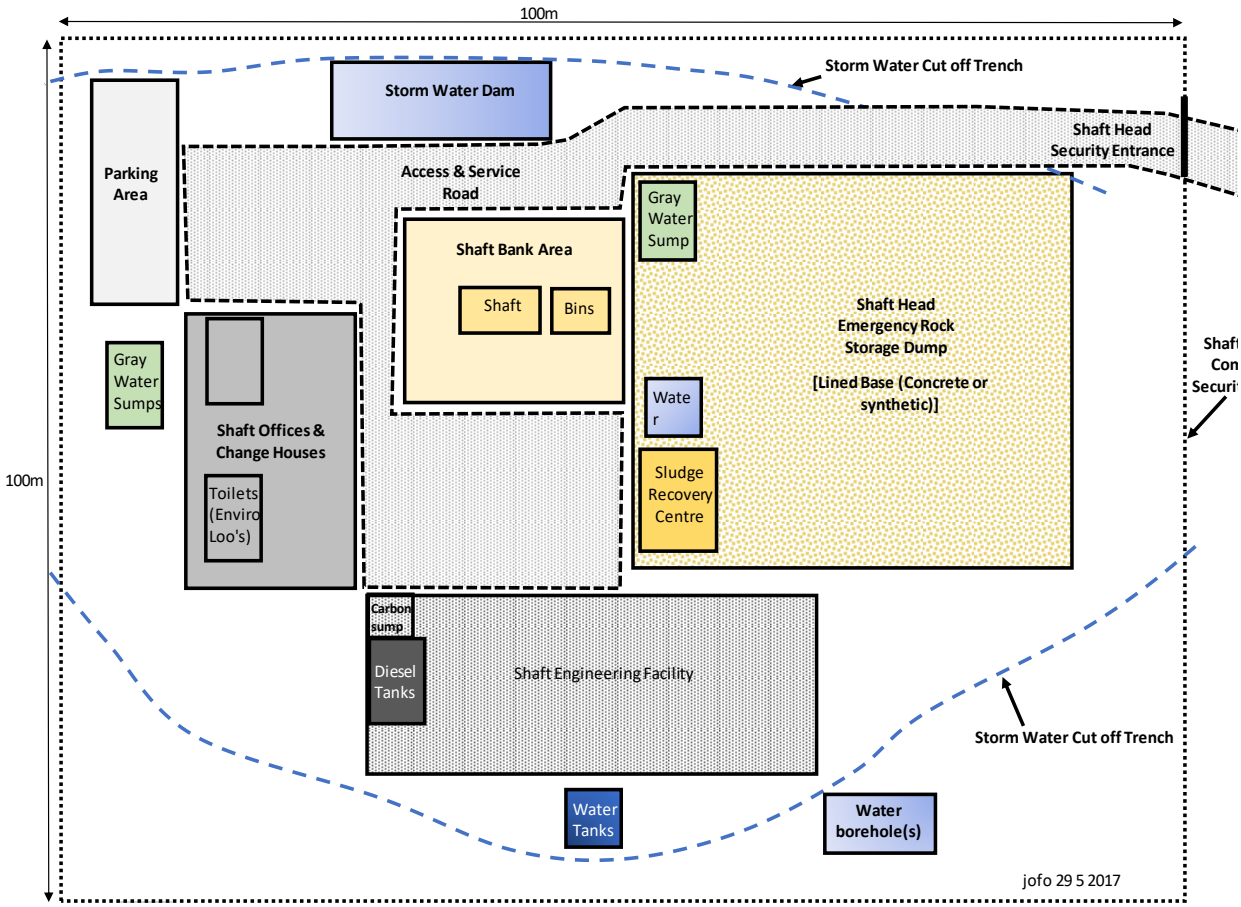
The mining process will include a process for Hard Rock Mining (HRM), whereby scrapers, hydro-vacs and high-pressure water jetting will be used to remove the material from the underground section. During the Hard Rock Mining development phase, the appropriately sized load-haul-dump (LHD) units will be used to cart the blasted rock from the development phase to the nearest conveyor belt.

The bulk of the material is expected to be conveyed out using a system of underground conveyors supported by pumping infrastructure for the removal of fines when using high pressure water jetting. As far as possible all underground pumping will make use of air driven pumps to allow for flexibility in the positioning of the pumping system underground as well as to reduce the need for specialised personnel to complete the installation, i.e. electricians.

EQUIPPING OF MINES:

It is anticipated that the equipment purchased for the initial two Sabie (10161) and Pilgrims Rest (10167) mining sections respectively (PMR and HRM) will be re-used in the subsequent mines. While there may be a requirement to extend conveyors, piping and other general infrastructure the bulk of the equipment will be used for their full effective life.

Each mining section's surface infrastructure will occupy approximately 2ha. Three different infrastructures layouts have been developed, being a vertical shaft layout and two horizontal adit layouts. The layout of the proposed surface infrastructure at the shafts / adits is shown in (Figure 2 (a)-(c)). Table 8 indicates which layout is applicable to each mining section. Appendix 4 also provides the maps of each mining section overlain with the layout maps.

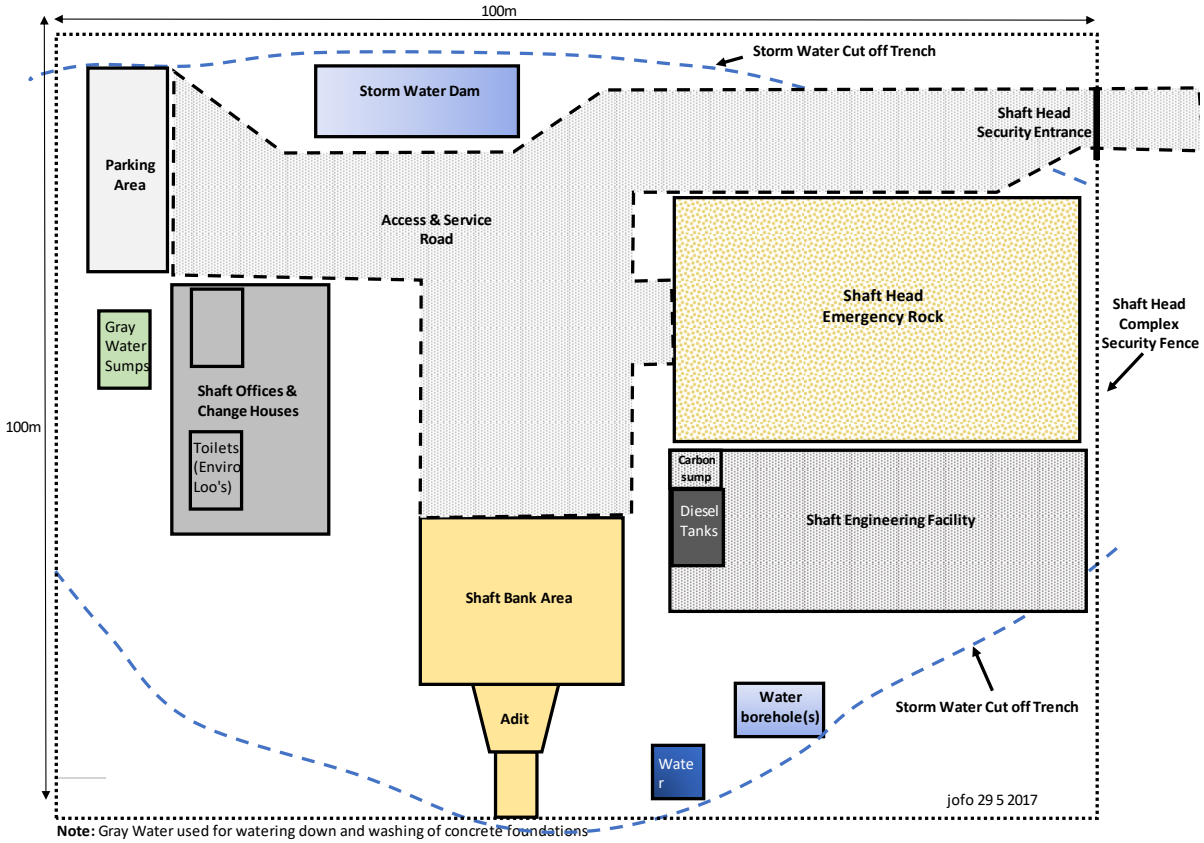


Note: Gray Water used for watering down and washing of concrete foundations

Stonewall Mining - TGME - Shaft Head Design & Requirements

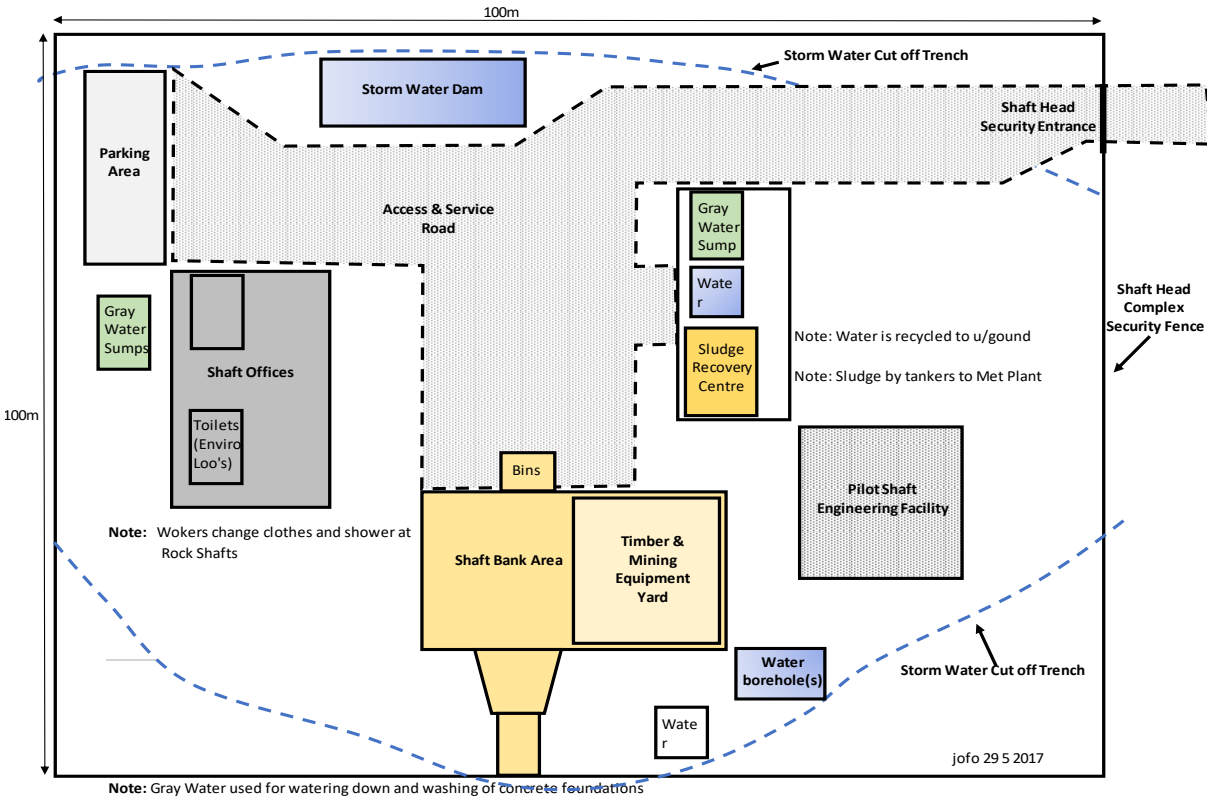
Standard Layout for Mines for use at Main Rock Service Shaft Complex - Vertical Shafts

Figure 2 (b) – (c): Generic layouts



Note: Gray Water used for watering down and washing of concrete foundations

Stonewall Mining - TGME - Shaft Head Design & Requirements
Standard Layout for Mines for use at Main Rock Service Shaft Complex - Horizontal Adits



Note: Gray Water used for watering down and washing of concrete foundations

Stonewall Mining - TGME - Shaft Head Design & Requirements
Standard Layout for Mines for use at Service Shaft Complex - Horizontal Adits

Figure 2 (b) – (c): Generic layouts

Table 8: Infrastructure type at each mining section

Mining Section	Site Layout
Werf South Adit 1 and Werf North Vertical Shaft	Main Rock & Service Shaft Complex - Vertical Shafts
Nestor Adit North, Nestor Adit Central, Nestor Adit South, Ross Hill, Leader Hill Central Adit, Maliveld North, Maliveld South, Mill Hill, Monument Hill, Olifantsgeraamte, Sheba Adit 1, Sheba Adit 2 and South Hill Adit 1	Main Rock & Service Shaft - Horizontal Adits
Leader Hill Adit South, Werf South Adit 1, Werf South, Werf North Vertical Shaft, Werf North, South Hill Adit 2	Service Shaft Complex - Horizontal Adits

Typical on-surface infrastructure at the mining sections will be:

- Access roads to each mining section
- Parking Areas;
- Change houses (showers and toilets) and Offices;
- Engineering Facilities which includes:
    - Emergency Workshop;
    - Salvage Yard (equipment yard);
    - Diesel Storage;
    - Carbon sump; and
    - Spares Storage Area.
- Water tanks and borehole(s) (where applicable);
- Greywater Sumps;
- Storm water dam (details and design as per the surface water assessment)
- Septic tanks for sanitation (Enviro Loo's);
- Sludge Recovery area – before being transported to the Met Plant.
- Shaft head emergency rock storage dump area;
- Shaft bank area with bins;
- Compressors for underground section; and
- Incoming power reticulation.

Each mining section will be fenced and secured with a security entrance. Applicable sections within the approximate 2ha footprint will be constructed on blocked concrete floors. The offices and workshop areas will be containers and pre-fabricated structures.

While there is a lot of existing infrastructure on the historical mine premises, some of the infrastructure to be installed at the adits are designed to improve the efficiency of the operations and reduce the time it takes to get personnel to the mining faces underground.

The underground section is expected to be equipped with the following general equipment and infrastructure:

- Conveyors;
- Winches;

- Pumping infrastructure;
- Ventilation fans;
- Power;
- Water;
- Compressed air; and
- Communication.

DRILLING AND BLASTING AT THE FACE

Limited blasting operations are anticipated during the PMR mining phase – and will mostly relate to the slipping of some access ways and blasting to remove larger falls of ground during the entrance clearing phase. Drilling and blasting will be utilised in the underground sections once the HRM mining process requires further development of the underground access to reef and to unearth the ore from the reef baring structures.

UNDERGROUND TRAMMING

The mining process is expected to make use of Scrapers, Hydro vacs and High-Pressure water jetting to remove the material from the underground section. The bulk of the material is expected to be conveyed out using a system of underground conveyors supported by pumping infrastructure for the removal of fines when using high pressure water jetting. As far as possible all the underground pumping will make use of air driven pumps to allow for flexibility in the positioning of the pumping system underground, as well as to reduce the need for specialised personnel to complete the installation i.e. electricians.

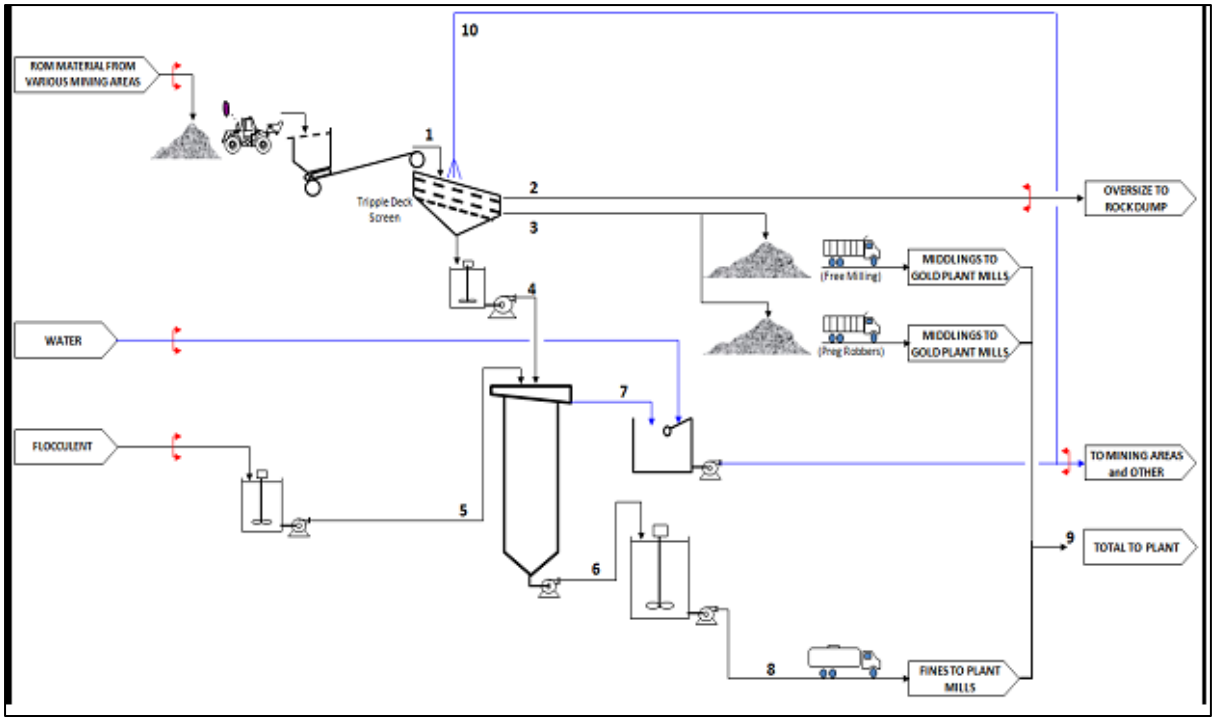
The ore reaching the portals of the Adits will be directed towards the Pre-Conditioning Centre (PCC), where applicable.

Pre-Conditioning Centre

The Pre-Conditioning Centre is a standalone process that falls between the mine and the processing plant. The purpose of the Pre-Conditioning Centre is to remove unwanted oversize and to produce two size fractions that can be transported to the approved Metallurgical Plant (also referred to as the Met plant) at the exciting approved TGME mining facility in Pilgrims Rest) plant for further processing. The Pre-Conditioning Centre also provides the first upgrade step in the processing of the gold ore.

The objective of the PCC is to reduce the tonnage load that needs to be transported to the metallurgical plant at TGME (Pilgrims Rest). The only component of the PCC that will be installed in the initial stage (please also refer below), would be the cyclone and sludge tank. The sludge arises from the mining program and is pumped from underground to recover the gold bearing sludge – as well as the recycling of water for the mine. The PCC is a pre-requisite to economic transportation and cost of the mining application at each section.

The process flow for this section is as follows:



Material from the mine is deposited into a feed hopper with feeder. From there the material is fed onto a triple deck screen. The top deck is set at 50 mm, the second deck at 17 mm and the bottom deck at 0.75 mm (750 micron). All plus 17mm material report to waste. The minus 17 mm - plus 0.75 mm fraction, reports as middling's and the minus 0.75 mm material reports to the thickener. The middling's fraction is transported via truck to the processing plant and the thickened material is transported to the plant via a tanker.

Water is recycled from the thickener back into the underground sections and also around the Pre-conditioning circuit.

The sizing of the equipment in this section makes use of the particle size distribution graph and the gold grade vs. size distribution curve.

TRANSPORTATION/LOGISTICS

At this stage, the intention is to use haul trucks to transport the ore to the plant. The Run of the Mine (ROM) (this is the products that come directly from the mine) will be transported to the existing Metallurgical plant near Pilgrims Rest. It is anticipated that two trucks per hour will be required, one in and one out.

The production tonnage in year 10 is considered to generate the "worst case" truck volumes which has been adopted for the purposes of the traffic impact assessment (Appendix 7) that was done. The maximum tons per annum is calculated as 400 000 ton per annum that will be transported from the Sabie circuit towards the processing plant at Pilgrims Rest

The future trip generation is expected to be less than the base year trip generation (refer to the traffic assessment) in that the future mines are expected to have lower production than Rietfontein and Glynn`s. The maximum production of 400 000 tons per annum has however also been adopted for analysis purposes. It is believed that more than two mines could be mined simultaneously when capacity to receive ore at the processing plant is available. Diesel is provided at the plant facility for the surface transport vehicles.

SOLIDS AND WASTE ROCK

There will be no proper rock stockpiles for the said mining process. Provision is made for emergency stocks and the designs are reflected in figure 2 (a) – (c).

Solids (sludge) in-suspension will be transported in typical concrete type trucks to the existing Metallurgical Plant in Pilgrims Rest.

Solids (Gold bearing rock), all rock reporting from underground, will be dumped in loading bins at the various rock shafts and then loaded in dump trucks. The rock will be transported to the TGME (Pilgrims Rest) Met Plant for processing.

The existing tailing facility at the approved Met plant will be used for the application. No new tailings facility forms part of the application.

MINE ACCESS

Mining access is achieved by re-opening and securing historic adits.

These access points are relatively easy to find and the initial 20 to 50 meters requires rehabilitation (re-instatement).

SUPPORT

Some previous investigations into the geotechnical conditions within the mines has indicated that in general the conditions are good and that in-mine support can be readily achieved through the use of simple supports such as timber. Given that the mining of the PMR is not expected to remove any potential support structures or support pillars, the geotechnical risk is not expected to increase. Again, the geotechnical considerations are important to the safety of personnel underground and therefore remain an important component for the underground planning. It is envisaged that detailed geotechnical planning will form part of the finite planning required prior to mining activities taking place.

VENTILATION / AIR QUALITY CONTROL

The current ventilation and geotechnical requirements for the PMR project are not expected to pose any significant challenges. While some of the ventilation and geotechnical considerations have been allowed for during the planning process it is envisaged that further detailed planning will be carried out in this area as the capital works commence.

The ventilation of the various mines is not expected to pose any significant issues however remains an important consideration for the overall planning of the mines. The fact that there is expected to be a total absence of blasting (during the PMR mining phase) and diesel equipment (except during entrance clearing in some mines) in the underground sections the ventilation requirements are greatly reduced as well as the complications in the mine. While there is natural ventilation in most of the mines this is expected to be supplemented through the use of ventilation fans and other ventilation infrastructure such as ventilation doors.

SURFACE WATER INFRASTRUCTURE

Water will be pumped from the Dewatering Tunnel (situated below the WERF Section) and also water entering the mine sections from dykes into the mine workings as required. The majority of the mine water will come from underground sources being pumped to surface. A settling and water treatment pond will be installed to handle the water from underground and act as a holding pond for water to be resent underground to the mining faces – no water will

decant from the operating mines. Detailed surface water assessment was undertaken that provides more detail (Appendix 5)

POWER SUPPLY

Allowance has been made for electricity to be supplied to the mine from Eskom – with standby diesel gen sets for emergency installations only. The nearby metallurgical plant is on the national grid and an overhead or underground power line will be extended to serve the Mines. Three alternative Eskom sources are available to cater for the required electrical demand.

WATER USE

The necessary water use license requirements will be investigated and the necessary application will be made prior to undertaking activities subject to a water use license.

ACCESS ROADS

Access roads from the public roads to the various shafts have been identified and details are attached. Please refer to the Traffic Impact Assessment report (Appendix 6) The following primary route options will be used (Figure 3):

- *Mines east of Sabie: Leader Hill, Monument Hill & Rietfontein)*

Trucks originating from the above areas will travel along R537 (P189/1) and R536 (P33/4) through Sabie Main Street and follow R532 (P9/1) towards Graskop.

    - Distance Rietfontein to Plant: 36.7km (22.5km tar +14.2km gravel)
    - Distance Leader Hill to Plant: 44.4 km (30.2km tar + 14.2km gravel)
- *Mines south of Sabie: Mill Hill, South Hill, Werf North, Sheba & Malieveld*

Trucks will travel towards R532 (P33/3- Sabie Lydenburg Rd) via an existing gravel road (Golden Valley Rd). Follow R532 through Sabie towards Graskop.

    - Distance Glynn`s to Plant: 36.6km (19.8km tar + 16.8km gravel)

- *Mines south –west of Sabie: Hendriksdal*

Follow R37 (National Road) towards the R37 / R532 (P33/3) intersection;

- *Olifantsgeraamte*

Route downhill in northern direction towards the Old Lydenburg Road (D2220) and along the Old Lydenburg Rd. towards Main Street Sabie.

In the event that for some reason the above primary roads cannot be utilised whether it be temporarily or permanent, the following alternative routes are available:

- Rietfontein Haul Route Section 1;
- Sabie Western Bypass;

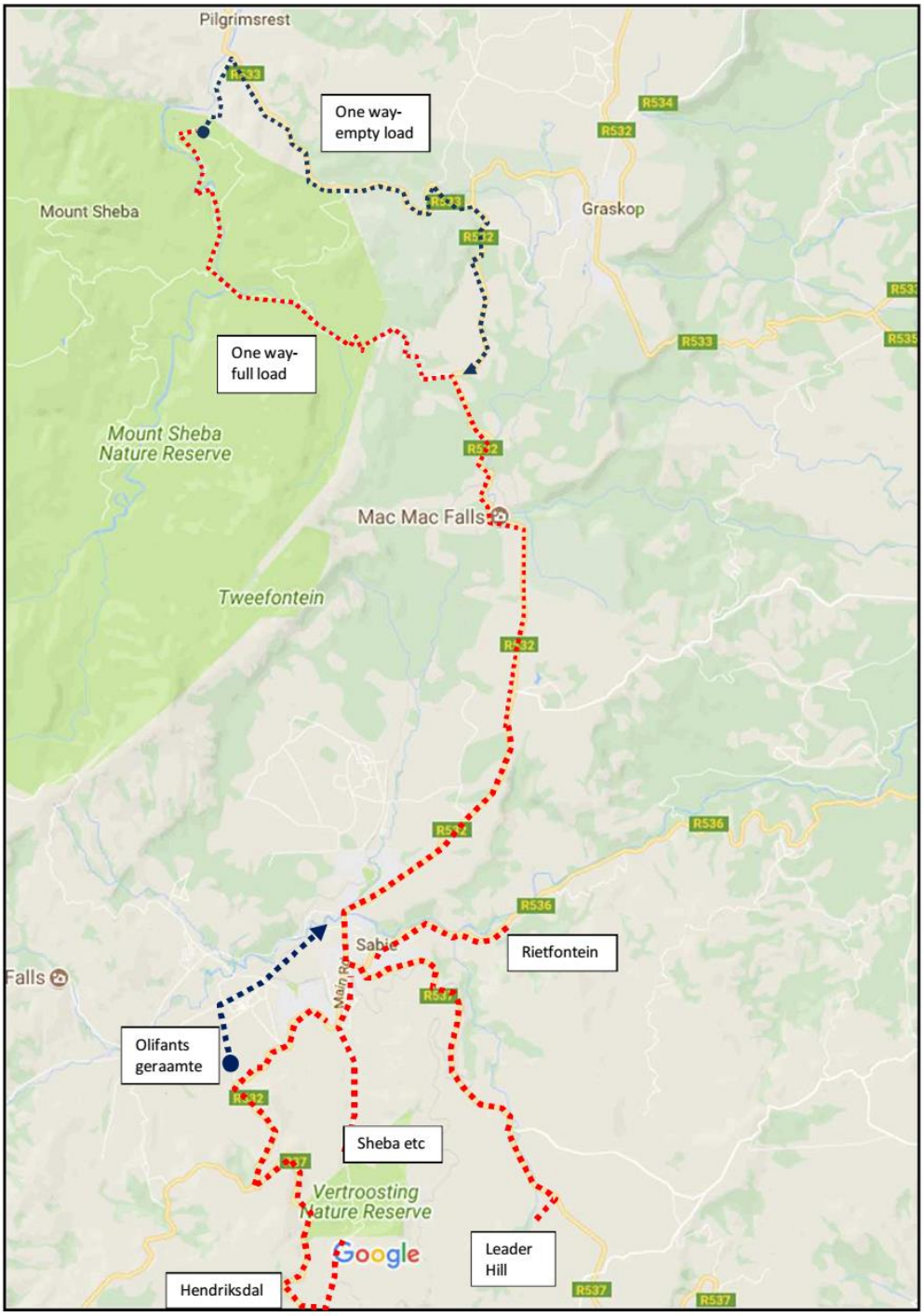


Figure 3: Proposed access routes for 10161

LIFE OF MINE

From date of submission of the Mining Right application to production of the first gold bar is projected as a worst case 10 years and best case 4~5 years. The total life of the main is based on a 25-year operation.

Please refer to Appendix 17 for the Mine Plan.

WORKFORCE

Construction Phase

The first year before the mine start operations about 167 workers will be involved by contractors in construction activities (surface and underground structures) to prepare for mining operations, i.e. 0.06% of employment created by the formal economy in Thaba Chweu municipality in 2016. This could contribute R8m or 0.05% towards the local Thaba Chweu economy, R4m paid out in the form of salaries and wages to the 167 workers and R4m as profits to contractors.

Operational Phase

The operational phase related to the mining application is expected to last 9- 12 years. During the operational phase between 400 and 700 workers could be employed, i.e. on average 530 jobs per annum. This represents between 2% and 3% of the current Thaba Chweu labour force and about 13-23% of the close to 3 000 forestry jobs currently created in the local area. The majority of workers will be medium skilled (76%) while 10% is expected to be skilled. Only 14% or between 56 and 98 of the jobs will be for unskilled workers.

e) Policy and Legislative Context

National Environmental Management Act, 107 of 1998: The act determines the processes, principles and criteria for consideration of applications, i.e. it is applicable in its entirety.

The objective of NEMA is: "To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith."

The listed activities that apply to this application is as follows:

Table 9: NEMA listed activities

EIA Notice	Activity Number	Activity Description
Listing Notice 1: GNR 983	Activity 9	The development of -infrastructure exceeding. 1 000 metres in length for the bulk transportation of water or storm water (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more, excluding where: a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b. where such construction will occur within

		urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse
Listing Notice 1: GNR 983	Activity 10	The development of -infrastructure exceeding. 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge and slime; (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more, excluding where: a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or b. where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse
Listing Notice 1: GNR 983	Activity 11	The construction of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.
Listing Notice 1: GNR 983	Activity 12	The development of— (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds

		100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (x) buildings exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse"
Listing Notice 1: GNR 983	Activity 14	The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;
Listing Notice 1: GNR 983	Activity 24	"The development of – (ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters."
Listing Notice 1: GNR 983	Activity 27	"The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan."
Listing Notice 1: GNR 983	Activity 28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or

		(ii) will occur outside an urban area, where the total land to be developed is bigger than 1hectare; excluding where such land has already been developed for residential, mixed, retail,
Listing Notice 1: GNR 983	Activity 56	"The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometre – (ii) where no reserve exists, where the existing road is wider than 8 meters…"
Listing Notice 2: GNR 984	Activity 4	The development of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.
Listing Notice 2: GNR 984	Activity 6	The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding extraction and primary processing of a mineral or petroleum resource excluding: (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities of the National Environmental Management: Waste Act, 2008 No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater, sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less
Listing Notice 2: GNR 984	Activity 9	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.

Listing Notice 2: GNR 984	Activity 15	"The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- • The undertaking of a linear activity; or • Maintenance purposes undertaken in accordance with a maintenance management plan."
Listing Notice 2: GNR 984	Activity 17	"Any activity including the operation of that activity which requires a mining right [section 22 of MPRDA], including infrastructure, structures and earthworks, directly related to the extraction of a mineral resource"
Listing Notice 2: GNR 984	Activity 19	The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
Listing Notice 2: GNR 984	Activity 21	"Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies."
Listing Notice 2: GNR 984	Activity 25	"The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15000 cubic metres or more"
Listing Notice 3: GNR 985	Activity 4 (a) (ee)	The development of a road by more than 4 meters; or the lengthening with a reserve less than 13,5 meters. (a) In Mpumalanga (ee) Within a critical biodiversity area as

		identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.
Listing Notice 3: GNR 985	Activity 12 (c) (ii)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (c) In Mpumalanga (ii) Within a critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.
Listing Notice 3: GNR 985	Activity 14 (a) (ff)	The development of Bridges exceeding10 square metres in size; (a) In Mpumalanga (ff) Within a critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.
Listing Notice 3: GNR 985	Activity 10 (a) (ee)	The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic meters (a) In Mpumalanga (ee) Within a critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.
Listing Notice 3: GNR 985	Activity 15 (b)	The transformation of land bigger than 1000 square metres In size, to residential, retail, commercial, industrial or institutional use, where, such land was zoned open space, conservation or had an equivalent zoning, on or after 02 August 2010 in Mpumalanga – in urban areas.
Listing Notice 3: GNR 985	Activity 18 (a) (ee)	The widening of a road by more than 4 meters; or the lengthening of a road by more than 1

		kilometre (a) In Mpumalanga (ee) Within a critical biodiversity area as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.

Below is the 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.

Table 10: Legal Content

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPLETE 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**
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a standalone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights. The Constitution guarantees: The right to an environment that is not harmful to human health or well-being (Section 24 (a)). The right to have the environment protected (section 24 (b)). Section 24 of the South African Constitution

	states that "everyone has the right: "to an environment that is not harmful to their health or well-being; and "to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that "prevent pollution and ecological degradation; "promote conservation; and "secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development
Minerals and Petroleum Resources Development Act (No. 28 of 2002)	In terms of Section 5 of the MPRDA no person may mine any area without: - A mining right. *Transvaal Gold Mining Estates Limited (TGME), Mpumalanga Province is applying to rework Pre-Mined Residue (PMR) mines in the Sabie area, which will form part of a larger project named the TGME Mine Development project (Project 10161), which requires a mining right application.*
National Environmental Management Act (No. 107 of 1998)	In terms of Section 24(2) of the NEMA, the Minister may identify activities which may not commence without prior authorisation The Minister thus published GNR 983 (Listing Notice 1), 984 (Listing Notice 2) and 985 (Listing Notice 3) (4 December 2014) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in GNR 982 [Environmental Impact Assessment Regulations (EIA)] (4 December 2014). Listing Notice 1 identifies activities that require a Basic Assessment (BA) process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require an S&EIR process to be undertaken, in terms of the EIA Regulations, prior to

	commencement of that activity. Listing Notice 3 identifies activities within specific areas that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. *Globesight undertook a review of the listed activities according to the proposed project description to assess the listed activities that are considered applicable.* *Under the One Environmental System, the Minister of Mineral Resources is the competent authority for the approval of environmental authorisations for mining activities related to the primary extraction and/or primary processing of ore material. The Minister of Environmental Affairs will form the appeal authority.*
National Environmental Management; Waste Act, Act 59 of 2008 (NEMWA)	The NEM: Waste Act (NEMWA) was accented to on 10 March 2009 and came into effect on 01 July 2009. This Act repeals the sections in the Environment Conservation Act, Act 73 of 1989 that previously dealt with the licensing of general and hazardous waste storage facilities. The Act was established to regulate waste management for the protection of human health and the environment. The Act aims to consolidate waste management in South Africa, and contains a number of commendable provisions *TGME will be required to apply for a Waste Licence due to the following listed activities, Category B (7 and 10), Category C (2) and Schedule 3 listed activity*
National Environmental Management: Air Quality Act (No. 59 of 2008)	In terms of section 21 of the NEM:AQA a list of scheduled processes were published in GNR893 (November 2013). Potential scheduled processes applicable are Category 1 and Subcategory 4.16. *An atmospheric emissions license (AEL) is required for Hard Rock Mining due to blasting.*

National Water Act (No. 36 of 1998)	Section 21(1) of the NWA states that a person may only use water if the water use is authorised by a license under NWA or if the responsible authority has dispensed with a license requirement if it is satisfied that the purpose the NWA will be met by the granting of a license, permit or other authorisation under any other law. A person may only use water without a license if the water use is permissible: Under Schedule I of NWA; - As a continuation of an existing lawful use; and - In terms of a general authorisation issued under Section 39 of NWA. *The necessary water use licenses requirements will be investigated as part of the EIA phase of the application.* *The necessary water use licenses are in place for the planned mining operation, due to current approved water use licences.* *The current Licences will however be review due and discussed with DWS due to additional activities and water uses required*.
National Heritage Resources Act (No. 25 of 1999)	Section 34 and 38 of the National Heritage Resources Act (No 25 of 1999) (NHRA) details specific activities that require an approved heritage impact assessment by the South African Heritage Resources Association (SAHRA). *A heritage permit will be required as a new road exceeding 300m in length will be constructed. In addition, more than 5 000m2 of land will be cleared for the new mining operations, including the re-use of pre-historic mines. Heritage Impact Assessment will be needed.*
The Hazardous Substances Act, 1973 (Act 15 of 1973) (HSA)	*All chemicals transported to and stored on site will be handled in accordance with the HSA and the applicable materials safety data sheets. A chemical log will be kept and all the necessary signage erected on site.*

National Environmental Management: Biodiversity Act, Act 10 of 2004	The National Environmental Management: Biodiversity Act (No.10 of 2004) addresses a number of issues related to biodiversity and how it should be protected and managed in undertaking development activities. The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. *Biodiversity Assessment will be required due to sensitive environments within the study area.*
Mine Health and Safety Act (Act No. 85 of 1993)	The Act was created to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith. *The Act will apply during the construction phase of the proposed development.*
Ehlanzeni District Municipality	Fire Services Bylaw *No person may store or allow the storage of any flammable substance in any storeroom unless- (a) that person has a certificate of registration (b) the storeroom complies with the requirements of this By-law and any other applicable law*
Thaba Chweu Local Municipality	Spatial Planning and Land Use Management By-Law February 2016. The Municipality must determine the use and development of land within the municipal area to which it relates in order to

	promote – (a) harmonious and compatible land use patterns; (b) aesthetic considerations; (c) sustainable development and densification; and (d) the accommodation of cultural customs and practices of traditional communities in land use management; and (e) a healthy environment that is not harmful to a person's health. *The Environmental Authorisation process being facilitated in support of the proposed project supports the purpose of the Land Use Scheme requirements drafted by the local government*

f) Need and desirability of the proposed activities.

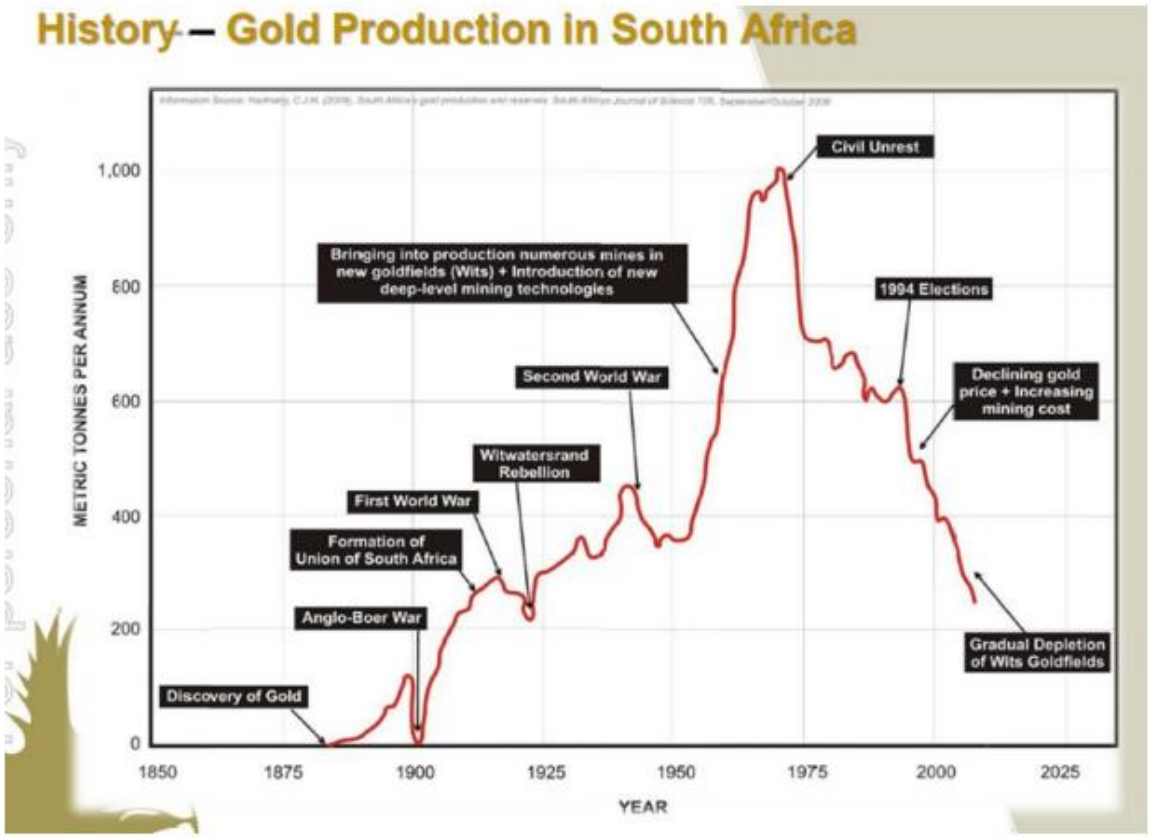
(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

Gold is still considered an important asset by most central banks, even though it is no longer the centre of the international financial system. Gold is the only reserve asset that is no-one's liability. This means that, unlike a currency, the value of gold cannot be affected by the economic policies of the issuing country or undermined by inflation in that country.

Gold has a track record of holding its real value over the centuries. Since gold is no-one's liability, it cannot be repudiated and holding it is a safeguard against potential unforeseen crises. Gold also brings much needed diversity to a central bank portfolio due to its low correlation with key currencies and its strong inverse correlation with the US dollar. Gold accounts for around 10% of reserves held by central banks (valued at market prices). Gold ranks among the most high-tech of metals, performing vital functions in many areas of everyday life.

Despite the fact that gold is predominantly used for the manufacturing of jewellery its unique properties make it useful in medical applications, pollution control, air bags, mobile telephones, laptop computers, space travel, and many other things we consider indispensable to today's society. Approximately 11% of demand for gold comes from industry.

ANNUAL CONSUMPTION AND DEMAND



Historical Production – the tip of the iceberg

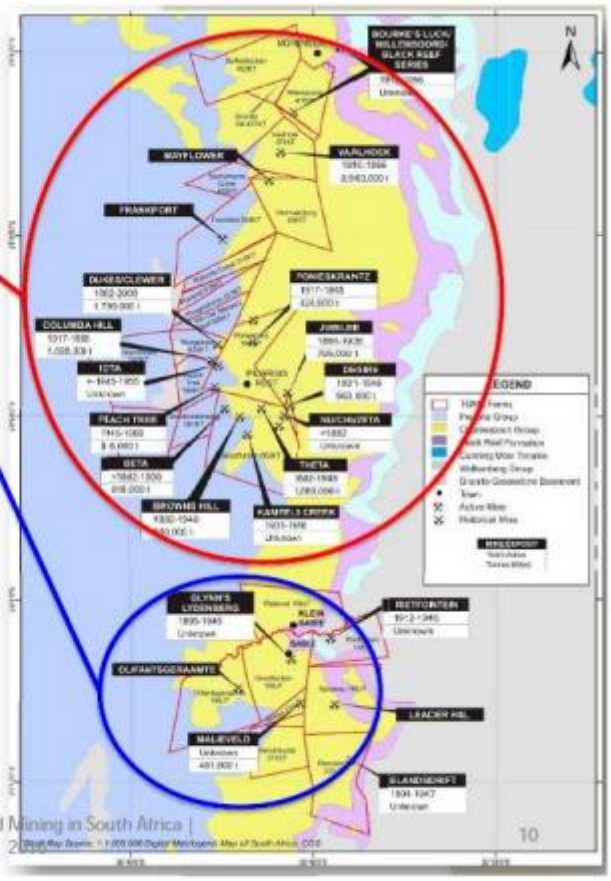
Northern & Central

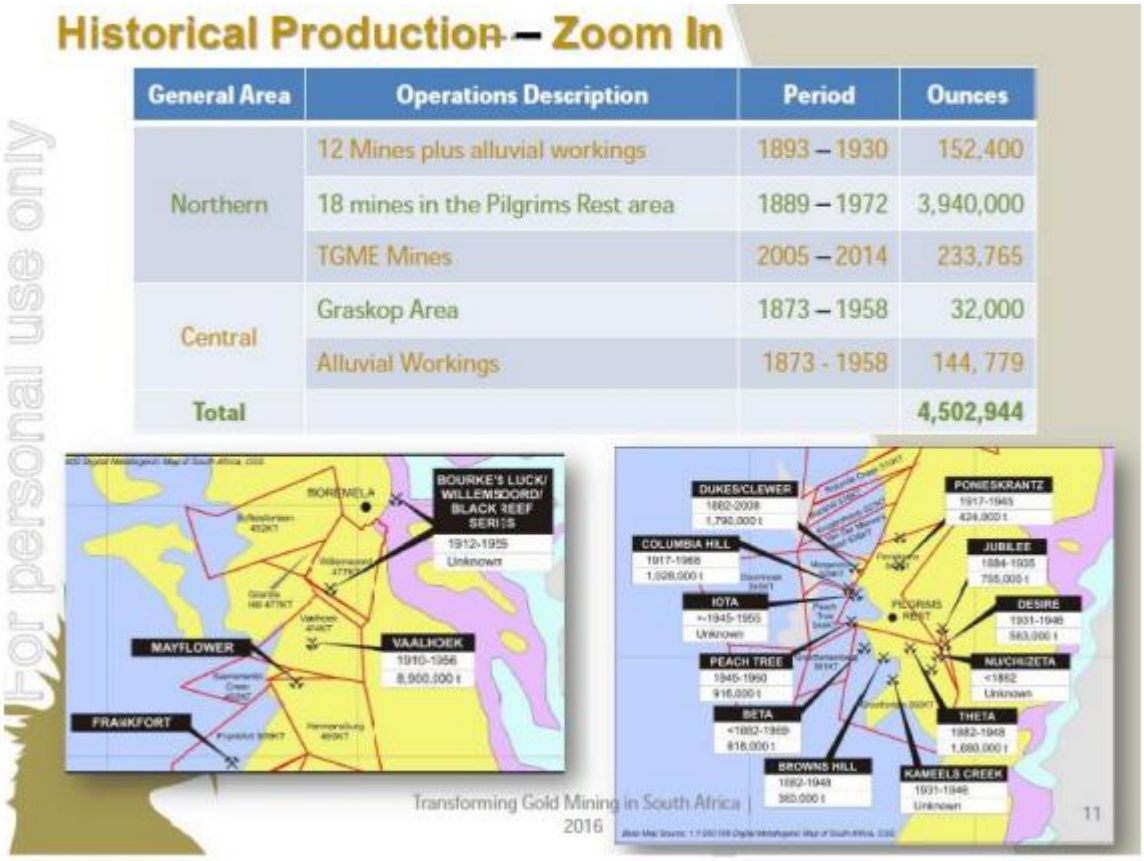
- 1872 - 1972 : ≈ 4.27 million ounces
- 2005 - 2014 : ≈ 0.23 million ounces

Southern

- 1872 – 1972 : ≈ 2.15 million ounces
- Glynns Lydenburg : ≈ 1.2 million ounces
- Elandsdrift : ≈ 78,000 ounces

Area also produced significant volumes of copper, silver, superphosphates (fertilizers) and pyrites (for sulphuric acid production)





USES OF GOLD

Industrial Uses

Gold, like other important industrial metals, has some unique physical and chemical attributes that mean it is the best material for certain industrial applications. Gold is very ductile and for some electronic components like bonding wires, the ability to draw gold alloys into extremely thin diameters without breaking is a critical property in the manufacturing process. Gold is also extremely malleable, so in the annealed state it can be hammered cold into a translucent wafer 0.000013cm thick. One ounce of gold can be beaten into a sheet covering over 9 square metres and 0.000018cm thick. Gold has excellent thermal and electrical conductivity, so it makes efficient wires and contacts in electronics, transporting electrical signals efficiently and conducting heat away from critical components. With its high corrosion resistance, the gold found in electronic contacts remains free from tarnish or oxidation. Gold-alloys used in dental work are proven to be durable and long-lasting and gold has excellent biocompatibility (it is non-toxic), so allergic reactions to a gold-based dental implant are extremely rare.

Medical Uses

From its early historical use in ancient cultures, gold is becoming increasingly important in many modern medical treatments, ranging from drugs to precision implants. Because it is "biocompatible", gold plays an important role in medical implants. For example, gold-coated "stents" are inserted into clogged arteries to clear the flow of blood. Also, because gold is opaque to x-rays, surgeons are able to place a stent with the utmost precision, which helps ensure optimal effectiveness. Other medical implants that contain gold are pace makers and insulin pumps. Gold is used in these devices because of its high level of reliability in micro-

electronics. Gold possesses a high degree of resistance to bacterial colonization, and because of this it is the material of choice for implants that are at risk of infection, such as the inner ear. Gold has a long tradition of use in this application and is considered a very valuable metal in microsurgery of the ear.

Gold is being used increasingly in pharmaceutical applications. Gold is ideal for delivering biologically active materials directly into the target tissues in the human body, without damaging the tissues themselves, or altering the biological activity of the material being delivered. Gold helps doctors to deliver precise doses of powerful drugs to the parts of the body where they are required. This is important in the treatment of a range of diseases, including cancer and HIV, the virus that causes AIDS. On the molecular level, gold has applications through its organic and chemical compounds used in medical science: for instance, anti-cancer drugs or in what doctors have started to describe as a "pharmacy on a chip" - a tiny covering of gold is used to encase micro doses of drugs on an electronic chip that is implanted in the body. When the chip is electronically activated to dissolve the tiny casing of gold, an appropriate dose of drug is released. In a similar way, gold is the preferred material for a branch of medical research the scientists call "biolistics", because it is a marriage of biology and ballistics. Strands of DNA are blended with microscopic gold powder and injected into the skin in search of targeted cells, so that the researchers can observe the reaction. In this application, three of gold's attributes are crucial: first, its non-reactiveness; second, the fact that it is opaque means it can be precisely located, just as with the stents and finally, the fact that gold is dense - it has a high ratio of mass or weight to volume - means that the compound can achieve the high speed required to penetrate the targeted cell.

Environmental Uses

New research published in the top scientific journal Nature has revealed that gold catalysts can clean up an important chemical process that is used every day to produce tons of pharmaceuticals, detergents & food additives. Gold's novel properties, particularly as an industrial catalyst, are currently being investigated in a number of applications related to environmental pollution control.

SUMMARY

The Pre-Mined Residue discovery at the Transvaal Gold Mining Estates Limited (TGME) as announced to the market in July 2013, and provides an outline of an internal study completed to bring the resource into operation. The results of investigations using the current prospecting rights in the Sabie area, more PMR and HRM reserves were defined – this includes vast potential reserves.

The internal study indicates that the project is financially robust, technically of low risk and is expected to provide a solid production platform from which to plan further opportunities including hard rock mining and tailings dam reclamation.

g) 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 (site) on which or location where it is proposed to undertake the activity;

Please also refer to the locality maps in Appendix 4 of each mining property / location.

Location of mining sections and surface infrastructure

The identification and selection of alternative locations for the placement of the mining section complexes was based on a process that considered location of the reserve, access to these reserves, depth of the reserve, quality of the gold reserve, location of sensitive environments, servitudes and proximity to the existing metallurgical plant near Pilgrims Rest. The proposed new mining activities will take place on historical mining areas (Phase 1 Pre-Mined Residue (PRM), and are therefore largely altered to an extent already due to said historical mining activities.

Various parameters and criteria played an essential role in the consideration of the various mining section locations. These included:

- Location of historical / old adits and shafts;
- Distance to the metallurgical plant near Pilgrims Rest;
- Access to the various mining sections from major road networks;
- Environmentally sensitive areas such as rivers, wetlands, sites of archaeological importance, and other biophysically sensitive areas; and
- Depth to reserve and quality of the minerals to be mined.

Location Alternatives proposed and preferred option.

Amendments at Hendrikdal mining section:

As part of the base case, the information contained in Table 7 above was provided by TGME as the initial project definition for the Henriksdal Section. However, based on the initial outcome of the specialist studies, TGME reconsidered the feasibility of the proposed alluvial mining activities associated with Hendriksdal.

Mining of the alluvials is therefore not included in this application. TGME could however opt to undertake further feasibility work to determine if said alluvials could be mined sustainably, and only if so, would a future application for mining of the alluvial be considered, but for this application, alluvial mining at Hendriksdal is excluded from the final mine plan. No infrastructure will be constructed at Hendriksdal. Only underground mining will be opted as the preferred mining method.

- The preferred option is thus that no infrastructure is to be developed at Hendriksdal, only underground mining will take place.

General location amendments to the base case:

Where initial infrastructure localities (linked directly to the historical adits) inadvertently encroached the 1:100 year flood line, these localities were amended to ensure that infrastructure placement will remain outside of the delineated buffer zones linked to water bodies or sensitive areas. Please refer to Appendix 4 and 18 for the layouts of each mining section as amended.

Location Alternatives based on Harmony Hill Residential Development

The Environmental Impact Assessment is underway to formalize the informal settlement (Fok Fok township) opposite Harmony Hill on the remaining extent of Portion 96 and the remaining extent of Portion 111 of the Farm Grootfontein 196 JT. The proposed development is referred to as Harmony Hill Extension 2 and would be an extension of the existing Harmony Hill Township. The Monument Hill mining section (part of the Glynn's Lydenburg Mine) is situated directly to the south of the proposed development. Below is the map figure 4 showing the location of the new development in relation to the TGME developments in light pink.

The access road proposed for the Monument Hill Mine Section traverses the western section of the proposed township in a north-south direction. Due to the dire need for land for housing projects and actual dwellings, it was therefore recommended that TGME realign the road to run along the western boundary of the township development.

The preferred alternative is thus to realign the road along the western boundary of the Monument Mining Section.

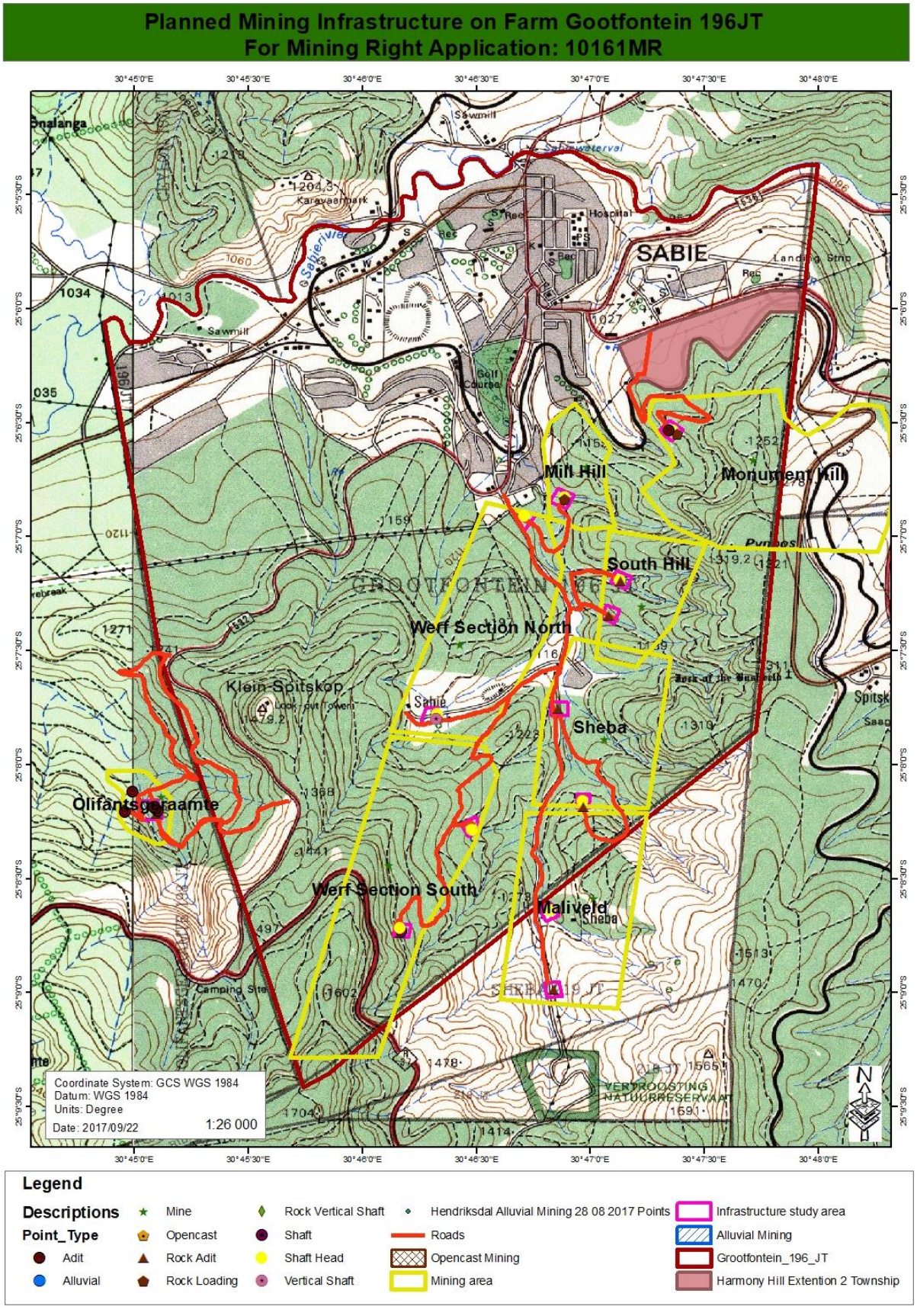
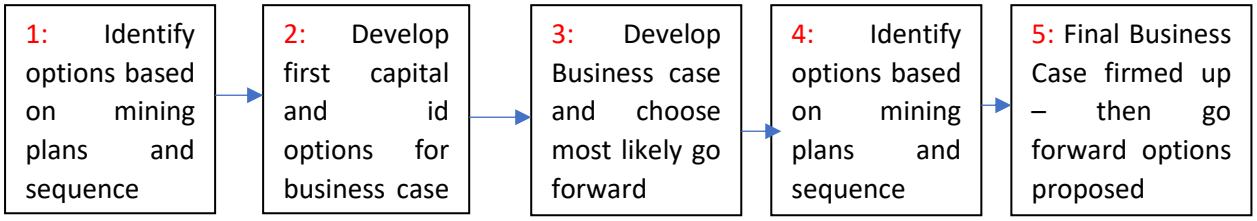


Figure 4: Location of Harmony Hill on Grootfontein

(b) the type of activity to be undertaken

Study and decision flow process:

The study process follows a systematic method of analysis and enables the project team to derive the best solution and value.



The study approach is highlighted in the below:

Transport alternatives:

The primary access routes for the proposed mining application has been identified and is discussed below. These routes were identified as the preferred routes (figure 3).

- *Mines east of Sabie: Leader Hill, Monument Hill & Rietfontein)*

Trucks originating from the above areas will travel along R537 (P189/1) and R536 (P33/4) through Sabie Main Street and follow R532 (P9/1) towards Graskop.

  - Distance Rietfontein to Plant: 36.7km (22.5km tar +14.2km gravel)
  - Distance Leader Hill to Plant: 44.4 km (30.2km tar + 14.2km gravel)

- *Mines south of Sabie: Mill Hill, South Hill, Werf North, Sheba & Malieveld*

Trucks will travel towards R532 (P33/3- Sabie Lydenburg Rd) via an existing gravel road (Golden Valley Rd). Follow R532 through Sabie towards Graskop.

  - Distance Glynn`s to Plant: 36.6km (19.8km tar + 16.8km gravel)

- *Mines south –west of Sabie: Hendriksdal*

Follow R37 (National Road) towards the R37 / R532 (P33/3) intersection;

- *Olifants Geraamte*

Route downhill in northern direction towards the Old Lydenburg Road (D2220) and along the Old Lydenburg Rd. towards Main Street Sabie.

Alternative feasibly options:

In the event that for some reason the above primary roads cannot be utilised whether it be temporarily or permanent, the following alternative routes are available:

Rietfontein Haul Route Section 1: This road is currently narrow, slippery and overgrown at places and will need extensive upgrading prior to be utilised as a haulage road.

- This route starts within close proximity to the existing Rietfontein mine and provided a link between R536 (P33/4) and R532 (P9/1). The route link with R532 (P9/1) at the existing intersection towards Klein Sabie.
    - The route is 7.84 km in length measured from Rietfontein

Sabie Western Bypass: This route is a viable alternative to the primary route through Sabie Town.

These two options have been considered and assessed, and the primary access routes has been identified as the preferred options, due the fact that these options will be regarded as the safest options taking into account the current road infrastructures and the load per truck that will be travelling per day.

(c) the design or layout of the activity

The following aspects were taken into consideration for the design of the layout of the mining sections:

- Regulation GN 704 which indicates that mining activities should take place outside the 1:100 year flood line or 100 m from a watercourse, whichever is the greatest;
- No mining infrastructure to be placed within a watercourse;
- Heritage site within the mining infrastructure areas will be avoided.
- Minimising the overall mining footprint;
- Separation of clean and dirty water by having berms around the shafts to divert clean water around the site, as well as directing all dirty water runoff from surface infrastructure areas to a storm water dam.
- Visual screening required per mining section
- All buildings fit its surroundings through the appropriate use of colour and material selection in order to lower the visibility of the proposed project. Olive greens and tans will be used at the base of buildings, fading to lighter colours, with the top section of the buildings painted a light grey to merge with the skyline. Roofs of buildings must be painted with a ‘dirty’ grey or light blue. Lighter tones attract an observer while darker shades recede from the viewer, therefore pure whites and bright colours should be avoided
- No permanent structures will be placed on site, infrastructure will be prre-fabricated and container based.

(d) the technology to be used in the activity;

Mining methods:

The various mining methods that were chosen for investigation are proven mining methods within the industry and are currently being exploited at various gold mines around the country. These methods can be summarised as follow:

- panning,
- sluicing,
- dredging,
- Pre-Mined Residue;
- hard rock mining, and
- by-product mining.

For the most effective gold mining at TGME 10161 application, the method used is pre-mine residue mining and hard rock mining, since reserves are typically fully encased in rock deep underground.

Mining Method Alternatives proposed and preferred option.

Amendments at Hendrikdal mining section:

As part of the base case, the information contained in Table 7 above was provided by TGME as the initial project definition for the Henriksdal Section. However, based on the initial outcome of the specialist studies, TGME reconsidered the feasibility of the proposed alluvial mining activities associated with Hendriksdal.

Mining of the alluvials is therefore not included in this application. TGME could however opt to undertake further feasibility work to determine if said alluvials could be mined sustainably, and only if so, would a future application for mining of the alluvial be considered, but for this application, alluvial mining at Hendriksdal is excluded from the final mine plan. No infrastructure will be constructed at Hendriksdal. Only underground mining will be opted as the preferred mining method.

- The preferred option is thus that no alluvial mining to be undertaken at Hendriksdal, only underground mining will take place.

Preferred Mining Method for TGME

The operational philosophy for the TGME Mine Development project is based on geotechnical conditions within the mines. In 2013, as part of the exploration strategy, a review of historical operational data of the mine highlighted an unexplained discrepancy between the mined and milled volumes. The mined volume was well in excess of the milled volume however the waste rock dumps did not reflect the expected volumes stored on them. Upon inspection in the underground sections of Beta mine it was found there were large volumes of rock stored in the mined-out stopes. Initial sampling indicated that this material carried value, in particular in the finer fractions. Further investigation revealed that the miners of old mined a narrow band of reef however needed to mine a larger stope width in order to practically progress into the reef horizon. Hand sorting took place underground to high grade the material, however given the comparatively primitive method, the remaining material carried grade and was not recovered as ore. This remaining material was then stacked into the old stopes behind starter walls of stone as the removal of this material would have affected the capacity of the underground section to deliver the required volumes of ore to the mill.

This material was labelled as Pre-Mined Residue (PMR) by the team and further detailed sampling and analysis was carried out which indicated that the material carried significant grade, and that the bulk of the gold could be concentrated up into the finer size fractions. Several more mines were accessed and it was discovered that there were significant quantities of PMR available in these mines and the PMR project was born.

The hard rock reserves are mostly situated on the periphery of the PMR areas and is contained in the pillars left historically and extending in all directions from the core PMR zones – but is not limited thereto. The extensions of the reserves have been delineated as

part of the exploration activities over the past 8 years through the authority of the prospecting rights.

- The mining method has been selected on the successful implementation of the above-mentioned mining method at the trial mining at Beta South PMR Mine in the TGME area (83MR) except for the use of underground conveyor systems.

(e) the operational aspects of the activity; and

Processing of minerals on site or off site

Processing of the hard rock material (obtaining the gold form the rock) at each mining section site was considered, however the preferred option (as part of the mining method) is to process the minerals at the existing TGME metallurgical plant near Pilgrims Rest. TGME has an existing processing facility and metallurgical plant with tailings facilities, therefore these will not be required within the immediate Sabie mining areas.

- The preferred option is to make use of the pre-condition centres at each mining section to reduce the tonnage load that needs to be transported to the metallurgical plant. Processing will take place at the existing metallurgical plant near Pilgrims Rest.

(f) the option of not implementing the activity.

The proposed mine will have a favourable economic impact on the local and regional economy. The Positive Impacts will be:

- Direct job opportunities,
- Increased income,
- Positive impacts on poverty through employment of unskilled labour,
- Social development support,
- Input into LED programmes and possible socio-economic spin-offs created through the entire process. Local procurement of goods, materials and services could occur, which would result in additional positive economic injections to the area in terms of income and employment.
- Positive impacts are further anticipated with regards to the local hospitality industry through the accommodation of members of the workforce and the overall possible development of the tourism industry's potential.

The positive impact will however, be more prominent in terms of the regional and local economies. The no project option will result in:

- Commitments made in the Social and Labour Plan (SLP) in terms of Human Resource Development (HRD) and Local Economic Development (LED) will not be achieved;
- Continuous effect of unemployment
- Negative effect in terms of the corporate social investment program; and
- Zero contributions in terms of poverty alleviation.

The “no project option” is not considered.

ii. **Details of the Public Participation Process Followed**

(Describe the process undertaken to consult interested and affected parties including public meeting and one on one consulting. 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.)

This section provides details of the public participation process followed to date and focuses on:

- Introduction to the approach followed;
- Identification of Interested and Affected Parties (I&APs);
- Background to the public participation process; and
- Public participation process undertaken for this environmental authorisation.

Approach

The public participation process followed for the Mining Right Application authorisation is an integrated and comprehensive process with the purpose to provide I&APs with sufficient and accessible information in an objective manner to assist them to:

During the pre-application and scoping phase:

- Raise comments and make recommendations to be considered during the impact assessment phase;
- Provide comment on project alternatives and the proposed process of assessment;
- Verify that their issues were recorded and understood; and
- Contribute local knowledge to the process.

During the impact assessment phase

- Verify that their comments have been considered in the EIA/EMP; and
- Comment on the findings of the specialist studies and the EIA.

During the decision-making phase

- Advise I&APs of the outcome of the environmental authorisation (i.e. DMR decision), and the appeals process and procedure.

Identification of Interested and Affected Parties

The NEMA Regulations require identification of and consultation with I&APs. The term I&AP generically refers to persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively.

Batho Earth's approach recognises that I&APs are diverse in character and in their project interest. The following criteria were used to identify I&APs:

- **Zone of influence**: physical location relative to the project site and potential impacts. Generally the closer stakeholders live to a project site, the higher their interest and the potential impacts of the project;

- **Stakeholder values**: the value stakeholders attach to the area that might be affected by the project. This includes aspects such as livelihoods, land use, ownership, heritage and sense of place; and
- **Jurisdiction**: the mandate/influence of institutions over the regulatory process and public opinion.

In addition to the above criteria, the following aspects refined the I&AP identification process:

- The focus in the Thaba Chewu Local Municipality was Wards 4, 6, 7, 8,9, 10,11, and 13
- Directly affected landowners or occupants living adjacent to the project area influenced by the mining right area of Sabie

In accordance with the NEMA, GNR 982, Chapter 6, the following activities have taken place or are proposed to take place within the Scoping Report review period or beyond:

I&AP Consultations

The public participation process must include consultation with (1) the competent authority, (2) every state department that administers a law relating to the matter, (3) all organs of state which have jurisdiction in respect of the activity to which the application relates, (4) all potential, or, where relevant, registered interested and affected parties. In order to satisfy this requirement, the Environmental Assessment Practitioner (EAP) will undertake the following consultations:

- Competent Authority - The DMR is the competent authority related to this application. This application forms the first of the consultations with the DMR. The EAP undertakes to engage in on-going communications with the DMR (preferably directly with the allocated case officer).
- Departments that administer a law relating to the matter – Due to existing Water Use Licence in place at the TGME mining areas, consultation with DWS is required. The draft EIA and EMPr report was submitted to DWS for comments.
- All organs of state which have jurisdiction in respect of the activity to which the application relates:
    - National Level: The Department of Environmental Affairs (DEA) - Under the “One Environmental System” rolled out by Government on 8 December 2014, licensing processes for mining, environmental authorisations and water use have been streamlined. Under the One Environmental System, The Minister of Mineral Resources will issue environmental authorisations and waste management licences in terms of the NEMA, and the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), respectively, for mining and related activities. However, note that in the new system, the Minister of Environmental Affairs will be the appeal authority for these authorisations to ensure complete independency to the competent authority.
    - Provincial Level: Given that the activity is located within the Mpumalanga Province the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDAT) will form a primary commenting authority during the process. The provincial Heritage Resource authority will be informed about the proposed project due to various heritage value linked to the pre-historic mining activities at TGME mine shafts. The draft EIA and EMPr report was submitted to SAHRA for comments.

- District Level The proposed project area falls within the jurisdiction of the Ehlanzeni District Municipality. The Ehlanzeni District Municipality will be informed about the project as part of on-going spatial development planning and land use updates.
- Local Level: Thaba Chweu Local Municipality is the local authority governing the proposed project area. The Municipality is responsible for managing the various wards which make up the proposed project area and surrounds. The Wards associated include: Wards 4, 6, 7, 8,9, 10,11, and 13. The ward councillors will be a primary target for the proposed project in an effort to communicate the project to as greater stakeholder database as possible, especially considering the locals will be the most affected stakeholder grouping. Focus Group meetings were held with the Thaba Chewu Local Municipality, please refer to Appendix 7 for a copy of the minutes of the meetings on 06 September 2017. Follow up meeting during the review period of the report was arranged on 16 November 2017 to discuss the outcome of the specialist studies. Please refer to Appendix 7 for a copy of the minutes.
- All potentially registered I&APs – A detailed stakeholder databased was created during the scoping phase of the application (appendix 8). The database was updated following all stakeholder request to be registered. The use of site notices, Notification Letters, Short Messaging Systems (SMS), email and fax was be used as methods in which to reach potentially interested and affected parties.
- Affected Landowners – As far as possible, all affected property owners have been contacted and informed of the proposed new mining right application lodge on there said properties.

The latest stakeholder database is included within this report as Appendix 7.

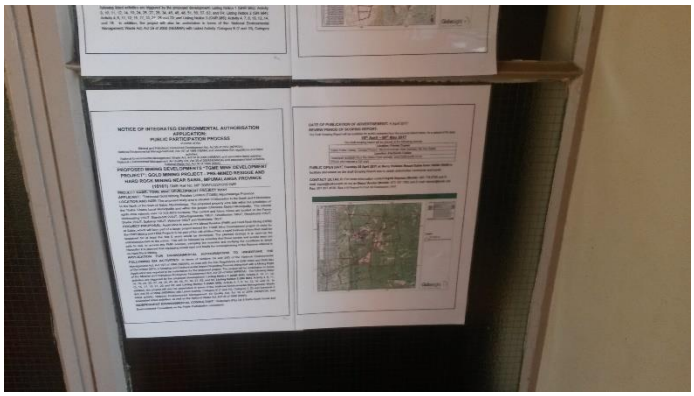
All registered I&APs, which have a direct affect/effect on the proposed project or are directly or indirectly impacted by the proposed project, have the right to lodge a comment/question on the project (until such time that the appeals process comes to a close).

Notification of Potential I&APs

In accordance with GNR 982 Section 41(2)(a-b) a site notice was developed (see below, proof of placement) and placed at ten locations, including:

1. Placed at the intersection of the R532 and R533 (close to the Farm Olifantsgeraamte 198)

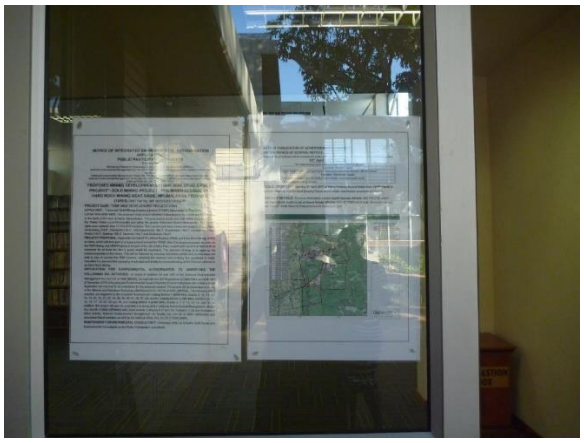
2. Placed at the Graskop Public Library (Thaba Chweu LM Graskop).



3. Placed at the Simile Public Library (Thaba Chweu LM Simile).

4. Placed at the intersection to the entrance of Simile and Sabie Rover Camp, from Main Street Sabie.

5. Placed at the Sabie Public Library (Thaba Chweu LM Sabie).



6. Placed at the Intersection of Sabie Town and the R536 towards Hazyview.

7. Placed outside the Sabie Post Office.

8. Placed outside Sabie Information Centre.

9. Placed outside Spar, Sabie

10. Placed on the entrance of the Farm Hendriksdal 216 on the R37 (R40)

The site notice will serve to inform the occupiers of the land along with the newspaper advert and existing stakeholder database.

In accordance with GN. R 982 41(2)(c) of Chapter 6 an advert was placed in

- The Lowvelder on 04 April 2017

There are many local languages spoken in the area of which Tswana and Xhosa are the most prevalent. English is considered a universal language; therefore, the newspaper advert will be placed in English only. The proof of advert is attached in Appendix 7 in the draft EIA report.

In addition to the minimum requirements outlined in GNR 982, the EAP has undertaken the following:

- Distribution of notification letters to TGME stakeholders via email and fax (where contact data is available); and
- A public open day WAS held on 25 April 2017 (Merry Pebbles Resort Sabie from 14h00-19h00), during the draft scoping report review period. Comments and Issues raised during the open day is included into the issues and response report Appendix 7.
- The Draft TGME Project 10161 (Sabie) Scoping Report was available to the public for review from 10 April to 09 May 2017.
- In mid-August 2017, a notification letter explaining the status of the project and the start of the EIA Phase of the project, was distributed to the registered I&APs on the database.

Any stakeholder whom submits a comment along the course of the process have automatically be registered on the project specific stakeholder database. Database is attached to Appendix 7.

Focus Group Meetings – EIA phase

The following focus group meetings with different groupings were held during the EIA Phase of the project:

- Representatives of the Sabie Chamber of Commerce and Tourism;
- Representatives of the Thaba Chweu Local Municipality;
- Property lessee Mr. B. Linde;
- Representatives of SAFCOL;

Way-Forward: EIA phase

Commenting Period: Draft EIA Report

The Draft TGME Project 10161 (Sabie) EIA Report WAS available to the public for review from 3 November 2017 until 4 December 2017.

All I&APs, registered as part of the public participation process, was notified of the availability of the draft EIA Report.

All comments received up to 04 December 2017 have been included and were addressed in the Issues and Response Report.

Availability of Draft EIA Report

The draft EIA Report will be placed at the following venues:

- Sabie Public Library (8th Ave, Sabie)
- Pilgrim's Rest Museum (Pilgrim's Rest)

Electronic copies can be downloaded from the Batho Earth website: www.bathoearth.co.za. Alternatively I&APs can contact Batho Earth to request copies of the draft EIA Report on CD.

Public Open Day

A public open day was held during the review period of the draft EIA Report. The open-day was held on 23 November 2017 at the Sabie Golf Club (14:00 until 18:30).

All I&Aps were provided with an opportunity to discuss issues regarding the draft EIA Report with the consultants and some of the specialists. The aim of the open-day was to clarify issues and to enhance the understanding of the findings of the EIA Report. The following specialist attended the open-day:

- Mr Stephan van Staden (Aquatic specialist) and Mr Emile van der Westhuizen (ecological specialist) from Scientific Terrestrial Services
- Mr Marius van Biljon (groundwater specialist) from MB Groundwater Consulting
- Mr Hendrikus Swart (traffic engineer) from Hamatino Consulting Engineers
- Ms Ingrid Snyman (Social Assessment specialist) from Batho Earth

Focus Group Meetings during EIA/EMPr Review Period

As requested by the representatives of the TCLM and the Sabie Chamber of Commerce and Tourism, focus group meetings will be held with these representatives during the review period. The aim of the meetings would be to present the findings of the EIA Report to the stakeholders and to discuss the content thereof.

Meeting with Thaba Chweu Local Municipality (TCLM)

As requested by the representatives of the TCLM, a focus group meeting was held with the representatives during the review period. The meeting was held on 16 November 2017. Please find attached as appendix 7, minutes of this meeting with attendance register. The aim of the meeting was to present the findings of the EIA Report to the stakeholders and to discuss the content thereof.

Meeting Sabie Chamber of Commerce and Tourism

A focus group meeting was held with the representatives during the review period. The meeting was held on 15 November 2017. Please find attached as appendix 7, minutes of this meeting with attendance register. The aim of the meeting was to present the findings of the EIA Report to the stakeholders and to discuss the content thereof.

Meeting with Motlatse Economic Development Cooperative

TGME (Elane Botha and Johan Fourier) arranged a meeting with Mr Andrew Mashego (Chairman Motlatse EDC) on 02 November 2017 in Motlaste. Please find attached as appendix 7, minutes of this meeting. The aim of the meeting was to determine the needs of the community and the involvement of TGME.

Consultation Process – with Authorities

Department of Water Affairs and Sanitation (DWS)

The copy of the Draft EIA / EMPR report was couriered to Ms Marcia Malapane on 03 November 2017. Please refer to Appendix 7 proof of submission folder for the way-bill showing delivery of the report and also e-mail sent to Mr Mpho Ntshagovhe - DWS Lydenburg.

Department of Agriculture, Rural Development, Land and Environmental Affairs

Contact was made with Ms. Pamela Ntuli from Environmental Affairs. It was confirmed that the Mpumalanga Tourism and Parks Agency (MPTA) is the commenting authority on Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) Reports. However, a hard copy of the report will also be deliver to her office before 15 December 2017. Please refer to Appendix 7 proof of submission folder for the proof of communication.

Mpumalanga Tourism and Parks Agency

The following people from MTPA are registered on the project database, Mr Frans Krige, Xolani Mthethwa, Abe Sibiya, Komilla Narasoo. MTPA, requested that a hard-copy of the scoping report be sent to Komilla Narasoo. Copy of the scoping report was couriered to the department. Ms Lientjie Cohen the contacted the public participation office, requesting an extension of time until 19 January 2018. This was granted by the DMR. Please refer to Appendix 7 proof of submission folder for the proof of consultation.

South African Heritage Resource Agency (SAHRA)

As per the requirements of SAHRA, the Heritage Impact Assessment Report was submitted on line via the SARIS online system. Please find attached to Appendix 8 proof of submission.

Department of Agriculture Forestry and Fisheries (DAFF)

DAFF was consulted and Mr Richard Green provided comments on the application. Please find attached as Appendix 7 proof of Submission the comment and consultation process with DAFF.

Mpumalanga Department of Public Works

The copy of the Draft EIA/EMPR report was couriered to Mr KM Mohlasedi on 03 November 2017. Please refer to Appendix 7 proof of submission folder for the way-bill showing delivery of the report.

Department of Roads and Transport

Notifications during the Scoping Phase and EIA phase was sent to Mr KM Mohlasedi Mpumalanga Department of Public Works, Roads and Transport (MDPWRT). Please find attached as Appendix 7 proof of e-mails sent.

Thaba Chweu Local Municipality (TCLM)

The copy of the Draft EIA / EMPR report was couriered to Mr TMP Kgoale on 03 November 2017. Please refer to Appendix 7 proof of submission. In total two meetings were held with TCLM. Please also note that all Ward Councillors for the entire study area was invited to all meetings. Proof of mails attached in Appendix 7. Minutes of meetings also attached. No comments received from TCLM on the draft EIA / EMPR.

Consultation Process – with Landowners and Adjacent Landowners

Landowner: York Timbers (PTY) LTD

York was identified through the title deed searches as one of the landowner and adjacent landowners. York was invited to the open day during the scoping phase, of which Ms Christine de Jager attended. York also commented on the draft scoping report. Please refer to Appendix 7 proof of submission for the formal comments received from York during the scoping phase. Response there to was addressed in the issues and response report. During the EIA phase Batho Earth contacted and e-mailed Ms de Jager in order to arrange for a meeting/discussion session. However, Ms de Jager could not make the proposed dates. (see mails). Follow-up mail was again sent to Ms de Jager on 15 September 2017, requesting a meeting. With no response (see mails). Batho Earth again requested a meeting vir e-mail on 16 October 2017. Ms De Jager replied on the 02 November 2017, referring to an attached letter sent to Stonewall Mining. (e-mail and letter attached). Notifications of the review period was sent to York, and CD was delivered to the office of York in Sabie. (proof of mail attached). York submitted comments on the draft EIA/EMPR. Response attached as part of the issues trail. In addition, also refer to the response letter from Stonewall Mining to York.

Landowner: South African Forestry Company SOC Limited (SAFCOL)

SAFCOL was identified through the title deed searches as one of the landowner and adjacent landowners. Mr Richard Madden was registered on the project database. Mr Madden confirmed the farm verification list from Komatieland Forests on 03 May 2017. Batho Earth submitted a meeting request to SAFCOL on 31 August 2017. Meeting was eventual arranged for 26 October 2017. Please refer to Appendix 7 proof of submission for the minutes and attendance register of the meeting. In the meeting Ms Bekky Mashego, requested a CD of the Draft EIA/EMPR. Please see proof of e-mail from Bekky confirm receipt on 09 November 2017. In addition, TGME also had a meeting with Mr Piet Bezuidenhout on 03 November 2017. Batho Earth is still awaiting comments from SAFCOL on the draft EIA/EMPR.

Landowner: SAPPI

SAPPI was identified through the title deed searches as one of the landowner and adjacent landowners. Confirmation of the affected properties by Sappi was confirmed by Ms Louise van Wyk on 08 May 2017 (proof of mails). Meeting was scheduled on 06 September 2017 with Ms van Wyk. Please refer to the attendance register and minutes of meeting. Comments from Sappi was received based on the Draft EIA/EMPR. Response thereto is attached in the issues and response report.

Landowner: Motlatse Economic Development Cooperative (tribal authority for the area)

Motlatse Economic Development Cooperative was identified through the title deed searches as one of the landowner and adjacent landowner and the tribal authority in the area. Contact was made with the Chairperson of the Development Committee: Moretele, Mr. Andrew Mashego on 05 April 2017. The said properties which belong to the committee was confirmed. The committee was informed of the Draft Scoping Report review period on 10 April 2017, and the details of the open-day that was held on 24 April 2017. Meeting was then arraged with the committee on 04 May 2017 together with TGME (Elane Botha) and Batho Earth (Ingrid Snyman). Please refer to Appendix 7 proof of submission for the minutes and attendance register of the meeting. Comment was also received from Mr Reginald Kgoedi, on the draft scoping report. Please refer to the issues and response report. Second meeting was arranged with the committee on 06 September 2017. Please find attached the attendance register and minutes of meeting, part of Appendix 7, proof of consultation. Mr Mashego was also informed on the avaialbity of the draft EIA/EMPR and comments was received on 04 December 2017. In addition a meeting was held between TGME (Elane Botha and Johan Fourier) and Mr Andrew Mashego (Chairman Motlatse EDC) on 02 November 2017 in Motlaste

Consultation Process Public:

Please refer to the attendance register for the open day held on 25 April 2017 and on 23 November 2017. Various stakeholders from the Hoedspruit area requested to be registered during the time period of Friday 01 December 2017 until Monday 04 December 2017 (date as to when the review period closed). Various objections were made. All these comments and objections are listed under Appendix 8, notification from 01 December stakeholders.

Sabie Chamber of Commerce and Tourism.

Captain Gwilym Rees registered on the project database during the open-day held on 25 April 2017. (refer to mails). Comments on the draft Scoping report was submitted on 08 May 2017. Please refer to Appendix 7 proof of submission for the comments received. These comments were included into the final scoping report, please refer to the issues and response report. On 15 August 2017, Batho Earth provided feedback to Mr Rees on the status of the EIA application. A Focus Group Meeting was then held on 05 September 2017. As part of App 7 proof of consultation is the minutes and attendance register of the meeting. Notifications were emailed on 03 November 2017, informing Mr Rees and the rest of the Chamber of the Dart EIA/EMPR review period. Follow-up focus group meeting was held on 15 November 2017. Mr Rees also provided comments on the minutes. Please find all attached. Comments on the draft EIA/EMPR was submitted on 28 November 2017. Please find attached and response there to in issues and response report. Additional e-mail comment was on 29 November 2017 and again on 30 November 2017. Attached as per the emails received.

Property Owner: Rietfontein Mr Shawne Botha and owner of Sabie Star Chalets.

Mr Botha attended the open-day on 25 April 2017, please refer to Appendix 7 proof of submission for the registration sheet. Issues raised on noise levels within the boundary of his facility was raised. Based on this, the noise specialist conducted test on his property and no increase in noise levels was received. Notifications on the availability of the draft EIA/EMPR was mailed on 03 November 2017. Mr Botha also

attended the open-day on 23 November 2017 in which comments were made. Please refer to the issues and response report.

Property Owner: Farm Waterfal, Mr Berrie Linde

Mr Linde contacted Batho Earth on 02 May 2017 confirm the permits applicable to the Farm Waterval, which has reference to Nestor Mine. Meeting was held on 06 September 2017 with Mr Linde. Please refer to Appendix 7 proof of submission for the copy of the minutes. Notifications on the availability of the draft EIA/EMPR was mailed on 03 November 2017. Mr Linde also attended the open-day on 23 November 2017 in which comments were made. Please refer to the issues and response report.

iii. Summary of issued raised by I&APs

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

Please refer to Appendix 7 for a copy of the Issues and Response Report which provides a summary of ALL the comments made during the scoping phase of the application. Additional comments was updated within the issues trail. All additional comments will also be submitted to the DMR as part of the EIA phase of the application, based on the comments received on the draft EIA/EMPr and or final EIA/EMPr.

iv. The Environmental attributes associated with the sites

1) Baseline Environment

(a) Type of environment affected by the proposed activity. (its current geographical, physical, biological, socio-economic, and cultural character).

TOPOGRAPHY

The TGME project areas are located in the midst of the Drakensberg mountain range, with Pilgrims Rest at an elevation of 1 300m above sea level and the Lowveld stretching eastwards from the Great Escarpment with an elevation of under 750m above sea level. The project area is dissected by river erosion, with the Blyde River Canyon reaching a depth of over 770m

The topography on the farms Vertroosting 218JT, Elandsdrift 220JT, Olifantsgeraamte 198JT, Grootfontein 196JT, Hendriksdal 216JT, Sheba 219JT, Spitskop 195JT, Waterval 168JT and Rietfontein 193JT is undulating and rises rapidly from the Sabie River into mountainous terrain to the West, East and South. Access to the area is via tar roads, gravel roads and forestry gravel roads which are used to a larger or lesser extent – depending on the geographical location. The greater TGME/Sabie areas are covered by various Prospecting and Mining rights. These rights allow for TGME and Sabie Mines to mine for gold, silver and copper as well as extract aggregates for sale. Various pre-historic mining activities are visible.

The TGME project areas are located in the midst of the Drakensberg mountain range, with Pilgrims Rest at an elevation of 1 300m above sea level and the Lowveld stretching eastwards from the Great Escarpment with an elevation of under 750m above sea level. The project area is dissected by river erosion, with the Blyde River Canyon reaching a depth of over 770m

SOILS AND LAND CAPABILITY

Scientific Terrestrial Services (STS) was appointed to conduct a soil, land use and land capability ecological assessment as part of the Environmental assessment and authorisation process (Appendix 8).

The investigated study areas are largely dominated by forestry plantations and historic mining infrastructure, with limited cultivation and livestock grazing under current conditions. The proposed mining areas as well as the associated haul roads are largely dominated by shallow lithic soils of Glenrosa (Gs) and Mispah (Ms), and disturbed Witbank (Wb) soil forms. The remainder of the study area comprises of Hutton (Hu)/Clovelly (CV) identified on gently sloping and higher landscape positions; Avalon (Av)//Pinedene (Pn), Bloemdal (Bd), and Fernwood (Fn) soil forms on valley bottom position.

Almost the entire proposed mining sites were historically used as mining sites prior to forestry plantations, whether as access points (Adits or vertical shafts) to the underground mine workings or as waste rocks dump sites. This was evident during the site assessment, as disturbances associated with historic mining activities were observed. The impact of the proposed mining sites on high potential agricultural soils is anticipated to be limited in extent, due to the nature of the mining infrastructure. Soils within the valley bottom wetlands (i.e. Hendriksdal Alluvial Site) will be significantly impacted due to the nature of the mining activities, therefore efforts should be made to minimise the impacts, as far as practically possible to maintain the natural ecological structure of the wetlands.

However from a land capability point of view, these soils are not considered as prime agricultural soils due to limitations associated with seasonal water logging in the lower lying horizons. The impacts of the proposed haul road(s) are anticipated to have a negligible impact on the land capability of the prevailing soils as the access roads are already existing. The impacts of the haul roads will however depend on whether the existing roads are considered sufficient or they need to be expanded in width to accommodate heavy motor vehicles. Should this be the case, the impacts are expected to be minor as the access roads largely occur on relatively shallow soils with effective rooting depth of less than 35cm. However, these soils are considered important for potential grazing opportunities.

GEOLOGY

The PMR/HRM mines derive its names from the reefs which was mined extensively in the past by TGME pre-1972. The reefs vary from a narrow quartz – carbonate vein with pyrite as the dominant sulphide and lesser amounts of chalcopyrite. The ore was historically reported to be refractory and preg – robbing in nature as a result of the presence of copper minerals (chalcopyrite), and the presence of graphitic and carbonaceous material.

Sabie is situated within the Sabie-Pilgrim's Rest goldfield, approximately 300 km northeast of the Witwatersrand Basin. Gold mineralisation occurs within sedimentary host rocks of the Transvaal Supergroup. This metallogenic province extends for approximately 140 km in a north-north-easterly direction, over a maximum width of 30 km along the Great Escarpment of Southern Africa – Figure 5 (Geology of the project Area)

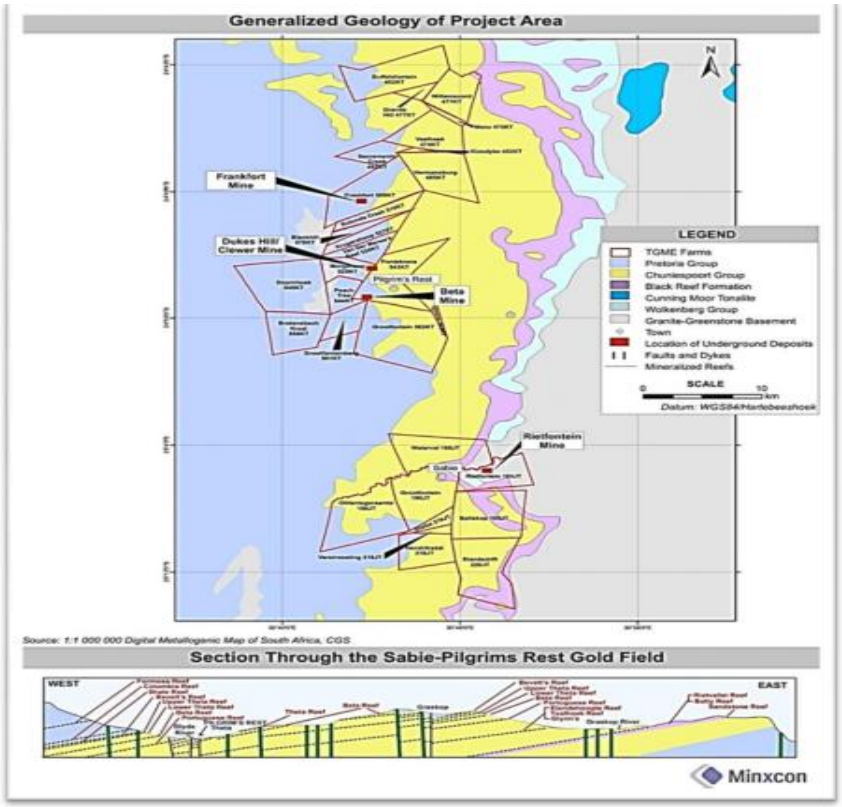


Figure 5 (Geology of the project Area)

The Sabie-Pilgrim's Rest goldfield is a north-south trending mineralized zone approximately 100 km long and 30 km wide and is structurally hosted in the carbonate and argillic rocks of the early Proterozoic Transvaal Basin. The strata have a shallow dip to the west. The

general stratigraphy of the area consists of Archaean granitegreenstone basement, overlain by the volcano-sedimentary successions of the Wolkberg Group (up to 600 m thick in the project area) which is overlain by carbonate-clastic units of the lower Transvaal Supergroup, including the Chuniespoort Group and the overlying Pretoria Group. The Transvaal Supergroup has also been intruded by numerous dykes and sills of pre-, syn- and post Bushveld age.

GROUNDWATER

MvB Consulting was appointed to assess the geohydrology and potential impacts from the proposed mining on the groundwater regime (Appendix 9).

The Sabie-Pilgrims Rest Goldfield stratigraphic succession, younging upwards, includes Achaean basement granite, as well as, minor volcano-sedimentary succession of Godwan Group and Wolkberg Group clastic sediments that uncomformably overlie the basement rocks.

The primary reefs that are mined in the region are as follows:

- Elandsdrift, Glynns and Vaalhoek reefs;
- Portuguese reef;
- Beta reef; and
- Theta reefs, top and bottom.

The region is structurally complex and a number of major north to north-easterly trending lineaments are prevalent throughout the Sabie-Pilgrims Rest Goldfield. These are broadly coincident with mineralisation patterns. These lineaments are represented by a series of near vertical faults and dykes. The period of northerly faulting is thought to postdates a period of east-west normal faulting. To the north of the town of Pilgrims Rest, the north-northeast trending Vaalhoek Dyke forms the main regional structure that carries mineralisation. Younger north-east transverse dykes appear to be unmineralised and post-date the Vaalhoek trend.

Groundwater occurrences in the study area are predominantly restricted to the following types of terrains.

- Primary aquifers consisting of the quaternary sediments which are restricted to the river valleys.
- Weathered and fractured rock aquifer in the Timeball Hill formations.
- Dolomitic and Karst Aquifers.

The most prominent aquifer is the dolomite aquifer, which is known to potentially contain large quantities of groundwater. The water that poses a risk to the underground mining is primarily derived from this karst aquifer in the Malmani dolomite, within which the Glynns / Vaalhoek reef is situated.

The shallower, weathered portion of the dolomite aquifer has been formed because of karstification. This occurred prior to the deposition of younger formations, at a time when the dolomite was exposed to the elements and had undergone extensive weathering. There is general agreement that this aquifer is the significant source of water within the dolomite. The extent of karstification of the Sabie-Pilgrims Rest dolomite is, however, not well documented.

In most geological terrains the groundwater level mimics the topography. The groundwater in dolomite aquifers do not typically follow this trend due to the high transmissivity that is found

in dolomite aquifers. The apparent relationship between the topography and groundwater levels that exists in the Sabie-Pilgrims Rest dolomite aquifer may indicate that this aquifer approximates a typical fractured aquifer and that the dolomite is not extensively karstified. This is not to say that the dolomite in this region is a minor aquifer and the association with the topography is likely a reflection on the distribution of the current boreholes that may not have specifically targeted karst areas. Karst zones with a potential for high yielding boreholes do in all likelihood exists.

The groundwater quality in this aquifer is very good, based on the current mine monitoring data as well as samples collected during this investigation. Except for the Nestor Adit, water seeping from the mining areas is generally also good. This is an indication that the buffering capacity of the host rock (dolomite) neutralises the acid generating potential of the reef horizon, which is generally pyritic in nature.

Samples were collected from waste rock material at existing adits as well as from a historic tailings storage facility (TSF) at Nestor mine. These samples were subjected to leach testing and Acid Base Accounting (ABA). The following conclusions were drawn from the ABA characterisation of the Sabie-Pilgrims Rest waste material:

- Based on the ABA testing it is concluded that the tailings material has the potential for acid generation, as confirmed by the leach testing, whereas the waste rock material generally does not.
- Since the waste rock material does not pose any risk to the groundwater there are no additional management requirements.
- Discussions with mine personnel indicated that the Nestor TSF will be removed and incorporated into the Sabie TSF, which will be a licenced facility with the necessary contaminant measures in place.

Based on the available data a calibrated flow and mass transport model was developed and used to simulate the potential mining impact on the groundwater regime:

The following scenarios were simulated:

- Scenario 1: Impact from the proposed mining on the groundwater level;
- Scenario 2: Simulation of the contaminant plume during the operational phase of the project; and
- Scenario 3: Simulation of the contaminant plume after closure and source removal.

The modelling results can be summarised as follows:

- The proposed mining extension is likely to intersect water-bearing fissures, resulting in an increased water inflow into the underground working. This potentially will cause dewatering of the aquifer and the regional lowering of the groundwater level. It is expected that this can be as much as 45m. It is, however, important to note that the current groundwater level is an interpolated level, based on very sparse data. This is typical in these type of investigations and once detailed mining plans are available and additional boreholes are drilled, a more accurate dewatering cone will be generated.
- Groundwater usage in the region appears to be restricted and very few groundwater users were identified during this and previous investigations. The impacts associated with the drop is groundwater levels is mainly to the mine that will have to deal with the increased water inflow. If there are any impacted groundwater users that have

not been identified, the mine will address these individually and will supply water to impacted users.

- The current discharges from the Glynn's Drainage Tunnel is estimated at 65 Megalitres per day (Mℓ/day). The increase in groundwater inflow due to the proposed mining extension is expected to be 92 Mℓ/day, excluding the current 65 Mℓ/day.
- Additional mining is also planned at Nestor mine. Since these workings are located above the groundwater level there will be no dewatering of the aquifer. There will, however, still be seepage into the mine voids. The estimated inflow is approximately 1.7 Mℓ/day.
- The Nestor TSF is a potential contaminant source impacting on the groundwater quality. The geochemical leach testing recorded high sulphate concentrations, which was used to specify the source term concentration for the contaminant plume simulations. The extent of the current contaminant plume is estimated at 70 hectares (based on the SANS 241 limit of 500 mg/ℓ) and does not currently impact on any down-gradient receptors (groundwater users or surface streams). This will reduce by 35% to 46 hectares, twenty years after the source has been removed. It is proposed to remove this TSF and place the material onto the Sabie TSF, which will be a licenced facility with contaminant prevention measures.

Several assumptions had to be made during the numerical modelling due to gaps in the available geohydrological information, especially within the new mining areas. It is recommended that the model be updated after additional drilling and aquifer testing has been done and once the mining layout has been finalised. The current model is a regional model and should be refined to assess each mine individually.

New mining ventures never have detailed, closely spaced, site-specific information and several assumptions had to be made during the numerical modelling as a result of gaps in the available geohydrological information. It is important to note that a numerical groundwater model is a representation of the real system. It is therefore at most an approximation, and the level of accuracy depends on the quality of the data that is available. This implies that there are always errors associated with groundwater models due to uncertainty in the data and the capability of numerical methods to describe natural physical processes. This does not mean that the current modelling presented in this report is flawed, but merely that it can and will be improved upon as site-specific data becomes available. The historical mining in the region provided valuable information that was incorporated into the model and increases the confidence in the modelling outcome.

It is recommended that the model be updated after additional drilling and aquifer testing has been done and once the mining layout has been finalised. The current model is a regional model and should be refined to assess each mine individually.

- Cover drilling programme to identify water bearing fissures ahead of mining;
- Detailed mapping of water bearing fissures and delineation of high risk zones;
- Delineate impacted areas and develop management options such as the construction of plugs to compartmentalize the mine; and
- Grouting of the rock formations to restrict inflow.

It is further recommended that clean and dirty water be separated underground. Any water intersected underground (that is not sealed-off) should be collected as close as possible to the source and discharged from the mine through dedicated clean water pipes. This will lower the potential contaminant risk to the environment considerably.

There are two potential groundwater impacts associated with the proposed mining in the Sabie region. These are:

- Excessive inflow of groundwater into the underground mines causing the dewatering of the aquifer and the resultant drop in the regional groundwater level; and
- Contamination of the groundwater and the deterioration of the groundwater quality impacting on down-gradient receptors (private boreholes and surface streams).

The proposed mining will take place within the dolomite aquifer as most of the gold reef packages are located within the Malmani dolomite. It is therefore unavoidable that the proposed mining extensions will intersect water-bearing fissures, resulting in an increased water inflow into the underground workings. This potentially will cause dewatering of the aquifer and the regional lowering of the groundwater level. This water will come into contact with minerals in the reefs, such as pyrite, that can potentially cause the deterioration of the water quality in the mine workings.

During the operational life of the mine, the excess water will be pumped from the workings and provided that it complies with the regulatory requirements, will be discharged into streams. If during this time any groundwater user is impacted on in terms of boreholes drying up or water quality deteriorating, the mines will have water available to supply to these affected parties. The town of Sabie is included as a potentially affected party.

After closure the mines will re-water and large portions of the aquifer will recover. Excess water from the mines will decant in places, as is currently the case. This water will be available for future usage and based on the current water quality emanating from mine adits, very little (if any) treatment of the water will be required.

The current water discharge from the Glynn's Drainage Tunnel is estimated at 65 Mℓ/day. This volume is expected to increase, meaning that more water will be readily available for future town development.

It is my opinion that the future mining operations in the Sabie region will not have an adverse, long-term impact on the geohydrological regime.

SURFACE WATER

Consulting Engineers and Hydrologist (CEH) was appointed to conduct a assessment of the hydrological conditions within the proposed 10161 Mining Rights Application Area (Appendix 6). The quaternary catchment project area is situated within the Drakensberg mountain range and varies between 900 – 1650 metres above mean sea level (mamsl). The Sabie River originates in the quaternary catchment X31A and flows through the Kruger National Park, and is ecologically very important for the Park. The Sabie River is the main stream of the catchment, with the Sand and Marite Rivers acting as major tributaries, and the Mac Mac River being a tertiary drainage. The Sabie River has a total length of about 230 km to its confluence with the Inkomati River in Mozambique, at an altitude of about 40 mamsl (Glynns Lydenburg EMP, 2009). The elevation profile of the Sabie River for the quaternary catchments considered has a total length of 68 km and elevation difference of 1561 m across this section.

The hydrologic soil groupings of the study area according to SCS classification, developed by Kwa-Zulu Natal using a reference to Schulze (1985). The study area lies predominantly within the B/C hydrological soils group, which is classified as moderately low stormflow potential to moderately high stormflow potential.

Surface Water Quality

The historic surface water quality is an important aspect to investigate as it represents the background baseline for any new operations. Three sources of data are considered within the context of this report and these are discussed in the sections that follow.

DWS Monitoring Data

Existing water quality gauge positions and data was obtained from the DWS Resource Quality Information Services website (www.dwaf.gov.za/iwqs/wms/data/WMS_pri_txt.asp). All water quality gauges within the specified quaternary catchments were obtained and is summarised in Table 14. The positions of these water quality gauges are shown in Figure 6a with respect to the proposed adits and shafts

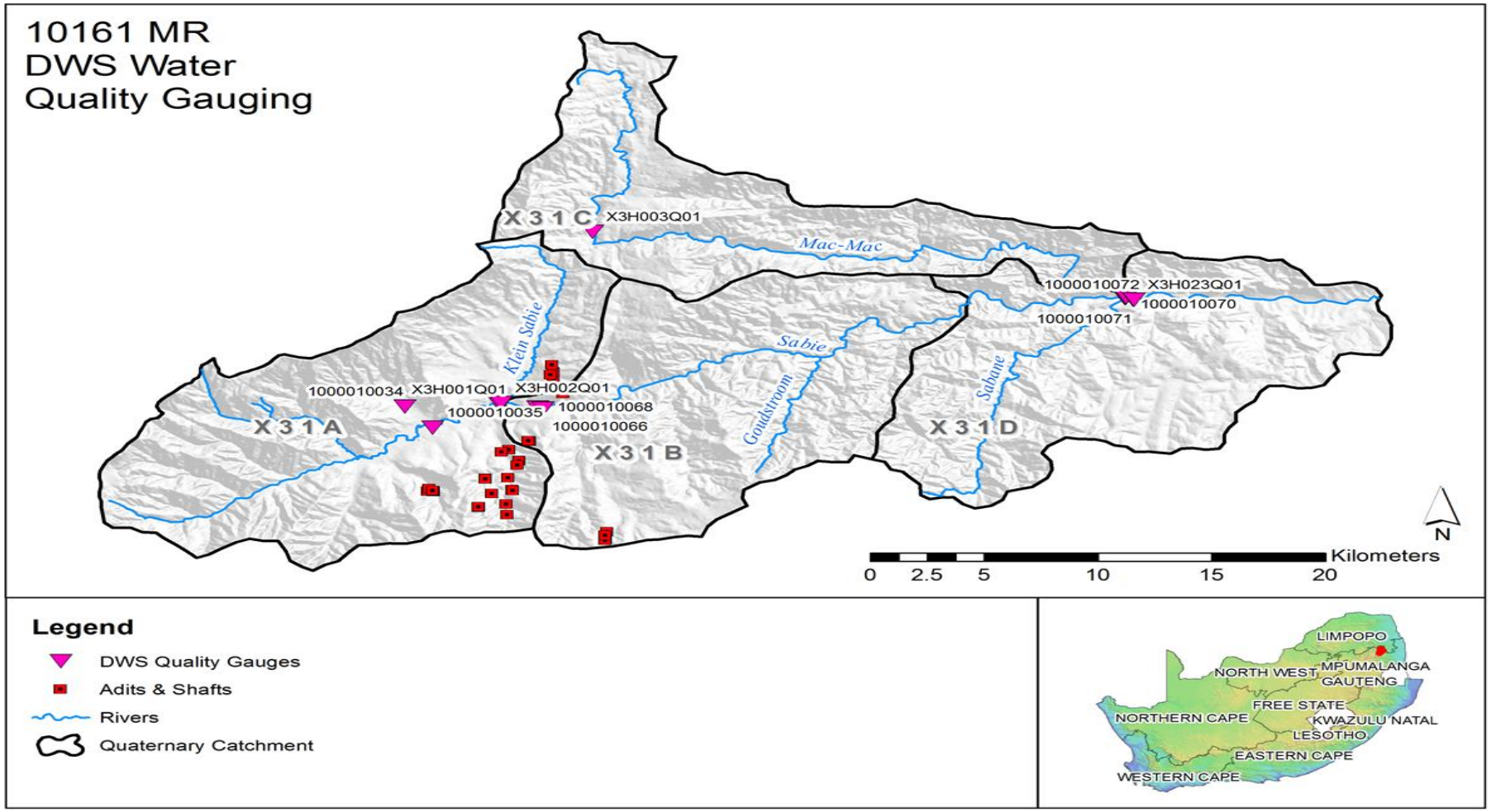


Figure 6: Positioning of Water Quality Gauges

Both the EC and pH is presented against the SANS 241:2015 drinking water quality guidelines. It should be noted that the aforementioned guideline applies to treated water quality.

Prior to 2006 only X3H001, X3H002 and X3H003 has water quality monitoring data. Generally, EC and pH is used as macro indicators of water quality

The EC profile over time shows a fairly constant behaviour with some spikes from 2006 onward, but stays well within the drinking water quality guideline. The pH over time also complies with the drinking water quality guidelines with the exception of two events

All other available water quality parameters comply with the SANS 241:2015 guideline and the detailed hydrology report provides a list of available water quality parameters.

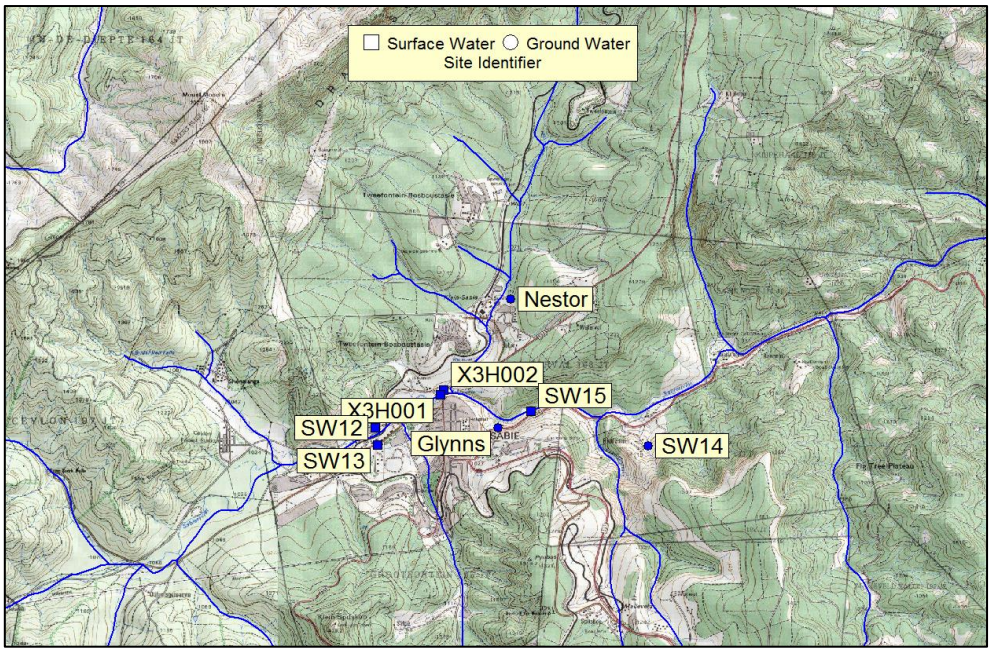
Major anion and cation information is only available for all sites over the common time period of 2011/05 to 2011/11. The pH and EC values over this time period. Water character can only be analysed and compared if all the major anions and cations for each of the sites are available at the same point in time. As this is not the case for the DWS dataset, the aforementioned time period is used to perform this analysis.

A summary of the water character interactions based on Figure 19 is given below. It should be noted that some variability in the results is expected due to the fact that a range of values were used rather than the sample point in time.

- The Stiff diagram of X10034 and X10035 look significantly different which implies different water character between these sites. The fact that the Stiff diagram of X3H001 retains the character of X10035 implies that very little flow is coming from X10034.
- The water character of 3XH002 and X3H001 is very similar with the major difference being that X3H002 has a higher ratio of TAL which implies a better buffer capacity.
- X3H001 and X10066 are very similar which implies a higher flow volume from X3H001 reporting to X10066 than compared to X3H002.
- A significant increase of Mg and TAL is observed from upstream of Sabie WWTW (X10066) to downstream of Sabie WWTW (X10068). Some treatment process makes use of Magnesium Hydroxide (Mg(OH)2) to remove phosphorous and nitrogen, which could be the explanation of the increase in Mg. This last statement is purely speculative as no prior knowledge is available on the particulars of treatment processes at Sabie WWTW.
- X10069 sees a decrease in Mg and Ca ratios when compared to X10068. X10069 is roughly 31 km downstream of X10086 and this change in water character is not unlikely over large distances where groundwater contribution to baseflow could affect the water character.
- The water character of X3H003 and X10070 also differ significantly and the same argument as in the previous statement holds true. These two gauges is 28 km apart from each other.
- The water character of X10072 and that of X10070 and X10069 reporting to X10072 are significantly different, which implies volumes of the same order mixing at X10072 to alter the water character.
- No data is available during this period to check the water character of X3H023. With X10072 and X3H023 being in close proximity it is assumed that X3H023 and X10072 will exhibit similar water character.

Field sampling was conducted during the low flow period (September 2017) and the surface water sites samples are presented below and the geographical locations are shown below.

Site	*Description*	*Latitude*	*Longitude*
Nestor	Nestor mine discharge	-25.0719110	30.7903260
Glynns	Glynns mine discharge	-25.0944440	30.7880970
SW12	Merry Pebbles	-25.0943720	30.7666940
SW13	TGME Office	-25.0974020	30.7671390
SW14	Sabie Mine	-25.0975550	30.8142830
SW15	Sabie WWTW	-25.0914890	30.7937990
X3H001	Sabie River @ Sabie	-25.0889700	30.7779400
X3H002	Klein Sabie River at Sabi	-25.0880000	30.7783300



All sites comply with the SANS 241:2015 drinking water guideline with respect to the aforementioned parameters with the exception of the Nestor site which has a pH value of 4.

All sites exceed the SANS 241:2015 drinking water guideline with the exception of X3H001 and SW14 (Sabie mine discharge). The Cd concentrations are seen to be a background phenomenon that could be related to the geology of the area. An investigation is warranted to give a more conclusive answer on this topic. The only other site that exceeds the SANS 241:2015 standard on selected parameters is Nestor

TERRESTRIAL ECOLOGY (FAUNA AND FLORA)

Scientific Terrestrial Services (STS) was appointed to conduct a terrestrial ecological assessment as part of the Environmental assessment and authorisation process (Appendix 10). Four habitat units were identified during the field assessment namely the (refer to figure 7):

- Secondary Grassland habitat unit,

- Transformed Grassland habitat unit,
- Plantations, and the
- Watercourse habitat unit.

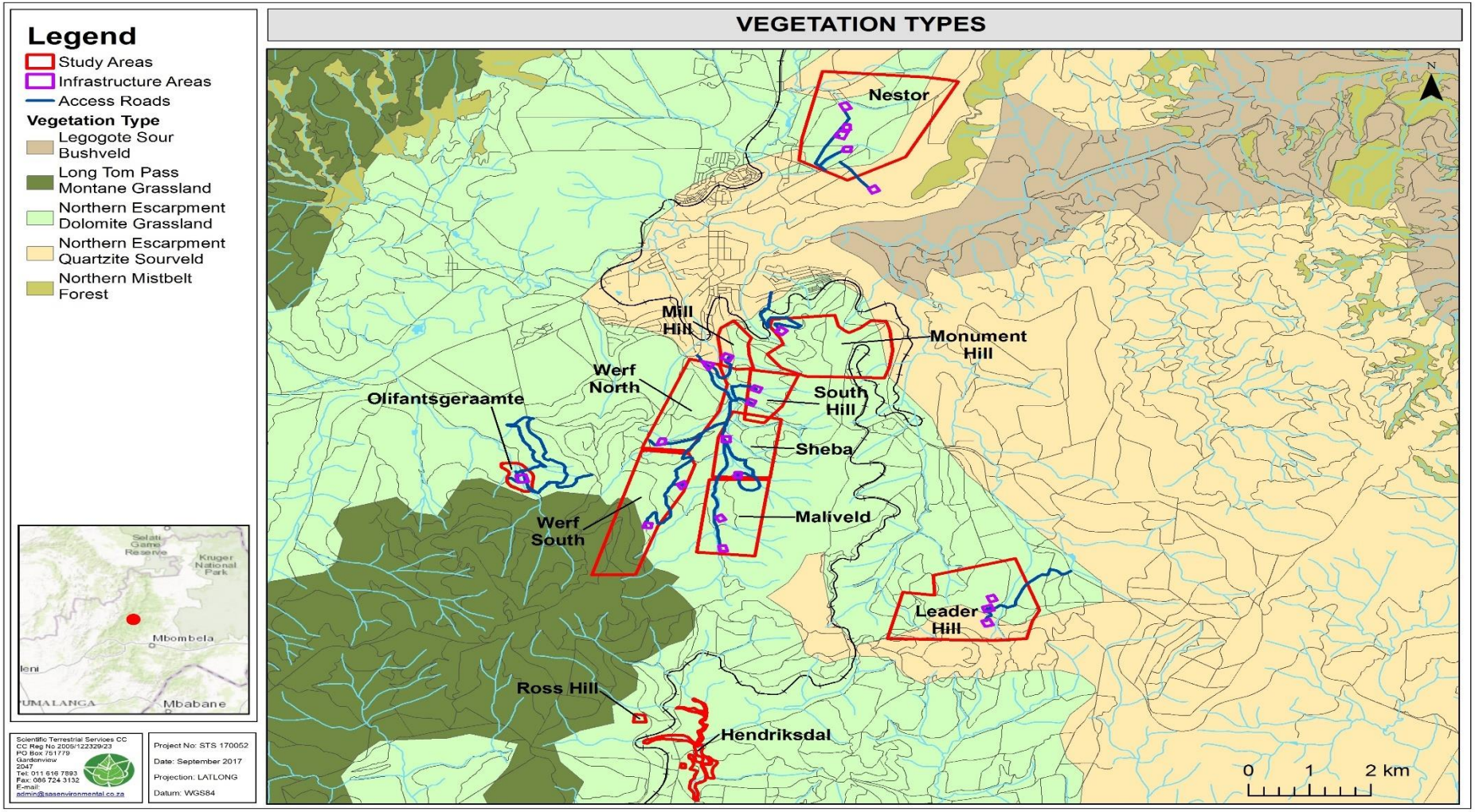


Figure 7: Vegetation types associated with the various TGME 10161 study areas (Mucina & Rutherford, 2012)

During the gathering of the background data, it was determined that all of the study areas associated with the various TGME 10161 sites were located within a single biome and bioregion according to Mucina & Rutherford (2012), namely the Grassland Biome, and the Mesic Highveld Grassland Bioregion.

Terrestrial Habitat Units

During the field assessments, it was observed that although the various sites are geographically isolated, the habitat units encountered at each of the sites were very similar, comprising of four distinct habitat types as stated above. As such, and in order to avoid repetition when discussing the findings of the various sites, the sites are discussed below in terms of habitat units. Table 11 below indicates the habitat units and the specific infrastructure sites associated with each habitat unit, whilst providing a brief description of each habitat unit and motivation for the various site allocations.

The Tables below, describe in detail the habitat units, ecological integrity, associated fauna and flora as well as related impacts and brief mitigation measures, which are further discussed in the assessment table of each impact.

Table 11: Summary of the habitat units and associated site.

Habitat Unit	Description of Habitat Unit	Sites investigated	Motivation
Plantations	Includes all areas currently utilised for the growth and harvesting of both *Pinus* and *Eucalyptus* species.	Nestor, Monument hill, Mill hill, Werf south, South Hill, Sheba, Olifantsgeraamte, Leader hill, Ross hill and various access roads.	These infrastructure sites are located within known timber production sites. Both *Eucalyptus grandis* and *Pinus spp.* plantations were grouped within this habitat unit.
Secondary Grassland	This habitat has been degraded as a result of ongoing anthropogenic activities, grazing of cattle and grass mowing practices. This habitat unit still contains a number of floral species indicative of the region and vegetation type.	Maliveld South, Monument hill access road	Levels of disturbance were lower than that of the transformed grassland whilst fewer alien invasive plant species were observed.
Transformed Grassland	This habitat unit has undergone extensive habitat disturbance and modification, and as a result presents very few indigenous floral species, and is characterised by a high rate of alien invasive plant proliferation.	Werf north, Maliveld north and Ross hill and various access roads.	Infrastructure areas and access roads included in the transformed grassland are characterised by a high abundance of alien invasive species, habitat disturbance and historic anthropogenic activities.
Watercourses	The water courses include all wetlands, streams and drainage lines observed during the site assessment. Many of these water courses, due to their locations in the plantations, have become infested with alien vegetation, however a few water courses still retain their indigenous vegetation characteristics, notably those not located in the plantations.	Hendriksdal, South hill, Olifantsgeraamte, Maliveld, Werf North Southern Infrastructure Area, and various access roads	All unnamed tributaries of the Sabie river, ephemeral drainage lines with riparian vegetation and wetland as per the freshwater report.

Faunal and Floral Species of Conservation Concern Assessment

The floral SCC (Species of Conservation Concern*) Cyathea dregei, Cyrtanthus tuckii* and *Crinum macowanii* protected under the Mpumalanga Nature Conservation Act (MNCA) of 1998, were observed within the Watercourse habitat unit, whilst there is a high likelihood that several other floral SCC also protected under this Act, may occur within this habitat unit. As such, this habitat unit is considered to be of a moderately high sensitivity for floral and faunal species;

No floral SCC were encountered during the field assessment within the secondary grassland habitat, however this habitat unit does provide potential habitat for floral SCC. Although alien invasive species were observed within this habitat unit, the abundance of such species were considered lower than within the Transformed Grassland and Plantation habitat unit, and as such is considered to be of intermediate sensitivity;

Although no faunal SCC were observed during the site assessment, communications with the land owners indicated that SCC such as *Panthera pardus* (leopard) have been regularly sighted within the proposed mining areas. Furthermore, the watercourses where permanent stream flow is present may potentially provide habitat to amphibian SCC such as *Hadromophryne natalensis (Natal Ghost Frog),* whilst also providing water and food resources to a number of other faunal species in the area;

The transformed grassland compromised of predominantly alien invasive plant species such as *Tagetes minuta, Bidens pilosa, Solanum mauritianum and Pteridium aquilinum*; however, a number of faunal species were observed to utilise this habitat, and as such is considered to be of a moderately low sensitivity.

Both *Eucalyptus grandis and Pinus spp*. plantations were included into the plantation habitat unit. This habitat unit is considered to be of a low sensitivity due to the loss of natural vegetation as a result of ongoing timber production as part of the forestry industry in the region; Faunal diversity was observed to be lowest in the plantations, whilst the remaining habitats had a significantly higher faunal diversity, notably in the watercourses and secondary grasslands.

The findings of the terrestrial impacts assessment results are discussed in the impacts table.

FRESHWATER (WETLAND) AND AQUATIC ECOLOGY

Scientific Terrestrial Services (STS) was appointed to conduct a Freshwater Resource and Aquatic Ecological Assessment as part of the environmental assessment and authorisation process (Appendix 11). During the gathering of the background data, it was determined that all study areas associated with the various TGME 10161 sites were located within a single Water Management Area (WMA), namely and the Inkomati WMA and particularly those systems within the Komati/Crocodile River Catchment (Figure 8)

Freshwater Systems.

The emphasis of this report is on true watercourses which are perceived to have an increased likelihood of being impacted to varying degrees by the proposed mining activities. This includes freshwater resources which are not necessarily located within the infrastructure areas but are located downgradient thereof. Resources located outside of these key focus areas, i.e. those within the zone of regulation - within the 500m investigation area, but not within the same catchment - of the proposed infrastructure areas, were delineated using digital satellite imagery, with limited or no field verification. However, when

field verification of features which were delineated using desktop techniques took place, delineations proved to be sufficiently accurate in most instances to allow for informed decision making

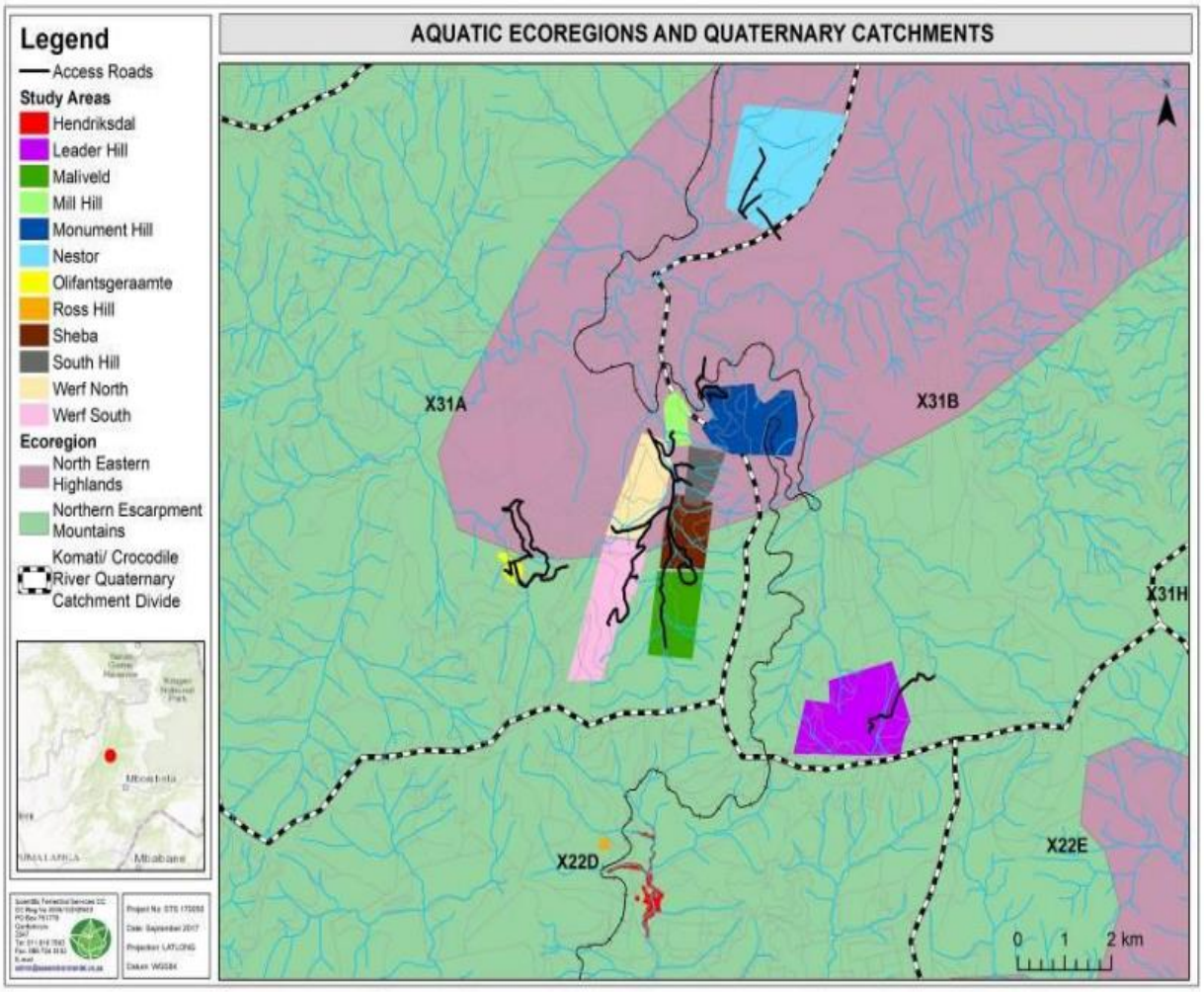


Figure 8: Aquatic ecoregions and quaternary catchments applicable to the various TGME 10161 study areas and surrounding region

The freshwater resources which were identified within the overall TGME 10161 study areas were classified according to the Classification System (Ollis et. al, 2013), as Inland Systems, falling within either the Northern Escarpment Mountains or North Eastern Highlands Aquatic Ecoregions (please refer to Table 2), and two wetland vegetation groups, namely the Mesic Highveld Grassland Group 9 wetland vegetation type (majority of the study areas), and the Mesic Highveld Grassland Group 6 (southern portion of the Werf South study area) wetland vegetation type.

The classification of these freshwater resources is summarised in the table below.

Table 12: Characterisation of the freshwater resources identified associated with the various study areas according to the Classification System (Ollis et. al., 2013)

Freshwater resource (in relation to the applicable study area)	Level 3: Landscape unit	Level 4: HGM Type
Hendriksdal and Ross Hill	**Valley floor:** The base of a valley, situated between two distinct valley side-slopes	**Channelled valley-bottom wetland:** a valley-bottom wetland with a river channel running through it.
Leader Hill, Olifantsgeraamte, Monument Hill, Werf North & South, Sheba, Maliveld, South Hill and Mill Hill	**Valley floor:** The base of a valley, situated between two distinct valley side-slopes	**Ephemeral Drainage Lines (EDL) with Riparian vegetation**. A description for these is not contained in Ollis *et al*, thus the following definition is utilised: **River:** a linear landform with clearly discernible bed and banks, which permanently or periodically carries a concentrated flow of water.
Nestor	**Valley floor:** The base of a valley, situated between two distinct valley side-slopes	**Unchannelled valley-bottom wetland:** a valley-bottom wetland without a river channel running through it.

Summary of the results of the Freshwater ecological assessment

The results of the freshwater resource ecological assessment indicate that the various freshwater resources associated with the TGME 10161 study areas are considered to be in a moderately to largely modified condition, having been impacted upon over an extended period of time by historical agricultural and mining activities, and in more recent years, by commercial forestry activities. Modifiers to the various freshwater resources that were assessed include transformed vegetation communities due to removal of vegetation and encroachment of alien vegetation, streambank incision and erosion, and flow-impeding infrastructure such as road crossings and culverts. Nevertheless, despite reduced ecological integrity, the freshwater resources associated with the TGME 10161 study areas are deemed to provide intermediate levels of ecological services such as flood attenuation, nutrient and toxicant assimilation, sediment trapping and streamflow regulation, and as such, are considered ecologically important on a local (and in some instances, regional) scale.

Aquatic Ecology

The various TGME 10161 study areas fall within the North Eastern Highlands and Northern Escarpment Mountains Ecoregions, and is located within the X31A, X31B and X22D quaternary catchments.

Table 13: Key Attributes of the North Eastern Highlands Aquatic Ecoregion

Dominant characteristics of the North Eastern Highlands Ecoregion Level 2 (4.04) (Kleynhans *et al.*, 2007a)	
Dominant primary terrain morphology	Closed Hills, Mountains, moderate and high relief. Low Mountains
Dominant primary vegetation types	Sour Lowveld Bushveld
Altitude (m a.m.s.l)	700 to 1300
MAP (mm)	600 – 1000
Coefficient of Variation (% of MAP)	< 20 to 29
Rainfall concentration index	55 to 60
Rainfall seasonality	Early to mid-summer
Mean annual temp. (°C)	14 to 22
Winter temperature (July)	4 – 24 °C
Summer temperature (Feb)	14 – 30 °C
Median annual simulated runoff (mm)	60 to > 250

Table 14: Key Attributes of the Northern Escarpment Mountains Aquatic Ecoregion

Dominant characteristics of the Northern Escarpment Mountains Ecoregion Level 2 (10.01) (Kleynhans *et al.*, 2007a)	
Dominant primary terrain morphology	Closed Hills, Mountains; moderate and high relief. High Mountains
Dominant primary vegetation types	Patches Afromontane Forest; North Escarpment Mountain Grassland; and Sour Lowveld Bushveld
Altitude (m a.m.s.l)	500 – 2100
MAP (mm)	500 – 1000
Coefficient of Variation (% of MAP)	< 20 to 29
Rainfall concentration index	55 to 64
Rainfall seasonality	Early to mid-summer
Mean annual temp. (°C)	10 to 22
Winter temperature (July)	0 – 24 °C
Summer temperature (Feb)	8 – 30 °C
Median annual simulated runoff (mm)	40 to 150; 200 to > 250

In order to assess the impacts on the systems above three Sampling points were taken from three points: one site along the Klein Sabie River, one on an unnamed tributary of the Sabie River and another unnamed tributary of the Nels River. Please see co-ordinates below in table 15.

Table 15: Co-ordinates of the biomonitoring sites

Site	TGME 10161 Study Area	Description	GPS co-ordinates	
			South	East
SB01	Nestor	The site is located on the Klein Sabie River within York Timber's plantation forest. The site is upstream of the town of Sabie and upstream of Nestor Mine.	25°03'48.90"	30°47'29.00"
SB02	Maliveld	The site is an unnamed tributary of the Sabie River situated in the Maliveld investigation area adjacent to the Vertroosting Nature Reserve. The site is upstream of the Spitkop settlement within York Timber's plantation.	25°08'47.46"	30°46'46.60"
SB03	Hendriksdal	The site is an unnamed distant tributary of the Nels River situated in the Hendriksdal investigation area. The site is within Hendriksdal's alluvial zone (3&4) and upstream of the Hendriksdal settlement.	25°11'12.80"	30°46'36.87"

Desktop assessment results -

Quaternary Catchment (QC) Level – Kleynhans (1999)					
QC	Resource	EIS	PEMC	DEMC	Best AEMC
X31A	Sabie River	High	C	B: Sensitive System	B
X22F	Nels River	Low/Marginal	C	D: Resilient System	C
Sub-quaternary Catchment Reach (SQR) Level – DWS PES/EIS Database (2011)					
SQR	Resource	PES	Mean EI	Mean ES	Default EC
X31A-00741	Klein Sabie River	C	Moderate	Very High	A
X31A-00778	Sabie River	C	Moderate	Very High	A
X22F-00842	Nels River	C	High	Very High	A

EISC = Ecological Importance and Sensitivity Category;
PESC = Present Ecological Status Category;
PES = Present Ecological State;
ES = Ecological Sensitivity;
EC = Ecological Category; default based on median PES and highest of EI or ES means.
DEMC = Default Ecological Management Class;
Best AEMC = Best attainable Ecological Management Class;
EI = Ecological Importance;

Aquatic ecological Importance and Sensitivity Assessment

The Ecological Importance and Sensitivity analysis for the tributary of the Klein Sabie River yielded a score of 2.5 whilst a score of 2.0 was obtained for the tributary of the Nels River. The EIS for both systems is thus regarded as highly important and sensitive. The increased importance and sensitivity of the streams are mainly as a result of limited direct impact on the systems and presence of sensitive aquatic species within the systems. The Ecological Importance and Sensitivity Assessment analysis for the unnamed tributary of the Sabie River yielded a score of 1.9 which is regarded as moderately important and sensitive. The system is considered moderately sensitive to alterations in flow and flow-related water quality changes, with year-round water required in the system.

AIR QUALITY

Existing sources of air pollution can be identified in the region of the proposed mining areas. These are important to consider in terms of assessing the cumulative impact potential on air quality in the region. Sources identified as having an impact on air quality in the Sabie region are:

- Fugitive dust sources
- Biomass Burning
- Household fuel combustion
- Vehicle tailpipe emissions
- Forestry

Mining activities associated with the TGME 10161 application will be underground mining with limited impact on air quality.

VISUAL

Scientific Terrestrial Services (STS) was appointed to conduct a Visual Impact Assessment (VIA) as part of the Environmental assessment and authorisation process (Appendix 12)

The receiving environment of the TGME 10161 study areas have a semi - rural character and is strongly associated with the commercial forestry industry, with the town of Sabie considered the commercial hub within the area. The land use is composed of various plantations (Pinus sp. and Eucalyptus sp.) for the commercial forestry industry, residential, industrial/commercial (sawmills within the area), and vacant/unspecified land. The commercial forestry activities dominate the area surrounding Sabie. The topography is characterised by gently to steeply undulating mountainous terrain interspersed with thicketed valleys in the vicinity of ephemeral drainage lines and rivers.

Due to the abovementioned characteristics of the area, as well as the limited number of receptors within the commercial forestry plantation, various TGME 10161 study areas will have a minimal visual impact on the receiving environment.

The overall landscape of the Nestor, Mill Hill and Werf North study areas are considered to be of low scenic quality. This is due to unsightly areas including: exposed bare ground during harvesting of plantations, industrial properties, a junkyard, a power station as well as various roads, and powerlines that weaken the scenic beauty of the mountainous area. The Leader Hill, Monument Hill, Ross Hill and Hendriksdal study areas do however exhibit a moderate scenic quality, since there is limited infrastructure in the form of houses and powerlines in the vicinity of the abovementioned study areas.

Sabie is an important tourism node within its area of jurisdiction (SDP, 2007), offering panoramic nature scenes, remarkable waterfalls and pristine mountain streams. Additionally, Sabie and the surrounding areas are recognized for their cultural and historical significance and together with the Pilgrim's Rest area are well known for its historic mining activities (Gold rush in the late 19th century). In addition, due to the current silvicultural practises, it is unlikely that the proposed mining activities will lower the landscape value. However, the proposed opencast mining activities associated with the Ross Hill and Hendriksdal study areas will have a negative impact on the landscape value, due to vegetation clearing and contrast in colour.

The sense of place associated with the TGME 10161 study areas are related to the landscape character type of the area – semi-rural, mountainous area dominated by commercial forestry plantations, interspersed with small villages and isolated homesteads. The sense of place is not unique to the TGME 10161 study areas, as it is found within the larger region. It can further be described as calm, tranquil and peaceful. The sense of place associated with the TGME 10161 study areas is therefore not highly significant when compared to its surroundings but may be considered to be of importance due to its undulating topography, calm nature, semi-rural character and cultural and tourism importance of the area.

From the viewshed analysis, using varying heights of 4m and 6m at the TGME 10161 study areas, the proposed mining infrastructure is expected to be highly visible to receptors present within 1km thereof, as these areas fall within the high visibility zone with the proposed infrastructure forming part of the foreground of their viewing experience. Due to the topography of the surrounding environment the proposed mining activities will become less visible the further away the sensitive receptors are from the study areas.

NOISE & VIBRATION

dBAcoustics was appointed to determine and assess the environmental noise and vibration impact (Appendix 13) of the proposed re-mining project of the existing mines and the hard rock mining at these mines on the residential areas in the vicinity of the mines within the Sabie town and districts.

The study area covered the boundaries of the different mining areas, access road, along the main feeder roads and at the noise receptors. The residents of the different identified noise receptors in the vicinity of the proposed mining complexes are exposed to forestry activity noise, distant traffic noise, domestic noise and natural noises such as insects, wind and animal noises. This now becomes part of the prevailing environmental ambient noise level per study area.

The following observations were made in and around the study area:

- There was a constant to intermittent flow of traffic along the main provincial feeder roads during the day and night time periods;
- There were vehicles travelling along the gravel roads;
- There were no mining activities at the time of the study at the proposed mining area;
- The wind and weather conditions play an important role in noise propagation;
- Distant traffic noise contributes to a large portion of the prevailing ambient noise levels in the vicinity of some of the noise receptors;
- Distant industrial activities such as timber mills contribute to the prevailing ambient noise levels of some of the areas

The following are noise sources in the vicinity of and the boundaries of the study area:

- Forestry activity noise;
- Heavy duty vehicle noise;
- Distant traffic noise from the abutting feeder and gravel roads;
- Insects;
- Birds;
- Wind noise.
- The increase in the noise and vibration levels, and;
- The overall noise and vibration levels produced.

The proposed changes during the construction, operational and decommissioning phases will require approved management measures and ongoing noise and vibration surveys will have to be carried out to ensure compliance to the relevant noise regulations and/or standards.

The findings of the noise impacts assessment results is discussed in the impacts table.

SITES OF ARCHAEOLOGICAL AND CULTURAL INTEREST

In accordance with Section 38 of the NHRA, an independent heritage consultant J A van Schalkwyk (Appendix 14) to undertake a cultural heritage assessment to determine if the proposed development of the proposed mining activities would have an impact on any sites, features or objects of cultural heritage significance.

The cultural landscape qualities of the region essentially consist of two components. The first is made up of a limited pre-colonial (Stone Age and Iron Age) occupation. The second component is a rural area in which the human occupation consists of two elements. The discovery of gold during the late 19th century resulted in a flood of people entering the area, establishing god mining activities all over the landscape. The second element is a rural farming community, which, since the early 20th century revolved around forestry, which altered the landscape beyond recognition. These two elements led to the establishment of a number of smaller towns in the region, all which are now part of an ongoing tourism industry.

The detailed history of the town Sabie and the history of gold mining in Sabie is discussed within the heritage report (Appendix 15).

The following sites, features and objects of cultural significance were identified in the study area – see detailed heritage report for a discussion of each individual site. In terms of Section 7 of the NHRA, all the sites currently known or which are expected to occur in the study area are evaluated to have a grading as identified in the table below.

Stone Age

- No sites, features or objects dating to the Stone Age were identified in the study area.

Iron Age

- No sites, features or objects dating to the Iron Age were identified in the study area.

Historic period

- A variety of sites and features dating to the historic period were identified. These are mostly relating to the gold mining industry and are summarised in Table 16 below.

Table 16: Summary of Identified Heritage Resources in the Study Areas.

IDENTIFIED HERITAGE RESOURCES					
Site No.	Site type	NHRA category	Field rating	Impact rating: Before/After	Proposed mitigation (**Refer to definitions above**)
Nestor					
Ns 01	Mine adit	Section 34	High significance –Grade III-B	Medium (52) Low (24)	(1) Avoid / (2) excavate archaeologically
Ns 02	House	Section 34	Low significance – Grade IV-C	Low (20) 20	(1) Avoid
Ns 03	Mine adit	Section 34	High significance –Grade IV-A	Medium (48) Low (24)	(1) Avoid / (2) excavate archaeologically
Ns 04-06	Houses	Section 34	Low significance – Grade IV-C	Low (20) Low (20)	(1) Avoid
Mill Hill					
MiH 01	Mine adit	Section 34	Low significance – Grade IV-C	Low (20) Low (20)	(1) Avoid
Monument Hill					
MiH 01	Mine adit	Section 34	Low significance – Grade IV-C	Low (20) Low (20)	(1) Avoid
South Hill					
SoH 01	Cemetery	Section 36	High significance	Medium (48)	(1) Avoid
			– Grade IV-A	Low (20)	
Malieveld					
Mv 01	Farmstead	Section 34	Low significance – Grade IV-C	Medium (48) Low (20)	(1) Avoid
Mv 02	Mining feature	Section 34	High significance – Grade III-B	Low (20) Low (20)	(1) Avoid / (2) excavate archaeologically
Sheba					
Sh 01	House structure	Section 34	Low significance – Grade IV-B	Medium (48) Low (20)	(1) Avoid / (2) excavate archaeologically
Werf North					
WeN 01	Mine structure	Section 34	Medium significance – Grade IV-B	Low (24) Low (24)	(1) Avoid / (2) excavate archaeologically

Objectives:

Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft. • The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during construction activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.

- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

SOCIAL ECONOMIC

Information regarding the social aspects in the TGME 10161 MRA project area was obtained from the Social Impact Assessment compiled by Batho Earth (Appendix 15)

Ehlanzeni District Municipality

The Ehlanzeni District Municipality (EDM) is one of the three districts in Mpumalanga Province and is located in the Northern Eastern part of Mpumalanga. EDM covers an area of 27 895.47 km². It is bordered by both Mozambique in the east and Swaziland in the south.

EDM comprises four local municipalities namely Bushbuckridge, City of Mbombela, Nkomazi, and Thaba Chweu Local Municipalities.

The Ehlanzeni District has experienced changes in the leading industries driving the economy. There has been a change from agriculture being the dominant sector in terms of gross value added (GVA) to community services, trade and finance . This situation indicates a shift from a primary activity based economy. Skills development and training would thus remain a critical factor in ensuring economic growth and stability.

The limited availability of skills in the district will require that agriculture, construction, mining and tourism must be further developed to provide employment opportunities for unskilled labourers. The tourism industry contributes 12.2% of the districts GDP. The industry has the ability to provide employment to both skilled and unskilled labour and has the ability to attract investment into the district .

Thaba Chweu Local Municipality

The Thaba Chweu Local Municipality (TCLM) is one of four local municipalities under the jurisdiction of the Ehlanzeni District. It is located in the north-western region of the Mpumalanga province. The escarpment divides the district into eastern and western sections. The western section (Lydenburg area) is dominated by agricultural and farming activities, while forestry is the main economic activity of the eastern section (Sabie/Graskop area).

The municipality shares its boundaries with the Bushbuckridge Local Municipality (to the east), the City of Mbombela Local Municipality (to the south), the Emakhazeni Local Municipality (to the west) and the Greater Tubatse Local Municipality which falls within the Limpopo Province (to the north).

The figure 9 provide an outline of the TCLM and adjoining local municipalities under the jurisdiction of the EDM.

The main economic sectors in the municipal area are mining, forestry, agriculture, business services, and tourism. Within the study area, forestry dominates the land-use and is an important contributor to the economy.

Figure 9: Thaba Chweu Local Municipality

Wards and settlements in the study area

The main towns in the municipal area are Sabie (including Simile and Harmony Hill), Graskop, Mashishing (Lydenburg) and Pilgrim's Rest with the northern sections which include Matibidi, Leroro and Moremela. All of these have a significant historical value. These towns and the surrounding areas sustain different tourist activities and attractions. Apart from forestry, tourism thus serves as one of the main economic sectors.

The tourism and forestry centres include Sabie, Graskop, and Pilgrim's Rest. The Urban/Rural ratio of the population is 68.1%: 31.9% compared to 40.5%: 59.5% for Mpumalanga as a whole. This indicates a higher degree of urbanisation for the Municipal Area that is expected to increase in future.

The affected wards within the study area for the Sabie Project 10161 include: Wards 4, 6, 7, 11 and 13. Table 15: Wards and settlements in the study area

WARDS	SETTLEMENTS / AREA	WARD DESCRIPTION	PROJECT SECTION
Ward 4	Spitskop area	Ward 4 is situated to the south of the town of Sabie and Ward 7 of the TCLM. It includes a large area from the south of the town of Sabie and stretches to the west of the R36. In the Spitskop area, the	Glynn's Lydenburg Mine: Leader Hill Mill Hill

WARDS	SETTLEMENTS / AREA	WARD DESCRIPTION	PROJECT SECTION
		R537 traverses Ward 4. A section of the R37 also passes through the Ward. This Ward also includes the Klipspruit, Badfontein, Bultkop and Coromandel areas7.	Monument Hill Werf North Werf South South Hill Sheba Malieveld Olifantsgeraamte
Ward 6	Simile	Ward 6 includes a small section of Sabie, but the main section is to the north of the town of Sabie and Ward 7. It includes the Simile settlement and stretches to the west of the R532.	Nestor Mine Approved Rietfontein Project
Ward 7	Sabie town	Ward 7 includes the town of Sabie and the area immediately to the east of Sabie. A section of Simile and the Harmony Hill Settlement fall within Ward 78.	Glynn's Lydenburg Mine: Mill Hill
Ward 11	Hendriksdal area	Ward 11 is situated to the east of Sabie and Simile and includes a section to the north of the R536. The main section of the ward stretches to the south of Ward 6 and 7 and includes the Hendriksdal Station, as well as the agricultural areas of Witklip and Malherbe9.	Hendriksdal Mine Ross Hill Mine
Ward 13	Pilgrim's Rest area	Ward 13 includes an area from north of Simile to Pilgrim's Rest. The main town in the area is Pilgrim's Rest. Other areas falling in this ward include the Ohrighstad Dam area, Spekboom and Boomplaats10.	Nestor Mine

[7] Thaba Chweu Local Municipality. 2017. Integrated Development Plan 2017 – 2022 Term

[8] Thaba Chweu Local Municipality. 2017. Integrated Development Plan 2017 – 2022 Term

[9] Thaba Chweu Local Municipality. 2017. Integrated Development Plan 2017 – 2022 Term

[10] Thaba Chweu Local Municipality. 2017. Integrated Development Plan 2017 – 2022 Term

Demographic Profile (Population Figures)

The total population figures for the TCLM were 98 387 individuals in 2011 and 101 895 in 2016. There has thus been a 3.4% increase in the overall population figures within the municipal area. There were 33 352 households with an average household size of 2.7.

According to StatsSA, there were 9 148 individuals living in the town of Sabie in 2011 with 166 persons per km2. There were 3 348 households with an average household size of 2.4. The town of Graskop had a population count of 3 996 individuals, and 1 340 households. The average household size in Graskop was 2.5. Simile is the most densely populated with 7 147 people per km2.

Table 17: Population Figures of the towns in the study area (2011)

Town / Settlement	Population	Number of Households	Average household size
Sabie	9 148	3 348	2.4
Simile	6 932	3 391	2
Graskop	3 966	1 340	2.5

As the study area also includes rural areas, the population figures within the different wards should be noted. The following provides an outline of the population figures in the Wards affected by the proposed development.

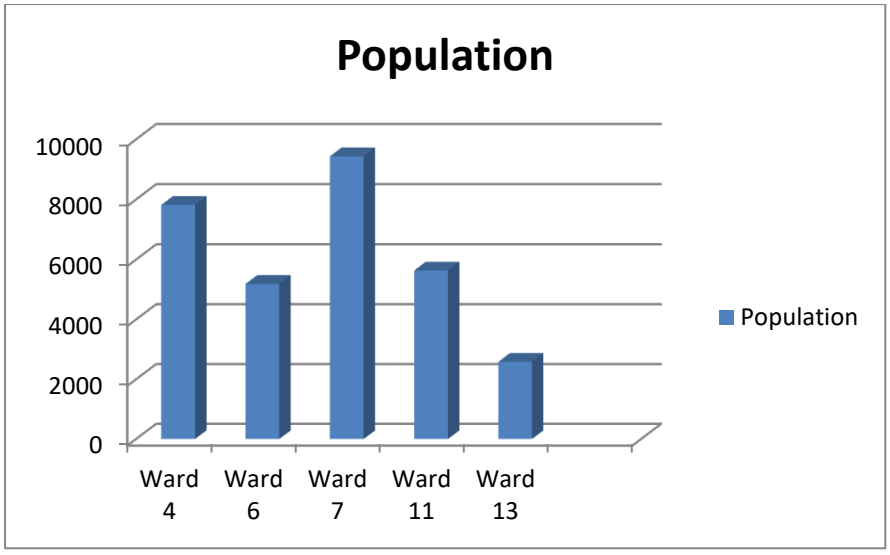


Figure 10: Population Distribution per Ward within the Study Area (2011)

The above indicates that Ward 7 (Sabie town and Harmony Hill), with a total population of 9 436 individuals, is the most densely populated, followed by Ward 4 (Spitskop area) with a population of 7 820 individuals. Ward 11 (Hendriksdal area) and Ward 6 (Simile) are almost similar in terms of population (approximately 5 000 individuals) with Ward 13 (rural area from north of Simile to Pilgrim's Rest area) the less densely populated.

Within the TCLM the younger population group (under 15 years of age) has increased from 25.2% in 2011 to 27.7% in 2016. The population between the ages of 15 to 64 was calculated at 67.5%. Only a small number of the population (4.8%) falls within the over 65 years of age category.

In 2011, the overall gender distribution for the TCLM was balanced with 51% males and 49% females.

Socio-Economic Profile (Structure of Local Economy)

In 2016 the total gross value added (GVA) of the municipal economy was estimated at R15bn (current prices) contributing close to 5% of the GVA produced in Mpumalanga province and 18% of the GVA of Ehlanzeni District. The formal economy created between 25 000 and 30 000 jobs in 2016, representing around 12% of formal jobs in the district and 4% in the Province (estimates based on Stats SA, 2011 and 2016; Thaba Chweu, 2016 and Ledger, 2015)

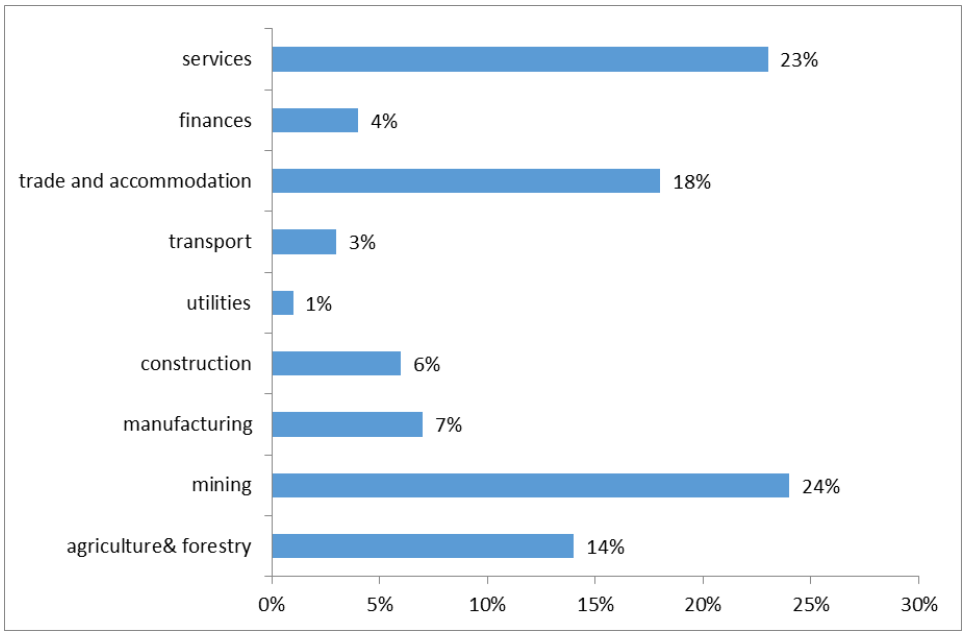


Figure 11: The Sector Distribution of Employment, Thaba Chweu, 2011

Figure 11 above shows the large role that the mining, agriculture, forestry and services sectors play in the local economy. The large role of the services sector indicates to the employment in the public services sector as well as service industries relevant to the tourism sector. The significant role that the tourism sector plays in the local economy (discussed in the main report) is also reflected in the large percentage of people employed in the trade and accommodation sector.

The agriculture and forestry sector is dominated by subtropical and deciduous fruits, crop farming, livestock, game farming and timber production. A variety of timber companies are operating within Thaba Chweu including York Timber and Sappi. Forestry activities are especially dominant in the western areas of the municipal area (Sabie and Graskop areas) applicable to the areas where the current mining right is applied for. While a significant number of people are employed in the agriculture and forestry sector, jobs in this sector are largely seasonal.

The mining sector is the single largest sector in the local economy contributing almost a quarter (24%) to total job opportunities created in the local area. The contribution towards economic output could be significantly higher and is estimated to be between 45% and 50% of total economic production in 2013

Education and Skills Levels

The following table provides an indication of the education levels of the population aged 20+ years within the TCLM based on the Community Survey of 2016

Table 18: Educational Profile of Population

EDUCATIONAL PROFILE: 2016		
No Schooling	Completed secondary	Higher
4.5%	36.9%	9.9%

Higher education levels have been achieved since the 2011 figures were released. In all three categories there have been improvements. In the TCLM, there has been an increase of 4.5% of learners passing Grade 12 since 2011 until 2016 .

Literacy and educational levels within the TCLM area, however, remains relatively low. It remains a priority of the TCLM to facilitate the development and expansion of schools, libraries and further education and training through these efforts

The unemployment rate within the TCLM in 2011 was calculated at 20.5%, with the youth unemployment rate (aged 15-34 years) at 27.1%. As indicated above the current unemployment rate is now at approximately 25%. The dependency ration was calculated at 43%. This place an immense burden on those employed persons to support the young and the aged.

Employment and Income

The unemployment rate within the TCLM in 2011 was calculated at 20.5%, with the youth unemployment rate (aged 15-34 years) at 27.1%. As indicated above the current unemployment rate is now at approximately 25%. The dependency ration was calculated at 43%. This place an immense burden on those employed persons to support the young and the aged.

Table 19: Employment Profile

EMPLOYMENT PROFILE: TCLM (2011)	
Unemployed	Youth Unemployed
20.5%	27.1%

Illegal mining activities

It is argued that while illegal mining has been reduced dramatically in Mpumalanga and other province since the introduction of the Illegal Mining Stakeholder Forums by Minister Susan

Shabangu in 2009, it still remains a major threat to the mining industry in South Africa, especially in the gold, platinum and diamond industries.

Illegal activities are usually dominated by organised crime syndicates that operate on a global scale. Illegal miners are often heavily armed, have explosives, and set booby traps for employees, security and rival groups of illegal miners. Illegal miners are furthermore at a high risk to be injured owing to their unsafe practices, leaving it to the company to arrange for their rescue and/or the recovery of the bodies of deceased miners.

The South African Police Service (SAPS) currently participates in forums such as the Mpumalanga Illegal Mining Stakeholder Forum and collaborates with mining companies and the DMR to further curb illegal mining. Preventative measures include (Ibid):

- Demolishing illegal mining infrastructure,
- Confiscating gold-bearing material
- Arresting illegal miners
- Deporting illegal immigrants
- Introduction of biometric scanners at mines
- Additional security guards at shaft entrances,
- A daily inspection of material cars on shaft heads for food parcels and illegal entries
- Involving stakeholders, such as the surrounding communities at mines, businesses and the local council, to participate in combating illegal mining
- Establishing whistle-blower channels.

Please refer to Appendix 15 for the Social Impact Assessment undertaken by Batho Earth with asses the impacts of illegal miners within the study area.

Tourism Industry

In 2015, Mpumalanga Province made the fifth highest contribution (9%) to the total 25 million domestic tourist trips in the country after Limpopo, KwaZulu Natal, Gauteng and the Eastern Cape. Mpumalanga Province's share of foreign tourist arrivals on the other hand is the third highest of all provinces, i.e. representing 11% or 8.6 million of the total 81 million bed-nights spent by international tourists in 2015. In terms of specific destinations or landmarks, two of the top 20 landmarks visited by tourists in 2015 are located in Mpumalanga. Kruger Park received the 8th highest number of visitors in South Africa in 2015 (242 000) and God's Window in the Blyde River Canyon (133 000) was number 17 on the top 20 list in 2015.

The Ehlanzeni District Municipality (EDM) plays a dominant role in tourism in Mpumalanga hosting popular tourist destinations including the Kruger National Park (KNP) in Bushbuckridge Local Municipality as well as numerous prime tourism attractions located in Thaba Chweu Municipal area (e.g. Pilgrim's Rest, God's Window in Blyde Canyon, Three Rondavels, Bourke's Luck, Mac Mac Falls). Thaba Chweu furthermore hosts numerous events throughout the year that attracts both local residents and visitors to the area including the Long Tom Marathon, Subaru/Ashburton Sabie Classic Mountain Bike race and Sabie Forest Fair.

The area further serves a popular route and stop-over for visitors on route to the Kruger National Park.

The tourism sector (GVA) contributed 8% towards GVA in Ehlanzeni compared to the 4% provincial average in 2013, i.e. the highest contribution of all three districts of Mpumalanga. For the past decade, the number of visitors to the district grew at a rate of more than 8% per

annum and more than doubled from 700 000 visitors in 2001 to more than 1.8m visitors in 2013.

In 2013, the tourism sector in Thaba Chweu LM made the second highest contribution (8%) towards GVA after Nkomazi LM within the Ehlanzeni district. While there are indications of the growth of visitor numbers to Thaba Chweu municipality, not all tourist destinations share in tourism growth to the area. While visitor numbers to God's Window for example grew from 106 000 in 2013 to 133 000 in 2015, the historic town of Pilgrim's Rest face a deteriorating tourism industry due to deteriorating safety and hygiene conditions . These factors related to illegal mining activities, increased vagrancies due to poverty and unemployment and lack of public facilities and municipal functions such as street cleaning. The town currently falls under the national Department of Public Works.

According to the Thaba Chweu IDP (2016) previously disadvantaged communities play a limited role in tourism development in the municipal area apart through employment and the selling of curio products along the main tourist routes.

Major tourist attractions are located within the municipal wards related to this mining right application (10161). Attractions include Mount Sheba, Pilgrims Rest, Ohrigstad Dam, a number of waterfalls (Horseshoe, Lonecreek, Bridal Veil), panoramic routes around Sabie and the Sterkspruit Nature Reserve.

The tourism sector in Sabie/ Graskop/ Pilgrims Rest Area area could directly employ close to 480 people in around 65 accommodation establishments, 14 restaurants and other tourist-related activities. The tourism sector in the area could generate a GVA of close to R200m per annum (Interviews with the Panorama Region Tourism Office and Statistics SA, 2016).

(b) Description of the current land uses

The receiving environment of the TGME 10161 study areas have a semi - rural character and is strongly associated with the mining industry and the commercial forestry industry, with the town of Sabie considered the commercial hub within the area. The land use is composed of various plantations (Pinus sp. and Eucalyptus sp.) for the commercial forestry industry, previous adits based on old mining activities, residential, industrial/commercial (sawmills within the area), and vacant/unspecified land. The commercial forestry activities dominate the area surrounding Sabie. The topography is characterised by gently to steeply undulating mountainous terrain interspersed with thicketed valleys in the vicinity of ephemeral drainage lines and rivers.

Please find attached as Appendix 8 the soil, land-use and land capability report.

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

Mining activities has been present in the study area since 1875 when gold was first discovered near Pilgrims Rest. By 1880 most of the underground mining activities were operated by small mining companies who installed stamp batteries and exploited oxide reserves. This continued until sulphide mineralisation was encountered with depth. Due to the resulting mineralogical problem, mining was discontinued.

Currently no mining activities are taking place within the study area by TGME, due to economic conditions and the fact that the mine is on care and maintenance at present.

Environmental features

As described in the baseline and the current land use sections above, the major sensitive features of the TGME 10161 project area are as follows:

- Watercourses;
- Wetlands;
- Areas of archaeological and heritage importance;
- Flora and fauna species; and
- Surrounding communities including the town of Sabie.

These are shown on the map in Appendix 3 and 4.

Please find attached as Appendix 3 the current land use map and the site-specific mining listed activities map, showing the current infrastructure and environmental features of each proposed mining section.

(d) Environmental and current land use map

Refer to Appendix 3 for the land use map of the TGME 10161 project. Please find attached as Appendix 8 the soil and land capability report.

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 identifies 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.

Before the impact assessment can be done, the different activities must be identified and mapped. The activities directly related to the mine are listed in Table 2 discussed in the first section of the report. Pre-construction activities would include fencing of the mining sections (sites), earth clearing activities (clearing of vegetation, soil stripping), road construction and the establishment of site offices, security checkpoints and surface infrastructure, as well as contractor's laydown areas for the temporary storage of materials and equipment.

During the construction phase, the appointed contractors will be responsible for the erection of the change houses, temporary ablution facilities (chemical toilets) and so forth. This infrastructure will remain on site for the duration of the construction phase. Permanent infrastructure will then be established on site.

The main earthworks, establishment of roads, as well as the securing of the adits are expected to last approximately one month per mining section. The construction period is thus anticipated to be of a very short duration at each mining section.

Once the adits have been secured, the mining of the PMR can start.

The mining activities can be summarised as the following.

Planning Phase

- Legal Requirements (Environmental & related permit applications)

Construction Phase

- Land and Footprint Clearance (Topsoil Stripping and Stockpiling)
- Establishment of Surface Infrastructure
- Waste Management

Operational Phase

- Operation of the underground mining activities
- Transportation (Load out area, roads)
- Operation of Workshop and enviro-loo's
- Waste Management and Handling
- Management of Domestic and Hazardous Waste

Decommissioning

- Rehabilitation of Waste Rock areas
- Dismantling and decommissioning of infrastructure and buildings, including product stockpiles
- Earth Moving, shaping and ripping of ground
- Cessation of Labour Contracts

Based on the above activities a detailed table was provided with all the identified impact associated with the mining application together with the significance before and after mitigation. Proposed mitigation measures are also provided for each identified impact. Please refer to *Appendix 16* for the detailed table per mining phase of each listed impact.

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).

The main issues and potential impacts associated with the proposed project were determined at both a desktop level based on existing information as well as field work and specialist input. The following methodology was used:

- Identify potential sensitive environments and receptors that may be impacted on by the proposed project
- Identify the type of impacts that are most likely to occur (including cumulative impacts);
- Determine the nature and extent of the potential impacts during the various developmental phases, including, construction, operation and decommissioning;
- Identify potential No-Go areas (if applicable); and
- Summarise the potential impacts that will be considered further in the EIA phase through detailed specialist studies.

Appendix 2 of GNR 982 NEMA requires the identification of the significance of potential impacts during scoping.

In order to adequately assess and evaluate the impacts and benefits associated with the project it was necessary to develop a methodology that could scientifically achieve this and to reduce the subjectivity involved in making such evaluations. For proper decision making it is necessary to assess all legal requirements and clearly defined criteria in order to accurately determine the significance of the predicted impacts or benefits on the surrounding natural and social environment.

This section will aim to discuss the methodology to be followed to determine, assess and describe possible impacts as a result of project implementation. Impacts will be discussed in terms of the construction, operational and decommissioning/closure phases of the project. The evaluation of impacts is conducted in terms of the criteria discussed below. The various environmental impacts and benefits of this project will be discussed in terms of the nature of the impact, as well as the status, certainty, duration, magnitude, extent, intensity, frequency and significance. The significance rating of each impact will determine whether or not mitigation will be required.

The EIA will also aim to achieve the following:

- Provide an overall assessment of the social and biophysical environments affected by the proposed project;
- Assess the study area in terms of environmental criteria;
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts, and
- Successfully analyse all public issues raised to date in order to recommend appropriate mitigation measures for all social and environmental related concerns.

Impacts and benefits are assessed before and after the application of mitigation measures.

Status of the Impact

The nature or status of the impact is determined by the conditions of the environment prior to construction and operation. A discussion on the nature of the impact will include a description of what causes the effect, what will be affected and how will it be affected. The nature of the impact can be described as negative or positive and can be derived from the significance rating of the impacts.

RATING	DESCRIPTION	QUANTITATIVE RATING
Positive	A benefit to the holistic environment	1
Negative	A detriment to the holistic environment	-1

Probability of the Impact

The certainty or probability of the impact describes the likelihood of the impact actually occurring.

RATING	DESCRIPTION	QUANTITATIVE RATING
Improbable	In all likelihood the impact will not occur	1
Low Probability	Possibility of the impacts to materialise is very low	2
Probable	A distinct possibility that the impact will occur	3
Highly Probable	Most likely that the impact will occur	4
Definite	The impact will occur regardless of any	5

prevention measures.

Frequency of the impact

The frequency of the impact refers to the temporal scale of the impact or benefit, in terms of the period of time that the surrounding environment will be affected or altered by the proposed project. This is determined by the following scale:

RATING	DESCRIPTION	QUANTITATIVE RATING
Continuous	Daily	1
Frequent	Less than daily (hours)	0.8
Infrequent	Moderate frequency (weekly)	0.5
Occasional	Less than weekly (Once or twice per month)	0.2

Spatial Extent of the impact

The extent of the impact refers to the spatial scale of the impact or benefit of the proposed project and the area over which it extends. A description is provided of whether effects are limited in extent or affects a wide area or group of people. The extent is rated according to the following scale:

RATING	DESCRIPTION	QUANTITATIVE RATING
Site Specific	Effects occur within the site/servitude boundary	1
Local	Effects extend beyond the site boundary Affects immediate surrounding areas	2
Regional	Widespread effect Extends far beyond the site boundary Effects felt within a 50km radius of the surface lease area	3
National	Effects felt beyond the 50km radius	4

Intensity of the impact

The severity or intensity of an impact is an attempt to quantify the magnitude of the impacts and benefits associated with the proposed project. The severity scale accounts for extent and magnitude, but is subject to the value judgement of the report writer. The following scale is useful in measuring severity and benefit.

RATING	DESCRIPTION	QUANTITATIVE RATING

Very Severe	Substantial deterioration/improvement Irreversible or permanent Cannot be mitigated	4
Very Beneficial	Permanent improvement and benefit	4
Severe	Marked deterioration Long term duration Serious and severe impacts Mitigation is very expensive, difficult or time consuming	3
Beneficial	Large improvement Long term duration	3
Moderately Severe	Moderate deterioration Medium term to long term duration Fairly easily mitigate	2
Moderately Beneficial	Moderate improvement Medium to long term duration	2
Slight	Minor deterioration Short to medium term duration Mitigation is easy, cheap or quick	1
Beneficial	Minor improvement Short to medium term duration	1

Duration of the impact

The duration of the impact refers to the temporal scale of the impact or benefit, in terms of the period of time that the surrounding environment will be affected or altered by the proposed project. This is determined by the following scale:

RATING	DESCRIPTION	QUANTITATIVE RATING
Short Term	0 – 5 years Less than the project lifespan	1
Medium Term	5 – 10 years	2
Long Term	Life of project 15 – 40 years	3

Permanent	Where the impact will be irreversible and will remain	4

Significance of the impact

After assessment of an impact in accordance to the preceding six criteria, the significance of an impact can be determined through a synthesis of the aspects produced in terms of their status, probability, duration, frequency, extent and severity. The significance of an impact is an expression of the cost or value of an impact to society. The focus of EIA's must be a judgement as to whether or not impacts are significant, based upon the value system of society, or groups of people (Thompson, 1988, 1990).

This subsection presents the criteria used to define significant effects on the environment. A high ranking for natural and cultural impacts will result in a significant negative impact on the existing environment. A high ranking for social impacts will give the indication that the impact will be positive. The rankings of each of the different impacts [health, safety, environment and community (social)] relates to the maximum and minimum totals that can be achieved for each possible impact.

The totals were used to calculate the threshold "classes" to determine the significance of the impact.

RATING	DESCRIPTION	THRESHOLD OF SIGNIFICANCE (NEGATIVE)
High	Negative long term/permanent change to the natural and social environment	13– 18
Medium	Medium or long term effects to the natural and social environment These effects are real and mitigation is possible, difficult and often costly	7 – 12.9
Low	Short term effects on the natural and environment Effects are not substantial and are often viewed as unimportant Mitigation is cheap, easy, quick or seldom required	0 – 6.9

Some impacts will prove to be positive and a benefit to the social and or natural environment. Although these impacts will be rated in accordance with the methodology provided above, high significance values could be obtained. The nature or status of the impact then proves to be the key indicator. Should the nature of the activity, as assessed, be positive the significance threshold will be reversed and the impact will be a benefit to the holistic environment.

RATING	DESCRIPTION	THRESHOLD OF SIGNIFICANCE (POSITIVE)
High	To the greater benefit of the social and/or natural environment No mitigation or monitoring needed	13 – 18
Medium	A benefit to the holistic environment Monitoring is needed Some mitigation is needed	7 – 12.9
Low	No real benefit to the holistic environment Mitigation and monitoring is needed	0 – 6.9

An example of the Impact Assessment methodology is provided below. The significance is determined by the following formula:

*(Status * Certainty/Probability + Duration + Extent + Intensity)*Frequency = Significance.*

This method for assessing the significance of impacts will be repeated for all three project phases i.e. Construction, Operation and Decommissioning. Impacts were also assessed in terms of project activities. The reason for this is that different environmental impacts can be expected for various project activities. For example, impacts on air quality associated with slag and alloy tapping will vary if compared with the impacts expected for handling of raw materials. This approach allows for a more adequate assessment of impacts and additional mitigating measures that should be identified and implemented per project related activity.

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 raided by affected parties)

During the operational stages of the mining operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and stockpiles/dumps will alter the topography by adding features to the landscape which may have a negative impact. Topsoil removal and excavations will unearth the natural topography. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and excavations, and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. Most of the site has a land capability largely dominated by forestry plantations and historic mining infrastructure, with limited cultivation and livestock grazing under current conditions. Almost the entire proposed mining sites were historically used as mining sites prior to forestry plantations, whether as access points (Adits or vertical shafts) to the underground mine workings or as waste rocks dump sites. This was evident during the site assessment, as disturbances associated with historic mining activities were observed. The impact of the proposed mining sites on high potential agricultural soils is anticipated to be limited in extent, due to the nature of the mining infrastructure. and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected through underground mining. Furthermore, if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources (watercourses) during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any excavations within a drainage lines/watercourse will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation. Bridge crossing are needed to be upgraded, if this is not properly manged it could have an impact on the watercourses and draining lines. Due to the sensitivity of the watercourses in the region, a high level of mitigation, comprising of avoidance, minimisation and rehabilitation, and possibly offsetting, will be required during all phases of the proposed mining project to ensure that the ecological integrity of the freshwater resources in the vicinity of mining activities is not compromised to such a degree that the Resource Quality Objectives for these drainage systems cannot be met.

The terrestrial ecology of the study area is sensitive in nature with specific reference to the habitat unit watercourses and secondary grassland and Species of Conservation Concern (SCC). The transformation of natural habitats to mining and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn, this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to operational activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Associated infrastructure will result in the loss of connectivity and fragmentation of natural habitat.

Fragmentation of habitat will lead to the loss of migration corridors, in turn resulting in degeneration of the affected population's genetic make-up. This results in a subsequent loss of genetic variability between meta-populations occurring within the study site. Pockets of fragmented natural habitats hinder the growth and development of populations. However, from a terrestrial point of view, it is evident that prior to mitigation the impacts on floral and faunal habitat are of medium to high significance impacts during the construction and operational phase, and low during the decommissioning and closure phase. If effective mitigation takes place, all impacts may be reduced.

During the operation, the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary roads. The proposed operation will add a certain amount of noise to the existing noise in the area. However, levels of noise generated by mining activities especially with blasting can be substantial.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local farm residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and operation-related businesses.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

Positive impacts are further anticipated with regards to the local hospitality industry through the accommodation of members of the workforce and the overall possible development of the tourism industry's potential

The positive economic contribution of the project is especially relevant in the context of high local unemployment and high poverty rates.

With any activity where invasive tasks will take place, such as site clearance and constructions, negative impacts may arise. As part of this project various impacts have been identified in *Appendix 16* it is however clear from these tables that with the correct management measures in place these impacts could be managed successfully.

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

(With regard to the issues and concerns raided 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).

Comments and concerns raised by stakeholders are included in Appendix 7 as discussed under the section public participation. Below is a summary of all comments received thus far, and the discussion on possible mitigations proposed with cross reference to the various specialist studies done. This will be updated with comments received on the draft EIA and EMPr.

Table 20: List of Mitigation Measures based on the issues and concerns raised.

Summary of issues raised during the public participation Process	
Impact / Concerns Raised	Mitigation Measures
TRAFFIC • The increase in the number of heavy vehicles on the local roads and through residential areas such as Sabie • Impact of increased heavy vehicles on the road surfaces • Concerns of overall impact on road infrastructure due to increased number of heavy vehicles • Information required about the volumes of material to be transported and the number of heavy vehicles involved in the transportation • Impact of heavy vehicles on noise levels • Local roads to be utilised by the heavy vehicles	TRAFFIC – please refer to the detailed specialist studies done • Traffic Impact Assessment • Noise Impact Assessment • Socio-Economic Impact Assessment In terms of traffic volume, please refer to section 5.1 of the traffic report. The volume to be transported is also addressed under section 5. Section 8 and 9 provides details on infrastructure upgrades needed. Noise levels were assessed and according to the noise assessment, the proposed reworking of the existing mines within the Sabie District (MR 10161) and the hard rock mining at the existing mining areas will comply with the relevant Noise Control Regulations and SANS 10103 of 2008
PROPERTY OWNERSHIP AND RELATED ISSUES • The DAFF indicated the Morgenzon Nature Reserve on the farm Sacramento • Impact of proposed project on state owned land and protected areas • Impact of proposed project on existing	PROPERTY OWNERSHIP AND RELATED ISSUES Terrestrial and Ecological Impact Assessment address the sensitive ecology of the study area, including Morgenzon, please refer to app D vegetation type of the said report. However no impacts will take place at Morgenzon reserve.

industries' properties and the possible impact on those industries' operations	Only underground mining. Socio-Economic Impact Assessment address all impacts on industries. Please refer to section 6 of the SIA.
TOURISM AND SOCIO-ECONOMIC ISSUES • Safety and security issues due to the inflow of workers, jobseekers and illegal miners • Employment creation • Impact on local tourism industry • Economic impact on the local area • Impact on infrastructure • Impact on natural scenic areas • Impact on increased traffic on local roads and tourism industry • Impact on proposed Harmony Hill Township Development • Housing of employees • Suitability of access roads for heavy vehicles • Increased fire risks • Possible increase in crime e.g. illegal harvesting of trees, trespassing etc. • Dust pollution due to vehicular movement • Mining company's involvement in socio-economic development in the area	TOURISM AND SOCIO-ECONOMIC ISSUES Socio-Economic Impact Assessment -this report addresses all impacts on illegal miners, refer to table 36 of this report. Please refer to section 6 of the SIA for the detailed assessment – on all of the listed impacts Appendix 16 provides a detailed assessment relating to dust pollution and risk of fires. Suitable Access roads are depicted in section 8 of the traffic report.
WATER RELATED ISSUES • Impact of mining operations on quality and quantity of underground water sources • Protection of existing water rights • Possible impact on continuation of water supply for household use • Location of water sources to be used • Impact on water sources of the town of Sabie • Information with regard to existing Water Use Licences • Impact on water due to the area being a dolomitic area • Presence of wetlands • Precautions to be taken to avoid / prevent ground water contamination / pollution	WATER RELATED ISSUES The groundwater report undertook numerical groundwater modelling in order to determine the impacts, please refer to section 5 of this report. Section 4 looks at existing boreholes. Including the impact on the town of Sabie. Dolomitic aquifer is also discussed under the executive summary. Mitigation measures are address under section 8 and 9. Water sources to be used is address under the mining description in the beginning of the report. The existing Water Use Licences was provided. The freshwater assessment provides a clear description of wetlands within the study area, please refer to section 3 of the said report. The terrestrial ecological report also provides impacts assessment on the watercourse habitat, All sensitive environments were rated as high and hence the location of infrastructure on sensitive environment were amended. Appendix 17 provides detailed maps to the amendment done. Please refer to the detailed specialist studies

	done • Groundwater Impact Assessment • Surface Water Impact Assessment • Freshwater and Aquatic Assessment • Socio-Economic Impact Assessment
MINING OPERATIONS • Impact of surface operations • Visual Impact of mining operations and infrastructure • Location of Pre-Conditioning Centres • Timing and phasing of mining operations • Movement of vehicles and roads to be used • Possibility of development of sinkholes • Possible subsidence • Extraction process • Heap Leach process • Inclusion of the requirements of the DPW Guidelines for infrastructure development on Dolomite to be adhered to • Impact of underground mining on above ground infrastructure • Impact of underground mining on water sources	MINING OPERATIONS Please refer to Appendix 16 for the detailed impact assessment table. Providing all the impacts with mitigation measures per mining phase and hence the impact of surface operations. Please refer to the mine plan in Appendix 18 which provides information on the phasing. Please also refer to the project description in the beginning of this report which provides clarity on the location of the PCC. Suitable Access roads are depicted in section 8 of the traffic report. The groundwater report undertook numerical groundwater modelling in order to determine the impacts, please refer to section 5 of this report. Section 4 looks at existing boreholes. Including the impact on the town of Sabie. Dolomitic aquifer is also discussed under the executive summary. Mitigation measures are address under section 8 and 9. The extraction process does not fall under the said mining method as all the waste rock will be transported to the existing approved metallurgical plant
NOISE IMPACTS • Noise impacts as a result of mining activities and equipment used • Noise impacts as a result of movement of vehicles • Noise impact of blasting	NOISE IMPACTS Noise levels were assessed and according to the noise assessment, the proposed reworking of the existing mines within the Sabie District (MR 10161) and the hard rock mining at the existing mining areas will comply with the relevant Noise Control Regulations and SANS 10103 of 2008. Please refer to the following studies: • Noise Impact Assessment • Socio-Economic Impact Assessment
LAND AND INFRASTRUCTURE DEVELOPMENT • TCLM requires land for development • Municipality's inability to commit to any	LAND AND INFRASTRUCTURE DEVELOPMENT Socio-Economic Impact Assessment -this report addresses all impacts on land development and

infrastructure development • Mining companies commitment to socio-economic development and specific development programmes	TCLM requirement, refer to table 49 of this report. Please refer to section 6 and 7 of the SEIA for the detailed assessment – on all of the listed impacts.
ECOLOGICAL • Areas with high natural significance • Occurrence of rare plant species and safeguarding of such species • Areas planted with commercial tree crops • Impact of mining on conservation areas • Protection of natural resources • Alien vegetation management • Impact of mining activities on animal life, ecological value, surface water and wetlands • Protection of large cat species e.g. leopard • Impact of mining on forestry industry	ECOLOGICAL Terrestrial and Ecological Impact Assessment address the sensitive ecology of the study area, refer to section 3 and 4 and sensitivity mapping done under section 5. Also refer to all the sensitivity maps done per mining section in appendix 18.
FORESTRY ACTIVITIES • Impact of mining activities on the forestry industry, the conservation areas and the resource use	FORESTRY ACTIVITIES According to the ecological reports the vegetation unit plantation has a low ecological unit. Clearing of the plantations will result in a minimal loss of faunal and floral habitat and diversity, as this habitat unit is considered to be extensively transformed already – please refer to the executive summary. The social impact report looks at the human factor, refer to section 6 and 7.

ix) Motivation where no alternative sites were considered

Alternatives have been considered for this project, as listed above Part A 3. (g) (i).

x. Motivation where no alternative sites were considered.

See section 2h(i)(e) for motivation.

X) Statement motivating the preferred site.

(Provide a statement motivation the final site layout that is proposed)

See section 2h(i)(e) for the appropriate motivation.

The current position for the proposed adits and shafts positions (including associated mining infrastructure area) was influenced by the following factors:

- Location of historical adits and shafts
- Distance to the Metallurgical Plant in Pilgrims Rest;
- Access to mining complex from major road networks;
- Environmentally sensitive areas such as rivers, wetlands arachnological sites and sensitive areas; and

Depth to reserve and quality of the minerals to be mined. The underground mining method was selected as the preferred mining method based on the following:

- Depth to the resource;
- Reduced impact on current land use activities;
- Location of old surface infrastructure (dwellings, etc.)

The high level positive and negative impacts for each alternative have been addressed in section 2h(i)(e).

Should the project not be approved (No Go Option) the following implications may arise:

- Commitments made in the Social and Labour Plan (SLP) in terms of Human Resource Development (HRD) and Local Economic Development (LED) will not be achieved;
- Negative impacts on current high unemployment rates;
- Negative effect in terms of the corporate social investment program; and
- Zero contributions in terms of poverty alleviation

h) 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.)

In order to identify the potential impacts associated with the proposed activities the following steps were undertaken:

- The stakeholder consultation process is undertaken in a manner to be interactive, providing landowners and identified stakeholders with the opportunity to provide input into the project. This is a key focus, as the local residence have capabilities of providing site specific information, which may not be available in desktop research material. Stakeholders are requested (as part of the BID) to provide their views on the project and any potential concerns which they may have. All comments and concerns received to date, have been captured and formulated into the impact assessment.
- Previous Environmental Studies have been undertaken for a number of projects for TGME within the study area, these include the MPRDA EMP, EMP Alignment, various Basic Assessment Processes, etc. on the portions of land, applicable to this project. The baseline studies and impact findings, were incorporated into the mining works program which lead to the application for a mining right.
- Additional site-specific specialist studies were conducted to determine the risk of the proposed project on the environment which included:
    - Terrestrial Ecology Assessment;
    - Freshwater and Aquatic Assessment;
    - Ground Water Assessment
    - Surface Water Assessment
    - Noise Assessment
    - Soil and land use assessment

- Heritage Assessment
- Traffic Assessment
- Visual Assessment and
- Social Economic Assessment.

- A detailed desktop investigation was undertaken to determine the environmental setting in which the project is located. Based on the desktop investigations various resources were used to determine the significance and sensitivity of the various environmental considerations. The desktop investigation involved the use of:
  - South African National Biodiversity Institute (SANBI) Biodiversity Geographic Database LUDS system;
  - Geographic Information System base maps;
  - Department of Water and Sanitation (previously the Department of Water Affairs) information documents such as the (ISP and Groundwater Vulnerability Reports);
  - AGIS;
  - Municipal Integrated Development Plan; etc.
- Site Visits were undertaken in August and September 2017. This site visit was utilized to ensure that the information gathered as part of the desktop investigation reflects the current status of the land.
- The rating of the identified impacts was undertaken in a quantitative manner as provided in Section 3.i.x.1 (Impact Ratings). The ratings are undertaken in a manner to calculate the significance of each of the impacts. The EAP also assessed the outcomes of the calculation to determine whether the outcome reflects the perceived and actual views.
- The identification of management measures is done based on the significance of the impacts and measures that have been considered appropriate and successful, specifically as Best Practical and Economical Options.

i) 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).

ACTIVITY	POTENTIAL IMPACT	ASPECTS AFFECTED	PHASE In which impact is anticipated	SIGNIFICANCE if not mitigated	MITIGATION TYPE ..	SIGNIFICANCE if mitigated

The table containing the relevant information, as determined from the template above, is attached as Appendix 16.

j) 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):-

For the purposes of the environmental authorisation related to the mining right application, numerous detailed specialist studies were undertaken. Please refer to Appendix 5 to 15 for these reports. The table below presents a concise snapshot of what the outcomes of these studies.

Table 21: Summary of findings from specialist studies undertaken

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
Terrestrial ecological assessment by E van der Westhuizen from Scientific Terrestrial Services (STS), September 2017. Appendix 10	Terrestrial Ecological Assessment Results: • Four habitat units were identified during the field assessment namely the Secondary Grassland habitat unit, Transformed Grassland habitat unit, Plantations, and the Watercourse habitat unit; • The floral SCC Cyathea dregei, Cyrtanthus tuckii and Crinum macowanii protected under the Mpumalanga Nature Conservation Act (MNCA) of 1998, were observed within the Watercourse habitat unit, whilst there is a high likelihood that several other floral SCC also protected under this Act, may occur within this habitat unit. As such, this habitat unit is considered to be of a moderately high sensitivity for floral and faunal species; No floral SCC were encountered during the field assessment within the secondary grassland habitat, however this habitat unit does provide potential habitat for floral SCC. Although alien invasive species were observed within this habitat	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 10.

	unit, the abundance of such species were considered lower than within the Transformed Grassland and Plantation habitat unit, and as such is considered to be of intermediate sensitivity; • Although no faunal SCC were observed during the site assessment, communications with the land owners indicated that SCC such as Panthera pardus (leopard) have been regularly sighted within the proposed mining areas. Furthermore, the watercourses where permanent stream flow is present may potentially provide habitat to amphibian SCC such as Hadromophryne natalensis (Natal Ghost Frog), whilst also providing water and food resources to a number of other faunal species in the area; • The transformed grassland compromised of predominantly alien invasive plant species such as Tagetes minuta, Bidens pilosa, Solanum mauritianum and Pteridium aquilinum; however, a number of faunal species were observed to utilise this habitat, and as such is considered to be of a moderately low sensitivity. • Both Eucalyptus grandis and Pinus spp. plantations were included into the plantation habitat unit. This habitat unit is considered to be of a low sensitivity due to the loss of natural vegetation as a result of ongoing timber production as part of the forestry industry in the region; • Faunal diversity was observed to be lowest in the plantations, whilst the remaining habitats had a significantly higher faunal diversity, notably in the watercourses and secondary grasslands; The findings indicating the significance of the impacts before mitigation takes place and the likely impact if management and mitigation takes place. In the consideration of mitigation, it is assumed that a high level of mitigation takes place but which does not lead to prohibitive costs. It is evident that prior to mitigation the impacts on floral and faunal habitat are of medium to high significance impacts during the construction and operational phase, and low during the decommissioning and closure phase *Recommendations:* It is recommended that site clearing of the proposed mining shaft complexes		

	and associated infrastructure takes place in a phased manner to allow for any faunal species present to move out of the footprint area; The construction and operational footprint must be kept as small as possible in order to minimise impact on the surrounding environment; Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed; Appropriate sanitary facilities must be provided during the construction phase and all waste must be removed to an appropriate waste facility; All soils compacted as a result of construction activities should be ripped and reprofiled to natural levels, and revegetated with indigenous vegetation. Special attention should be paid to alien and invasive plant control within these areas; No dumping of waste should take place. If any spills occur, they should be immediately cleaned up, and be disposed of at a registered waste facility; No trapping or hunting of any faunal species is to take place; Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species are reintroduced; Alien vegetation as listed in Appendix F must be removed from the study area during both the construction and operational phases, with specific mention of Category 1b species in line with the NEMBA Alien and Invasive Species Regulations (2016), with the exception of tree species utilised for timber production in the plantations; and Establishment of reintroduced vegetation must be monitored during the rehabilitation phase. *Floral and Faunal diversity and SCC* Crinum macowanii, Cyathea dregei and Cyrtanthus tuckii were encountered during field assessment, all of which are protected under the MNCA of 1998, and if any individuals of this species are to be disturbed, permits must be		

	obtained from the MTPA. As the majority of possible SCC were not yet in flower or emerged following the winter season, it is possible that a higher diversity of floral SCC is present within the watercourse and secondary grassland habitat. As such it is advised that a walkdown of the sites is conducted prior to vegetation clearing activities during prime flowering season (November to March) to mark flower SCC within the demarcated mining and infrastructure areas for rescue and relocation purposes; A speed limit of 40km/h should be implemented, and road signs warning motorists of animals crossing the road should be installed at distances complying with national standards; No trapping, snaring or hunting of faunal SCC is permitted; It must be ensured that the permanent streams throughout the study areas are not impacted upon, cleared or diverted, and that no loss of habitat or streamflow occurs; Should any other floral or faunal SCC be encountered during any phase of the proposed mining operation, all activities should be stopped, and a qualified expert be consulted to implement a suitable biodiversity management plan. *Vehicle access* Vehicles should be restricted to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; and In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practiced near the surface area to prevent ingress of hydrocarbons into topsoil. *Soils* Limit the footprint area of the construction activity to what is absolutely essential in order to minimise environmental damage; Edge effects of activities including erosion and alien and invasive plant control need to be strictly managed in these areas; ➢ It must be ensured that all hazardous		

	storage containers and storage areas comply with the relevant SABS standards to prevent leakage. All vehicles must be regularly inspected for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil; and To prevent the erosion of top soils, management measures may include berms, soil traps, hessian curtains and storm water diversion away from areas susceptible to erosion. It must be ensured that topsoil stockpiles are located outside of any watercourses and areas susceptible to erosion. Stockpiles should be placed away from areas known to contain hazardous substances such as fuel and if any soils are contaminated, it should be stripped and disposed of at a registered hazardous waste disposal site. *Rehabilitation* As much vegetation growth as possible should be promoted within the proposed development areas in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species as the first choice during landscaping; ➢ All areas of disturbed and compacted soils need to be ripped and reprofiled; and All areas affected by mining activities should be rehabilitated upon closure of the mining and associated infrastructure areas. Areas should be reseeded with indigenous grasses as required. All rehabilitated areas should be rehabilitated to a point where natural processes will allow the pre-development ecological functioning and biodiversity of the area to be re-instated.		
Freshwater and Aquatic Ecology Assessment by S van Staden from Scientific Terrestrial Services (STS), October 2017. Appendix 11	Based on the findings of this study, it was determined that the various project components have varying degrees of impact based on the distance of each operation from the watercourses in the region. Additional Addendum made by Scientific Terrestrial Services: The water quality requirements to maintain the Ecostatus of the receiving aquatic environment must be determined. This should be undertaken by application of the Physic-chemical Assessment Index (PAI) Ecostatus tool.	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 11

	This will ensure that appropriate water quality. standards for the receiving environment can be defined as part of the WULA to maintain the ecology of the highly sensitive rivers in the area. The Instream flow of the rivers in the area is considered an important aspect of their ecology. Any significant changes to the flow regime of the system may have a detrimental impact on the ecology of these systems. Should the Reserve not be available at an appropriate position in the rivers in the vicinity of the proposed mining projects, reserve determinations should be undertaken, as a minimum on a desktop level, to define the Environmental Water Requirements (EWR) for the system. This information must then be used to manage any discharges of underground dewatering water or any abstraction from the system to ensure that the EWR tolerances are not breached. No development will be allowed within the 1:100 year floodline or within a wetland. If these areas are foreseen the infrastructure area needs to be moved. It should be ensured that no development take place within 100m of the Klein Sabie River, Sabie River and its tributaries as well as the tributaries of the Nels River, in line with regulation GN 704 of the National Water Act as far as possible; Due to the sensitivity of the watercourses in the region, a high level of mitigation, comprising of avoidance, minimisation and rehabilitation, and possibly offsetting, will be required during all phases of the proposed mining project to ensure that the ecological integrity of the freshwater resources in the vicinity of mining activities is not compromised to such a degree that the Resource Quality Objectives for these drainage systems cannot be met. *Summary of the results of the Freshwater ecological assessment* The results of the freshwater resource ecological assessment indicate that the various freshwater resources associated with the TGME 10161 study areas are considered to be in a moderately to largely modified condition, having been impacted upon over an extended period of time by historical		

	agricultural and mining activities, and in more recent years, by commercial forestry activities. Modifiers to the various freshwater resources that were assessed include transformed vegetation communities due to removal of vegetation and encroachment of alien vegetation, streambank incision and erosion, and flow-impeding infrastructure such as road crossings and culverts. Nevertheless, despite reduced ecological integrity, the freshwater resources associated with the TGME 10161 study areas are deemed to provide intermediate levels of ecological services such as flood attenuation, nutrient and toxicant assimilation, sediment trapping and streamflow regulation, and as such, are considered ecologically important on a local (and in some instances, regional) scale. *Aquatic ecological Importance and Sensitivity Assessment* The Ecological Importance and Sensitivity analysis for the tributary of the Klein Sabie River yielded a score of 2.5 whilst a score of 2.0 was obtained for the tributary of the Nels River. The EIS for both systems is thus regarded as highly important and sensitive. The increased importance and sensitivity of the streams are mainly as a result of limited direct impact on the systems and presence of sensitive aquatic species within the systems. The Ecological Importance and Sensitivity Assessment analysis for the unnamed tributary of the Sabie River yielded a score of 1.9 which is regarded as moderately important and sensitive. The system is considered moderately sensitive to alterations in flow and flow-related water quality changes, with year-round water required in the system. *Recommendations:* All mining infrastructure should remain out of the wetland and riparian zones and associated zones of regulation in line with the requirements of Regulation GN704 and Regulation GN509 of the National Water Act unless it is absolutely unavoidable; Limit the footprint area of the construction activity to what is absolutely essential in order to minimise the loss of clean water runoff areas and catchment yield and the concomitant recharge of streams in the area; No dirty water runoff should be permitted to reach the freshwater resources, in		

	line with regulation GN 704 of the National Water Act and appropriate clean and dirty water separation and storm water management controls must be developed as the first part of the construction phase of each project aspect; It is deemed essential that the mine be designed in such a way as to ensure that decant is prevented for the life of the proposed mine expansion and beyond closure unless measures to treat decant to background water qualities can be ensured until the quality of the decant naturally returns to these background levels; Detailed investigation of the impact of the proposed mine expansion on the groundwater environment needs to take place. The extent of the cone of dewatering needs to be determined. A suitably sized buffer needs to be placed around the freshwater systems, wherein no activities are to take place which could lead to dewatering of the system or impacts form Acid Mine Drainage; All proposed access roads, fences and any additional linear infrastructure (e.g. conveyors) should cross the freshwater resources at the narrowest point and at a 90-degree angles. The substrate conditions of the freshwater resources and stream connectivity must be maintained; Obstruction of flow should not take place or should only occur for very short periods; and Restrict construction to the drier winter months to avoid sedimentation of the freshwater resources in the vicinity of the proposed mining project During any further exploration activities or the construction phase no vehicles should be allowed to indiscriminately drive through the freshwater resources and vehicles must remain on designated roadways; No new crossings of the aquatic resources should take place and the substrate conditions of the aquatic resources and stream connectivity must be maintained; Permit only essential construction personnel beyond approved construction		

	areas; and All areas of increased ecological sensitivity (i.e. the freshwater resources and areas which are important in terms of recharge) should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel during all phases of the proposed mining project. Any area where decant points may be determined by the geohydrological assessment, needs to be very carefully managed until groundwater quality returns to pre-mining conditions; • Water levels need to be very strictly managed to keep water levels below any decant level, while ensuring that a significant cone of depression impact does not take place; If decant will occur, all water is to be treated to background water quality values prior to release into the receiving environment; • If decant will occur decant volumes and salt load could be reduced if an underground high-pressure seal is installed, to engineer requirements to reduce decant rates and volumes; and • Upstream dewatering boreholes should be considered in order to minimise the creation of dirty water within the opencast pits/adits, and this clean water should be used to recharge the freshwater features downstream of the mining area; Measures to contain and reuse as much water as possible within the mine process water system should be sought, and very strict control of water consumption must take place. Detailed monitoring must be implemented and maintained to ensure that all water usage is continuously optimised; No undermining should be permitted and no activities should take place which will cause subsidence of the landscape and thus change the drainage characteristics of the area; An extensive monitoring programme will need to be implemented to track the cone of depression on an ongoing basis for the life of the mine, and suitable mitigation measures will be required to protect surface water recharge in the vicinity of the proposed development. Monitor all potentially affected wetlands		

	for changes in riparian vegetation structure; No dirty water runoff must be permitted to reach the wetland and riverine resources during the entire life of mine, and clean and dirty water management systems must be put in place to prevent the contaminated runoff (suspended solids and salts and water with low pH) from entering the receiving aquatic environment. Clean and dirty water runoff systems should be constructed before construction of any other infrastructure takes place; Any dirty water runoff containment facilities must remain outside of the defined wetland and riparian areas and their buffers as a measure to minimise the impact on the receiving environment; Strict control of sewage water treatment must take place and the sewage system should form part of the mine's closed process water system; All dirty water containment structures should be designed to contain a minimum storm event of a 24 hour 1 in 50 year flood event; All pollution control facilities must be managed in such a way as to ensure that storage and surge capacity is available if a rainfall event occurs; Adequate storm water management must be incorporated into the design of the proposed development in order to prevent erosion and the associated sedimentation of the riparian and instream areas. In this regard, special mention is made of: • Sheet runoff from cleared areas, paved surfaces and access roads needs to be curtailed; • Runoff from paved surfaces should be slowed down by the strategic placement of berms; and All overburden stockpiles and waste stockpiles must have berms and/catchment paddocks at their toe to contain runoff from the facilities.		
Groundwater Assessment by M van Biljon, September 2017. Appendix 9	The most prominent aquifer is the dolomite aquifer, which is known to potentially contain large quantities of groundwater. The water that poses a risk to the underground mining is primarily derived from this karst aquifer in the Malmani dolomite, within which the Glynns / Vaalhoek reef is situated. The shallower, weathered portion of the dolomite aquifer has been formed	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 9

	because of karstification. This occurred prior to the deposition of younger formations, at a time when the dolomite was exposed to the elements and had undergone extensive weathering. There is general agreement that this aquifer is the significant source of water within the dolomite. The extent of karstification of the Sabie-Pilgrims Rest dolomite is, however, not well documented. In most geological terrains the groundwater level mimics the topography. The groundwater in dolomite aquifers do not typically follow this trend due to the high transmissivity that is found in dolomite aquifers. The apparent relationship between the topography and groundwater levels that exists in the Sabie-Pilgrims Rest dolomite aquifer may indicate that this aquifer approximates a typical fractured aquifer and that the dolomite is not extensively karstified. This is not to say that the dolomite in this region is a minor aquifer and the association with the topography is likely a reflection on the distribution of the current boreholes that may not have specifically targeted karst areas. Karst zones with a potential for high yielding boreholes do in all likelihood exists. The groundwater quality in this aquifer is very good, based on the current mine monitoring data as well as samples collected during this investigation. Except for the Nestor Adit, water seeping from the mining areas is generally also good. This is an indication that the buffering capacity of the host rock (dolomite) neutralises the acid generating potential of the reef horizon, which is generally pyritic in nature. Samples were collected from waste rock material at existing adits as well as from a historic tailings storage facility (TSF) at Nestor mine. These samples were subjected to leach testing and Acid Base Accounting (ABA). The following conclusions were drawn from the ABA characterisation of the Sabie-Pilgrims Rest waste material: • Based on the ABA testing it is concluded that the tailings material has the potential for acid generation, as confirmed by the leach testing, whereas the waste rock material generally does not. • Since the waste rock material does not pose any risk to the		

	groundwater there are no additional management requirements. • Discussions with mine personnel indicated that the Nestor TSF will be removed and incorporated into the Sabie TSF, which will be a licenced facility with the necessary contaminant measures in place. Based on the available data a calibrated flow and mass transport model was developed and used to simulate the potential mining impact on the groundwater regime: The following scenarios were simulated: • Scenario 1: Impact from the proposed mining on the groundwater level; • Scenario 2: Simulation of the contaminant plume during the operational phase of the project; and • Scenario 3: Simulation of the contaminant plume after closure and source removal. The modelling results can be summarised as follows: • The proposed mining extension is likely to intersect water-bearing fissures, resulting in an increased water inflow into the underground working. This potentially will cause dewatering of the aquifer and the regional lowering of the groundwater level. It is expected that this can be as much as 45m. It is, however, important to note that the current groundwater level is an interpolated level, based on very sparse data. This is typical in these type of investigations and once detailed mining plans are available and additional boreholes are drilled, a more accurate dewatering cone will be generated. • Groundwater usage in the region appears to be restricted and very few groundwater users were identified during this and previous investigations. The impacts associated with the drop is groundwater levels is mainly to the mine that will have to deal with the increased water inflow. If there are any impacted groundwater users that have not been identified, the mine will		

	address these individually and will supply water to impacted users. • The current discharges from the Glynn's Drainage Tunnel is estimated at 65 Megalitres per day (Mℓ/day). The increase in groundwater inflow due to the proposed mining extension is expected to be 92 Mℓ/day, excluding the current 65 Mℓ/day. • Additional mining is also planned at Nestor mine. Since these workings are located above the groundwater level there will be no dewatering of the aquifer. There will, however, still be seepage into the mine voids. The estimated inflow is approximately 1.7 Mℓ/day. • The Nestor TSF is a potential contaminant source impacting on the groundwater quality. The geochemical leach testing recorded high sulphate concentrations, which was used to specify the source term concentration for the contaminant plume simulations. The extent of the current contaminant plume is estimated at 70 hectares (based on the SANS 241 limit of 500 mg/ℓ) and does not currently impact on any down-gradient receptors (groundwater users or surface streams). This will reduce by 35% to 46 hectares, twenty years after the source has been removed. It is proposed to remove this TSF and place the material onto the Sabie TSF, which will be a licenced facility with contaminant prevention measures. Several assumptions had to be made during the numerical modelling due to gaps in the available geohydrological information, especially within the new mining areas. It is recommended that the model be updated after additional drilling and aquifer testing has been done and once the mining layout has been finalised. The current model is a regional model and should be refined to assess each mine individually. New mining ventures never have detailed, closely spaced, site-specific information and several assumptions had to be made during the numerical modelling as a result of gaps in the available geohydrological information. It is important to note that a numerical groundwater model is a representation of the real system. It is therefore at most an approximation, and the level of accuracy depends on the quality of the data that is available. This implies that there are always errors associated with groundwater models due to		

	uncertainty in the data and the capability of numerical methods to describe natural physical processes. This does not mean that the current modelling presented in this report is flawed, but merely that it can and will be improved upon as site-specific data becomes available. The historical mining in the region provided valuable information that was incorporated into the model and increases the confidence in the modelling outcome. It is recommended that the model be updated after additional drilling and aquifer testing has been done and once the mining layout has been finalised. The current model is a regional model and should be refined to assess each mine individually. • Cover drilling programme to identify water bearing fissures ahead of mining; • Detailed mapping of water bearing fissures and delineation of high risk zones; • Delineate impacted areas and develop management options such as the construction of plugs to compartmentalize the mine; and • Grouting of the rock formations to restrict inflow. It is further recommended that clean and dirty water be separated underground. Any water intersected underground (that is not sealed-off) should be collected as close as possible to the source and discharged from the mine through dedicated clean water pipes. This will lower the potential contaminant risk to the environment considerably. There are two potential groundwater impacts associated with the proposed mining in the Sabie region. These are: • Excessive inflow of groundwater into the underground mines causing the dewatering of the aquifer and the resultant drop in the regional groundwater level; and • Contamination of the groundwater and the deterioration of the groundwater quality impacting on down-gradient receptors (private boreholes		

	and surface streams). The proposed mining will take place within the dolomite aquifer as most of the gold reef packages are located within the Malmani dolomite. It is therefore unavoidable that the proposed mining extensions will intersect water-bearing fissures, resulting in an increased water inflow into the underground workings. This potentially will cause dewatering of the aquifer and the regional lowering of the groundwater level. This water will come into contact with minerals in the reefs, such as pyrite, that can potentially cause the deterioration of the water quality in the mine workings. During the operational life of the mine, the excess water will be pumped from the workings and provided that it complies with the regulatory requirements, will be discharged into streams. If during this time any groundwater user is impacted on in terms of boreholes drying up or water quality deteriorating, the mines will have water available to supply to these affected parties. The town of Sabie is included as a potentially affected party. After closure the mines will re-water and large portions of the aquifer will recover. Excess water from the mines will decant in places, as is currently the case. This water will be available for future usage and based on the current water quality emanating from mine adits, very little (if any) treatment of the water will be required. The current water discharge from the Glynn's Drainage Tunnel is estimated at 65 Mℓ/day. This volume is expected to increase, meaning that more water will be readily available for future town development. It is my opinion that the future mining operations in the Sabie region will not have an adverse, long-term impact on the geohydrological regime.		
Surface Water Assessment by R. Dennis, from CEH, October 2017. Appendix 5	A surface water rainfall runoff model was constructed by making use of a DEM generated from 5m contour lines and available spot heights throughout the study area. The model code used was HEC-HMS and the model was calibrated by using existing flow gauges to determine flows at the various water quality sites.	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 5.

	The simulated flows through the network as well as the measured TDS values was used to setup a conservative mass-transport or load model for the monitoring network. The scenario considered is the low flow scenario during September 2017 and is considered a baseline scenario for the purposes of this report. By making use of the load model discharge rates for ungauged sources could be estimated. The 3.2Ml/d that Nestor require from the Klein Sabie is 10.7% of the low flow in the Klein Sabie. The maximum of 5.95 Ml/d required by the other mines will be from groundwater. If a worst-case scenario is assumed, that all ground water will be taken directly from the groundwater contribution to baseflow, the impact on the Sabie River will 3.4% of low flow at any given time. Generic site layouts of infrastructure were supplied. Default parameters were used to calculate the 1:50 year and the 1:100 year flood peak responses from the various site layouts by making use of SWMM (Storm Water Management Model). The storm water on these generic sites were separated in to clean and dirty water and the associated flood peaks were calculated. Sizing of the clean and dirty storm water dams and conveyance structures can only be done once the final site layout together with the grading is available. In addition to this, the volumes pumped from the mine workings are also required to comply with the capacity requirements as specified in Government Notice 704. An analysis was done on the location restriction of the adits and shafts as it relates to the 1:100 year flood line. A screening was done by only selecting the adits and shafts within a 100m distance from major drainage lines. As no detail cross-sections are available, no flood lines were generated, but the existing 20m DEM was used to estimate cross-sections to route the calculated flood peaks through. Only the SCS flood peaks were used as they exceeded those calculated by the Rational method because a worst-case scenario was required. Flood peak modelling was done for the proposed alluvial mining, as storm water diversions are required during the operational phase. Both the Rational and SCS methods were used in the flood calculations, with the SCS method		

	resulting in the largest flood peaks for both the 1:50 year and 1:100 year flood events. Sizing of the diversion structures can only be done when a detailed mining plan is available together with detail cross-sections. It is recommended that the flood peak estimations be revised once more data is available before used for design purposes. If assumed that all forestry and plantations are removed and the land cover changes to natural, then a 35% increase in the flood peaks calculated by Rational method was observed and a 27% in the SCS method. An additional two surface water monitoring points were recommended, one upstream of the drainage line from the Olifantsgeraamte mines to record background values for the Sabie River. An impact assessment against Government Notice 704 was carried out to identify the various impacts/risks. Most of the impacts were moderate and can be mitigated by taking specific measures.		
Noise and Vibration Assessment by B van der Merwe from dBAcoustics, October 2017. Appendix 14	According to the noise assessment, the proposed reworking of the existing mines within the Sabie District (MR 10161) and the hard rock mining at the existing mining areas will comply with the relevant Noise Control Regulations and SANS 10103 of 2008 provided that the noise mitigatory measures are in place and that the noise and vibration management plan be adhered to at all times. The noise increase during the construction and decommissioning phases will be insignificant, There will be a shift in environmental noise levels (from insignificant to minor) of the proposed activities on a temporary basis during the construction phase and a permanent basis during the operational phase and the communities will have to be briefed and informed of this during the public participation process. Please note no infrastructure will be developed at Hendriksdal. The noise increase during the operational phase will be below 5.0dBA at Nestor, Monument, Southhill, Sheba, Malieveld, Werfmine north, Werfmine south, Olifantsgeraamte, Roshill, Hendriksdal and Leaderhill mining areas which can be classified according to the magnitude of the impact from not	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 14.

	audible to low. The impact from the controlled blasting will be insignificant to minor as ground vibration at some of the noise receptors will be below 2mm/s and at some between 2.0mm/s to 5.0mm/s. These vibration levels are within the threshold value of 10.0mm/s for poorly constructed buildings. The possible noise intrusion from the blasting and mine activities can however be controlled by means of approved acoustic screening measures, state of the art equipment, proper noise management principles and compliance to the Local Noise Regulations, and the International Finance Corporation's Environmental Health and Safety Guidelines. The proposed noise and vibration management plan must be in place during the construction and operational phases so as to identify any noise increase on a pro-active basis.		
Soil and land capability assessment by S van Staden from Scientific Terrestrial Services (STS), October 2017. Appendix 8	Almost the entire proposed mining sites were historically used as mining sites prior to forestry plantations, whether as access points (Adits or vertical shafts) to the underground mine workings or as waste rocks dump sites. This was evident during the site assessment, as disturbances associated with historic mining activities were observed. The impact of the proposed mining sites on high potential agricultural soils is anticipated to be limited in extent, due to the nature of the mining infrastructure. However, from a land capability point of view, these soils are not considered as prime agricultural soils due to limitations associated with seasonal water logging in the lower lying horizons. The impacts of the proposed haul road(s) are anticipated to have a negligible impact on the land capability of the prevailing soils as the access roads are already existing. The impacts of the haul roads will however depend on whether the existing roads are considered sufficient or they need to be expanded in width to accommodate heavy motor vehicles. Should this be the case, the impacts are expected to be minor as the access roads largely occur on relatively shallow soils with effective rooting depth of less than 35cm. However, these soils are considered important for potential grazing opportunities.	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 8

	The proposed mining project and associated haul roads are anticipated to have low cumulative loss of arable land and natural grasslands for grazing and/or ecological conservation, since the project footprint is relatively limited and located within an extensively disturbed area from an agricultural resource perspective on a local to regional scale. Therefore, the overall impact footprint of the proposed development is considered to be relatively minor. Soil contamination monitoring can be integrated into the surface water monitoring, where selected points can be sampled in the vicinity of the nearby surface water resources in order to identify if contaminant migration may have occurred from the proposed mining activities. This can be carried out on a quarterly period concurrent to the mining process and at least one-year subsequent to the Mining process. Based on the findings of this assessment and the proposed integrated mitigation measures, the anticipated impacts of the proposed mining project and associated haul roads on the soil resources and their land capability can be reduced to an acceptable low level. It is therefore of the specialist's opinion that the proposed mining project and associated haul road(s) can be considered favourably from the soil and land capability point of view, provided that the proposed mitigation measures will be satisfactorily integrated in the project execution and implemented accordingly, in order to minimise accumulative impacts on the soils, and to maintain their current land capability for future land use Recommendation: All vehicular traffic should be restricted to the existing service roads as far as practically possible; - Vegetation clearance and commencement of construction activities can be scheduled to coincide with low rainfall conditions when soil moisture is anticipated to be relatively low, such that the soils are less prone to compaction; - Direct surface disturbance of the identified wet based soils including the Bloemdal and the Avalon/Pinedene soil forms can be avoided where possible to minimise the intensity of compaction due to the susceptibility of these soils		

	to seasonal waterlogging conditions (inundation). The potentially contaminated storm water must be captured in the vicinity of the mining activity infrastructure areas in compliance with Regulation GN704 as it pertains to the NWA, to minimise runoff and/or leaching on to the surrounding soils, and to prevent ingress of potentially contaminated water into the adjacent freshwater systems located in the valley bottoms – Unauthorized discharge of potentially contaminated storm water should be strictly prohibited on site; - Contamination prevention measures should be addressed in the Environmental Management Programme (EMP) for the proposed development, and this should be implemented and made available and accessible at all times to the contractors and construction crew conducting the works on site for reference; - The contamination prevention measures should entail demonstration of how the mining process will be conducted in such a manner that limits contaminant migration from the mining areas to the surrounding environmental receptors including groundwater, surface water and soils. This can include descriptive measures of waste water detention and appropriate treatment and/or disposal methods for instance. – A spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans should also be compiled to guide the construction works; - An emergency response contingency plan should be put in place to address clean-up measures should a spill and/or a leak occur, as well as preventative measures to prevent ingress; and – Burying of any waste including rubble, domestic waste, empty containers on the site should be strictly prohibited and all construction rubble waste must be removed to an approved disposal site.		
Cultural Heritage Assessment by JA van	From a heritage point of view it is recommended that the proposed development be allowed to continue on acceptance of the proposed	Yes	Refer to Section 3.i.ix.1.f and

Schalkwyk September 2017 Appendix 14	mitigation measures. Should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Copies of all mitigation work done as a result of this or other developments undertaken by TGME, should be incorporated into the central TGME archive for safekeeping. Recommendations: Known sites should be clearly marked in order that they can be avoided during construction activities. The contractors and workers should be notified that archaeological sites might be exposed during the construction activities. Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible; All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken; Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).		Impacts Table in Appendix KK Detailed report is attached as Appendix 14
Traffic Assessment by H Swart from Hamatino Consulting	That the proposed mining activities as described in this study be supported from a traffic engineering point of view.	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as

Engineers September 2017. Appendix 6	That the Primary Roads as discussed in section 8 be supported In the event that for some reason the above primary roads cannot be utilised whether it be temporarily or permanent, the following alternative routes are available: Rietfontein Haul Route Section 1; Sabie Western Bypass; • That the Rietfontein TGME haul route section 3 (as provided by the client), be utilised for heavy vehicles from the source towards the plant (one way). Fully loaded heavy vehicles will therefore utilise this road while the empty trucks will return via R533 (P9/1) due to the insufficient width of the above-mentioned gravel road at places. • The Graskop TGME haul route section 3 is not recommended since it traverse trough an existing residential village on very narrow residential class 5 roads. Children are playing in these streets with apparent safety concerns. • Advanced warning signs W216, W217 as well as W339 IN11.1 combination be provided at both approaches to the following access intersections: o Rietfontein access; o Golden Valley Rd; • That rumble strips be provided at both approaches to Rietfontein as well as Golden Valley Rd (to be approved by the Mpumalanga Department of Public Works: Roads & Transport); • Trucks may not be overloaded by any means; • The roads authorities (Municipality as well as Department of Roads) shall conduct a pavement survey of the existing pavement and remaining capacity (life) of the pavement; o Repair existing failures as soon as possible;		Appendix 6.

	o Budget for re-construction at the end of the design E 80`s The Graskop TGME haul route section 3 is not recommended since it traverse trough an existing residential village on very narrow residential class 5 roads. Children are playing in these streets with apparent safety concerns. Advanced warning signs W216, W217 as well as W339 IN11.1 combination be provided at both approaches to the following access intersections: o Rietfontein access; o Golden Valley Rd; That rumble strips be provided at both approaches to Rietfontein as well as Golden Valley Rd (to be approved by the Mpumalanga Department of Public Works: Roads & Transport); • Trucks may not be overloaded by any means; • The roads authorities (Municipality as well as Department of Roads) shall • conduct a pavement survey of the existing pavement and remaining capacity (life) of the pavement; Repair existing failures as soon as possible; Budget for re-construction at the end of the design E 80`s		
Visual Assessment by S Erwee from Scientific Terrestrial Services October 2017 Appendix 12	Based on the findings from both the desktop and the field assessments it is evident that the proposed project is located within a region with gently to steeply undulating mountainous terrain interspersed with thicketed valleys in the vicinity of ephemeral drainage lines and rivers. The land use is composed of and dominated by various plantations (Pinus sp. and Eucalyptus sp.) for the commercial forestry industry. Due to the abovementioned characteristics of the area, as well as the limited number of receptors within the commercial forestry plantation, various TGME 10161 study areas will have a minimal visual impact on the receiving environment. The proposed project is expected to lead to visual intrusion	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 12

	within limited portions of the surrounding landscape, due to the differing screening ability of the landscape and vegetation. The surrounding landscape is considered to have a moderate VAC, mostly due to the terrain and the silvicultural practises resulting in periodic unsightly views as a result of timber harvesting in the greater Sabie area. The overall landscape of the Nestor, Mill Hill and Werf North study areas are considered to be of low scenic quality. This is due to unsightly areas such as exposed bare ground and industrial properties etc., that weaken the scenic beauty of the mountainous area. The Leader Hill, Monument Hill, Ross Hill and Hendriksdal study areas do however exhibit a moderate scenic quality, since there is limited infrastructure in the form of houses and powerlines in the vicinity of the abovementioned study areas. The sense of place associated with the TGME 10161 study areas are related to the landscape character type of the area – semi-rural, mountainous area dominated by commercial forestry plantations, interspersed with small villages and isolated homesteads. The sense of place is not unique to the TGME 10161 study areas, as it is found within the larger region. It can further be described as calm, tranquil and peaceful. The sense of place associated with the TGME 10161 study areas is therefore not highly significant when compared to its surroundings but may be considered to be of importance due to its undulating topography, calm nature, semirural character and cultural and tourism importance of the area. From the elevation profile and line of sight analysis, supported by the findings of the field assessments and Key Observation Point (KOP) analysis, it was found that several of the main and secondary roads, as well as certain areas in villages and the town of Sabie will have intermittent views of the proposed TGME 10161 study areas. The project will also be located within the foreground to middle ground of several individual homesteads and main roads in the area. Several potential risks to the receiving aesthetic and visual environment as a result of the proposed project have been identified, relating to impacts on visual character and sense of place, visual intrusion and visual exposure and		

	visibility, as well as night time lighting impacts. The significance of these impacts may be reduced should appropriate and effective mitigation measures be implemented. It is the opinion of the specialist that this study provides the relevant information required to implement Integrated Environmental Management (IEM) and to ensure that the best long-term use of the visual environment in the TGME 10161 study areas will be made, in support of the principle of sustainable development. It is recommended that, from a visual impact perspective, the proposed mining activities be taken into consideration on a site-specific basis, and that the recommended mitigation measures for the identified impacts be implemented, ensuring that the relevant authorities are consulted in accordance with the stipulated guidelines.		
Social Impact Assessment (SIA) Report by Ingrid Snyman from Batho Earth October 2017 Appendix 15	Based on the assessment of the receiving social environment and the anticipated social impacts, the following conclusions can be made: There are no socio-economic impacts that can be classified as fatal flaws and which are of such significance that it cannot be mitigated. The proposed mining activity could result in different negative socio-economic impacts with varying rates of intensity and significance. The potential negative impacts associated with the construction phase are typical of general construction related projects. These relate to the inflow of workers to the area, inflow of jobseekers, impact on daily living and movement patterns of nearby residents (e.g. noise pollution, increased vehicle movement and so forth), as well as safety and security issues The inflow of workers to the different mining sites and subsequent intrusion impacts would mainly be felt by the residents of Sabie, Simile and Harmony Hill which is in close proximity to the mining activities. The social impacts associated with an inflow of a workforce and jobseekers (temporary and permanent), however could have further far reaching impacts on towns located further away from the mining activities, but inside the municipal boundary such as Lydenburg, Pilgrim's Rest and Graskop. In this regard, the impacts on the social networks could be minimised should local residents be	Yes	Refer to Section 3.i.ix.1.f and Impacts Table in Appendix KK Detailed report is attached as Appendix 15

	employed. TGME to develop a regional communication strategy to inform individuals of their recruitment and procurement strategy and progress. Proof of residency must be provided by local residents during the recruitment and procurement process The mine should contribute towards solving service delivery issues in TGME through a Consultative Forum that presents the local municipality and business interests in TGMW including the mine, and local chambers of commerce. The mine together with the Consultation Forum should assist in the mobilisation of funds and roll-out of public works programmes (e.g. through the expanded public works programme) to ensure roads in the tourism areas are maintained The mine should assist the local municipality in building management capacity as part of the community development programmes that still needs to be developed in the SLP. The inflow of jobseekers is difficult to mitigate and control, but it is expected that through proper communication on the recruitment methods and by the employment of local community members this impact can be mitigated to some extent. Development of the various mining sections could put increased pressure on the provision of infrastructure, especially housing, and services in the area. The employment of locals could again assist in mitigating this possible negative impact. The influx of outsiders and the associated spread of sexually transmitted diseases such as HIV/Aids remain a grave concern. An additional workforce and their associated families would place added pressure on the existing health services. An increase in traffic volumes on the local roads would increase the risks of		

	accidents and degradation of the road surfaces. These impacts, even of a low significance due to the low volume of additional traffic, could be felt by residents, and other road users such as tourists and cyclists. Should any of the planned surface infrastructure or access roads traverse areas used for plantations, compensation would have to be negotiated as sterilisation of the resource use could occur with subsequent economic implications for the forestry company involved. Impacts on land used for commercial forestry, as well as the conservation areas should be minimised to limit negative impacts on compliance with the principles of the Forest Stewardship Certification (FSC). Possible impacts could occur with regards to the proposed Harmony Hill Township establishment. With pro-active planning, these impacts are anticipated to be mitigated.		

k) Environmental impact statement

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

Below, please find a summary of the key findings pertaining to the environmental authorisation application as part of the mining right application for TGME 10161:

- Blasting may have a medium impact on, fauna, flora, noise, surface water and topography after mitigation.
- The Explosive Magazine may have a medium impact on, fauna, flora, groundwater, soil, and surface water after mitigation.
- The Enviro-Loo Mobile Container Plants will have a very low impact on groundwater and soil in case of an emergency spill after mitigation.
- The Clean & Dirty water systems may have a low impact on groundwater, soil and surface water after mitigation.
- The Fuel Storage facility (Diesel tanks) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Re-fuel station may have a low impact on groundwater, soil and surface water after mitigation.
- The Mining Sections at Nestor, Monument Hill, Mill Hill Leader Hill and Werf North and South, South Hill, Maliveld, Sheba and Olifatnsgeraamte study areas may have a medium impact on fauna, flora, heritage, traffic, groundwater, noise, soil, surface water and topography after mitigation.
- The Generators may have a medium impact on, groundwater, noise, soil and surface water after mitigation.
- The Office at Nestor, Monument Hill, Mill Hill Leader Hill and Werf North and South, South Hill, Maliveld, Sheba and Olifatnsgeraamte study areas may have a medium impact on fauna, flora, groundwater and soil after mitigation.
- The Roads (both access and haulage road on the mining sections site) may have a medium impact on, fauna, flora, groundwater, noise, soil and surface water after mitigation.
- The Salvage yard (Storage and laydown area) may have a medium impact on fauna, flora, groundwater, soil and surface water after mitigation.
- The Security Gate and guard house at access control point may have a low impact on, fauna, flora, groundwater and soil after mitigation.
- The Product Stockpile area may have a low impact on, fauna, flora, groundwater, noise, soil and surface water after mitigation.
- The Ore Stockpile dumps may have a low impact on, fauna, flora, groundwater, noise, soil and surface water after mitigation.
- The Storage Facility may have a low impact on air quality, fauna, flora, groundwater, soil and surface water after mitigation.
- The topsoil storage area (temporary) may have a medium impact on, fauna, flora, groundwater, noise, soil and surface water after mitigation.
- The waste disposal site (domestic and industrial waste) may have a low impact on groundwater, soil, and surface water after mitigation.
- The Workshop and Wash bay may have a low impact on groundwater, soil and surface water after mitigation.

- The Water distribution pipeline may have a low impact on fauna, flora, groundwater and surface water after mitigation.
- The Water tanks may have a low impact on fauna, flora, groundwater and surface water after mitigation.

From the assessment of impacts throughout all the phases it is clear that though the impacts may occur directly as a result of the proposed start in mining operations, the impacts are mostly of medium significance before mitigation. According to the assessment carried out by the EAP the majority of the impacts can be reduced to a medium to low significance with the appropriate mitigation measures in place.

The overall project as presented in this report is therefore presented with the view of reducing long term rehabilitation requirements.

The EAPs and environmental consultants responsible for the compilation of this document, and the associated PPP are of the opinion, based on the presented specialist assessments, impact assessment proposed and management plan that the environmental authorisation in support of the TGME 10161 Mining right can be granted.

The following mitigation measures are crucial and should form part of the environmental authorisation to ensure that the applicant manages impacts adequately:

- Adhere to the Storm Water Management Plan
- Adhere to the Groundwater Monitoring Programme
- Adhere to the Environmental Management Programme
- Adhere to the Terrestrial Ecological Recommendations and Monitoring requirements
- Adhere to the Freshwater and Aquatic Recommendations and Monitoring.
- Adhere to the Soil, Land-Use and Land Capability Recommendations.
- Adhere to the Heritage Assessment Recommendations.
- Adhere to the Traffic Assessment Recommendations
- Adhere to the Noise Monitoring Programme
- Adhere to the Social and Economic Recommendations
- Adhere to the Visual Screening Recommendations required at each mining section.
- Ensure that all design drawings include effective erosion control measures
- Apply for relevant permits with authorities for the removal of indigenous tree species and indigenous vegetation.
- Major spills should be reported within 24hr to the Department of Water and Sanitation.

The nature of impacts can vary widely depending on the type of physical environment, the size of the activity and the perceptions and values of each of the affected parties. It was the objective of the assessment to identify both positive and negative impacts. The existing information was reviewed to assess the present status of the environment and the extent to which they have already been modified. The planned activities and associated infrastructure was used as reference to assess potential impacts.

In general, the environmental impacts associated to the mining operation are rather negative, while the social impacts are more beneficial. Impacts on vegetation are likely to be most profound, because the mining operation will constitute large-scale clearance of

indigenous vegetation and most likely also the removal of protected species. Soil erosion and surface water deterioration are likely to be possible important impacts if appropriate management strategies are not practised.

Positive impacts include the demarcation and subsequent protection of heritage resources and the eradication of alien invasive species. Positive social impacts include the creation of jobs, social upliftment, training opportunities, community development and numerous economic benefits.

To conclude, it must be accepted that any activities will have both physical and social impacts. Most of the natural environmental features within the mining area will not be disturbed due to the mining method applied. The significance of the impacts will however be affected by the success of the mitigation measures implemented and the rehabilitation programme for the mining area.

(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

A map with all of the proposed activities and associated infrastructure related to the TGME 10161 application is attached as Appendix 4. All environmental and social aspects have been included to identify project area sensitivities and to inform the final site location and layout. Please refer to Appendix 18 for the site sensitivity maps per mining section.

The final site maps in Appendix 18 indicates the mining right application area in which all mining will take place. Existing roads are also depicted. The associated infrastructure relating to the mining site is also indicated. The sensitive areas include, watercourses, the non-perennial drainage lines (waterways), heritage sites, and sensitive ecological habitat units.

Several freshwater resources were identified within the greater TGME 10161 study area (see Freshwater and Aquatic Assessment report by SAS, October 2017) traversing over site selected mining infrastructure sites. Recommendations from the Freshwater and Aquatic Study indicate that no development take place within the footprint of surface infrastructure or adits encroaches on freshwater resources (such as at Olifantsgeraamte and Maliveld). it is strongly recommended (from both the Terrestial ecological report and the Freshwater Aqatic report) that during the planning phase, the delineations of the freshwater resources and their applicable zones of regulation be utilised in order to reposition and optimise the layout of surface infrastructure, wherever possible, with the aim of minimising encroachment on freshwater resources. Consideration should also be given to the mine planning at Ross Hill and the project scope at these sites changed to reduce the impact on the receiving environment. This is indicated on drawing 10161.02.09 and 10161.02.08, Appendix 18.

Recommendations from the Freshwater and Aquatic Study also indicate that no development takes place within 100m of the Klein Sabie River, Sabie River and its tributaries as well as the tributaries of the Nels River, in line with regulation GN 704 of the National Water Act as far as possible. This is indicated in, Appendix 18.

The GN704 restricts activities within the 200m buffer area or the 1:100 year flood line, whichever is the greatest. In this instance reference is made to the 200m buffer area.

Sensitive heritage sites have been identified in the Heritage Assessment report. Recommendations from the Heritage study, required that the Heritage site at Nestor 2 Audit: which entails Two old mining features that are probably linked to each other as they are only 40 m apart. An old mine adit, much overgrown with vegetation, excavated into the side of a hill and apparently extends 100s of metres underground. The second feature is a ventilation shaft, the sides of which has been strengthened with masonry work. Its date of operation could not be established. The site needs to be avoided. This is indicated on drawing 10161.02.01, Appendix 18.

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

As mentioned before, the specific occurrence of gold and minerals in the area dictates the selection of the specific mining site and there are no alternatives in terms of project location.

In terms of alternative land use, the proposed mining operation will be done in such a way that timber production will still be possible as the site will be rehabilitated in such a way that it allows the establishment of plantations. The rest of the farm where applicable will still be able to be used for grazing and timber purposes.

In the first year before the mine start operations about 167 workers will be involved by contractors in construction activities. During the operational phase between 400 and 700 workers could be employed, i.e. on average 530 jobs per annum this will also add to the increased economic activity and the area surrounding the farm.

The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.

The infrastructure and stockpiles/dumps will alter the topography by adding features to the landscape which may have a temporary negative impact. Topsoil removal and excavations will unearth the natural topography. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and excavations, and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement

of infrastructure. Most of the site has a land capability largely dominated by forestry plantations and historic mining infrastructure, with limited cultivation and livestock grazing under current conditions. Almost the entire proposed mining sites were historically used as mining sites prior to forestry plantations, whether as access points (Adits or vertical shafts) to the underground mine workings or as waste rocks dump sites. This was evident during the site assessment, as disturbances associated with historic mining activities were observed. The impact of the proposed mining sites on high potential agricultural soils is anticipated to be limited in extent, due to the nature of the mining infrastructure. and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected through underground mining. Furthermore, if any oil and fuel spillages occur during these scenarios and activities, then groundwater may be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources (pans and drainage lines) during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any excavations within a drainage lines/watercourse will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation. Bridge crossing are needed to be upgraded, if this is not properly manged it could have an impact on the watercourses and draining lines. Due to the sensitivity of the watercourses in the region, a high level of mitigation, comprising of avoidance, minimisation and rehabilitation, and possibly offsetting, will be required during all phases of the proposed mining project to ensure that the ecological integrity of the freshwater resources in the vicinity of mining activities is not compromised to such a degree that the Resource Quality Objectives for these drainage systems cannot be met.

The terrestrial ecology of the study area is sensitive in nature with specific reference to the habitat unit watercourses and secondary grassland and Species of Conservation Concern (SCC). The transformation of natural habitats to mining and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to operational activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates. Associated infrastructure will result in the loss of connectivity and fragmentation of natural habitat. Fragmentation of habitat will lead to the loss of migration corridors, in turn resulting in degeneration of the affected population’s genetic make-up. This results in a subsequent loss of genetic variability between meta-populations occurring within the study site. Pockets of fragmented natural habitats hinder the growth and development of populations. However, from a terrestrial point of view, it is evident that prior to mitigation the impacts on floral and faunal habitat are of medium to high significance impacts during the construction and operational phase, and low during the decommissioning and closure phase. If effective mitigation takes place, all impacts may be reduced.

During the operation, the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary roads. The proposed operation will add a certain amount of noise to the existing noise in the area. However, levels of noise generated by mining activities especially with blasting can be substantial.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local farm residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and operation-related businesses.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

Positive impacts are further anticipated with regards to the local hospitality industry through the accommodation of members of the workforce and the overall possible development of the tourism industry’s potential

The positive economic contribution of the project is especially relevant in the context of high local unemployment and high poverty rates.

In terms of the Social Impact Assessment findings derived from the information available at this stage it is concluded that the likely benefits of the proposed project outweigh the potential social risks and/or threats to the local communities. However, as indicated earlier in the report, the possible impact on the infrastructure and service needs due to the inflow of an additional workforce should be addressed. It would remain the responsibility of the Local Municipality, but considering the social framework within which the mine operates, it is important for the mine to engage with the TCLM in this regard to minimise any possible

negative impacts. Such engagement should also contribute to meaningful contributions to the communities situated in close proximity to the mine.

It is furthermore important to ensure that any negative impacts as a result of the mining activities on the town of Sabie and Harmony Hill and Settlement should be limited. On a more detailed level, the following potential **positive impacts** are anticipated:

- The creation of job opportunities in the area, and associated local economic development;
- The positive impacts on poverty through employment of unskilled labour,
- The input into LED programmes and possible socio-economic spin-offs created through the entire process. Local procurement of goods, materials and services could occur, which would result in additional positive economic injections to the area in terms of income and employment.
- Positive impacts are further anticipated with regards to the local hospitality industry through the accommodation of members of the workforce and the overall possible development of the tourism industry's potential.

Potential Negative impacts as a result of the mining activity refer to:

- Inconvenience and intrusion impacts during the start-up and construction phases of the project such as the inflow of an additional workforce to the area, the possible influx of jobseekers, possible increase in the criminal activities (safety and security issues), disruption of social networks, as well as possible health risks;
- Possible negative impacts on the game farming activities in the area;
- Possible negative impacts of blasting;
- Disruptions in the daily living and movement patterns (increased traffic and possible dust pollution);
- Additional pressure on infrastructure development and maintenance;
- General intrusion impacts such as visual and noise pollution

From a social perspective, it can be concluded that the proposed TGME 10161 Mining Application Project would not result in permanent damaging social impacts. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented. (Social Impact Assessment, Ms Ingrid Snyman: Batho Earth, October 2017).

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR are adhered to.

l) 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 following relates to the impact management outcomes for the inclusion in the EMPr:

Air Quality

To limit the creation of nuisance, dust, the following management guidelines must be followed:

- Avoidance of unnecessary removal of vegetation.
- Routine spraying of unpaved site areas and roads utilized by the mining operation with water.
- Speed limits of vehicles inside the mining area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous backfilling and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.
- Drilling and blasting activities preferably to take place on wind-free days.

Archaeology:

To ensure minimum impact on heritage sites located within the study area, the following management guidelines will be followed:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken; •
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and • Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.
- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

Fauna

To ensure a minimum of impact to animals the following management guidelines will be followed:

- Speed limits of vehicles inside the application area must be strictly controlled to avoid road kills.
- Continuous backfilling of open excavations.
- Operational areas must be low angled as a preventative measure to ensure an escape route for animals.
- No hunting (snares) must be allowed at the application area or in the surrounding area.
- All mining and access roads must be fenced.

Flora:

- It is recommended that site clearing of the proposed mining shaft complexes and associated infrastructure takes place in a phased manner to allow for any faunal species present to move out of the footprint area;
- The construction and operational footprint must be kept as small as possible in order to minimise impact on the surrounding environment;
- Informal fires by construction personnel should be prohibited, and no uncontrolled fires whatsoever should be allowed;
- Appropriate sanitary facilities must be provided during the construction phase and all waste must be removed to an appropriate waste facility;
- All soils compacted as a result of construction activities should be ripped and reprofiled to natural levels, and revegetated with indigenous vegetation. Special attention should be paid to alien and invasive plant control within these areas;
- No dumping of waste should take place. If any spills occur, they should be immediately cleaned up, and be disposed of at a registered waste facility;
- No trapping or hunting of any faunal species is to take place;
- Upon completion of construction activities, it must be ensured that no bare areas remain and that indigenous grassland species are reintroduced;
- Alien vegetation as listed in Appendix F must be removed from the study area during both the construction and operational phases, with specific mention of Category 1b species in line with the NEMBA Alien and Invasive Species Regulations (2016), with the exception of tree species utilised for timber production in the plantations; and
- Establishment of reintroduced vegetation must be monitored during the rehabilitation phase.
- Crinum macowanii, Cyathea dregei and Cyrtanthus tuckii were encountered during field assessment, all of which are protected under the MNCA of 1998, and if any individuals of this species are to be disturbed, permits must be obtained from the MTPA. As the majority of possible SCC were not yet in flower or emerged following the winter season, it is possible that a higher diversity of floral SCC is present within the watercourse and secondary grassland habitat. As such it is advised that a walkdown of the sites is conducted prior to vegetation clearing activities during prime flowering season (November to March) to mark flower SCC within the demarcated mining and infrastructure areas for rescue and relocation purposes;
- A speed limit of 40km/h should be implemented, and road signs warning motorists of animals crossing the road should be installed at distances complying with national standards;
- No trapping, snaring or hunting of faunal SCC is permitted;
- It must be ensured that the permanent streams throughout the study areas are not impacted upon, cleared or diverted, and that no loss of habitat or streamflow occurs;

Freshwater resource

- It should be ensured that no development take place within 100m of the Klein Sabie River, Sabie River and its tributaries as well as the tributaries of the Nels River, in line with regulation GN 704 of the National Water Act as far as possible;
- All mining infrastructure should remain out of the wetland and riparian zones and associated zones of regulation in line with the requirements of Regulation GN704 and Regulation GN509 of the National Water Act unless it is absolutely unavoidable;
- Limit the footprint area of the construction activity to what is absolutely essential in order to minimise the loss of clean water runoff areas and catchment yield and the concomitant recharge of streams in the area;
- No dirty water runoff should be permitted to reach the freshwater resources, in line with regulation GN 704 of the National Water Act and appropriate clean and dirty water separation and stormwater management controls must be developed as the first part of the construction phase of each project aspect;
- It is deemed essential that the mine be designed in such a way as to ensure that decant is prevented for the life of the proposed mine expansion and beyond closure unless measures to treat decant to background water qualities can be ensured until the quality of the decant naturally returns to these background levels;
- Detailed investigation of the impact of the proposed mine expansion on the groundwater environment needs to take place. The extent of the cone of dewatering needs to be determined. A suitably sized buffer needs to be placed around the freshwater systems, wherein no activities are to take place which could lead to dewatering of the system or impacts form Acid Mine Drainage;
- Mine design and planning should ensure that the cone of dewatering caused by opencast pit mining and underground mining (as applicable) must not lead to a reduction of stream flow or dewatering of any wetland or riparian areas and connectivity of the freshwater resources should be maintained;
- All proposed access roads, fences and any additional linear infrastructure (e.g. conveyors) should cross the freshwater resources at the narrowest point and at a 90-degree angles. The substrate conditions of the freshwater resources and stream connectivity must be maintained; Obstruction of flow should not take place or should only occur for very short periods; and ➢ Restrict construction to the drier winter months to avoid sedimentation of the freshwater resources in the vicinity of the proposed mining project.

Groundwater

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside an excavation and outside of the maintenance area.
    - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.
    - All efforts must be made to move the broken-down vehicle or pieces of equipment to the maintenance area.
    - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
- No repairs may be allowed outside the maintenance area except for emergencies.

- Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
- Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).
- Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
- Acceptable hygienic and aesthetic practices must be adhered to.
- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- Clean and dirty water needs to be separated underground and any water intersected underground (that is not sealed) should be collected as close as possible to the source and discharged from the mine through dedicated clean water pipes
- The Borehole monitoring network should be expanded to include the new mining areas;
- Groundwater levels should be measured monthly.
- Groundwater quality monitoring should be conducted on a quarterly basis, unless specified otherwise by the WUL. The required chemical parameters to be analysed will be specified in the WUL.
- Cover drilling programme to identify water bearing fissures ahead of mining;
- Detailed mapping of water bearing fissures and delineation of high risk zones;
- Delineate impacted areas and develop management options such as the construction of plugs to compartmentalize the mine; and
- Grouting of the rock formations to restrict inflow.
- Rainfall must be recorded.
- Data must be analysed by a qualified hydrogeologist annually.
- Place oil traps (drip trays) under stationary vehicles, only re-fuel al fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
- Ensure good housekeeping rules.

Noise

Working hours must be kept between sunrise and sunset as far as possible.

- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- Emergency generators to be placed in such a manner that it is away from any residential area. Noise monitoring to be done along the mine footprint and noise sources within the mine boundary on a monthly basis after which the frequency can change to a quarterly basis.
- The siren when conveyor, hauling vehicles area reversing and/or any other mine vehicle to be replaced with a vibrating type siren if it is approved by the Department of Labour.

- Haul roads to be levelled on a regular basis to avoid the formation of potholes. Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the baseline noise levels.
- Blasting to be done during daytime periods only.
- Blasting to be done in terms of the safe blast techniques as illustrated in Figure 2.1 of the noise impact assessment report.
- Blasting monitoring to be done at the adit and at the abutting noise receptors when blasting at the adit or 200m within the mine takes place.

Mechanical equipment

- All mechanical equipment must be in good working order and vehicles must adhere to the relevant noise requirements of the Road Traffic Act.
- All vehicles in operation must be equipped with a silencer on its exhaust system.
- Safety measures, which generate noise such as reverse gear alarms on large vehicles, must be appropriately calibrated / adjusted.

Screening / Migration Control:

- Appropriate measures must be specifically be installed and / or employed at the plant to act as screen and to reflect/reduce the noise.
- Appropriate non-metalic washers/insulation must be used with any joining of apparatus made from materials such as corrugated iron. Such apparatus must be maintained in a fixed position.

Safety

- No employees may reside on the mine site.
- Access and haul roads must be maintained.
- Security access point to ensure monitoring of access to the site.

Soil

- All vehicular traffic should be restricted to the existing service roads as far as practically possible;
- Vegetation clearance and commencement of construction activities can be scheduled to coincide with low rainfall conditions when soil moisture is anticipated to be relatively low, such that the soils are less prone to compaction;
- Direct surface disturbance of the identified wet based soils including the Bloemdal and the Avalon/Pinedene soil forms can be avoided where possible to minimise the intensity of compaction due to the susceptibility of these soils to seasonal waterlogging conditions (inundation).

Surface Water

- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.
- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the

operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.

- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- An application for an integrated Water Use Licence must be submitted at the Department of Water Affairs for all actions to be performed which requires authorization in terms of water uses.
- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open excavations must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.
- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.
- Buffer zones must be placed around all non-perennial drainage lines and watercourses in which no mining may take place.

Topography

- All open excavations must be backfilled if and when possible and made safe so as to reflect as far as possible the pre-mining topography of the area.
- All temporary features e.g. plant, containers and stockpiling must be removed and handled in the prescribed manner during rehabilitation.

Visual

- Where infrastructure is sited within view of visually sensitive areas, it must be placed as far away as possible or within lower-lying areas where it may be screened by topography. Where full screening of infrastructure components is not possible, siting should take advantage of partial screening opportunities by vegetation. Structure the proposed waste rock dump at the Ross Hill study area in such a manner that it does not extend over the crest of the mountain against which it is constructed as this will assist greatly in minimising the visual instruction and exposure of the project to the north of the mining footprint area;
- The waste rock dumps must be shaped and rounded to blend in with the surrounding undulating landscape. All stockpiles should be shaped to fit in with the surrounding hills and mountains and revegetated to blend with the surroundings and to minimise visual contrast;
- As far as possible, surface infrastructure should be placed in areas that have already been disturbed;
- Any new roads are to follow the contours of the landforms to make it less visually prominent and to reduce the need for cut and fill activities. Siting of roads should avoid steep side slopes. Areas where additional access roads are required, the design of the slopes should be as gradual as possible. A slope of 1:2,5 or 1:3 is preferred. However, where the reserve width requires a slope steeper than 1:2 the cut face or fill slope must be stabilised by means of a retaining wall that should allow

for planting. A slope of 1:2 and steeper has the potential of soil erosion during heavy rain events, hampering the growth of the covering vegetation;
- A lighting engineer may be consulted to assist in the planning and placement of light fixtures for the mining infrastructures to reduce visual impacts associated with glare and light trespass;
- Security flood lighting and operational lighting should only be used where absolutely necessary and carefully directed, preferably away from sensitive viewing areas, i.e. away from settlements, villages, towns, and the main roads.
- Wherever possible, lights should be directed downwards to avoid illuminating the sky;
- The use of high light masts and high pole top security lighting should be avoided along the periphery of the TGME 10161 study areas. Any high lighting masts should be covered to reduce glow;
- As far as possible, construction activities should be restricted to daylight hours, to limit the need to bright floodlighting and the potential for skyglow and to avoid the use of additional night-time lighting for security purposes;
- Outdoor lighting in the vicinity of the proposed infrastructure areas must be strictly controlled;

The impact management objectives for TGME 10161 planned mining operation should include:

- To limit the alteration of the surrounding topography
- To manage and preserve sensitive soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- The non-perennial stream is classified as a water system according to GN704 and is a natural storm water accumulation stream. No water system shall be mined before an authorization is obtained from DWS. This water system will however not be mined.
- Historical excavation sites that were identified and which contribute to catchment flow reduction must be rehabilitated following mining activities.
- Monitoring of surface water runoff: Chemical analysis of water samples as per hydrogeological report.
- Regular inspections (monthly basis) of the dirty water collection dams and perimeter storm water canals are proposed.
- Rehabilitation of disturbed areas during the mine life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained, when a closure certificate is issued.
- To minimise the loss of natural vegetation.

- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.
- To minimise noise and vibration to a level that disturbances felt by the communities are limited.
- To reduce the impact on visual quality due to intrusive mine infrastructure, activities and facilities.
- To ensure that all traffic generated by the proposed mining development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
- To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
- To ensure that the current socio-economic status quo is improved.
- To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

m) 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 are detailed above in PART A 3 (g) (i) and the positive and negative impacts of the alternatives and the preferred options have been described in the alternative sections. The EAP's approach to assess, minimise and avoid impacts is outlined in Part A 3 (h) above.

The locality of this mining area is based on the old existing Mining areas, and much of the mining sections has been previously impacted on. The footprints of most infrastructures were chosen to utilize old disturbance and minimize new footprints. There is therefore no other alternative with regard to the overall operation footprint.

The location of the mining sections and associated infrastructure is primarily based on existing adits, proximity to the access roads, proximity to the areas earmarked for mining and limited additional impact on the environment and heritage resource.

It will therefore cause additional impacts if this infrastructure is moved and render the consideration of alternative mining sites useless.

The mining activities and methodologies associated with gold (i.e. underground mining) is the only economic viable method currently being used. There is no alternative mining method for the mining of gold within the study area.

n) Aspects for inclusion as conditions of Authorisation.

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of

1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The above mitigation measures are tried and tested over many years in the iron ore mining industry. The Company must monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

The EAP who compiled this document and the specialists who compiled the respective specialist reports have extensive knowledge in their field and it is therefore assumed that the above assumptions are adequate and that the information provided is in the region of 85% - 95% correct.

p) Reasoned opinion as to whether the proposed activity should or should not be authorized.

i) Reasons why the activity should be authorized or not.

There are no significant reasons why the activity should not be authorised. However, if the proposed management and mitigation measures are not properly applied or if the mining operation intentionally disregards any of these measures, it will negatively affect the environment and have potential consequences. Therefore, the competent authority should take all the necessary steps to ensure that the mining operation complies with the conditions set out in the approval of the EMPR.

ii) Conditions that must be included in the authorisation

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

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

(2) Rehabilitation requirements

The requirements of the final rehabilitation, decommissioning and mine closure plan, as they are stated in Appendix 4 of the NEMA Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GNR 1147), are to identify a post mining land use that is feasible through the following:

- Providing the vision, objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;
- Outlining the design principles for closure;

- Explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
- 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;
- Committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
- Identifying knowledge gaps and how these will be addressed and filled;
- 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
- Outlining, monitoring, auditing and reporting requirements

q) Period for which the Environmental Authorisation is required

Environmental authorisation will be required for the following periods:

Construction = 6 months

Operation = 25 years

Closure = 2 years

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 Basic assessment report and the Environmental Management Programme report.)

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) Financial Provision

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

Compounded rehabilitation estimate for yrs1-10 - Sabie Project (10161 MR)										
Mine Section	**Yr1**	**Yr2**	**Yr3**	**Yr4**	**Yr5**	**Yr6**	**Yr7**	**Yr8**	**Yr9**	**Yr10**
GLYNN'S	738 774,14	738 774,14	1 477 548,29	2 216 322,43	2 955 096,58	3 693 870,72	4 432 644,86	5 171 419,01	3 693 870,72	2 955 096,58
OLIFANTSGERAAMTE				369 387,07	369 387,07	369 387,07	369 387,07	369 387,07	369 387,07	369 387,07
HENDRIKSDAL										
ROSSHILL								369 387,07	369 387,07	369 387,07
NESTOR										1 108 161,22
TOTAL (excl. VAT)	**738 774,14**	**738 774,14**	**1 477 548,29**	**2 585 709,50**	**3 324 483,65**	**4 063 257,79**	**4 802 031,94**	**5 910 193,15**	**4 432 644,86**	**4 802 031,94**

i) Explain how the aforesaid amount was derived.

The approach adopted during this evaluation broadly involved conducting a site investigation during which visual observations were made and interviews were held with key personnel and a comprehensive review and scrutiny of applicable scientific and technical reports

including related information. From this a costing strategy and framework was developed in order to ultimately compile a detailed independent rehabilitation and closure cost estimate.

The development of site specific costs for final rehabilitation, decommissioning and closure necessitated the following sequence of evaluations:

- A determination of a new Bill of Quantities (BoQ). In this particular instance a Bill of Quantities was calculated from new by a civil engineer from information contained on the respective site layout diagrams;
- Identification of the respective closure components;
- Identification of the prescribed post mining land use requirement for each closure component (informed by the relevant biophysical baseline studies);
- Compilation of a list of activities/actions to be implemented in order to achieve the desired post mining land use objective for each closure component; and
- Determine the equipment capacity, operator efficiency, fuel requirement, distance of travel, angle of route & height of infrastructure applicable to each activity/action in order to derive unit rates for the purposes of an auditable cost basis.

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

It is confirmed that the amount for outstanding rehabilitation can be provided from operating expenditure.

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).

The methodology to rate the impacts and risks associated with the proposed TGME 10161 project detailed in this EIA/EMP have not deviated from those described in the Scoping Report.

ii) Motivation for the deviation

Not applicable – No deviations from the methodology proposed in the Scoping Report.

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 EIA 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).

Ms. Ingrid Snyman from Batho Earth has been to provide a Social Impact Assessment (SIA) Report for TGME 10161 Mining Right Application. The complete report is attached to this EIA/EMP as Annexure 15.

From a social perspective, the following objectives and measures should be included as part of the Social Management Plan (SMP) as part of the Environmental Management Plan (EMP).

It should be noted that the responsibility of the mitigation lies with the owner, operator, and/or with the local municipality. The mitigation measures would have to form part of the respective stakeholder's expenditure predictions or operations and management within the area, therefore the monitoring activities cannot be expressed in financial terms.

It is recommended that the mine appoint a dedicated person (SLP manager) to manage the execution of the SLP and other community initiatives on behalf of the mine.

Maximise Employment Opportunities and Limit Skills Inequities

Objective	Maximise local employment opportunities and limit skills inequities associated with the construction and operation	
Mitigation: Action/control	Responsibility	Timeframe
Prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of contractor management plan during construction and operations	Human resources /SLP officer	Before construction activities commences
Meet the targets of mining legislation and the relevant mining charter for employment of HDSA in management positions and core skills	Human resources /SLP officer	Before construction activities commences
Put a procurement strategy as well as a contractor management plan (if relevant) in place to ensure that as close to 100% as possible local employment target in terms of unskilled labour is met	Human resources /SLP officer	Before construction activities commences
Up-skill the local labour force as per SLP	Human resources /SLP officer	Before construction activities commences
Develop a database of goods and services that could potentially be outsourced to the local community	Supply chain management	Before construction activities commences
Where local contractors are used, put a contractor management plan in place (if relevant) to ensure that the local employment and procurement targets of the operations are met	Supply chain management	Before construction activities commences
Performance Indicator	% local labour employed in different skill categories % HDSA in management positions	

	Training programmes completed by local labour force % of goods and services procured from local community by type of product
Monitoring	Annually as per SLP and procurement strategies

Minimise external costs for the local community

Objective	Minimise external costs for the local community	
Mitigation: Action/control	Responsibility	Timeframe
Implement management measures of specialist reports (ground and surface water and transport)	Environmental Officer	Before construction/ during planning phase
Establish a community forum to discuss potential complaints related to water quality and traffic flows	Environmental Officer	During construction phase
Participate on a regular basis in the local business chambers (Sabie, Graskop and Pilgrim's Rest) and address issues that could negatively impact on local businesses	Environmental Officer	During construction phase
The recommendations made by the Visual Impact Assessment and Traffic Impact Assessment should be adhered to in order to limit any possible negative impacts on the tourism industry	Environmental Officer	All Phases
Performance Indicator	» The number of community complaints received and resolved » The number of chamber meetings attended, complaints received and resolved	
Monitoring	» Per quarter (4 times a year)	

Minimise the negative impacts related to concentration of local output in mining activities

Objective	Minimise the negative impacts related to concentrated mining activities in the local economy	
Mitigation: Action/control	Responsibility	Timeframe
Focus on the support of non-mining related activities in community development programmes	SLP officer, corporate social investment programme	During construction
Focus the local procurement programme on non-core mining inputs (e.g. catering, accommodation)	Supply chain/procurement	During construction
Performance Indicator	% spending on non-mining related sector support % spending on non-core mining local inputs	
Monitoring	Annually	

Minimise the increase in local resource use intensity

Objective	Minimise energy and water consumption	
Mitigation: Action/control	Responsibility	Timeframe
Develop a resource use plan with the specific objective to minimize the mining operations' energy and water use as far practical	Environmental officer	Planning/design phase
Performance Indicator	Water use per revenues generated Energy use pre revenues generated	
Monitoring	Annually	

Population Change, Inflow of Temporary Workers and Jobseekers

Objective	Minimise any potential negative impacts associated with the inflow of workers and jobseekers	
Mitigation: Action/control	Responsibility	Timeframe
Employment of locals (within the low to semi-skilled positions) already residing in the TCLM area must receive priority as this would limit the negative impacts (e.g. Infrastructure requirements) associated with a sudden or additional population increase.	TGME and Contractor	All Phases
A community skills audit could be undertaken by TGME. Alternatively, the existing database of the TCLM of Unemployed Graduates could be used to determine which skills are locally available and which employees could come into consideration for employment	TGME and TCLM with input from councillors	Pre-Construction
Ensure that local businesses and service providers are informed of the timing associated with the inflow of additional people and/or sudden temporary increase in the local population concentrated around the town of Sabie. This could be done through general articles in the local newspapers based on the progress of the mining activities. This will enable them to be prepared for the possible higher temporary demand for goods and services	TGME and TCLM	Pre-Construction
TGME to develop a regional communication strategy to inform individuals of their recruitment and procurement strategy and progress.	TGME	Construction and Operation
Construction workers falling within the semi-skilled to unskilled category should be sourced from the local population, where possible, to avoid possible conflict arising between locals and the outside workforce, but also to limit the need for a temporary accommodation facility.	TGME and Contractor	Pre-Construction
The development, publication and widespread dissemination of a recruitment policy could serve to encourage local employment	TGME and Contractor	Pre-Construction and Construction

and reduce the potential influx of jobseekers to the area.		Phase
The communication strategy should ensure that unrealistic employment expectations are not created.	TGME	Pre-Construction and Construction Phase
Introduce contractual obligations for contractors to use local labour as far as possible.	TGME and Contractor	Pre-Construction and Construction Phase
Contractors to ensure that foreign workers reside in suitable facilities and not establish informal houses.	TGME and Contractor	Construction Phase
Construction workers should be supervised at all times.	TGME and Contractor	Construction Phase
Property owners surrounding the construction areas should be informed of the construction schedules and activities.	TGME and Contractor	Pre-Construction and Construction Phase
Security on-site should be active prior to the construction period.	TGME and Contractor	Pre-Construction and Construction Phase
The construction site and accommodation facilities should be properly managed to avoid any littering and possible environmental pollution. Water and sanitation facilities should be up to standard.	TGME and Contractor	Construction Phase
Information distributed as part of the existing HIV/Aids awareness campaigns undertaken in the area should again be focused on and communicated to the local workforce.	TGME and Contractor	Construction Phase
The development of informal vending “stations” where food and small goods are sold should be properly managed, to avoid littering, safety risks and possible environmental pollution.	TGME and Contractor	Construction Phase
TGME should support efforts by the TCLM to limit squatting and sub-letting in the area through the provision of some form of rental or housing allowance as part of the remuneration packages.	TGME and TCLM	All Phases
Proof of residency must be provided by local residents during the recruitment and procurement process	TGME	Construction and Operation
Performance Indicator	Locals are employed. Reports are not made from members of the local communities regarding unrealistic employment opportunities. No conflict between outsiders, jobseekers and local community members No to limited increase in informal settlements in the area surrounding the mining activities	
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met	

Accommodation of workforce

Objective	To ensure that all employees are are informed of their accommodation options		
Mitigation: Action/control		Responsibility	Timeframe
The TCLM should be informed of any possible additional housing needs within the TCLM area		TGME and TCLM	All Phases
Housing needs should be monitored		TCLM	All Phases
Ideally, local accommodation facilities in close proximity to the site (e.g. Sabie area) should receive preference.		TGME, TCLM, tourism fraternity, employees	All phases
Ideally, once all local accommodation facilities have been exhausted other facilities further afield should be considered		TGME, TCLM, tourism fraternity, employees	All phases
TGME should provide actual policies and procedures with regard to employee accommodation if included as part of their remuneration packages		TGME	All phases
Temporary accommodation facilities are not recommended.		TGME and TCLM	Pre-Construction and Construction Phase
Employees should be educated with regards to their accommodation options.		TGME and employees	All phases
Maximise the employment of locals to limit the need for any additional housing infrastructure, as far as possible		TGME	All phases
Performance Indicator	Limited housing shortage Integrated and mixed land use development Infrastructure and services needs are met		
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met		

Impact on TCLM and provision of services and infrastructure

Objective	Minimise any negative impact on TCLM capacity to provide services and infrastructure Avoid any additional pressure on infrastructure and services as a result of the proposed mine and mining activities Contribute to social development by assisting the TCLM with planning and implementation processes		
Mitigation: Action/control		Responsibility	Timeframe
Quantify the use of local labour, the needs of contract workers and number of outside workers to be employed at any given time.		TGME	All Phases
Maximise the employment of locals where possible		TGME	All Phases
Detailed pro-active communication and planning with the TCLM in terms of the service and infrastructure needs (if		TGME & TCLM	All Phases

applicable) would be required.		
Where possible, assist the TCLM with the planning and implementation processes of IDP priority projects	TGME & TCLM	All Phases
Where possible, assist with the development of LED programmes	TGME & TCLM	All Phases
Other infrastructure requirements should be addressed by the TCLM and other relevant departments e.g. DWA as part of the Integrated Water Use Licence Application, Eskom, and so forth	TGME, TCLM, DWA, Relevant Govt. Depts.	All Phases
Ensure that a proper emergency plan that fits with the Municipal Disaster Management Plan is in place. Such a plan should be developed by the TCLM in consultation with the TGME	TGME & TCLM	All Phases

Performance Indicator	Continuation of provision of existing services. No negative impact on infrastructure within local communities Maintenance of the local roads is undertaken
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met

Harmony Hill Township Development

Objective	Limit any negative socio-economic impacts on the proposed township development Road alignment and construction do not negatively impact on the proposed development

Mitigation: Action/control	Responsibility	Timeframe
Refer to the Traffic Impact Study with regards to the road traversing the Harmony Hill Township Establishment.	Not applicable	Not applicable
Suitable safety measures (e.g. suitable size pillars) should be implemented to avoid subsidence	TGME	All Phases

Performance Indicator	Township development can continue without negative impacts of mining activities on the layout plans No subsidence is experienced
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met

Capacity Building and Socio-Economic Development

Objective	Increase the development of skills of the workforce and ensure socio-economic development within the area

Mitigation: Action/control	Responsibility	Timeframe

A community skills audit could be undertaken by TGME. Such an audit should also include local SMME's.	TGME & TCLM	Pre-Construction
The findings of the community skills database should determine and contribute to the specific type and level of training interventions to be provided during the operational life of the mine.	TGME	Operational
Training and career path plans must be focused on mining related skills. Progress in this regard should be monitored on an annual basis.	TGME	Operational
In-house training through learnerships to fill the hard-to-fill vacancies would be crucial for long term capacity building and skills development within the core and affected communities	TGME	Operational
Sectors for portable skills training should also be identified in consultation with the TCLM to ensure the transfer of applicable skills relevant at the time of downscaling.	TGME	Operational
Women should also benefit from the skills training programmes	TGME	Operational
The mine through the Consultation Forum contributes towards solving service delivery issues in TCLM	TGME, Consultation Forum	Operational
TGME, through their SLP and CSI, could focus on involvement and/or assistance with regards to infrastructure projects such as the upgrading of the sewage works in Sabie, rehabilitation of the solid waste dump, provision of electricity supply and so forth.	TGME, Consultation Forum	Operational
TGME, through their SLP and CSI, could focus on involvement and/or assistance with regards to the local schools, hospitals, clinics, community facilities and infrastructure as well as recreational facilities and infrastructure	TGME, Consultation Forum	Operational

Performance Indicator	» Skilled and capacitated employees » Continuation of skills development and training for the life of mine » Compliance to Mining Charter and MPRDA.
Monitoring	» TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met.

Impact on Social Networks and Presence of Outside Agency

Objective	Avoid negative impacts on social networks by employing locals as far as possible Ensure informed decision making to avoid any possible social mobilisation against TGME

Mitigation: Action/control	Responsibility	Timeframe
Maximise the employment of locals as far as possible	TGME	All Phases

Unrealistic job expectations should be restrained through a transparent communication process.	TGME	All Phases
Consult with local structures and TCLM on employment matters.	TGME	All Phases
The appointment of locals and the inflow of temporary workers should still be managed with due cognisance of the sensitivities at hand and the process of introducing foreigners should be pro-actively managed.	TGME	All Phases
As far as possible, the movement of construction workers should be confined to the work site to avoid any potential for impact from this variable in proximate residential areas.	TGME	Construction
Specify the conduct of contract workers in worker related management plans and employment contracts.	TGME	Construction
Do not house construction workers on site, but ensure sufficient and proper accommodation facilities are utilised.	TGME	Construction
Ensure sufficient safety and security measures at the construction sites	TGME	Construction
Make use of credible SMME's for the provision of goods and services	TGME	All Phases
Embark on regular communication efforts towards the community with regards to the mine's involvement in the communities. This could be done through an established forum	TGME	All Phases
TGME should embark on a transparent communication process with the TCLM and affected property owners in the study area.	TGME	All Phases
The establishment of a community forum consisting of representatives of TGME, contractors (if applicable), local leaders such as councillors, representatives of the Sabie Chamber of Commerce and Tourism (SCCT), the Environmental Control Officer and the affected property owners could be established. One of the aims of such a forum would be to provide an opportunity and forum for open discussions regarding possible hostile relationships. Such a forum should meet regularly	TGME	All Phases
Performance Indicator	No negative impacts on the health services and infrastructure, water and electricity services and road infrastructure	
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met.	

Impacts on Farming and Commercial Forestry Activities

Objective	Limit negative impacts on farming and commercial forestry activities	
Mitigation: Action/control	Responsibility	Timeframe

As far as possible, the movement of construction workers should be confined to the work site to avoid any trespassing on forestry and privately-owned areas.	TGME & Contractor	Construction
Specify the conduct of contract workers in worker related management plans and employment contracts.	TGME & Contractor	Construction
Pro-active security measures should be put in place to avoid unauthorised entry onto mining sections, as well as forestry and conservation areas	TGME & Contractor	All Phases
Minimise negative impacts on the plantations through negotiations with the affected forestry company	TGME & Forestry Company	Pre-construction
A Fire/Emergency Management Plan should be developed and implemented. It is important that this management plan and associated communication channels are developed at the outset of the construction phase. It would be important to regularly review the functionality and efficiency of such a plan in conjunction with the local emergency teams, mine management and affected communities as well as neighbouring landowners (forestry companies)	TGME & Contractor	Construction
Appropriate firefighting equipment should be on site and construction workers should be appropriately trained for fire fighting	TGME & Contractor	Construction
Open fires for cooking and related purposes should not be allowed on site	TGME & Contractor	Construction
Should an environmental authorisation be received, TGME should enter into negotiations with the individual with the surface permit rights to determine the extent of the direct negative impacts on the business and how these can be mitigated. It should be determined whether any compensation for the lease agreement would be required. This type of negotiation processes falls outside the ambit of the EIA	TGME	Construction & Operation
Mitigation measures as stipulated in the EMP must be strictly adhered to, to avoid and minimise any environmental pollution	TGME	All Phases
Security companies employed by the mining sector and forestry industry could set up a joint committee to discuss and finalise an integrated security management plan with the focus on unauthorised entries and issues associated with illegal mining.	TGME	All Phases
Performance Indicator	Mitigation of dust emissions Mitigation of noise impacts. Mitigation of possible water quality and quantity impacts No reports from property owners regarding pollution or impacts on farming and forestry activities No illegal trespassing on mining, forestry and conservation areas	
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that	

	these have been met.

Impact on Daily Living and Movement Patterns

Objective	Limit environmental pollution and social intrusions to avoid impacts on daily living and movement patterns on neighbouring property owners, business owners and local community members

Mitigation: Action/control	Responsibility	Timeframe
Dust suppression methods should be strictly implemented if and where required	TGME	All Phases
Should local road users be affected by the movement of the mining vehicles or by the construction activities of access roads taking place near main roads, sufficient warning signs should be erected	TGME	All Phases
The construction of additional access roads should be limited	TGME	Construction
Speed limits on the local roads surrounding the various mining sites should be enforced.	TGME	All Phases
Speeding of mine related vehicles must be strictly monitored	TGME	All Phases
Access from gravel roads to local main roads must be in line with the road standard and requirements to accommodate the traffic load and traffic patterns.	TGME	All Phases
All mining vehicles should be in a good condition and adhere to the road worthy standards	TGME	All Phases
Monitoring of possible impacts on water quality and quantity	TGME	All Phases
Recommendations and mitigation measures proposed by the Noise Impact Assessment should be strictly implemented	TGME	All Phases
Construction and operational mining activities with potential noise impacts should be mitigated and should preferably not be undertaken during night time.	TGME	All Phases
The maximum acceptable night time noise levels should not be exceeded	TGME	All Phases
Personnel should be equipped with the necessary noise protection equipment	TGME	All Phases
Heavy machinery and heavy vehicles should be kept in a good working order. Also, ensure that all vehicles and equipment comply with generally accepted noise levels and noise abatement regulations	TGME	All Phases

Performance Indicator	Mitigation of impacts on infrastructure and services Mitigation of dust emissions Mitigation of noise impacts.

	Mitigation of traffic related impacts
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met.

Safety and Security Risks

Objective	Limit any safety and security risks during the pre-construction, construction and operational phases

Mitigation: Action/control	Responsibility	Timeframe
Discuss the safety and security issues, as well as construction schedule with the local community policing forum and local SAPS.	TGME, TCLM, SAPS, Community Policing Forums	All Phases
The construction areas should be fenced or access to the area should be controlled to avoid animals or people entering the area without authorisation.	TGME	Construction
Prevent illegal miners to access the pre-mined areas that falls under the jurisdiction of the Mining Right.	TGME & SAPS	All Phases
Set up a platform whereby community members and miners can report any illegal mining activities	TGME	All Phases
TGME to liaise and work together with the Mpumalanga Illegal Mining Forum to address the possible negative impacts of localised illegal mining activities	TGME	All Phases
The construction and mining sites should be clearly marked and “danger” and “no entry” signs should be erected. The mining area must be fenced with electrical fencing	TGME	Construction
Speed limits on the local roads surrounding the mining sites should be enforced	TGME	All Phases
Employ locals where possible	TGME	All Phases
Workers must not trespass on private properties.	TGME	All Phases
A Health and Safety Plan should be implemented and it must be ensured that all managers are qualified in First Aid and other relevant safety courses	TGME	All Phases
Permanent security personnel should be on site.	TGME	All Phases
Implement safety measures to limit fire hazards and implement fire breaks if possible.	TGME	All Phases
TGME should, in conjunction with the property owners and timber companies, develop and implement emergency procedures	TGME	All Phases
Measures to deal with illegal mining should be in accordance with the examples set by the DMR and	TGME	All Phases

Chamber of Mines		

Performance Indicator	No increase in criminal activities No speeding of construction and mining related vehicles on local roads No increase in road accidents No veld fires No increase in illegal mining activities in the area Emergency, Health and Safety, as well as Fire Management Plans are in place
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met.

Health Risks

Objective	Limit health risks associated with mining activities

Mitigation: Action/control	Responsibility	Timeframe
Maximise the employment of locals where possible	TGME	All Phases
First aid and/or emergency supplies should be available at various points at the construction and mining sites	TGME	All Phases
Continue and extend the current HIV/AIDS awareness and support programmes, with specific focus on those in and nearby the mining areas, as well as on the mine employees	TGME	All Phases
TGME could assist in implementing a community health awareness plan	TGME	All Phases
The general health of mine workers should be monitored on an on-going basis	TGME	All Phases
The mining sites should be effectively managed to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services	TGME	All Phases
Environmental pollution must be limited and the mine should be managed and operated according to International Best Practice	TGME	All Phases
The mine could, through LED programmes and infrastructure development assist in improving the overall health services within the communities	TGME	All Phases
A Health and Safety Plan should be implemented and it must be ensured that all managers are qualified in First Aid and other relevant safety courses	TGME	All Phases
Firefighting equipment should be on site and should be in a good working	TGME	All Phases

Performance Indicator	Healthy employees No lowering in productivity

	No negative financial implications to replace workers
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met.

Impact on Visual Quality of the area and Sense of Place

Objective	Limit negative impact on the visual quality of the area and the sense of place	
Mitigation: Action/control	Responsibility	Timeframe
The construction site should be kept litter free	TGME	Construction
Site rehabilitation should occur as soon as the construction or operational process allows	TGME	All Phases
The recommendations made by the Visual Impact Assessment should be adhered to	TGME	All Phases
Recommendations and mitigation measures as part of the EMP should be strictly implemented.	TGME	All Phases
Position lights at such an angle that light is focused on the immediate mining site and not the surrounding area.	TGME	All Phases
Use focused light sources	TGME	All Phases
Design of buildings should blend in with surrounding environment, where possible (architectural and colouring).	TGME	All Phases
Retain as much of the existing vegetation as possible.	TGME	All Phases
Performance Indicator	Limited visual impact on landscape character and sense of place	
Monitoring	TGME, TCLM and local leaders must monitor indicators listed above to ensure that these have been met.	

Minimise the negative economic impacts related to mine closure

Objective	Minimise the negative economic impacts related to mine closure	
Mitigation: Action/control	Responsibility	Timeframe
As per the requirements of the SLP develop mechanisms to assist employees, prior to retrenchment date in the transition phase after closure of the operations including portable skilled development programmes during the operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies etc.	Human resources/ SLP officer/	During operations/ before closure
Focus on non-core related local supply links during the operational phases of the mine to facilitate easier transitioning of local suppliers to other costumers	Supply chain/procurement	During construction
Plan community projects with an exit strategy of which	SLP officer, corporate social	During operations/ before

beneficiaries are aware of		investment programme	closure
Performance Indicator	% spending on non-core mining local inputs % of employees that receive portable skills training % of retrenched employees placed in alternative employment Exit strategies for every community investment programme		
Monitoring	Annually/ just before closure		

(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).

All impacts on heritage conditions are assessed in the Heritage Impact Assessment (Appendix 14). Based on the available information, no unmitigated / permanent impact on the natural estate will take place as part of this project.

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).

Information regarding the baseline and potential impacts for the TGME 10161 project, is based on the information available, discussions with stakeholders, specialists, the applicant and discussions with authorities. The EAP has included all identified impacts, based on the current scope, in this EIA and has assigned appropriate management measures to reduce and manage each identified impact, which are included in this EMP.

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft environmental management programme

a) Details of the EAP

The details and expertise of the EAP are detailed in Part A 3. (a) (i) and (ii).

b) Description of the Aspects of the Activity

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 3.d.

c) Composite Map

Refer to Appendix 18 for the TGME 10161 layout with all sensitivities and buffers identified.

d) Description of Impact management objectives including management statements

i) Determination of closure objectives.

The main closure objectives of the Company's planned mining operation are:

- To restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any ore reserves.
- To prevent the establishment of any permanent structures or features.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained when a closure certificate is issued.
- To establish a stable and self-sustainable vegetation cover.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability.
- To limit and manage the visual impact of the mining activities.
- To safeguard the safety and health of humans and animals on the site.
- To close the mining operation efficiently, cost effectively and in accordance with Government Policy.

The key aim of decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas should be left in a stable, self-sustainable state. Proof of this should be submitted at closure. Specific objectives include:

Rehabilitation of infrastructure areas

- The objectives for the removal of infrastructure and the subsequent rehabilitation of the areas they occupied include:
- To ensure that infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.
- The removal, decommissioning and disposal of all mining infrastructure, will comply with all conditions contained in the MPRDA. To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:
- The plant and associated disused infrastructure will be dismantled or demolished. Any building foundations will be removed and land exposed to the demolition and dismantling of infrastructure and all other disturbed land will be rehabilitated.
- Rubble will be disposed of at a suitable site.
- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

Temporary Waste Rock Dumps

- The objectives pertaining to the effective management and rehabilitation of the temporary waste rock dumps include:
- To ensure that the Waste Rock Dump deposits are stable and that there is an acceptably low risk of failure of these deposits during the decommissioning phase and following mine closure, should the dump(s) remain in place;
- To establish self-sustainable vegetation cover on the waste rock dump so that the visual impact of the waste rock dump is improved and in order to prevent erosion.

Management principles pertaining to waste rock dumps include

- The waste rock dump(s) will continuously be inspected to ensure their stability. If they are unstable, the appropriate remedial measures will be implemented.
- Any infrastructure or facilities that serve the Waste rock dump will be maintained to ensure that they are both stable and functional.

Maintenance

- The necessary agreements and arrangement will be made by TGME to ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state or for three (3) years after closure or as long as deemed necessary at the time.

- Such processes include erosion of the waste rock dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

Performance assessments

- As per the MPRDA and associated Regulations, as well as NEMA and associated Regulations, this Environmental Management Programme will be continually assessed in terms of its appropriateness and adequacy. In order to achieve this, TGME will undertake the following:
- Implement the necessary monitoring programmes, as discussed as part of this EMPR;
- Conduct performance assessments of this EMPR; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will be annually. An independent and competent person will undertake all performance assessments.

Decommissioning and closure objectives

- The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas will be left in a stable, self-sustainable state. Proof of this will be submitted at closure.

Specific objectives include

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine;
- Rehabilitate disturbed land to a state suitable for its post-closure uses;
- Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;
- Limit the impact on staff whose positions become redundant at the time of mine closure, as addressed in the SLP;
- Keep relevant authorities informed of the progress of the decommissioning phase;
- Submit monitoring data to the relevant authorities;
- Maintain required pollution control facilities and rehabilitated land until closure.

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

Environmental management on the mine site must be conducted in terms of the Companies Environmental Management Systems (EMS). The table below needs to form part of the companies' environmental policy.

Table 22: Potential pollution sources of the TGME project

Potential pollution source	Description	Potential mechanism of impact
CONSTRUCTION PHASE		
General earthworks	Stripping of topsoil and civil works undertaken	Increased turbidity and suspended solids enters watercourses
Construction vehicles	Movement of construction vehicles through watercourses	Increased turbidity and suspended solids
	Servicing of construction vehicles close to watercourses	Increase in hydrocarbon concentrations
OPERATIONAL PHASE		
Mining below the groundwater level. Mining above or close to the groundwater level	Mining below the Groundwater Level	Water flow into the mine resulting in the draining of the aquifer and potential lowering of the regional groundwater level
	Groundwater Quality (Within the mine workings)	Water flow into the mine resulting in water quality contamination
	Groundwater Quality (From surface contaminant sources)	Groundwater contamination from waste bodies
Workshops	Oil and silt traps	Local hydrocarbon impact if compromised
Bulk oil storage facilities	Bunded areas	Local hydrocarbon impact if compromised
CLOSURE PHASE		
Removal of infrastructure	All material and infrastructure removed for reuse, or for disposal at an appropriately licensed facility. Rehabilitation of the footprint	Increased turbidity and suspended solids

Construction vehicles	Movement of construction vehicles through watercourses	Increased turbidity and suspended solids
	Servicing of construction vehicles close to watercourses	Increase in hydrocarbon concentrations

In terms of the impact on ground water as mentioned above, the following mitigation measures will be implemented, ensuring that the risks are manageable. The following is recommended to negate this risk:

- Cover drilling programme to identify water bearing fissures ahead of mining;
- Detailed mapping of water bearing fissures and delineation of high risk zones;
- Delineate impacted areas and develop management options such as the construction of plugs to compartmentalize the mine; and
- Grouting of the rock formations to restrict inflow.

Appendix 16 describes each project specific activity, along with identified potential impacts associated with each project phase and applicable management measures, in order to ensure that risks and impacts are avoided or minimized. These management measures address the potential for environmental damage, pollution and treatment of water.

iii) Potential risk of Acid Mine Drainage

An assessment of the geohydrological conditions of the proposed TGME 10161 study area was conducted by M van Biljon, October 2017 attached as Appendix 10.

Samples were collected from waste rock material at existing adits as well as from a historic tailings storage facility (TSF) at Nestor mine. These samples were subjected to leach testing and Acid Base Accounting (ABA). The following conclusions were drawn from the ABA characterisation of the Sabie-Pilgrims Rest waste material:

- Based on the ABA testing it is concluded that the tailings material has the potential for acid generation, as confirmed by the leach testing, whereas the waste rock material generally does not.
- Since the waste rock material does not pose any risk to the groundwater there are no additional management requirements.
- Discussions with mine personnel indicated that the Nestor TSF will be removed and incorporated into the Sabie TSF, which will be a licenced facility with the necessary continent measures in place.

The calibrated flow and mass transport model was used to simulate the potential mining impact on the groundwater regime. The following scenarios were simulated:

- Scenario 1: Impact from the proposed mining on the groundwater level;
- Scenario 2: Simulation of the contaminant plume during the operational phase of the project; and
- Scenario 3: Simulation of the contaminant plume after closure and source removal.

The modelling results can be summarised as follows:

- The proposed mining extension is likely to intersect water-bearing fissure, resulting in an increased water inflow into the underground working. This potentially will cause dewatering of the aquifer and the regional lowering of the groundwater level. It is expected that this can be as much as 45m. It is, however, important to note that the current groundwater level is an interpolated level, based on very sparse data. This is typical in these type of investigations and once detailed mining plans are available and additional boreholes are drilled, a more accurate dewatering cone will be generated.
- Groundwater usage in the region appears to be restricted and very few groundwater users were identified during this and previous investigations. The impacts associated with the drop is groundwater levels is mainly to the mine that will have to deal with the increased water inflow. If there are any impacted groundwater users that have not been identified, the mine will address these individually and will supply water to impacted users.
- The current discharges from the Glynn's Drainage Tunnel is estimated at 65 Megalitres per day (Mℓ/day). The increase in groundwater inflow due to the proposed mining extension is expected to be 92 Mℓ/day, excluding the current 65 Mℓ/day.
- Additional mining is also planned at Nestor mine. Since these workings are located above the groundwater level there will be no dewatering of the aquifer. There will, however, still be seepage into the mine voids. The estimated inflow is approximately 1.7 Mℓ/day.
- The Nestor TSF is a potential contaminant source impacting on the groundwater quality. The geochemical leach testing recorded high sulphate concentrations, which was used to specify the source term concentration for the contaminant plume simulations. The extent of the current contaminant plume is estimated at 70 hectares (based on the SANS 241 limit of 500 mg/ℓ) and does not currently impact on any down-gradient receptors (groundwater users or surface streams). This will reduce by 35% to 46 hectares, twenty years after the source has been removed. It is proposed to remove this TSF and place the material onto the Sabie TSF, which will be a licenced facility with contaminant prevention measures.

Groundwater monitoring in the region currently focusses on the active mining sites. The monitoring network should be expanded to include the new mining areas.

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

Please refer to the section above.

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

The purpose and recommended monitoring is as follows: Monitor groundwater quality at possible contaminant sources such as waste rock dumps and tailings facilities. The proposed shaft / adit layout makes provision for the drilling of boreholes. The main purpose of these boreholes is for water supply, but they can also be used for monitoring.

Water intersected underground and water emanating from adits should also be monitored for volume and quality.

- Monitor groundwater levels in areas where water inflow into the mine workings can potentially lower the regional groundwater levels. Monitoring can be done either

through surface monitoring boreholes or the installation of underground pressure gauges. Short boreholes can be drilled into underground fissures and equipped with a pressure gauge. The pressure reading can be converted to a water level.
- Groundwater levels should be measured monthly.
- Groundwater quality monitoring should be conducted on a quarterly basis, unless specified otherwise by the WUL. The required chemical parameters to be analysed will be specified in the WUL

New mining ventures never have detailed, closely spaced, site-specific information and several assumptions had to be made during the numerical modelling as a result of gaps in the available geohydrological information. It is important to note that a numerical groundwater model is a representation of the real system. It is therefore at most an approximation, and the level of accuracy depends on the quality of the data that is available. This implies that there are always errors associated with groundwater models due to uncertainty in the data and the capability of numerical methods to describe natural physical processes. This does not mean that the current modelling presented in this report is flawed, but merely that it can and will be improved upon as site-specific data becomes available. The historical mining in the region provided valuable information that was incorporated into the model and increases the confidence in the modelling outcome.

It is recommended that the model be updated after additional drilling and aquifer testing has been done and once the mining layout has been finalised. The current model is a regional model and should be refined to assess each mine individually.

The most prominent risk of the proposed mining is the fact that mining will occur within what is considered a major aquifer. Not only poses this a risk to the environment, but it also poses a risk to the mine in terms of uncontrollable inrush of water. The following is recommended to negate this risk:

- Cover drilling programme to identify water bearing fissures ahead of mining;
- Detailed mapping of water bearing fissures and delineation of high risk zones;
- Delineate impacted areas and develop management options such as the construction of plugs to compartmentalize the mine; and
- Grouting of the rock formations to restrict inflow.

It is further recommended that clean and dirty water be separated underground. Any water intersected underground (that is not sealed) should be collected as close as possible to the source and discharged from the mine through dedicated clean water pipes. This will lower the potential contaminant risk to the environment considerably.

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

Please refer to the sections above

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

Project Description – 10161 Mining Right Application Project ("SABIE")				
Mining Sections related to 10161 MRA ("SABIE")				
Mines and shafts associated with Mining right	**Remarks on Water Requirements (Ml/day)**			
	Domestic	**Industrial**	**Mining**	**Total**
MR 10161				
Mines and shafts				
1. Nestor				
1.1 No 1 shaft West	0,8	0,4	2	3,2
1.2 No 2 shaft East				
2. Glynn's Lydenburg (East & West), includes:				
a. Leader Hill				
2.a.1 North	1,3	0,65	4	5,95
2.1.2 CentralSouth				
2.a.3 South				
b. Werf				
2.b.a Northern Section				
Rock Shaft	1,3	0,65	4	5,95
Service Shaft				
2.b.b Southern Section				
Rock Shaft	1,3	0,65	4	5,95
Service Shaft				
c. Mill Hill				
Rock Shaft	0,8	0,4	2	3,2
Service Shaft				
d. Monument Hill				
Rock Shaft	1,3	0,65	4	5,95
Service Shaft				
e. South Hill				
Rock Shaft	0,8	0,4	2	3,2
Service Shaft				
f. Maliveld				
Rock Shaft	1,3	0,65	4	5,95
Service Shaft				
g. Sheba				
Rock Shaft	1,3	0,65	4	5,95
Service Shaft				
4. Olifantsgeraamte				
4.1 No 1 shaft	0,8	0,4	2	3,2
4.2 No 2 shaft				
5. Ross Hill				
5.1 No 1 shaft	0,8	0,4	2	3,2
5.2 Opencast Control Centre				

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

A water use licence application (WULA) has not yet been submitted. A WULA will be submitted prior to the commencement of the proposed TGME 10161 project.

ix) Impacts to be mitigated in their respective phases

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

Table 23: TGME 10161 Impacts to be mitigated in their respective phases

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.).	**PHASE** of operation in which activity will take place. State; Planning and design, Pre- Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**SIZE AND** **SCALE** of disturbance (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (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)	**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:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Blasting	Operational	The size of the blasts is determined by the practical blast block design and the production rate required from the mine.	Dust control and monitoring Noise control and monitoring Access control	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations	Upon cessation of the individual activity.

			Continuous rehabilitation Storm water run-off control	• COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. • Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.	
Explosive Magazine:		The size of the blasts is determined by the practical blast block design and the production rate required	Access control Maintenance of magazine and fence		Removal of explosive magazines upon closure of Mining Right.

		from the mine.	Groundwater quality monitoring Storm water run-off control Immediately clean spill		
Sewage facilities Enviro Loos.	Construction Commissioning Operational Decommissioning Closure	Still to be determined	Maintenance of container Removal of container plants upon closure		Removal of container plant upon closure of the Mining Right.
Clean & Dirty water systems: Haul Road River Crossing Structure Storm Water Control Dam per mining section	Construction Commissioning Operational Decommissioning Closure	Still to be determined	Maintenance of berms and trenches Groundwater levels and quality monitoring Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.		Upon cessation of the individual activity (continuous rehabilitation) Levelling of storm water dam's walls upon closure of Mining Right
Fuel Storage facility (Diesel tanks)	Construction Commissioning Operational Decommissioning	Size still to be determines Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Groundwater quality monitoring		Removal of diesel tanks upon closure of Mining Right.

	Closure		Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		
Re-fuel and lube station	Construction Commissioning Operational Decommissioning Closure	Size still to be determines Pipes, concrete, bricks and steel	Maintenance of diesel tanks and bund walls. Oil traps Groundwater quality monitoring Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of Lube station upon closure of Mining Right.
Mining Area per mining section for TGME 10161	Commissioning Operational Decommissioning Closure	Each mining area is approximately 2ha in extent with concrete foundations.	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Access control Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Continuous rehabilitation		Upon cessation of the individual activity (continuous rehabilitation)

			Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Rock stability control and monitoring Erosion control		
Generator:	Construction Commissioning Operational Decommissioning Closure	10m x 20m = 200m² Generator, Electric wires / power lines, building of concrete, bricks and steel	Access control Maintenance of generator and bund walls Noise control and monitoring Oil traps Groundwater quality monitoring Immediately clean hydrocarbon spill		Removal of generator upon closure of mining right.
Office	Construction Commissioning Operational Decommissioning Closure	Bricks, concrete, doors, windows or pre-fabricated office blocks on concrete	Immediately clean hydrocarbon spill Rip disturbed areas to allow re-growth of vegetation cover		Removal of container upon closure of mining right.
Parking Bays	Construction	Still to be determined. .	Dust control and monitoring		Ripping of parking bay

	Commissioning Operational Decommissioning Closure		Groundwater quality monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover.		upon closure of the mining right.
PCC Plant	Construction Commissioning Operational Decommissioning Closure	Still to be determined.	Access control Maintenance of processing plant Dust control and monitoring Groundwater quality and level monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation		Removal of processing plant upon closure of mining right.

			cover		
Roads (both access and haulage road to each mining section):	Construction Commissioning Operational Decommissioning Closure	Still to be determined.	Maintenance of roads Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining right.
Salvage yard (Storage and laydown area)	Construction Commissioning Operational Decommissioning Closure	Still to be determined. No construction material, area to be levelled with a grader and fenced with a gate and access control	Access control Maintenance of fence Groundwater quality monitoring Storm water run-off control Immediately clean hydrocarbon spill		Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining right.
Security Gate and guard house at access	Construction Commissioning	Concrete, bricks, steel and levelled parking area.	Access control Maintenance of boom gates		Removal and breaking down of building and boom gate upon

control point	Operational Decommissioning Closure		and entrance Dust control and monitoring Noise control and monitoring Groundwater quality monitoring Immediately clean hydrocarbon spill Rip disturbed areas to allow re-growth of vegetation cover		closure of the mining right.
Shaft bank area	Construction Commissioning Operational Decommissioning Closure		Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Drip trays Storm water run-off control. Immediately clean hydrocarbon spills. Rip disturbed areas to allow re-growth of vegetation cover		Ripping of shaft bank area upon closure of mining right.
Subgrade stockpile area	Commissioning Operational		Dust control and monitoring Groundwater quality monitoring		Ripping of subgrade stockpile area upon closure of mining right

	Decommissioning Closure		Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Topsoil storage area (temporary)	Commissioning Operational Decommissioning Closure	Still to be determined	Dust control and monitoring Storm water run-off control Continuous rehabilitation Rip disturbed areas to allow re-growth of vegetation cover. Placing topsoil on Backfilling areas during rehabilitation		Spreading of all stored topsoil on rehabilitated areas and ripping of storage area upon closure of mining right.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	15m x 30m = 450m²	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right.

The rock storage dump	Commissioning Operational Decommissioning Closure	Still to be determined	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Storm water run-off control Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to		Backfilling of waste rock into open excavations. Ripping of disturbed areas upon closure of mining right.

			record and respond to complaints. Maintain a buffer zone of 100 m around the pans and streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible. Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any		

			important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes,		

			tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of pristine habitats and minimise the overall mining footprint. The footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Low angle access ramp in excavations;		

			Snares & traps removed and destroyed; and Maintenance of firebreaks.		
Workshops and Wash bays	Construction Commissioning Operational Decommissioning Closure	Still to be determined.	Groundwater quality and quantity monitoring Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills		Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures Groundwater levels and quality monitoring		Removal of pipeline upon closure of the mining right.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m² each	Maintain water tanks and structures Groundwater levels and quality monitoring		Removal of water tank and steel structure upon closure of the mining right.

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management

Table 24: TGME 10161 Impact Management Outcomes

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**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	**STANDARD TO BE ACHIEVED** **(impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Blasting	Dust Fly-rock Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance Surface water contamination	Air quality Fauna Flora Soil Noise and vibration Surface Water Topography Safety	Operational	Dust Control and monitoring Noise and vibration control and monitoring Access control Continuous rehabilitation Storm water run-off control. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of	Dust levels minimized Noise levels minimized Safety ensured Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. At no point may plant cover be removed within the no-development zones. All attempts must be made to avoid exposure of dispersive soils. Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. Ground exposure should be minimised in terms of the surface area and duration, wherever possible. Construction that requires the clearing of large areas of vegetation and excavation should ideally occur during the dry season only. Construction during the rainy season (November to March) should be closely monitored and controlled. The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers. The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion.	

				All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses. Excavated and stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate. Stockpiles susceptible to wind erosion are to be covered during windy periods. Audits must be carried out at regular intervals to identify areas where erosion is occurring. Appropriate remedial action, including the rehabilitation of the eroded areas, must occur. Rehabilitation of the erosion channels and gullies. The mining operation should avoid land with steep slopes. Dust suppression must take place, without compromising the sensitive water balance of the area.	
Explosive Magazine:	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna	Groundwater Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of magazines and fence Groundwater quality monitoring Storm water run-off control Immediately clean up accidental spills.	Rehabilitation standards and closure objectives to be met.

Sewage facilities Enviro-Loos	Soil contamination Groundwater contamination	Soil Groundwater	Construction Commissioning Operational Decommissioning Closure	Maintenance of sewage facilities on a regular basis. Removal of container plants on closure	Minimize the potential for a chemical spill on soil, which could infiltrate to groundwater.
Clean & Dirty water systems: Haul Road River Crossing Structure Storm Water Dam per mining section one dam is required.	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	Soil Groundwater Surface Water	Construction Commissioning Operational Decommissioning Closure	It will be necessary to divert storm water around opencast areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the mining pit area. Older excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Watercourse units have to be protected. Groundwater level monitoring Groundwater quality and quantity monitoring Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.	Safety ensured. Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				Linear infrastructure such as roads will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. Maintain a buffer zone of 100 m around the pans and streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning	Maintenance of Diesel tanks and bund walls. Oil traps Groundwater quality monitoring Drip tray at re-fuelling point.	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to

	natural habitat of fauna Soil contamination Surface disturbance		Closure	Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	be met.
Re-fuel and lube station	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of Diesel tanks and bund walls. Oil traps Groundwater quality monitoring Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				be regularly serviced and maintained.	
Mining Area (per mining section).	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Access control Dust control and monitoring Groundwater Quality and quantity monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Rock stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				Maintain a buffer zone of 100 m around the streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible. Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave	

				the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.	

				Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of pristine habitats and minimise the overall mining footprint. The footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Low angle access ramp in excavations; Snares & traps removed and destroyed; and Maintenance of firebreaks.	
Generator:	Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air quality Groundwater Noise Soil Surface Water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of generator and bund walls Noise and vibration control and monitoring Oil traps Groundwater quality monitoring Immediately clean hydrocarbon spill Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise;	Safety ensured. Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.

				Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	
Office	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Fauna Flora Groundwater Soil	Construction Commissioning Operational Decommissioning Closure	Immediately clean hydrocarbon spill Rip disturbed areas to allow re-growth of vegetation cover. Maintain a buffer zone of 100 m around streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.

				possible.	
Parking Bay	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Groundwater Noise Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Dust Control and monitoring Groundwater quality monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean up hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
PCC	Dust Noise Groundwater	Air Quality Fauna Flora Groundwater Noise	Construction Commissioning Operational Decommissioning	Access control Maintenance of processing plant Dust control and monitoring Groundwater quality monitoring Noise and vibration control and	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater

	contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Surface water Safety	Closure	monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Maintain a buffer zone of 100 m around streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable	Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible.	
Roads (both access and haulage road on the mine site):	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of roads Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives met. Erosion potential minimized.

				mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Groundwater quality monitoring Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Security Gate and guard house at access control point	Dust Groundwater contamination Noise	Air Quality Fauna Flora Groundwater Soil	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of boom gates and entrance Dust control and monitoring Noise control and monitoring Groundwater quality monitoring	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized

	Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance			Immediately clean hydrocarbon spill Rip disturbed areas to allow re-growth of vegetation cover. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Shaft bank area	Dust Groundwater Contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Groundwater Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Groundwater quality monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	
Topsoil storage area (temporary)	Dust Removal and disturbance of vegetation cover and natural habitat of fauna Soil disturbance Surface disturbance	Air Quality Fauna Flora Groundwater Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Storm water run-off control Continuous rehabilitation Rip disturbed areas to allow re-growth of vegetation cover Backfilling of topsoil during rehabilitation Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. Topsoil stockpiles must be kept separate from sub-soils. The topsoil should be replaced as soon as possible on to the	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.
Rock Storage Dump	Dust Groundwater Contamination	Air quality Fauna Flora Groundwater	Commissioning Operational Decommissioning	Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Storm water run-off control	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater

	Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Noise Soil Surface Water Topography	Closure	Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Maintain a buffer zone of 100 m around streams. Note that these buffer zones are essential to ensure healthy functioning and maintenance of wetland. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas,	Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible. Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers	

				undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of pristine habitats and minimise the overall mining footprint. The footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Low angle access ramp in	

				excavations; Snares & traps removed and destroyed; and Maintenance of firebreaks.	
Workshop and Wash bay	Groundwater contamination and usage Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Groundwater quality and quantity monitoring Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water distribution Pipeline	Groundwater abstraction and use Surface disturbance	Fauna Flora Groundwater Surface Water	Construction Commissioning Operational Decommissioning Closure	Monitor pipeline for water leaks Maintenance of pipeline Groundwater levels and quality monitoring Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water tanks:	Groundwater abstraction and usage Surface disturbance	Fauna Flora Groundwater Surface Water	Construction Commissioning Operational Decommissioning Closure	Maintain water tanks and structures Groundwater levels and quality monitoring	Safety ensured. Rehabilitation standards and closure objectives to be met.

f) Impact Management Actions

Table 25: TGME 10161 Impact Management Actions

ACTIVITY Whether listed or not listed.	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**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	**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:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.**	**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)
Blasting	Dust Fly-rock Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance Surface water contamination	Dust Control and monitoring Controlled blasting Noise and vibration control and monitoring Access control Continuous rehabilitation Storm water run-off control. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of	Upon cessation of the individual activity.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

		natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. At no point may plant cover be removed within the no-development zones. All attempts must be made to avoid exposure of dispersive soils. Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. Ground exposure should be minimised in terms of the surface area and duration, wherever possible. Construction that requires the clearing of large areas of vegetation and excavation should ideally occur during the dry season only. Construction during the rainy season (November to March) should be closely monitored and controlled. The run-off from the exposed ground should be controlled with the careful placement of flow retarding barriers. The soil that is excavated during construction should be stock-piled in layers and protected by berms to prevent erosion. All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses. Excavated and stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate. Stockpiles susceptible to wind erosion are to be covered during windy periods. Audits must be carried out at regular intervals to		• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		identify areas where erosion is occurring. Appropriate remedial action, including the rehabilitation of the eroded areas, must occur. Rehabilitation of the erosion channels and gullies. The mining operation should avoid land with steep slopes. Dust suppression must take place, without compromising the sensitive water balance of the area.		
Explosive Magazine:	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna	Access Control Maintenance of magazines and fence Groundwater quality monitoring Storm water run-off control Immediately clean up accidental spills.	Removal of explosive magazines upon closure of Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents,

				and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Sewage facilities Enviro Loos	Soil contamination Groundwater contamination	Maintenance of sewage facilities on a regular basis. Removal of container plants on closure	Removal of container plant upon closure of the Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations

				must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Clean & Dirty water systems: Haul Road River Crossing Structure Storm Water Dam per mining section	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	Older excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of Dams, Crossing structure and trenches Groundwater level monitoring Groundwater quality and quantity monitoring Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and Water control dams will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands.	Upon cessation of the individual activity (continuous rehabilitation) Levelling of storm water dam's walls upon closure of Mining Right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		Effluents and waste should be recycling and re-use as far as possible.		
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of Diesel tanks and bund walls. Oil traps Groundwater quality monitoring Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Removal of diesel tanks upon closure of Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Re-fuel and lube station	Groundwater contamination	Maintenance of Diesel tanks and bund walls. Oil traps Groundwater quality monitoring	Removal of Lube station upon closure of Mining Right.	The following must be placed at the site and is applicable to all

	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.		activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Mining Area (per mining section).	Dust Groundwater contamination Noise Removal and	Access control Dust control and monitoring Groundwater Quality and quantity monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays	Upon cessation of the individual activity (continuous rehabilitation)	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations

	disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Rock stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible. Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation		• COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		of any important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the		

		destruction of pristine habitats and minimise the overall mining footprint. The footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Low angle access ramp in excavations; Snares & traps removed and destroyed; and Maintenance of firebreaks.		
Generator:	Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Access control Maintenance of generator and bund walls Noise and vibration control and monitoring Oil traps Groundwater quality monitoring Immediately clean hydrocarbon spill Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Removal of generator upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

				Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Office	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Immediately clean hydrocarbon spill Rip disturbed areas to allow re-growth of vegetation cover. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems / wetlands. Effluents and waste should be recycling and re-use as far as possible.	Removal of container upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the

				operation adheres to the contents of the EIA and EMPr documents.
Parking Bay	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Dust Control and monitoring Groundwater quality monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean up hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Ripping of parking bay upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
PCC	Dust	Access control	Removal of processing	The following must be placed at

	Noise Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of processing plant Dust control and monitoring Groundwater quality monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Minimizing – unavoidable impacts shall be minimized by taking appropriate and practicable measures such as transplanting important plant specimens, confining works in specific area or season, restoration (and possibly enhancement) of disturbed areas, etc. Special care needs to be taken during the construction phase to prevent surface storm water rich in sediments and other pollutants from entering the natural drainage systems /	plant upon closure of mining right.	the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		wetlands. Effluents and waste should be recycling and re-use as far as possible.		
Roads (both access and haulage road on the mine site):	Dust Surface Water contamination Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of roads Dust control and monitoring Groundwater quality monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

Salvage yard (Storage and laydown area)	Surface Water contamination Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Access Control Maintenance of fence Groundwater quality monitoring Storm water run-off control Immediately clean hydrocarbon spill	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Security Gate and guard house	Dust Surface Water	Access control Maintenance of boom gates and entrance Dust control and monitoring	Removal and breaking down of building and boom gate upon closure of the	The following must be placed at the site and is applicable to all

at access control point	contamination Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Noise control and monitoring Groundwater quality monitoring Immediately clean hydrocarbon spill Rip disturbed areas to allow re-growth of vegetation cover. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	mining right.	activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Shaft bank area	Dust Surface Water contamination Groundwater	Dust Control and monitoring Groundwater quality monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills	Ripping of ore stockpile dump area upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation;

	Contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.		• Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Storage facility Drill Cores	Removal and disturbance of vegetation cover and natural habitat of fauna Surface Water contamination	Storm water run-off control Rip disturbed areas to allow re-growth of vegetation cover	Breaking down of building if approved by Regional Manager upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's

	Surface disturbance			• SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Topsoil storage area (temporary)	Dust Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil disturbance	Dust Control and monitoring Storm water run-off control Continuous rehabilitation Rip disturbed areas to allow re-growth of vegetation cover Backfilling of topsoil during rehabilitation Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. Topsoil must not be handled when the moisture	Spreading of all stored topsoil on rehabilitated areas and ripping of storage area upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be

	Surface disturbance	content exceeds 12 %. Topsoil stockpiles must be kept separate from sub-soils. The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil. Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic enclosures for equipment causing radiating noise; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.		trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Waste disposal site (domestic and industrial waste):	Groundwater contamination Surface Water contamination Contamination of soil Surface water contamination	Storage of Waste within receptacles Storm water control Ground water monitoring Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be

				trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Workshop and Wash bay	Surface Water contamination Groundwater contamination and usage Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater quality and quantity monitoring Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Removal of washbay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

				• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water distribution Pipeline	Groundwater abstraction and use Surface disturbance	Monitor pipeline for water leaks Maintenance of pipeline Groundwater levels and quality monitoring Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Removal of pipeline upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

				• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water tanks:	Groundwater abstraction and usage Surface disturbance	Maintain water tanks and structures Groundwater levels and quality monitoring	Removal of water tank and steel structure upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be

				trained to understand the contents of these documents, and to adhere thereto. Annual performance Assessment Reports and quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

g) 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.

Closure:

The main closure objective of this mine is to rehabilitate the mined areas in such a way to ensure that the rehabilitated topographical landscape would blend in with the surrounding landscape, would not pose a safety hazard for human and animal, but at the same time allow a certain alternative land use. Establish a self-sustaining and stable vegetation cover in order to mitigate the visual impact, to control erosion and to create some habitat for animals. The rehabilitated environment also needs to be aesthetically acceptable according to the principle of BPEO. The closure objectives have been informed fully by the baseline biophysical and socio-economic conditions.

TGME will ensure that the mine site is:

- Neither a danger to public health and safety nor to animal health and safety.
- Not a source of any pollution.
- Stable (ecological and geophysical).
- Rehabilitated to the state that is suitable for the predetermined and agreed land use.
- Compatible with the surrounding biophysical environment.
- A sustainable environment.
- Aesthetically acceptable.
- Not an economic, social or environmental liability to the local community or the state now or in the future.

TGME will ensure that the physical and chemical stability of the rehabilitated mining site will be such that risk to the environment is not increased by naturally occurring forces to the extent that such increased risk cannot be contended with by the installed measures.

TGME will subscribe to the optimal exploitation and utilization of South Africa's mineral resources.

TGME will ensure that the mining site is closed efficiently and cost effectively.

TGME will ensure that the operation is not abandoned but closed in accordance with the relevant requirements.

TGME will ensure that the interest of all interested and affected parties will be considered.

TGME will ensure that the all-relevant legislation regarding mine closure will be adhered to, and all relevant application procedures followed.

With regard to the extension, the mitigation of all environmental impacts on all applicable aspects uses BPEO (Best practical environmental option) principles.

- Optimal utilization and maintenance of existing mine facilities in a well-planned manner.

- To take care that no new land surface, habitats of vegetation and animals are destroyed, disturbed or alienated unnecessarily.
- To contain and prevent any pollution (physical and chemical) from the mining operation within structures, facilities provided therefore.
- To ensure an effective surface run-off control system in order to deal with the separation of clean and dirty water environment.
- The sustainable and responsible utilization (re-use) of all water resources and the prevention of pollution thereof.
- The sustainable rehabilitation of the mining site (excavations, topsoil- & overburden stockpiles, rest of terrain) in order to address all environmental impacts as far as practical.

Socio-Economic conditions as identified in the Social and Labour Plan:

- The objectives of the social and labour plan are to:
- Promote employment and advance the social and economic welfare of all South Africans;
- Contribute to the transformation of the mining industry; and
- Ensure that the holder of mining rights contribute towards the socio-economic development of the areas in which they are operating.

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

Please refer to Part A, for the detailed discussion regarding I&AP Consultation. The detailed issues and response report is attached to Appendix 8.

(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

Please refer to Appendix 18

Infrastructure Areas:

On completion of the mining operation, the various surfaces, including the access roads, the office areas, storage areas and the screening plant site, will finally be rehabilitated as follows:

- All remaining material on the surface will be removed to the original topsoil level. This material will then be backfilled into the depressions. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.
- All infrastructures, equipment, screening plant, and other items used during the operational period will be removed from the site.
- On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with Regulation 44 of the Minerals and Petroleum Resources Development Act, 2002, which states:

1. *Regulation 44: When a prospecting right, mining right, retention permit or mining permit lapses, is cancelled or is abandoned or when any*

prospecting or mining operation comes to an end, the holder of such right or permit may not demolish or remove any building, structure or object –

(a) which may not be demolished or removed in terms of any other law;

(b) which has been identified in writing by the Minister for purposes of this section; or

(c) which is to be retained in terms of an agreement between the holder and the owner or occupier of the land, which agreement has been approved by the Minister in writing.

2. *The provision of subsection (1) does not apply to bona fide mining equipment, which may be removed.*

Topsoil and Stockpile Deposits:

Disposal Facilities:

- Waste material of all description inclusive of receptacles, scrap, rubble and tyres will be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- Ongoing Seepage, Control of Rain Water:
    - Monitoring of ground or surface water will take place, for a period of 3 years post-closure or until water quantity and quality conforms to the closure objectives.
    - Long Term Stability and Safety:
    - It will be the objective of mine management to ensure the long-term stability of all rehabilitated areas including the backfilled depressions. This will be done by the monitoring of all areas until a closure certificate has been issued.
- Final rehabilitation in respect of erosion and dust control:
    - Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is planned.

Final Rehabilitation Roads:

- After rehabilitation has been completed, all roads will be ripped or ploughed, fertilized and seeded, providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

Maintenance (Aftercare):

- Maintenance after closure will mainly concern the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine will be to create an acceptable post-mine environment and land-use. Therefore, all agreed commitments will be implemented by Mine Management.

After-effects Following Closure:

- Acid Mine Drainage:

  No potential for bad quality leachate or acid mine drainage development exists after mine closure.
- Long Term Impact on Ground Water:

  No after effect on the groundwater yield or quality is expected.
- Long-term Stability of Rehabilitated Land:

  One of the main aims of any rehabilitated ground will be to obtain a self-sustaining and stable end result.

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

The ultimate rehabilitation of the mining site that involves the sloping, levelling, replacement of topsoil and the seeding of a grass seed mix in areas that does not recover acceptably as agreed to by the land owner will ensure that the site could be regarded as safe for humans and animals and will also ensure that the site is stable from an erosion point of view and also ensuring that the site could be used for plantations or grazing land again.

The removal of waste material of any description from the mining area and the disposal thereof at a recognised landfill facility.

The removal of infrastructure, equipment, plant and other items from the site.

The ripping of compacted areas to a level of 300mm and the levelling of such areas in order to re-establish a growth medium for plants (such areas will furthermore be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the prospecting operation, if the re-establishment of vegetation is unacceptably slow.

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

Compounded rehabilitation estimate for yrs1-10 - Sabie Project (10161 MR)										
Mine Section	**Yr1**	**Yr2**	**Yr3**	**Yr4**	**Yr5**	**Yr6**	**Yr7**	**Yr8**	**Yr9**	**Yr10**
GLYNN'S	738 774,14	738 774,14	1 477 548,29	2 216 322,43	2 955 096,58	3 693 870,72	4 432 644,86	5 171 419,01	3 693 870,72	2 955 096,58
OLIFANTSGERAAMTE				369 387,07	369 387,07	369 387,07	369 387,07	369 387,07	369 387,07	369 387,07
HENDRIKSDAL										
ROSSHILL								369 387,07	369 387,07	369 387,07
NESTOR										1 108 161,22
TOTAL (excl. VAT)	**738 774,14**	**738 774,14**	**1 477 548,29**	**2 585 709,50**	**3 324 483,65**	**4 063 257,79**	**4 802 031,94**	**5 910 193,15**	**4 432 644,86**	**4 802 031,94**

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

It is hereby confirmed that the financial provision will be provided as determined.

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

h) Monitoring of Impact Management Actions

The following sections present the monitoring requirements of the mine.

Groundwater Monitoring in the Sabie-Pilgrims Rest Goldfield

Groundwater monitoring in the region currently focusses on the active mining sites. The monitoring network should be expanded to include the new mining areas. The purpose and recommended monitoring is as follows:

- Monitor groundwater quality at possible contaminant sources such as waste rock dumps and tailings facilities. The proposed shaft / adit layout makes provision for the drilling of boreholes. The main purpose of these boreholes is for water supply, but they can also be used for monitoring.
- Water intersected underground and water emanating from adits should also be monitored for volume and quality.
- Monitor groundwater levels in areas where water inflow into the mine workings can potentially lower the regional groundwater levels. Monitoring can be done either through surface monitoring boreholes or the installation of underground pressure gauges. Short boreholes can be drilled into underground fissures and equipped with a pressure gauge. The pressure reading can be converted to a water level.
- Groundwater levels should be measured monthly.

Groundwater quality monitoring should be conducted on a quarterly basis, unless specified otherwise by the WUL. The required chemical parameters to be analysed will be specified in the WUL, but will likely consist of the following (Table 26.)

Table 26: Sampling parameters

Parameter	Unit	Parameter	Unit
pH	pH Units	Fluoride	mg/ℓ F
Electrical Conductivity	mS/m	Calcium	mg/ℓ Ca
Total Dissolved Solids	mg/ℓ	Magnesium	mg/ℓ Mg
Suspended Solids	mg/ℓ	Sodium	mg/ℓ Na
Total Alkalinity	CaCO3	Potassium	mg/ℓ K
Total Hardness	CaCO3	Aluminium	mg/ℓ Al
Chloride	mg/ℓ Cl	Iron	mg/ℓ Fe
Sulphate	mg/ℓ SO4	Manganese	mg/ℓ Mn
Nitrate	mg/ℓ NO3	Lead	mg/ℓ Pb
Ammonium	mg/ℓ NH4	Zinc	mg/ℓ Zn
Ortho-phosphate	mg/ℓ PO4	Copper	mg/ℓ Cu
Arsenic	mg/ℓ As	Cyanide	mg/ℓ Cn

Surface Water Monitoring

The current surface water monitoring points of TGME and DWS is provided in the surface water report together with the probable runoff paths for the various shafts and adits, should

runoff occur. The existing monitoring sites is sufficient except for a background reading before the drainage line originating from the Olifantsgeraante.

The assumption is that both the TGME and DWS monitoring will continue. Flow gauging is also currently continuing at X3H001, X3H002 and X3H023. As long as these gauges continues flow monitoring, model calibration should be possible to infer flows at the various water quality monitoring sites.

Freshwater resource monitoring

- Any areas where active erosion is observed must be rehabilitated and berms utilised to slow movement of water.
- Wetland and riparian resources need to be monitored using the wetland assessment protocols as defined below unless updated and/or more appropriate methods are developed in future:
    - Wetland Ecoservices;
    - PES according to the WET-Health method or the IHI method as applicable;
    - Wetland zonation monitoring to determine whether impacts on wetland base flow levels are occurring;
    - Water quality monitoring as part of the mine's water quality monitoring program; and
    - Monitoring of the wetland and riparian vegetation assemblage, in particular alien vegetation. Where applicable, VEGRAI should be used as part of the monitoring process.
- Ongoing monitoring of the trends in ecological integrity of the assessed sites in the vicinity of the existing and proposed TGME mining facilities is deemed essential, in order to monitor the impacts of the mining activities of these very sensitive and ecologically important systems. Aquatic biomonitoring should take place on a biannual basis by an SA RHP Accredited assessor, in order to identify any emerging issues in the receiving environment using the following indices in the assessment:
    - Habitat assessments using IHAS (6monthly) and the IHIA (annually);
    - Aquatic macro-invertebrates using SASS5 and the MIRAI Ecostatus tool (6 monthly);
    - Fish community integrity using the FRAI Ecostatus tool (Annually in summer); and
    - Diatoms and the application of the SPI index (6 monthly).
    - Close monitoring of water quality (surface water, groundwater and process water) must take place. Monitoring of water quality should take place monthly, during which time basic parameters such as pH, Total Suspended Solids (TSS) and Total Dissolved Solids (TDS), Dissolved Oxygen (DO) and Electrical Conductivity (EC) are measured;
    - Should EC or pH values reach an undesirable level, suitable mitigation measures should be implemented;
- Toxicity testing of the mines process water facilities, the groundwater and surface water resources should take place concurrently with the biomonitoring program, in order to monitor the toxicological risk of the process water system to the receiving environment and in particular the groundwater resources. These ongoing toxicological tests should be compared to baseline data to monitor and manage any emerging *impacts over time. Tests should include the following test organisms as a minimum:* •
    - *Vibrio fischeri;*

    - *Poecilia reticulata; and*
    - *Daphnia pulex.*
- Should emergency discharge from any process water system be required, definitive toxicological testing according to the Direct Estimation of Ecological Effect Potential (DEEEP) protocol should take place, in order to define safe discharge volumes and ensure sufficient dilution;
- Results of future assessments should be compared spatially and temporally to the results of this document. If it is observed through biomonitoring information that significant negative changes are taking place in ecological integrity (Change of Class), it should be taken as an indication that the system is suffering stress and mitigatory actions should be identified and where possible, implemented; and
- Biomonitoring results very strongly rely on the competency level of the assessor. All future biomonitoring studies should be undertaken by an accredited assessor and it would be preferable to utilise the same assessor in subsequent studies in order to allow for more accurate comparison of data over time.
- Additional Addendum made by Scientific Terrestrial Services:
- The water quality requirements to maintain the Ecostatus of the receiving aquatic environment must be determined. This should be undertaken by application of the Physic-chemical Assessment Index (PAI) Ecostatus tool. This will ensure that appropriate water quality. standards for the receiving environment can be defined as part of the WULA to maintain the ecology of the highly sensitive rivers in the area.
- The Instream flow of the rivers in the area is considered an important aspect of their ecology. Any significant changes to the flow regime of the system may have a detrimental impact on the ecology of these systems. Should the Reserve not be available at an appropriate position in the rivers in the vicinity of the proposed mining projects, reserve determinations should be undertaken, as a minimum on a desktop level, to define the Environmental Water Requirements (EWR) for the system. This information must then be used to manage any discharges of underground dewatering water or any abstraction from the system to ensure that the EWR tolerances are not breached.

Soil contamination monitoring must be combined with the surface water monitoring, where selected points can be sampled in the vicinity of the nearby surface water resources in order to identify if contaminant migration may have occurred from the proposed mining activities.

Terrestrial Ecological Monitoring

A terrestrial ecological monitoring plan must be designed and implemented throughout all phases of the mining development, should it be approved. The following points aim to guide the design of the monitoring plan, and it must be noted that the monitoring plan must be continually updated and refined for site-specific requirements:

- Permanent monitoring plots within similar habitat to what was disturbed, must be established in areas surrounding the surface infrastructure areas. These plots must be designed to accurately monitor the following parameters:
    - Measurements of crown and basal cover;
    - Species diversity (Flora and Fauna);
    - Species abundance (Flora and Fauna);
    - Impact of dust on flora;

    - Recruitment of indigenous species;
    - Alien vs. Indigenous plant ratio;
    - Recruitment of alien and invasive species;
    - Erosion levels and the efficacy of erosion control measures;
    - Floral and Faunal community structure including species composition and diversity which should be compared to pre-development conditions; and
    - Presence, abundance and condition of floral SCC communities.
- The following methods aim to guide the monitoring plan, although more detailed, site specific methods must be employed during the development and implementation of the monitoring plan:
    - Monitoring activities must take place on an annual basis as a minimum, but on an bi annual for avifauna;
    - Annual walk down of all water sources within a radius of 1km of the infrastructure areas, access roads and opencast mining areas must be done, as these water courses will be used as migratory corridors by faunal species. All spoor, scat and signs of faunal species occurrence must be identified and recorded with a relevant GPS point taken; and •
    - Sherman traps and camera traps must be installed to monitor small mammal diversity.
- Monitoring of rehabilitation trials in light of the above parameters must also take place throughout all phases of the proposed mining development and for a period of 5 years after decommissioning and closure;
- The rehabilitation plan must be continuously updated in accordance with the monitoring results in order to ensure that optimal rehabilitation measures are employed;
- Results of the monitoring activities must be taken into account during all phases of the proposed mining development and action must be taken to mitigate impacts as soon as negative effects from mining related activities become apparent; and
- The method of monitoring must be designed to be subjective and repeatable in order to ensure consistent results

Visual Monitoring

Visual monitoring, to ensure that mitigation measures regarding visual impacts are implemented and maintained, should be considered throughout all mining phases. This programme would largely be based on visual reconnaissance at ground level and it must be noted that the monitoring plan must be continually updated and refined for site-specific requirements. The following points aim to guide the design of the monitoring plan:

- The selected KOPs from where infrastructure is proven to be visible, should be used over the life of the project to review the success of the mitigation plan;
- The visual monitoring programme should be based on the following parameters:
    - Airborne dust (in line with air quality assessment)
    - Visibility of lights at night from surrounding receptors;
    - Number of lights visible;
    - Vegetation cover and height; and
    - Disturbance to receptors
- A decommissioning and site revegetation plan must be developed in order to ensure that the area's pre-development scenic quality and visual integrity is restored and that the project area is visually integrated into the surrounding landscape setting.

Important aspects addressed should include requirements that all aboveground and near-ground structures be removed, that the project site be re-graded and shaped, and that vegetation be re-established to be consistent with the surrounding landscape;

- Predevelopment visual conditions and the inventoried visual quality rating and scenic integrity should be reviewed after construction;
- Vegetation must be monitored annually in terms of vegetation growth, density, height, species analysis for a period of five years after decommissioning or in line with the vegetation monitoring plan, to ensure that concurrent rehabilitation is taking place and that the proposed infrastructure footprint areas are suitably revegetated;
- The maintenance of infrastructure must be monitored throughout the operational phase of the project; and
- Results of the monitoring activities must be taken into account during all phases of the proposed project and action must be taken to mitigate impacts as soon as unexpected negative visual effects from the proposed activities become apparent
- At decommissioning the success of rehabilitation would be based on the rate and percentage of vegetation recovery. Monitoring is to continue beyond decommissioning to ensure that the rehabilitation is successful and that the vegetation is self-sustaining. The success of rehabilitation will also largely be dependent upon the eradication of alien and invasive floral species.

Waste Monitoring

On 2 June 2014 the National Environmental Management: Waste Amendment Act came into force. With various amendments brought by this amendment, the most significant, and still most controversial change is the blanket inclusion of mine residue stockpiles as hazardous waste under the Schedule 3: Defined Wastes Definitions. Section 4 of the act has also been amended to remove the previous exclusion of mine residue deposits and stockpiles from the act's ambit. Mine residue deposits and stockpiles are accordingly no longer governed by the MPRDA, but are subject to all the provisions of the National Environmental Management: Waste Act, 2008 (NEM:WA).

Schedule 3: Defined Wastes have been broken down into two categories: Category A being hazardous wastes and category B being general wastes. Under Category a (hazardous wastes) the act makes allowance for "Wastes resulting from exploration, mining, quarrying, and physical and chemical treatment of minerals".

In order to attempt to understand the implications of this on a mining operation, it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means " any waste that contains organic or inorganic elements or compounds that may, owning to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."
- Residue deposits: means "any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."
- Residue stockpile: means "any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is

stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act."

Various regulations have been drafted in support of the NEM: WA, some of which are already in effect, and then there are also those still proposed.

Chapter 9 of the above-mentioned Regulations stipulates the requirements for a motivation for and consideration of listed Waste Management Activities that do not require a Waste Management License. The motivation must:

- Demonstrate that the waste management activity can be implemented without unacceptable impacts on, or risk to, the environment or health;
- Must provide a description of the waste;
- Description of waste minimisation or waste management plans;
- Description of potential impacts, etc.

The transitional provisions under Chapter 6 of this regulations prescribes timeframes in which all wastes must be classified within 18 months from the date of commencement of these regulations (23 August 2013) and every five years thereafter or should the process be changed or altered.

For the above purposes, TGME must implement and undertake a Waste Classification System in accordance with the NEM: WA.

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

h) Monitoring and Reporting Frequency

i) Responsible persons

j) Time Period for Implementing Impact Management Actions

k) Mechanisms for Monitoring Compliance

Table 27 Mechanism for monitoring

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
Topography	To minimise the reduction of land capability.	To ensure that rehabilitation post-mining slopes are stable, free draining and no slopes have an angle in excess of 20º.	Site Manager/ Environmentalists	Monitoring will be done on an annual basis to ensure that the levels and the slopes are in order.
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified.	Site Manager/ Environmentalists	Monitoring will be done on an annual basis or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the mine minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental

				Consultant and submitted to Mine Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in mining areas, and therefore a habitat for wildlife; and To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an annually basis to investigate species diversity and abundance.
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining.	Site Manager/ Environmentalists	Monitoring will be done at the rehabilitated areas on a twice a year basis (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will be adhered to at all times. To control the incidence of unacceptable noise levels on site.	The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant and that which may migrate outside the plant area.	The engineer during the construction phase and the responsible person during the operational phase of the project. The site engineer and independent qualified environmental noise and vibration specialist.	Quarterly reports on fall-out noise monitoring will be conducted as required by legislation. If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.
Surface Water	To conserve water; and To eliminate the contamination	There are no sources in the vicinity of the mine. The non-perennial stream will be monitored by collecting surface water samples	Site Manager/Water Supply	The streams which may be impacted by the mining activity are non-perennial. Monitoring takes place by collecting surface water samples during the rainy

	of run-off.	during the rainy season.		season at a frequency of once a month.
Ground Water	To minimise and prevent as far as practically possible the contamination of ground water. To minimise and prevent as far as practically possible the dewatering of the areas around the mine.	Ground water in the pits is dewatered and used as far as practically possible. Monitoring will also be done on groundwater that is encountered in excavations.	Site Manager/Water Supply	Groundwater quality monitoring should be conducted on a quarterly basis, unless specified otherwise by the WUL. The required chemical parameters to be analysed will be specified in the WUL, but will likely consist of the following (Table 26.)

(l) Indicate the frequency of the submission of the performance assessment report.

Internal Audits

Quarterly internal audits should be undertaken to ensure that the conditions of this EMP are implemented.

External Performance Assessments

During the construction and closure phases it is recommended that the independent external performance assessments be undertaken biannually.

After the construction activities have been completed, independent external performance assessments should be undertaken annually.

The external performance assessments must also include the overall mine assessment of the financial provision and EMP commitment. The report should be submitted to the DMR within 30 days of finalisation.

Other Performance Indicator Assessments

Due to the dynamic nature in which the mine is addressing the water management on site and considering the near-future projects that are planned, the following measure to ensure that performance measures are reached are recommended:

- Ongoing water monitoring in terms of the monitoring protocol.
- Biannual meetings be scheduled with the DWS and/or CMA to discuss the action plan compliance and status.
- Annual update of the IWWMP.
- Annual update of the Water Balance.
- Annual update of the Salt Balance.

(m) 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

An Environmental Awareness and Risk Assessment Schedule have been developed and is outline in Table . The purpose of this schedule is to ensure that employees are not only trained but that the principles are continuously re-enforced.

Table 28: Environmental Training and Awareness Schedule

Type of Forum	Frequency	Time allocation	Objective
Internal Management Meetings	Monthly	One hour workshop	A workshop session in which the following is discussed: 1. Current status of environmental compliance; 2. Environmental concerns and non-compliances recorded; 3. Weekly, monthly, quarterly, annually and 5 year mine plan; 4. Environmental risks and requirements; 5. Action plan.
Induction (all staff	Prior to first time	1 hour training on	1. Develop an understanding of what is meant

Type of Forum	Frequency	Time allocation	Objective
and workers)	site access, and biannually thereafter	environmental awareness training as part of site induction	by the natural environmental and social environment and establish a common language as it relates to environmental, health, safety and community aspects. 2. Establish a basic knowledge of the environmental legal framework and consequences of non-compliance. 3. Clarify the content and required actions for the implementation of the EMP. 4. Confirm the spatial extent of areas regarded as sensitive and clarify restrictions. 5. Provide a detailed understanding of the definition, the method for identification and required response to emergency incidents.
Awareness Talks (all staff and workers)	Weekly	30 minute awareness talks	1. Current status of environmental compliance; 2. Environmental concerns and non-compliances recorded; 3. Based on actual identified risks and incidents (if occurred) reinforce legal requirements, appropriate responses and measures for the adaptation of mitigation and/or management practices.
Risk Assessments (supervisor and workers involved in task)	Daily	Daily task based risk assessment	1. Establish an understanding of the risks associated with a specific task and the required mitigation and management measures on a daily basis as part of daily tool box talks.

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

As prescribed in Table before, Task / Issue Based Risk Assessments must be undertaken with all workers involved in the specific task in order to establish an understanding of the risks associated with a specific task and the required mitigation and management measures.

Environmental emergencies occur over the short term and require an immediate response. A mine, as part of its management tools, especially if it is ISO 9000 and ISO 14001 compliant, should have an Emergency Response Plan.

This plan should be placed around the mine where it will be easily viewed. The plan should contain a list of procedures, evacuation routes and a list of emergency contact numbers. It is advisable that the mine tests the emergency response plan in order to identify any areas for improvement.

If the emergency has the potential to affect surrounding communities, they should be alerted via alarm signals or contacted in person. The surrounding community will be informed, prior to mining taking place, of the potential dangers and emergencies that exist, and the actions to be taken in such emergencies.

Communication is vital in an emergency and thus communication devices, such as mobile phones, two-way radios, pagers or telephones, must be placed around the mine.

TGME has an Emergency Preparedness and Response Plan in place on site. This plan specifically addresses the following:

- Procedures applicable to all surface areas;
- Procedures applicable to veldt fires;
- Procedures applicable to underground fires;
- Damage to a Radio Active source;
- Radioactive source and fires;
- Major fall of ground accidents;
- Major power failure;
- Tailings Dam collapse;
- Flooding in the underground workings;
- Labour unrest;
- Handling petrochemical spills;
- Lightning detector warning alarm within the mining area, surface and underground;
- Safety harness fall rescue plan;
- Rescue and response capability; and
- Management of Emergencies.

(n) Specific information required by the Competent Authority

In terms of Section 41, Regulations 53 and 54 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002), TGME is required to make financial provision for the interim and final rehabilitation activities on the site. This provision will be reviewed annually for adequacy and amended to compensate for new activities and/or inflation. During the annual review, confirmation will be provided that this amount can be provided for from operating expenditure.

TGME, will provide for the closure liability either through a Bank Guarantee as allowed by Regulation 527 of the MPRDA.

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.

Signature of the Environmental Assessment Practitioner

Globesight (Pty) Ltd

Name of company

Date

Undertaking by the client:

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

Full Names and Surname

Identity Number

Designation

Signature

Date