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**APPLICANT: TSHIPI É NTLE MANGANESE MINING**

**DMR Reference Number: NC/30/5/1/2/2/0206MR**

**SCOPING REPORT FOR THE CHANGES TO SURFACE  
INFRASTRUCTURE AT THE TSHIPI BORWA MINE**

**AUGUST 2015**

**SCOPING REPORT**

Submitted with due regard to

**consultation with communities and interested and affected parties**

**as required in terms of Regulation 49 of the Mineral and Petroleum Resources  
Development Act (Act 28 of 2002), and in accordance with the standard directive for the  
compilation thereof as published on the official website of the Department of Mineral  
Resources**

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# SCOPING REPORT FOR THE CHANGES TO SURFACE INFRASTRUCTURE AT THE TSHIPI BORWA MINE

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## ACRONYMS AND ABBREVIATIONS

Acronyms / Abbreviations	Definition
BID	Background information document
DALRRD	Department of Agriculture, Land Reform and Rural Development
DENC	Department of Environment and Nature Conservation
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
DRPW	Department of Roads and Public Works
EAP	Environmental Assessment Practitioner
EAPSA	Environmental Assessment Practitioners of South Africa
EIA	Environmental impact assessment
EMP	Environmental management programme
IAPs	Interested and/or affected parties
MPRDA	Mineral and Petroleum Resources Development Act, 28 of 2002
NEMA	National Environmental Management Act, 107 of 2008
NEM:AQA	National Environmental Management: Air Quality Act, 39 of 2004
NEM:WA	National Environmental Management: Waste Management Act, 59 of 2008
NGO	Non-Government Organisation
NWA	National Water Act, 36 of 1998
SAHRA	South African Heritage Resources Agency
SLR	SLR Consulting (Africa) (Pty) Ltd
WESSA	Wildlife and Environmental Society of South Africa
WULA	Water Use License Application

## INTRODUCTION

### Introduction to the proposed project

Tshipi é Ntle Manganese Mining (Tshipi) currently operates the developing Tshipi Borwa Mine located on the farms Mamatwan 331 and Moab 700, to the south of Hotazel in the John Taolo Gaetsewe District Municipality (previously known as the Kgalagadi District Municipality) in the Northern Cape Province. The project location is illustrated in Figure 1 and Figure 2.

The mine currently holds an approval (NC/30/5/1/2/2/0206MR) from the Department of Minerals and Energy (currently known as the Department of Mineral Resources) and an approval (NC/KGA/KATHU/37/2008) issued by the Department of Tourism, Environment and Conservation (currently known as the Department of Environment and Nature Conservation).

Tshipi is proposing to amend its approved Environmental Impact Assessment (EIA) and Environmental Management Programme (EMP) to cater for changes to its approved infrastructure layout that have already taken place as well as proposed changes. Changes that have already taken place at the Tshipi Borwa Mine include:

- The relocation of the western waste rock dump
- The establishment of a new waste rock dump (eastern waste rock dump)
- The relocation of the office, plant, workshop and related infrastructure
- Design and capacities change of the approved stormwater dams
- Changes in the design of the railway siding
- The establishment of an additional stormwater dam (contractors stormwater dam)
- The relocation of the low grade and fines stockpiles
- The expansion of the diesel storage facility
- The expansion of the sewage treatment plant

In addition to the above, Tshipi is proposing to develop a boundary mining venture area with Mamatwan mine including the establishment of a process water dam.

SLR Consulting (Africa) (Pty) Ltd (SLR) has been appointed to manage the environmental authorisation processes.

The EIA process comprises two phases: the scoping phase and environmental impact assessment phase combined with the environmental management programme (EIA and EMP) phase. This report describes the scoping phase for the proposed project.

### Brief project motivation (need and desirability)

During the construction phase of the Tshipi Borwa Mine it became apparent that the approved infrastructure layout was sub optimal and as such there have been changes to the layout. In this regard,



the Northern Cape Department of Mineral Resources (DMR) requested that Tshipi amend its approved EIA and EMP to cater for changes that have taken place and proposed changes to the infrastructure layout.

### Legal Framework

Prior to the commencement of the proposed project, an environmental decision from the DMR in terms of Section 102 of the Mineral and Petroleum Resources Development Act, 28 of 2002 (MPRDA) in the form of an amended EIA and EMP report is required. DMR has been informed of Tshipi's intention to amend the approved Tshipi Borwa Mine EMP.

It is expected that any additional approvals/permits needed for the project will be identified during the course of the environmental assessment process. A detailed list will be provided in the EIA and EMP report.

This document has been prepared strictly in accordance with the DMR 2010 Scoping Report template format, and was informed by the guidelines posted on the official DMR website. This is in accordance with the requirements of the MPRDA. The relevant criteria are indicated in Table 1.

**TABLE 1: LEGAL FRAMEWORK**

Reference in scoping report	Mining Regulation 49 of Regulation 527 of 23 April 2004
Introduction	-
Introduction	-
Section 6	Describe the methodology applied to conduct scoping.
Section 1 and Appendix B	Describe the process of engagement of identified interested and affected parties (IAPs), including their views and concerns.
Section 2	Describe the existing status of the environment prior to the mining operation.
Section 3.1	Describe the most appropriate procedure to plan and develop the proposed operation.
Section 4.1 and 4.5	Identify and describe reasonable land use or development alternatives to the proposed operation. Describe the consequences of not proceeding.
Section 3	Identify and describe the anticipated environmental, social and cultural impacts, including cumulative effects where applicable.
Section 6	Describe the nature and extent of further investigations required in the environmental impact assessment report.

### Scoping phase objectives

The objectives of the scoping phase are to understand the proposed project, identify and describe potential environmental and social impacts, and to set out any related terms of reference for further investigations that will enable the meaningful assessment of all relevant environmental and social issues. The terms of reference for further investigations are included in Section 6.1.

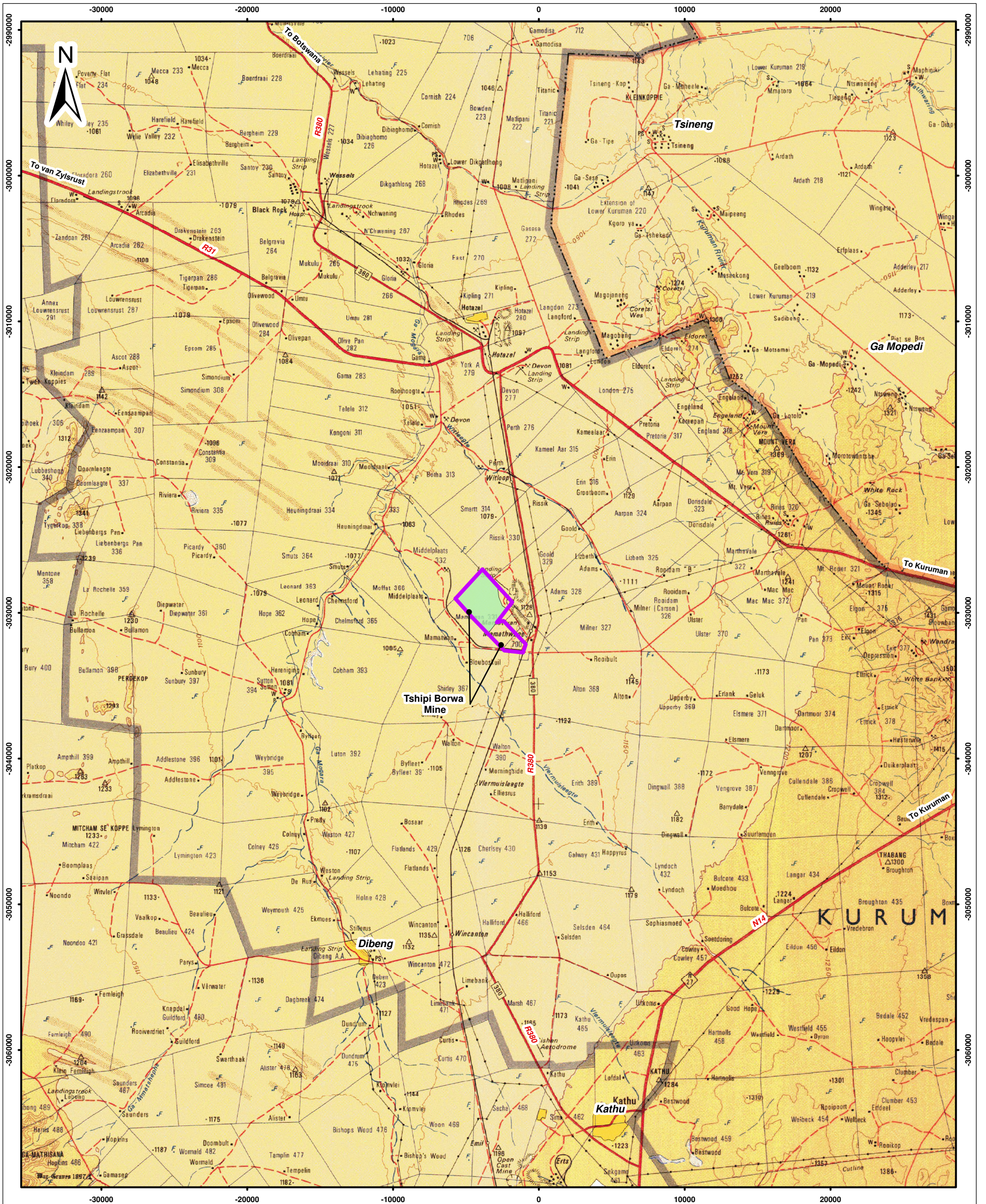
**Scoping team**

Natasha Daly (project manager) has approximately six years of relevant experience. Brandon Stobart (project reviewer) has over 17 years of relevant experience and is certified with the Certification Board for Environmental Assessment Practitioners of South Africa (EAPSA) as an Environmental Assessment Practitioner (EAP).

SLR has no interest in the project other than fair payment for consulting services rendered as part of the environmental assessment process.

**Contact details for responsible persons**

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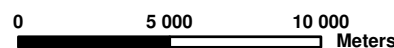
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- Approved Mining Right Area

**TSHIPI E' NTLE MANGANESE MINING**

**Figure 1**  
**Regional Setting**



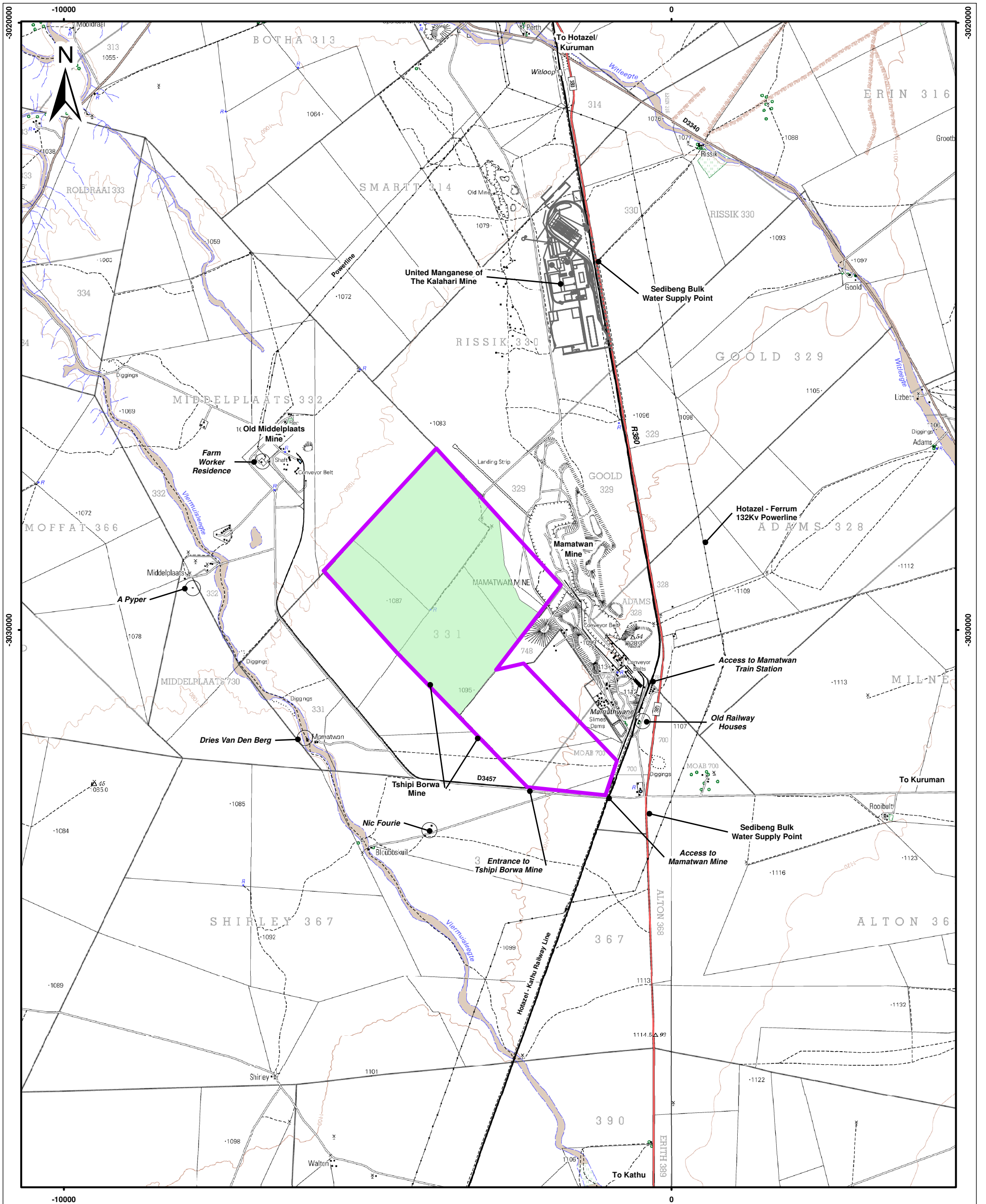
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Projection: Transverse Mercator  
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March 2015



**Legend**

- Surface Use Area
- Approved Mining Right Area

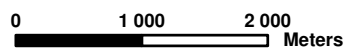
**TSHIPI E'NTLE MANGANESE MINING**

**Figure 2**

**Local Setting**



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 Projection: Transverse Mercator  
 Datum: WGS1984, Lo23

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## 1 THE METHODOLOGY APPLIED TO SCOPING

The scoping process was conducted in accordance with the requirements of the legal framework outlined in Table 1 of the Introduction to this report and involved the following steps:

- Key team members conducted a site visit to the developing Tshipi Borwa Mine
- Available studies and reports covering the Tshipi Borwa Mine were reviewed
- A project description was drafted in consultation with the mine
- Potential positive and negative impacts were identified by considering the project description and site conditions
- Interested and affected parties (IAPs) were identified, notified of the proposed project and consulted (the consultation process is outlined in Section 5 of this report)
- The relevant authorities were identified, notified of the proposed project and consulted (the consultation process is outlined in Section 5 of this report)
- The SLR environmental team identified the investigations required to assess the potential positive and negative impacts (the terms of reference are included in Section 6 of this report)
- A Scoping Report was compiled.

The main sources of information used to develop this report are discussed below.

As part of the approved EIA and EMP process various specialist studies were commissioned to cover the Tshipi Borwa Mine (previously referred to as the Ntsimbintle Manganese Mine) site. The following studies were completed and have been used to inform this report:

- *Specialist air quality impact assessment for the proposed Ntsimbintle Manganese Mining operations, Airshed, April 2009*
- *Specialist ecological survey for the proposed Ntsimbintle Manganese Mine, Ecological Management Services, November 2008*
- *Specialist groundwater investigation for the Ntsimbintle Manganese Mine, Water Geoscience Consulting, February 2009*
- *Specialist heritage impact assessment for the Ntsimbintle Manganese Mine, PGS, March 2009.*
- *Specialist soil information for the Ntsimbintle Mine, ARC-Institute for soil, climate and water, October 2008.*

### 1.1 RELEVANT COMMUNITIES

The communities, as defined in the DMR Guideline, closest to the proposed project are listed below:

- Farm workers residence located on the farm Middelpaats 332 located approximately 2km north west from the mine (Figure 2)

- Permanent farm homestead (A. Pyper) located on the farm Middelpaats 332 approximately 2km west of the mine (Figure 2)
- Permanent farm homestead (Andries van den Berg) located on the farm Mamatwan 331 approximately 2.5km south west of the mine (Figure 2)
- Permanent farm homestead (Nic Fourie) located on the farm Shirley 367 approximately 2km south of the mine (Figure 2)
- The Black Rock mining community located approximately 26 km north west of the mine (Figure 1)
- The Hotazel mining community about 18 km north of the mine (Figure 1)

## 1.2 COMMUNITY LAND OWNERSHIP

Surface rights of the project area are held by mining companies and private landowners as detailed in Section 1.6.

## 1.3 DEPARTMENT OF LAND AFFAIRS INTEREST

The Department of Rural Development and Land Reform, (formerly known as the Department of Land Affairs) has been identified as an interested and affected party (IAP) and has been consulted. Proof of consultation is attached in Appendix A.

## 1.4 LAND CLAIMS

According to the Department of Rural Development and Land Reform no land claims have been lodged on the farms Mamatwan 331 and Moab 700. Refer to Appendix A for the proof of consultation with the Department of Rural Development and Land Reform.

## 1.5 RELEVANT TRADITIONAL AUTHORITY

There are no traditional authorities located within close proximity to the Tshipi Borwa Mine.

## 1.6 LANDOWNERS

The title deed owners are listed in Table 2 below.

**TABLE 2: LAND OWNERS IN THE PROJECT AREA**

Portion	Landowner	Title deed number
<b>Mamatwan 331</b>		
Remaining extent	Andries Mathys Van Den Berg	T594/1987
Portion 16 (Portion of portion 1)	Ntsimbintle Mining Pty Ltd	T904/2011
Portion 17 (Portion of portion 2)	Ntsimbintle Mining Pty Ltd	T904/2011
Portion 18 (Portion of portion 3)	Ntsimbintle Mining Pty Ltd	T301/2011
Portion 8	Tshipi é Ntle Manganese Mines	T770/2011

Portion	Landowner	Title deed number
<b>Moab 700</b>		
Portion 3	Hotazel Manganese Mines (Pty) Ltd	T953/2009

## 1.7 LAWFUL OCCUPIERS

A servitude right is held by Ntsimbintle Mining (Pty) Ltd for the establishment of a railway siding located on portion 3 of the farm Moab 700 and portion 18 (Portion of portion 3) of the farm Mamatwan 331.

## 1.8 OTHER PARTIES THAT MAY BE DIRECTLY AFFECTED

This section briefly discusses whether or not other persons (including on adjacent and non-adjacent properties) socio-economic conditions will be directly affected by the proposed mining operation.

Other parties that may be directly affected include the landowners on the adjacent properties (as listed in Table 3 below) and the associated farm workers.

**TABLE 3: LANDOWNERS ADJACENT TO THE PROJECT AREA**

Portion	Landowner	Title deed number
<b>Mamatwan 331</b>		
Portion 1	Hotazel Manganese Mines (Pty) Ltd	T2426/2010
Portion 2		T2426/2010
Portion 3		T953/2009
Portion 7	Transnet	T666/1965
<b>Middelplaats 332</b>		
Remaining Extent	Saltrim Ranches (Pty) Ltd	T2297/2006
Portion 4	Hotazel Manganese Mines (Pty) Ltd	T2426/2010
<b>Moab 700</b>		
Remaining Extent	Kruger Machiel Andries	T1229/1993
Portion 1	Transnet (Republic of South Africa)	T250/1983
<b>Rissik 330</b>		
Portion 1	Terra Nominees (Samancor Manganese)	T2395/1996
<b>Goold 329</b>		
Portion 5	Hotazel Managanese Mines	T2426/2010
<b>Shirley 367</b>		
Portion 1	Annalien Elizabeth Fourie	T730/1984
Portion 3	Transnet	T43/1993
<b>Sinterfontein 748</b>		
Whole farm	Terra Nominees (Samancor Manganese)	T2401/1996

Other parties that may be affected by the project that have been identified to date include:

- Downstream water users
- Surrounding mining operations
- Surrounding private landowners and land users on non-adjacent properties

## 1.9 RELEVANT LOCAL MUNICIPALITY

The relevant local municipality is the Joe Morolong Local Municipality.

## 1.10 OTHER STAKEHOLDERS

The relevant government departments, agencies and institutions responsible for the various aspects of the environment, land and infrastructure that may be affected by the proposed project are listed below:

- Regulatory authorities:
  - Department of Mineral Resources (DMR)
  - Department of Environment Affairs (DEA)
  - Department of Water and Sanitation (DWS) (Previously known as the Department of Water Affairs (DWA))
  - Department of Environment and Nature Conservation (DENC)
  - South African Heritage Resource Agency (SAHRA)
  - Department of Agriculture
  - Department of Rural Development Land Reform (DRDLR)
  - Department of Roads and Public Works (DRPW)
  - Joe Morolong Local Municipality
  - John Taolo Gaetsewe District Municipality
  - Ward councillor
- Non-governmental Organisation (NGO):
  - Wildlife and Environmental Society of South Africa (WESSA)
- Parastatals:
  - Transnet
- Other:
  - Landowners and land users
  - Surrounding mines

## 1.11 NOTIFICATION OF LANDOWNERS, LAWFUL OCCUPIERS AND IAPS

Proof that the landowners, lawful occupiers and IAPs were notified of the project is provided in Appendix B.



## **2 DESCRIPTION OF THE EXISTING STATUS OF THE ENVIRONMENT**

This section has been compiled using studies completed by various specialists for the original EIA (Metago, May 2009) as well as information from the site visits by SLR personnel. This baseline information is aimed at giving the reader perspective on the existing status of the cultural, socio-economic and biophysical environment. More detailed information will be provided in the EIA and EMP report.

### **2.1 AGREEMENT ON EXISTING STATUS OF ENVIRONMENT**

Information on the existing status of the environment was provided to IAPs in the Background Information Document (BID) and also during the scoping meeting, as per the minutes attached in Appendix B. IAPs will also have the opportunity to review this scoping report which includes details of the existing status of the environment.

Following from the scoping meetings it was confirmed that IAPs agreed on the status of the existing environment as laid out in the BID and scoping meeting presentation. It was however suggested that the prevailing wind direction be amended to include both south-easterly and north-easterly wind. In the regard the status of the existing environment has been updated accordingly and this will be reviewed during the air specialists study.

### **2.2 EXISTING STATUS OF THE CULTURAL ENVIRONMENT**

The term 'cultural resource' is a broad, generic term covering any physical, natural and spiritual properties and features adapted, used and created by humans in the past and present. Cultural resources are the result of continuing human cultural activity and embody a range of community values and meanings. These resources are non-renewable and finite. Cultural resources include traditional systems of cultural practise, belief or social interaction. They can be, but are not necessarily identified with defined locations. Heritage resources are considered to be cultural resources, therefore these resources are dealt with together in the section below.

### **2.3 EXISTING STATUS OF THE HERITAGE ENVIRONMENT**

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

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

As part of the approved EIA and EMP process, a heritage study (PGS, March 2009) was undertaken to identify any heritage resources located at the Tshipi Borwa Mine. No sites of significance were identified on site.

Based on the findings of desktop palaeontological reviews conducted for nearby prospecting operations (PGS, May 2014), the palaeontological sensitivity of the area is found to be low, however there is a possibility that the Hotazel Formation manganese ore body could contain stromatolites. Taking this into consideration it is possible that fossil resources may be found at the mine. These resources are protected by the National Heritage Resources Act (No 25 of 1999) and may not be affected (demolished, altered, renovated, removed) without approval.

## **2.4 EXISTING STATUS OF CURRENT LAND USES AND THE SOCIO-ECONOMIC ENVIRONMENT**

This section describes the existing status of current land uses and the socio-economic environment that may be affected by the proposed project.

Projects of this nature have the potential to influence current land uses both on the site (through land development) and in the surrounding areas (through direct or secondary positive and/or negative impacts). In addition, mining projects have the potential to influence various aspects of the socio-economic profile of a community. As a baseline, this section provides a brief description of the existing land tenure, land uses on site, and the current socio-economic status of the region.

### **2.4.1 CURRENT LAND USE**

The relevant land uses and socio-economic factors that may be affected within the surface use and mining rights area include the following:

- Third party prospecting activities within the Tshipi Borwa Mine surface use area

The relevant land uses and socio-economic factors within the vicinity of the Tshipi Borwa Mine (Figure 2) that may be affected include:

- Other mining operations:

- United Manganese of Kalahari (north east of the proposed site)
- Samancor Mamatwan mine (east of the proposed site)
- Old Middelplaats mine (North West of the proposed site)
- Farmers and farm worker residences
- Agricultural activities such as game farming and livestock grazing

#### **2.4.2 MINERAL/PROSPECTING RIGHTS**

The mining right (Reference number NC/30/5/1/2/2/0206MR) for the portions 1 (Currently portion 16) and portion 2 (Currently portion 17) of the farm Mamatwan 331 was originally granted to Ntsimbintle Mining (Pty) Ltd in 2008. Ntsimbintle subsequently transferred this mining right to Tshipi after receiving ministerial consent in terms of the section 11 of the MPRDA. This mining right has subsequently been notorially registered in Tshipi's name.

Borneo Mining SA holds prospecting rights on the remaining extent, portion 3 (Currently portion 18 which is a portion of portion 3 plus the remainder of portion 3) and portion 8 of the farm Mamatwan 331. Samancor holds a mining right on portion 3 of the farm Moab 700.

#### **2.4.3 SOCIO-ECONOMIC PROFILE**

Information in this section has been sourced from the John Taolo Gaetsewe District Municipality, Spatial Development Framework (JTGDMSDF, March 2012).

The district municipality (John Taolo Gaetsewe District Municipality) comprises of three local municipalities: the Gamagara, Ga-Segonyana and Joe Morolong Local Municipality. The proposed project area falls within the John Taolo Gaetsewe District Municipality of the Northern Province. As of 2009, the John Taolo Gaetsewe District Municipality has a population of 189 540 living in approximately 190 settlements most of which are small scattered villages. The key demographic challenges within the district include: widespread female-headed households; a very young population resulting in high dependency ratios; extensive reliance on public social safety nets/grants; and a high unemployment rate and associated poverty levels. Only 14% of the population in the John Taolo Gaetsewe District Municipality have a Matric (Grade 12) as their highest level education, and 25% of the population has no schooling at all. The relatively high illiteracy level in the district remains a challenge.

The industries present in the district include agriculture, mining/quarrying, manufacturing, electricity/gas/water, construction, wholesale/retail, transport/communication, business/ government services and community services. Economic developments, as well as employment opportunities in the John Taolo Gaetsewe District, are clustered around Kuruman and the mining towns of Hotazel, Kathu and Black Rock.

Compared to the district and other local municipalities, the John Taolo Gaetsewe District Management Area shows significantly higher percentage of households with basic services such as electricity, water and sewage (90 – 95%). This can be attributed to the large percentage of the district municipality's population residing in mining towns or on privately owned farms. Overall however, water scarcity in the district is an endemic problem, which affects service delivery, current medical facilities are inadequate and unable to serve all residents, there is a shortage of health workers to provide quality care, more schools are needed to accommodate the growing population, most households, schools and clinics receive below-standard sanitation services, provincial and local roads (and pavements) are in need of upgrading and maintenance, formal waste removal services are provided mostly only in larger towns, and the majority of residents currently qualify for free basic services yet it is not known whether the public sector will be able to sustain its current commitments.

## **2.5 EXISTING STATUS OF RELEVANT INFRASTRUCTURE**

This section describes the existing status of any infrastructure that may be affected by the proposed project.

### **2.5.1 COMMUNITIES AND COMMUNITY STRUCTURES**

With reference to Figure 1 and Figure 2, the nearest residences are the aforementioned farm residences. These are owned and/or occupied by farmers, farm workers or people that work on the mines in the region. Further to this the nearest residential centres include the following:

- The Hotazel town situated about 18 km north of the mine
- The Black Rock mining community located approximately 26 km north west of the mine
- The town Kuruman located approximately 48km south east of the mine
- The town Kathu located approximately 46km to the south of the mine.

Due to the lack of available surface water resources in the area, no informal settlements are located in immediate proximity to the Tshipi Borwa Mine.

### **2.5.2 REGIONAL ROAD INFRASTRUCTURE**

A network of roads exists within the vicinity of the Tshipi Borwa Mine. These include:

- The tarred R380 that runs along the east of the Tshipi Borwa Mine from Hotazel to Kathu (refer to Figure 2)
- The D3457 dirt road that runs to the south of the mine, leading to the old Middelplaats mine and Kuruman (refer to Figure 2)
- The D3340 dirt road that goes past the farm Rissik (refer to Figure 2)
- The tarred R31 that runs between Hotazel and Kuruman (refer to Figure 1).

As part of the original EIA and EMP (Metago, May 2009), a traffic study was undertaken (Siyazi, December 2008). As part of this traffic study (Siyazi, December 2008), the level of service and adequacy of the following intersection was evaluated:

- Intersection of Roads R31 and R380 (Figure 1)
- Intersection of Road R380 and the access road to the Mamatwan Train Station (Figure 2)
- Intersection of Roads R380 and D3457 (Figure 2)
- Intersection of Roads D3457 and the access road to Mamatwan Mine (Figure 2)
- Intersection of Road D3457 and the entrance to the Tshipi Borwa Mine (Figure 2)

The results of the traffic study (Siyazi, December 2008) indicates that in terms of the Tshipi Borwa Mine the level of service of intersections likely to be utilised by the Tshipi Borwa Mine is acceptable to support current and future traffic levels.

### **2.5.3 REGIONAL POWERLINE INFRASTRUCTURE**

A 132 KV powerline passes to the east of the site, along the R 380 Hotazel to Kathu road (Figure 2).

### **2.5.4 REGIONAL WATER PIPELINE INFRASTRUCTURE**

The Sedibeng Vaal-Gamagara water supply pipeline supplies the Tshipi Borwa Mine with process and potable water. A pipeline connection to the Sedibeng Vaal-Gamagara pipeline is located approximately 500m east of the Tshipi Borwa Mine (Figure 2).

### **2.5.5 RAILWAY**

A railway line connecting Kathu, Mamatwan and Hotazel runs along the east of the Tshipi Borwa Mine, Parallel to the R 380.

## **2.6 EXISTING STATUS OF THE BIOPHYSICAL ENVIRONMENT**

This section describes the existing status of the biophysical environment that may be affected by the proposed project.

### **2.6.1 GEOLOGY**

The geology of a particular area will determine the following factors:

- The type of soils present since the soils will be derived from the parent rock material
- The presence and quality of groundwater and the movement of the groundwater in the rock strata
- The presence of paleontological resources in the rock strata
- The potential for acid generation.

All of these aspects will be considered in the EIA. However, a basic description of the following aspects is provided below:

- Regional geology
- Potential for acid generation.

Soil types are discussed in section 2.6.4, groundwater in section 2.6.7 and paleontological resources in section 2.3.

The information in this section was sourced from the approved EIA and EMP (Metago, May 2009), the groundwater study (WGC, February 2009) undertaken as part of the approved EIA and EMP process and the hydrogeological study undertaken for mine closure planning for the mine (SLR, November 2012).

### Regional Geology

The world's largest land based sedimentary manganese deposit is contained in the Kalahari Manganese Field covered by Kalahari sand and sediments, situated 47km northwest of Kuruman in the Northern Cape. The Kalahari Manganese Field comprises five structurally preserved erosional relics of the manganese bearing Hotazel Formation of the Paleoproterozoic Transvaal Supergroup. These include the Mamatwan-Wessels deposit (also known as the main Kalahari Basin), the Avontuur and Leinster deposits, and the Hotazel and Langdon Annex/Devon deposits (Metago, May 2009).

Within the Kalahari Manganese Field, the Kalahari basin is the largest of the five structurally preserved erosional relics of the manganese bearing Hotazel Formation deposits, comprising a basin with a strike length of approximately 56 km and a width varying between 5 and 20 km (Metago, May 2009). In the central and northern parts of the Kalahari Basin, the Hotazel Formation is separated from the Kalahari Formation by the Mooidraai Formation, lithologies of the Olifantshoek Supergroup and /or the Dwyka Formation of the Karoo Supergroup (WGC, February 2009).

The proposed Tshipi Borwa Mine is located towards the southern end of the Kalahari basin.

### Local geology

Tshipi is exploiting manganese from the Hotazel Formation. The ore is contained within a mineralised zone that dips gradually to the north-west at approximately five degrees (SLR, November 2012).

### Faults and fractures and other lineaments

No significant faults, fractures or other lineaments occur at the Tshipi Borwa Mine

### Potential for acid generation

As part of the feasibility study undertaken for the tailings dam (Metago, March 2009) for the approved EIA and EMP process, leachate tests on manganese tailings products from a nearby mine indicated that

manganese tailings are chemically relatively inert and are not expected to exhibit acid mine drainage effects. In its natural form the polluting potential from waste rock is expected to be less than that of the tailings.

More detailed information on the acid generation potential of tailings and waste rock material will be provided in the EIA.

## 2.6.2 TOPOGRAPHY

The topography of a particular area will determine the following factors:

- The flow of surface water, and in many cases, also groundwater
- The depth of soils and the potential for soil erosion, for example, in the case of steep slopes
- The type of land use, for example flat plains are more conducive to crop farming (subject to water availability)
- The aesthetic appearance of the area
- Topography can also influence climatic factors such as wind speeds and direction, for example, wind will be channelled in between mountains along the valley.

Changes in the topography caused by the mining activities could therefore alter all of the above-mentioned aspects of the environment. Project-related activities have the potential to alter the topography of the site through the establishment of both temporary (such as the plant and support facilities) and permanent infrastructure (such as the residue facilities).

This section provides brief description of the site topography to facilitate an understanding of the topographical features relevant to the project site and surrounding area from which to measure potential change. More detailed information will be provided in the EIA. The information in this section was sourced from the approved EIA and EMP (Metago, May 2009).

The proposed project site is relatively flat with a gentle slope towards the North West. The elevation on site varies from 1087 m to 1107 m above mean sea level (mamsl). The highest topographical features near the mine are the Mamatwan waste rock dumps approximately 0.2 km southeast of the Tshipi Borwa Mine (Figure 2). About 2km to the south west of the project site is a non-perennial river, the Vlermuisleegte.

It is however noted that the construction and operation of infrastructure at the Tshipi Borwa Mine has already altered the natural topography and drainage patterns at the mine site. Drainage systems are discussed in Section 2.6.6 below.

### 2.6.3 CLIMATE

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

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

To understand the basis of these potential impacts, a brief baseline situational analysis is described below. More detailed and updated information will be provided in the EIA. The information in this section was sourced from the approved EIA and EMP (Metago, May 2009).

#### Regional climate

The Tshipi Borwa Mine falls within the northern steppe climatic zone as defined by the South African Weather Bureau. This is a semi-arid region characterised by seasonal rainfall, hot temperatures in summer, and cold temperatures in winter.

#### Weather stations

Climatic data for weather recording stations near the Tshipi Borwa Mine was obtained from the Milner (0393083) and Kuruman (0393806) weather stations. The Milner and Kuruman weather stations are located approximately 3.6km east and 40km south east from the Tshipi Borwa Mine respectively.

#### Rainfall and evaporation

The long-term average annual precipitation ranges from 386 mm to 455 mm with rainfall generally in the form of thunderstorms. The majority of the rainfall occurs during the summer months of October to April. The average evaporation is 1 971 mm per year, which greatly exceeds the annual rainfall.

#### Temperature

The area experiences an average maximum temperature of about 26°C and an average minimum temperature of about 10°C. The area has experienced a maximum average temperature of 39.9°C on 2 February 1988 and an average minimum temperature of -7.6°C on 14 June 1962.

#### Wind

Both south-easterly and north-easterly winds are observed on site.



#### 2.6.4 SOIL AND LAND CAPABILITY

Soil is an important natural resource and provides ecosystem services that are critical for life, such as:

- Water filtering
- Providing growth medium for plants, which in turn provide food for plant-eating animals
- Providing habitat for a wide variety of life forms.

Soil forms rather slowly by the breaking down of rock material and is therefore viewed as a non-renewable resource. Soil determines the type of land use the area is suitable for, for example, soil with low nutrients may not be able to support unassisted crop farming.

Soil resources are vulnerable to pollution, erosion and compaction, which could be caused by project-related activities.

The baseline soil information will be used to identify sensitive soil types, to guide the project planning in order to avoid sensitive soil types where possible, to determine how best to conserve the soil resources in the area and allow for proper rehabilitation of the site once mining ceases.

The land capability of an area is based on the soil properties and related potential to support various land use activities. Mining operations have the potential to significantly transform the land capability.

A brief description of the soil types and land capability in the project area is provided below. More detailed information will be provided in the EIA. The information in this section was sourced from the approved EIA and EMP (Metago, May 2009).

##### Soil types and land capability

Soils found at the Tshipi Borwa Mine include the Hutton and Clovelly soil types which are homogeneous in terms of texture, structure, and soil depth. These soil types are sandy and deep (> 1.5m) soils with a low clay content and will therefore drain rapidly. The Hutton and Clovelly soil types are generally slightly acidic to mildly alkaline with low phosphorus levels. Soil types located at the mine have low dryland arable agricultural potential due to high infiltration rates and lack of fertility and a moderate irrigation potential due to the low clay content.

#### 2.6.5 BIODIVERSITY

Biodiversity refers to the flora (plants) and fauna (animals). According to the International Union for Conservation of Nature (IUCN) (2011), biodiversity is crucial for the functioning of ecosystems which provide us with products and services which sustain human life. Healthy ecosystems provide us with oxygen, food, fresh water, fertile soil, medicines, shelter, protection from storms and floods, stable

climate and recreation. Biodiversity therefore has a direct impact on human health when considering (IUCN, 2011):

- Biodiversity is essential to global food security and nutrition and also serves as a safety-net to poor households during times of crisis
- Increased diversity of genes within species e.g. as represented by livestock breeds or strains of plants, reduces risk from diseases and increases potential to adapt to changing climates
- More than 70,000 plant species are used in traditional and modern medicine
- The value of global ecosystem services is estimated at \$16-\$64 trillion.

The establishment of project infrastructure as well as project-related activities have the potential to result in a loss of habitat through the destruction/disturbance of vegetation and/or contamination of soil and/or water resources, thereby reducing the occurrence of fauna and flora on site and in the surrounding areas.

The baseline information on biodiversity in the project area will be used to identify sensitive areas, to guide the project planning in order to avoid sensitive areas where possible, to determine how best to conserve the fauna and flora in the area and allow for proper rehabilitation of the site once mining ceases.

A brief description of fauna and flora and fauna in the project area is provided below. More detailed information will be provided in the EIA. The information in this section draws upon the findings of the specialist biodiversity study conducted by Ecological Management Services (EMS, November 2008) as part of the approved EIA and EMP process.

#### Flora (Natural plant life)

The Tshipi Borwa Mine falls within the Kathu Bushveld which is described as an open savannah. The area is characterised by flat sandy plains with a mixture of vegetation types consisting of fairly well-developed tree stratum and a moderately developed shrub layer, some of which have undergone various changes due to grazing and past mining activities. It is also noted that the Tshipi Borwa Mine lies outside of an area identified in the 2008 National Protected Area Expansion Strategy (NPAES) as a potential focus or protected area.

On a local scale, the Tshipi Borwa Mine consists of the following three distinct vegetation types:

- *Vachellia haematoxylon* Savannah - This vegetation type is characterised by a dominant tree layer with a height between 2.5m -6m, a shrub layer with a height between 1.5m – 2.5m and a grass layer (height of 70 cm). *Vachellia erioloba* (Camel thorn), *Vachellia haematoxylon* (Grey camel thorn), and *Vachellia hebeclada* (Candle thorn) are dominant species within this layer. Within this vegetation type there are areas that contain a significantly higher percentage of *Vachellia erioloba* (Camel thorn) trees.

- Mixed *Vachellia* Savannah - This vegetation type has a moderate grass cover (50-60%) with a moderately developed shrub layer. *Vachellia haematoxylon* (Grey camel thorn) is the dominant shrub species. The tree layer is poorly developed with individuals of *Vachellia erioloba* (Camel thorn) occurring.
- *Grewia Flava* Scrub – This vegetation type is characterised by a dominant shrub layer, scattered trees and a grass layer that can vary between patchy to well developed. The dominant species is *Grewia Flava* however *Vachellia haematoxylon* (Grey camel thorn), *Lycium hirsutum* (River honey thorn) and *Senegalia mellifera* (Black thorn) also occur in this vegetation type.

No red data plant species were recorded at the Tshipi Borwa Mine during the survey undertaken by EMS as part of the approved EIA and EMP process. The threatened species programme of the South African National Biodiversity Institute (SANBI) was consulted to determine the likelihood of any red data species at the Tshipi Borwa Mine. No red data species are likely to occur at the mine. Protected tree species that occur in the area include the *Vachellia erioloba* (Camel thorn) and *Vachellia haematoxylon* (Grey camel thorn) in terms of the National Forests Act of 1998 (Act 84 of 1998). A number of protected plant species in terms of the Northern Cape Nature Conservation Ordinance Schedule 4 include *Asclepias burchellii* (Milkbush), *Babiana hypogea* (Babiana), *Boophane disticha* (Oxbane), *Brunsvigia radulosa* (Candelabra) and *Ruschia griquensis* (Brilliant Ruschia).

Overall the area is uniform in terms of habitat structure and the types and nature of ecological processes that occur. However the Mixed *Vachellia Savannah* and the *Vachellia haematoxylon* Savannah have a slightly higher conservation priority. This is attributed to the presence of a number of protected trees species that occur within these vegetation types.

It is however noted that the construction of infrastructure and existing mining activities have influenced the remaining natural flora at the mine.

#### Fauna (Natural animal life)

Very little evidence of wild faunal populations was evident during the field survey undertaken as part of the approved EIA and EMP process, mostly due to disturbances caused by general farming practices, prospecting and surrounding mining activities.

No Red Data reptile or amphibian species are likely to occur on site. Red data bird and animal species that may occur at the Tshipi Borwa Mine are included in Table 4 below.

**TABLE 4: RED DATA BIRD AND MAMMAL SPECIES LIKELY TO OCCUR ON SITE**

Common name	Scientific name	*IUCN Conservation status
<b>Bird species</b>		
Martial Eagle	<i>Polemaetus bellicosus</i>	Near threatened
Ludwig's Bustard	<i>Neotis ludwigii</i>	Endangered

Common name	Scientific name	*IUCN Conservation status
Secretary bird	<i>Sagittarius serpentarius</i>	Vulnerable
<b>Mammal species</b>		
Honey badger	<i>Mellivora capensis</i>	Least concern
South African hedgehog	<i>Atelerix frontalis</i>	Least concern

\*International Union for Conservation of Nature (IUCN)

It is however noted that the construction of infrastructure and existing mining activities in the project area have influenced the natural remaining fauna at the mine.

### 2.6.6 HYDROLOGY (SURFACE WATER)

Surface water resources include drainage lines and paths of preferential flow of stormwater runoff. Project-related activities have the potential to alter the drainage of surface water through the establishment of both temporary (such as the plant and support facilities) and permanent infrastructure (such as residue facilities) and/or result in the contamination of the surface water resources through seepage and/or spillage of potentially polluting materials, non-mineralised waste (general and hazardous) and mineralised wastes. Key to understanding the hydrology of the site is the climatic conditions of the site (climate is discussed in section 2.6.3). As a baseline, this section provides a brief description of surface water resources in the project area in order to facilitate an understanding of the hydrological catchments that could be affected by the project and the status of surface water resources in the project area. More detailed information will be provided in the EIA.

The information in this section was sourced from the approved EIA and EMP (Metago, May 2009), the groundwater study (WGC, February 2009) undertaken as part of the approved EIA and EMP process and the water quality monitoring report (Synergistics, February 2013).

#### Drainage and water resources

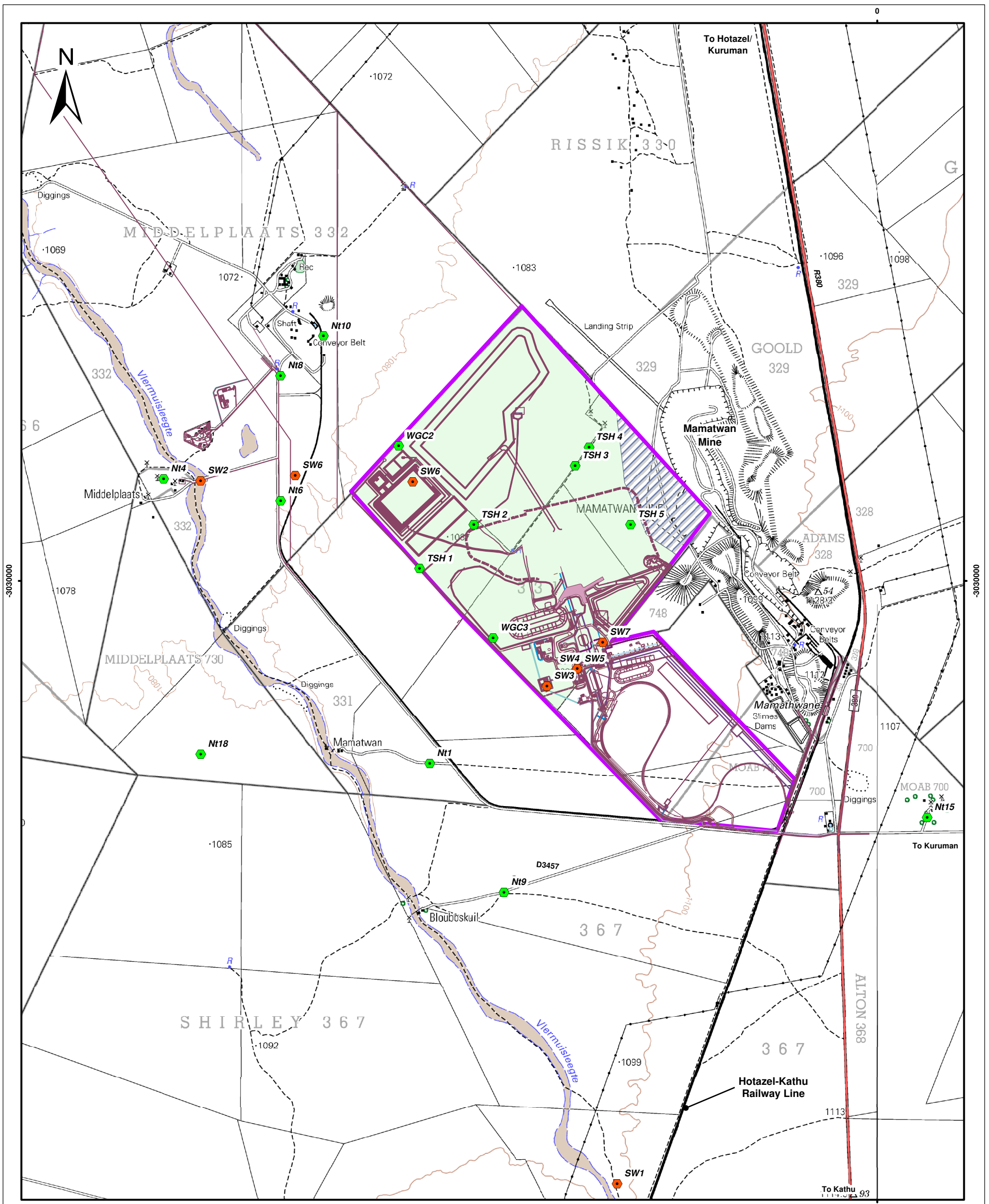
The Tshipi Borwa Mine is located within quaternary catchment D41K within the Lower Vaal Water Management Area (WGC, February 2009). The mine site is located within the sub-drainage catchments of the non-perennial Vlermuisleegte and Witleegte River courses. Both the Vlermuisleegte and the Witleegte are tributaries of the Ga-Mogara River, which is a tributary of the Kuruman River (Metago, May 2009).

There are no surface water resources within the Tshipi Borwa Mine mining right and surface use area. The closest watercourses to the mine are the non-perennial Vlermuisleegte ( $\pm 2$ km southwest), the non-perennial Witleegte ( $\pm 10$ km northeast), and the non-perennial Ga-Mogara ( $\pm 6$  km west) (Metago, May 2009).

### Surface water quality

No surface water quality samples could be taken as part of the approved EIA and EMP process as there was no surface flow at the time of undertaking the study (Metago, May 2009).

The Tshipi Borwa Mine currently monitors surface water quality on a quarterly basis in accordance with the existing surface water monitoring programme. Refer to Figure 3 for the position of the surface water monitoring points. It should however be noted that all natural surface water monitoring points (SW1 and SW2 illustrated on Figure 3) have been dry since the implementation of the surface water monitoring programme. Monitoring of non-natural surface water monitoring points (raw and dirty water dams, process dams and water tanks) shows that in general the quality of surface water at the Tshipi Borwa Mine exceeds the SANS 241 (Standards 2011) Domestic Water Quality Guidelines for the following parameters: electrical conductivity, total dissolved solids, Nitrate, Chloride, Selenium and Iron (Synergistics, February 2013).

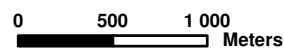


**Legend**

- Infrastructure
- ▭ Surface Use Area
- ▭ Approved Mining Right Area
- ▭ Proposed Boundary Mining Venture Area

**Current Water Monitoring Points**

- Ground Water Monitoring Points
- Surface Water Monitoring Points



Scale: 1:40 000 @ A3  
 Projection: Transverse Mercator  
 Datum: WGS1984, Lo23

TSHIPI E' NTLE MANGANESE MINING

**Figure 3**  
**Current Water Monitoring Points**



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710.20008.00008

March 2015

### Surface water users

Surface water in the area is potentially used for livestock watering and for limited domestic purposes. However, no reliable surface water use is possible from any of the watercourses (Gamogara, Witleegte, Vlermuisleegte Rivers) due to their non-perennial nature and related seasonal river flow (Metago, May 2009).

### Wetlands

No wetlands have been identified within the project area (Metago, May 2009).

## **2.6.7 GROUNDWATER**

Groundwater is a valuable resource and is defined as water which is located beneath the surface in rock pore spaces and in the fractures of lithologic formations. Understanding the geology of the area (See Section 2.6.1) provides a basis from which to understand the occurrence of groundwater resources. Project-related activities such as the development of the underground mining areas, the handling, storage and disposal of mineralised and non-mineralised wastes have the potential to impact on groundwater resources, both to the environment and third party users, through dewatering and pollution. As a baseline, this section provides a brief description of the pre-mining groundwater conditions to facilitate an understanding of the potential for dewatering cones of depression and pollution plumes to occur as a result of project-related activities. More detailed information will be provided in the EIA.

The information in this section was sourced from the approved EIA and EMP (Metago, May 2009), the groundwater study (WGC, February 2009) undertaken as part of the approved EIA and EMP process and the water quality monitoring report (Synergistics, February 2013).

### Presence of groundwater

Two aquifers are present beneath the Tshipi Borwa Mine (WGC, February 2009):

- A shallow aquifer made of the Kalahari Beds, sand and calcrete; and
- A deep fractured aquifer made of the Dwyka clay and the Moodraai dolomite Formation.

The Kalahari sand and the sediment beds with its associated underlying calcrete layer overlie the low permeability Dwyka clay bed. Beneath a thick clay layer, which acts as a confining layer. The Moodraai dolomite Formation and Dwyka clay contact forms the deeper fractured bedrock aquifer. The average yield for the shallow aquifer system is <1 L/s and for the deep aquifer is approximately 0.9 L/s. The deeper aquifer is of local importance for water supply to the farmers in the area (WGC, February 2009).

Based on the Aquifer Classification Map of South Africa (Parsons and Conrad, 1998) the aquifers underlying the Tshipi Borwa Mine are classified as a poor to minor aquifer system. Although borehole yields in the deeper aquifer are generally considered low, structural features such as faults and fractures

can produce high yielding boreholes (WGC, February 2009). The definition of aquifer systems is as follows (Parsons and Conrad, 1998):

- Minor Aquifer System: A moderately-yielding aquifer system of variable water quality. Although these aquifers seldom produce large quantities of water, they are important for local supplies and in supplying base flow for rivers.
- Poor Aquifer System: A low to negligible yielding aquifer system of moderate to poor water quality.

#### Groundwater quality

As part of the approved EIA and EMP process a hydrocensus was undertaken within the vicinity of the Tshipi Borwa Mine in order to provide a description of the groundwater prior to the establishment of the mine. Groundwater samples taken during the hydrocensus were compared to the SANS 241 (standards 2005) Domestic Water Quality Guidelines. Results indicated that the ground water quality could be regarded as medium to poor mainly due to elevated nitrate levels.

The Tshipi Borwa Mine currently monitors groundwater quality on a quarterly basis in accordance with the existing groundwater monitoring programme. Refer to Figure 3 for the position of the groundwater monitoring points. Monitoring results indicate parameters electrical conductivity, total dissolved solids, Nitrate, Chloride, manganese, molybdenum and iron exceed the SANS 241 (2011) drinking water standards. In addition to this, parameters total dissolved solids and nitrate exceed the DWAF live stock water guideline limits and molybdenum exceeds the DWAF water quality guidelines. It should however be noted that the groundwater quality at Nt15 (Figure 3) is of significantly lower quality than at any of the other monitoring points. High concentrations of electrical conductivity, total dissolved solids, chlorides and nitrates have been detected in all monitoring periods conducted to date for Nt15 (Synergistics, February 2015).

Several boreholes that form part of the groundwater monitoring programme are not currently being monitored due to accessibility related issues and as such monitoring of water quality to the south of the mine is not currently being undertaken. In addition to this none of the additional boreholes recommended in the approved EIA and EMP have yet been drilled and added to the network of groundwater monitoring points (Synergistics, February 2015).

#### Groundwater levels and flow

The Tshipi Borwa Mine currently monitors groundwater levels on a quarterly basis in accordance with the existing groundwater monitoring programme. Monitoring results indicate that groundwater levels generally averaged between 42.17 mbgl and 70.15 mbgl with groundwater flow towards the north-west. Monitoring results indicate a continual decreasing trend in groundwater levels in boreholes TSH01 and TSH04 which is likely to be attributed to mining activities. A slowly decreasing trend can be observed in borehole TSH05 which is likely to be attributed to dewatering activities undertaken at the neighbouring Mamatwan Mine; however this has yet to be confirmed.



### Groundwater use

Groundwater within the area is used to supply drinking water for cattle and in some instances supply water for domestic use (Metago, May 2009).

### **2.6.8 AIR QUALITY**

Identification of existing sources of emissions in the region and the characterisation of existing ambient pollution concentrations is fundamental to the assessment of cumulative air impacts. A change in ambient air quality can result in a range of impacts, which in turn, may cause a disturbance to nearby receptors.

Information in this section was sourced from the air quality study conducted for the approved EIA and EMP process (Airshed, April 2009).

Existing sources of emissions in the region are listed below.

- Existing mining operations outlined in Section 2.4.1 comprising mining operations, stockpiles and tailings dams, an ore reduction facility and a sintering plant
- Fugitive sources including vehicle entrainment of dust from local paved and unpaved roads, veld fires, wind erosion from open areas and dust generated by agricultural activities
- Vehicle tailpipe emissions from public roads (minor source given relatively low vehicle activity rates in the region)
- Household fuel combustion (particularly wood and paraffin)
- Rail-related emissions with diesel locomotives being used to transport ore from mines in the area
- Regionally transported particulates.

Tshipi currently monitors dust fallout on a monthly basis in accordance with the air quality monitoring programme. The results of the air quality monitoring programme indicate that in general dust fallout rates monitored along the perimeter of the mine do not exceed the South Africa National Standards (SANS 1925:2005) residential limit of 600 mg/m<sup>2</sup>/day. In April 2012, the SANS industrial limit of 1200 mg/m<sup>2</sup>/day was exceeded at the eastern boundary monitoring point between Tshipi and the Mamatwan mine. The reason for this exceedance is unknown. The dust monitoring point located near the open pit frequently exceeds the SANS industrial limit of 1200 mg/m<sup>2</sup>/day. This is however due to the proximity of the monitoring point to on-going open cast activities.

According to the approved EIA and EMP (Metago, May 2009), the air quality monitoring programme also makes provision for the following:

- One PM10 ambient concentration monitoring station
- Provision to analyse the PM10 for manganese concentrations over a period of two operational years
- Three passive samplers for NO<sub>2</sub> and SO<sub>2</sub>
- One meteorological station

A meteorological station has been established on-site. It is important to note that passive sampling will only commence when the sinter plant is established. Further to this discussions are underway between Tshipi and relevant specialists regarding the PM10 monitoring station.

Potential receptor sites include the surrounding communities discussed in section 1.1.

### **2.6.9 NOISE**

Some of the noise generating activities associated with the project may cause an increase in ambient noise levels in and around the mine. This may cause a disturbance to nearby receptors. As a baseline, this section provides a brief description of pre-mining conditions in the area from which to measure changes as a result of project-related noise. More detailed information will be provided in the EIA.

Information in this section was sourced from the approved EIA and EMP (Metago, May 2009).

The greater area is generally defined by rural features and is not subjected to elevated noise levels. Existing noise in the project area is mainly caused by surrounding farming activities, localised traffic, train movements, and mining operations. Previously measured ambient noise levels vary from 39 dBA during the day to 33 dBA during the night.

Potential sensitive receptors include the surrounding communities discussed in section 1.1.

### **2.6.10 VISUAL ASPECTS**

Project-related activities have the potential to alter the landscape character of the site and surrounding area through the establishment of both temporary (such as the plant and support facilities) and permanent infrastructure (such as residue facilities). As a baseline, this section provides an understanding of the pre-mining visual character of the project area against which to measure potential change as a result of project infrastructure and activities.

Information in this section was sourced from the approved EIA and EMP (Metago, May 2009).

The mine is located within an area characterised by flat open plains of the Kalahari (Figure 2). In general the area surrounding the mine is rural in nature in that it is sparsely populated with isolated farmhouses. The main land use in the area includes livestock grazing, game farming, mining and a railway line. The existing mining operations and construction activities have already influenced the sense of place and natural visual character of the area.

Potential sensitive receptors include the surrounding communities discussed in section 1.1.

## 2.7 RELEVANT ADDITIONAL INFORMATION

None.

### 3 IDENTIFICATION OF THE ANTICIPATED IMPACTS

Potential environmental, social or cultural impacts, including the cumulative impacts that have been identified during the scoping phase are discussed in this section. In order to identify these potential impacts an understanding of the proposed activities that will take place is required and as such the project description is provided first in this chapter to provide a reference when discussing the potential impacts. These discussions should be read with the corresponding descriptions of the baseline environment in Section 2 of the scoping report.

The potential impacts associated with all the phases (construction, operations, decommissioning and closure) have been conceptually identified and described. In addition to this, reference is made to studies that may be required to further investigate the identified potential impacts to provide the necessary additional information.

#### 3.1 PROJECT DESCRIPTION

A description of the proposed project including a map showing the spatial locality of infrastructure is given in the section below (see Figure 4 and Figure 5).

The aim of the current environmental assessment process is to assess the environmental and social impacts of changes that have already taken place to the approved infrastructure layout as well as proposed changes. Changes that have already taken place at the Tshipi Borwa Mine include:

- The relocation of the western waste rock dump
- The establishment of a new waste rock dump (eastern waste rock dump)
- The relocation of the office, plant, workshop and related infrastructure
- Design and capacities change of the approved stormwater dams
- Changes in the design of the railway siding
- The establishment of additional stormwater dams (contractors stormwater dam)
- The relocation of the low grade and fines stockpiles
- The expansion of the diesel storage facility
- The expansion of the sewage treatment plant

In addition to the above, Tshipi is proposing to develop a boundary mining venture area with Mamatwan mine including the establishment of a process water dam.

Refer to Section 3.1.5 for further detail on the above mentioned changes to the approved infrastructure layout.

### 3.1.1 CONSTRUCTION PHASE ACTIVITIES

Construction phase activities (most of which have already commenced as part of the approved EIA and EMP) include:

- Selective clearing of vegetation in areas designated for surface infrastructure in line with a biodiversity management plan and soil conservation procedure as per the approved EIA and EMP (Metago, May 2009)
- Stripping and stockpiling topsoil and sub-soil
- Digging of foundations and trenches
- Drilling and blasting associated with the development of the open pit
- Dewatering, if required
- Establishment of access roads and internal haul roads
- Establishment of railway siding
- Establishment of waste rock dumps, low grade and fines stockpiles
- Construction of plant infrastructure including crushing and screening plant, thickener plant, tailings facility and return water dam
- Construction of services including storm water management facilities, waste management facilities, sewage plant, water supply infrastructure and power supply infrastructure
- Transportation of staff, building materials, mining and plant equipment etc.

The proposed project is not expected to have any substantial changes to the current construction activities.

### 3.1.2 CONSTRUCTION PHASE SUPPORT SERVICES AND FACILITIES

Temporary contractor's working areas have (in accordance with the approved EIA and EMP) been established on site for construction phase activities. The temporary contractors working area includes the following:

- Temporary contractors area
- Contractors laydown areas
- A store for handling and storing construction materials (fuel, lubricants, paints, solvents, oils, construction substances)
- Temporary domestic and hazardous waste collection and storage area
- A parking area for cars and equipment
- Power supply will be by temporary diesel-powered electricity generator
- A workshop/maintenance area for servicing and maintaining equipment and vehicles
- A clean water reservoir
- Wash bays and change houses
- Temporary offices and portable ablution facilities.

These facilities will either be removed at the end of the construction phase or incorporated into the layout. Mining of the open pit commenced during the construction phase to allow sufficient time to reach steady state feed when the plant, tailings dam and thickener are operational.

As per the approved EIA and EMP, the number of temporary construction workers will vary depending on the construction activities at any given time. It is estimated that there will be approximately 350 temporary workers that will be on the site at any stage during the construction period. Construction employees are responsible for arranging their own accommodation in the surrounding towns of Kuruman, Hotazel, and Kathu.

The proposed project is not anticipated to generate any additional construction job opportunities as Tshipi will make use of existing contractors on site.

### **3.1.3 CONSTRUCTION PHASE TIMING**

Construction phase activities commenced during 2011 and are still on-going. It is anticipated that the remaining construction phase activities and facilities will be completed towards the middle of 2016.

### **3.1.4 OPERATIONAL PHASE ACTIVITIES**

As per the approved EIA and EMP, this project has a design capacity of between 2.5 and 4.5 million tonnes of Manganese product per annum. The core activities as per the approved EIA and EMP that are expected to take place during the operational phase include:

- Opencast drilling and blasting
- Waste rock and ore material will be removed by truck and shovel method
- Waste rock will be stockpiled on surface and used for other construction and rehabilitation activities
- Ore will be trucked to the run of mine (ROM) pad from where it will be transferred via conveyor to the primary crushing and screening plant where it will be sent for further crushing and screening at the secondary plant by means of a conveyor system
- From the secondary crushing and screening plant, the ore is conveyed to the tertiary crushing and screening section in order to prepare the ore for sinter plant feed. Prior to the sintering stage, ore that is below the required grade can be beneficiated using dense medium separation. The product will be conveyed to the silo/loading area where it will be loaded on trains and/or trucks and sent off-site.
- The fine waste from the screening process and washing is processed at the thickener and disposed as tailings

It is anticipated that the sinter plant and dense media separator plant will only be established in the near future. Until these facilities are established ore will be sent via conveyor from the secondary crushing and screening plant to the silo/loading area where the ore will be loaded onto trains and/or trucks and sent off-site to China for processing. While the primary and secondary crushing and screening plants and conveyor systems are being established, ore from the pit is trucked to a temporary crushing and screening facilities. The crushed ore is trucked to the silo/loading area and loaded onto the train and/or trucks and is sent to China for processing.

### **3.1.5 OPERATIONAL PHASE SUPPORT SERVICES AND FACILITIES**

#### **Employment and housing**

As per the approved EIA and EMP, it is anticipated that a maximum of approximately 400 employees will be on site during the operational phase. The proposed project is not anticipated to generate any additional operational job opportunities as Tshipi will make use of existing contractors and workers.

Tshipi will not be providing any accommodation for mine employees or contractors. Financial allowance for housing will be included in the overall remuneration packages of the mine employees and its contractors. No other on-site facilities will be provided for employees.

#### **Water Supply**

As per the approved EIA and EMP, both process and potable water is sourced from the Sedibeng Vaal-Gamagara pipeline. Process water is required for dust suppression along access roads and conveyors, the crushing and screening plant and open pit mining activities. Potable water is required for domestic use in offices and change rooms. A reverse osmosis treatment process is required for Sedibeng water to be used for potable water purposes.

#### **Water management**

As per the approved EIA and EMP separate clean and dirty water systems at the mine have been designed, implemented, and managed in accordance with the provisions of Regulation 704, 4 June 1999 (Regulation 704) for water management on mines. In general, the footprint of all dirty areas will be minimised by isolating these areas from clean water runoff and dirty water will be contained in designated systems. In this regard the management of stormwater generated at the mine includes the diversion of clean water by means of elevated roads and berms and the containment of dirty water. Dirty water stored within containment facilities will be re-cycled as process water.

The approved EIA and EMP makes provision for the establishment of several stormwater dams within the vicinity of the plant and operational areas (Figure 4). These stormwater dams include the following:

- A 10MI stormwater dam for the collection of dirty water from the operational areas (mining workshop and primary crusher area)

- An 8MI stormwater dam for the collection of dirty water from around the plant area
- A 6.3MI settling dam that would receive dirty water from the pit dewatering and the various storm water dams described above.

The approved plan has been adjusted such that the above listed stormwater dams have been combined to form one 24.3MI stormwater dam (Figure 5) which consists of four compartments. The stormwater dam is lined with an HDPE liner. Moreover, given that, the original stormwater management system did not adequately allow for the containment of dirty water run-off from the contractors area, Tshipi has established an additional stormwater dam near the contracts areas to collect dirty run-off water (Figure 5). The stormwater dam has been designed for a capacity of 4MI and will be lined with an HDPE liner. In addition to this, a lined process water dam with an estimated capacity of 4MI (Figure 5) is proposed near the ROM stockpile area in order to contain any dirty run-off from the ROM area. The exact position of this the process water dam will be confirmed as part of the EIA and EMP process; however the possible positions are illustrated in Figure 5.

The approved EIA and EMP made provision for the establishment of two unlined stormwater dams with a capacity of 78MI positioned to the north of the tailings dam. Stormwater from other dirty areas on site that is not contained within the other on site stormwater dams, as listed above, would be captured in these two unlined stormwater dams. In addition, return water from the tailings dam will drain into a HDPE lined tailings water return dam. No changes to these facilities are anticipated as part of the proposed project.

## **Transport Systems**

### *Roads*

As per the approved EIA and EMP the main entrance to the Tshipi Borwa Mine is located along the D3457 gravel road which is accessed via an intersection off the provincial R380 road. Internal haul roads are used to transport manganese-bearing ore and waste rock. The haul roads are constructed from suitably sized and compacted waste rock. Internal haul roads will vary in width up to a maximum width of 25m.

It is not anticipated that the proposed project will influence existing traffic volumes at the mine.

### *Railway*

As part of the approved EIA and EMP a railway siding was planned between the regional railway line (adjacent to the R380) and the Tshipi silo/loading area (Figure 4). The design of the approved railway siding has been changed and the length has been increased. The current layout of the railway siding is illustrated in Figure 5.

### *Conveyor*



As per the approved EIA and EMP, various conveyors will be used to move material through the crushing and screening plant, onto the product stockpiles and ultimately through to the silo/loading area. Dust suppression at selected material transfer points will be by means of water sprays. Additives will be added to dust suppression mechanics which allows dust to combine to the product and as such dust suppression is only required at selected transfer point.

#### *Pipelines*

As per the approved EIA and EMP a pipeline connection has been established to the Sedibeng Vaal-Gamagara pipeline to supply the mine with potable and process water. Secondary pipelines will also be installed to move water between the return water dams, water treatment, and the mining areas.

#### **Power Supply**

As per the approved EIA and EMP, operational power is sourced from Eskom via a dedicated powerline. Backup power is provided by means of diesel generators. A substation has been established in order to receive power from a regional Eskom power line. The substation is equipped with transformers and switchgear to enable the voltage from the regional line to be stepped down and internally distributed via a network comprising powerlines and mini substations.

#### **Waste Management**

##### *Sewage*

The approved EIA and EMP makes provision for an anaerobic digester sewage treatment plant for the treatment of 60m<sup>3</sup> of sewage per day. The design of the sewage treatment plant has been changed to a sludge activated system and has been expanded to cater for the treatment of 96m<sup>3</sup> of sewage per day. The approved position of the sewage treatment plant is illustrated in Figure 4. The relocated position is illustrated in Figure 5).

Sewage effluent will be sourced from the plant and office ablutions facilities and change houses. Sewage effluent on site will be pumped in conservancy tanks before being sent to the sewage treatment plant. The sludge activated sewage treatment plant will allow for the treatment of sewage by means of aeration treatment (inclusion of oxygen), chlorination to kill any remaining bacterial and filtration to remove suspended solids. Treated sewage effluent will be collected in a lined stormwater dam (referred to as the combined stormwater dam on Figure 5) and re-used within the mine process. The treated sewage effluent will not be used for domestic purposes. Any sewage sludge will be removed off site by a certified contractor and disposed of at a licensed sewage works. More information will be provided in the EIA.

##### *Non-mineralised wastes*

In terms of the approved EIA and EMP, the types of waste that could be generated on site during the operational phase include: hazardous industrial waste (such as packaging for hazardous materials, used oil, lubricants), general industrial waste (such as scrap metal and building rubble), medical waste (such

as swabs and bandages) from the medical clinic facility, and domestic waste (such as packaging and office waste). These wastes will be temporarily handled and stored on site before being removed by contractors for reuse, or disposal at an appropriately licensed waste disposal facility.

It is not anticipated that the proposed project will change the current temporary storage, removal and disposal process at the mine.

### **Mineralised waste disposal**

#### *Tailings disposal*

As per the approved EIA and EMP the standalone tailings dam would cover an area of approximately 300 000m<sup>2</sup> with a total volume of 2 million m<sup>3</sup>. It is not anticipated that the proposed project will influence the physical dimensions of the approved tailings dam.

#### *Waste rock disposal*

As part of the approved EIA and EMP, two waste rock dumps, namely the western and northern waste rock dumps (Figure 4), were planned with a total area of approximately 215 ha and a volume of 91.5 million m<sup>3</sup>. An additional waste rock dump has been established to the east of the ROM pad (Figure 5). It is important to note that the eastern waste rock dump is still located within the approved surface use and mining rights area. The total area for the storage of waste rock has increased to 269ha and the volume has increased to 105 million m<sup>3</sup>.

### **Other support services**

#### *Diesel storage facilities*

Tshipi currently has approval for the storage of 500m<sup>3</sup> of diesel on site as per the approved EIA and EMP. Tshipi has expanded their current diesel storage capacity by more than 500m<sup>3</sup>. The position of the additional diesel storage facility is illustrated in Figure 5.

#### *Development of boundary mining venture*

Tshipi with Mamatwan Mine is proposing to co-operate along the common boundary to mine the boundary pillar with rehabilitation of the areas. Ntsimbintle vended part of the original mining right into Mamatwan for a share in Hotazel Manganese Mines. This was accompanied by a co-operation agreement along the border which will be converted into a practical mining plan. The area vended into Hotazel Manganese Mines by Ntsimbintle Mining (Pty) Ltd is shown on Figure 5 and forms part of Mamatwan Mine's mining right. Discussions between Mamatwan and Tshipi are on-going with regards to the practical implementation of the agreement.

This area will not be assessed as part of the proposed project but is shown on the figure 5 for the sake of completeness.

#### *Offices, plant and workshop infrastructure*

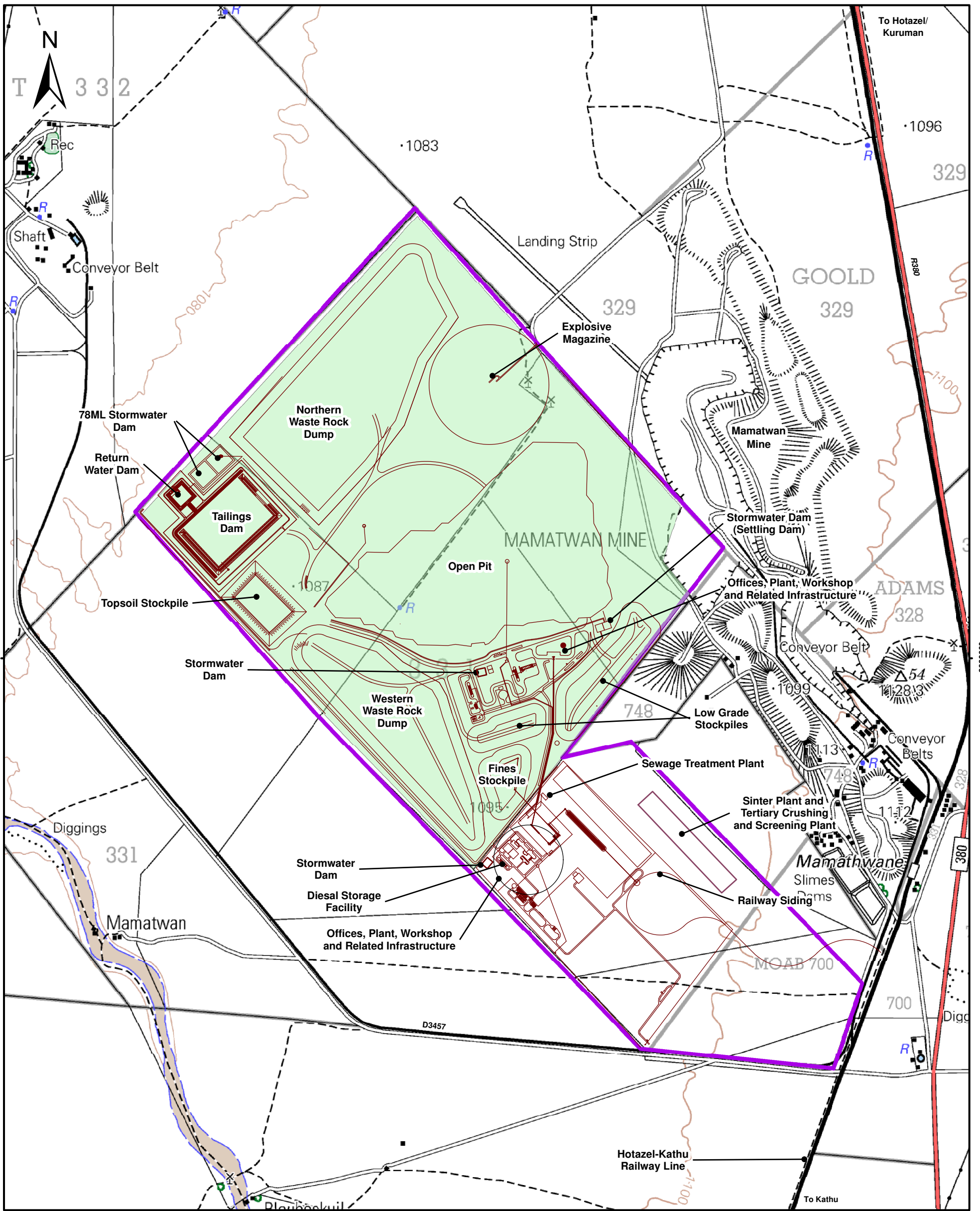
Tshipi has relocated their offices, plant, workshop and related infrastructure. The position of the approved location of these facilities is illustrated in Figure 4. Refer to Figure 5 for the position of the relocated offices, plant, workshop and related infrastructure.

#### *Low grade and fines stockpiles*

The approved EIA and EMP makes provision for two low grade stockpiles (Figure 4). Tshipi has combined these low grade stock piles in order to establish one low grade stockpile. Tshipi has also relocated the position of the approved low grade stockpile. Refer to Figure 5 for the position of the relocated low grade stockpile. In addition to this, Tshipi has relocated the position of the approved fines stockpile (Figure 4). Refer to Figure 5 for the relocated position of the fines stockpile.

### **3.1.6 LIFE OF MINE**

As per the approved EIA and EMP (Metago, May 2009), the minimum design life of mine is approximately 20 years. The proposed project has not altered the duration of the life of mine.



- Legend**
- Approved\_Infrastructure
  - sinter plant
  - Approved Mining Right Area
  - Surface Use Area

TSHIPI E' NTLE MANGANESE MINING

**Figure 4**  
**Approved Infrastructure Layout**  
 (Metago, May 2009)

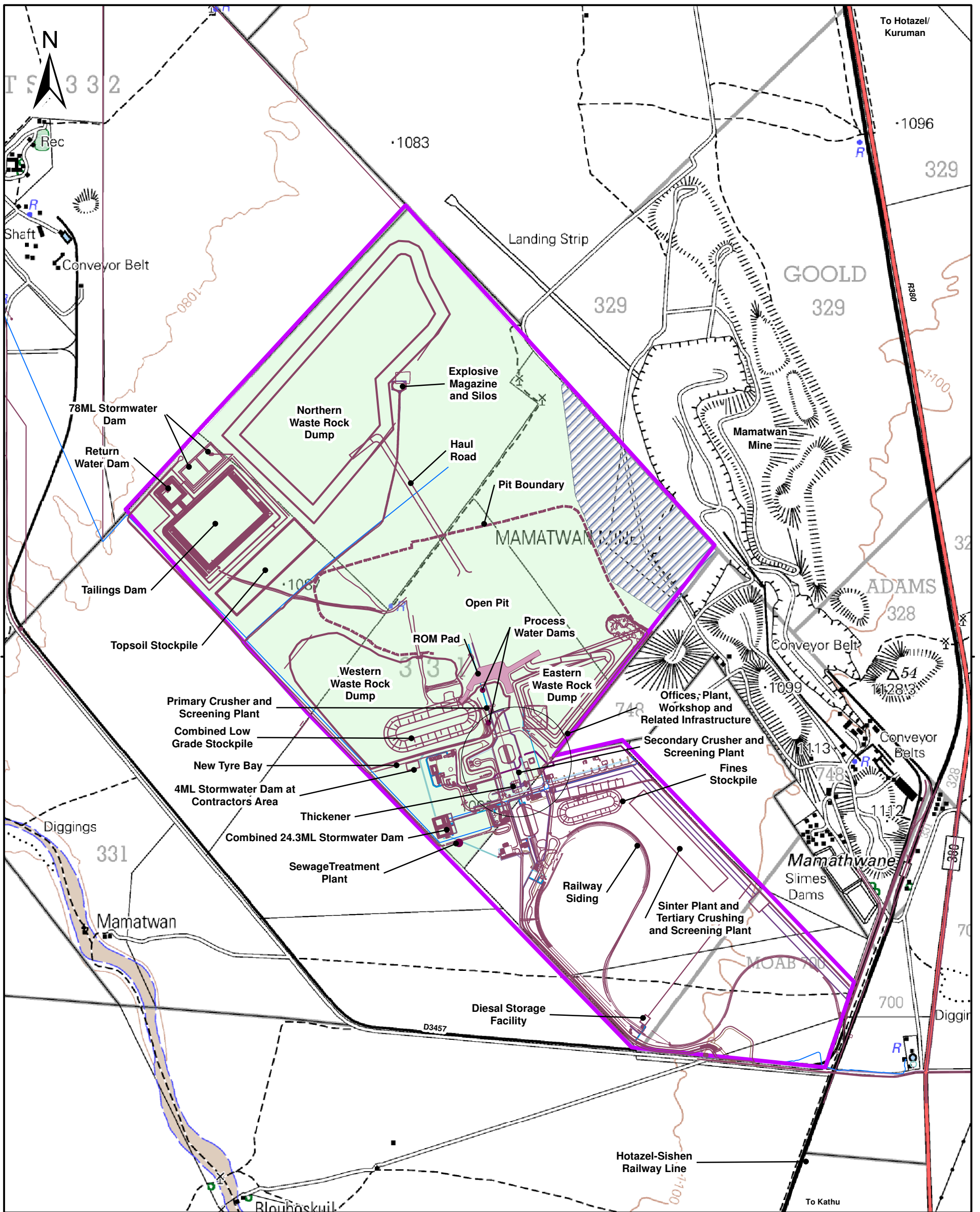


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0 500 1 000 Meters  
 Scale: 1:25 000 @ A3  
 Projection: Transverse Mercator  
 Datum: WGS1984, Lo23

710.20008.00008

March 2015



- Legend**
- Infrastructure
  - ▭ Surface Use Area
  - ▭ Approved Mining Right Area
  - ▭ Proposed Boundary Mining Venture Area

TSHIPI E' NTLE MANGANESE MINING

**Figure 5**  
New Infrastructure Layout



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0 500 1 000 Meters

Scale: 1:25 000 @ A3  
Projection: Transverse Mercator  
Datum: WGS1984, Lo23

710.20008.00008

March 2015

### 3.1.7 CLOSURE

The approved EIA and EMP (Metago, May 2009) noted the environmental objective is to restore the pre-mining potential of the land, wilderness and grazing land.

The conceptual closure plan provided in the approved EIA and EMP (Metago, May 2009) includes the following:

- Dismantling and demolishing of infrastructure
- Backfilling the open pit with waste rock material
- Rehabilitation of the disturbed areas where infrastructure has been removed by sloping, filling in excavations and re-vegetating
- The surface of the tailings dam will be covered with waste rock and/or vegetation
- Rehabilitation of residue facilities by sloping the sides to allow vegetation establishment
- Ensure that vegetation on rehabilitated areas is sustainable.

### 3.2 RELEVANT NEMA LISTED ACTIVITIES

Activities that were authorised as part of the approved EIA and EMP in accordance with the NEMA, Regulations 2006 are included in Table 5.

Some of the changes that were made to the infrastructure layout (expansion of the diesel storage capacity) did require authorisation in terms of the National Environmental Management Act No. 107 of 1998 (NEMA) prior to establishment. It is important to note that the authorisation of this facility in terms of NEMA will be managed under a separate process. It follows that for the purpose of this scoping report, there are no relevant NEMA activities.

**TABLE 5: APPROVED NEMA ACTIVITIES**

<b>Activity Number</b>	<b>Listed Activity</b>
<b>Listed activities in terms of Regulation 386 of 2006</b>	
1(a)	The construction of facilities or infrastructure, including associated structures or infrastructure, for-
(b)	The above ground storage of 1 000 tons or more but less than 100 000 tons of ore;
(c)	The storage of 250 tons or more but less than 100 000 tons of coal;
(k)	The bulk transportation of sewerage and water, including storm, in pipelines with -
(i)	An internal diameter of 0.36 metres or more; or
(ii)	A peak throughput of 120 litres per second or more;
(l)	The transmission and distribution of electricity above ground with a capacity of more than 33 kilovolts and less than 120 kilovolts;
(n)	The off-stream storage of water, including dams and reservoirs, with a capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of the activity listed in item 6 of GN R387 of 2006
(p)	The temporary storage of hazardous waste;
(s)	The treatment of effluent, wastewater or sewerage with an annual throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres;
7.	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site.
12.	The transformation or removal of indigenous vegetation of 3 hectares or more of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of NEMBA 10 of 2004.
13.	The abstraction of ground water at a volume where, any general authorization issued in terms of NWA 36 of 1998, will be exceeded
15.	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres.
<b>Listed activities in terms of Regulation 387 of 2006</b>	
1.	The construction of facilities or infrastructure, including associated structures or infrastructure, for –
(c)	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas, in containers with a combined capacity of 1 000 cubic metres or more at any location or site including the storage of one or more dangerous goods, in a tank farm;
(e)	Any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in GN R.386 of 2006;
(h)	The manufacturing, storage or testing of explosives, including ammunition, but excluding licensed retail outlets and the legal end use of such explosives;
(p)	The treatment of effluent, wastewater or sewerage with an annual throughput capacity of 15 000 cubic meters or more;
2.	Any development activity, including associated structures and infrastructure, where the total area of the development area is, or is intended to be, 20 hectares or more.
3.	The construction of filling stations, including associated structures and infrastructure, or any other facility for the underground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin.
6.	The construction of a dam where the highest part of the dam wall, as measured from the toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.

### 3.3 CONFIRMATION OF IAP CONSULTATION AND AGREEMENT ON POTENTIAL IMPACTS

IAPs were provided information on the potential impacts during the public scoping meeting. All of the IAP issues, concerns and objections raised during the scoping meetings have been provided in Appendix B. IAPs will also have the opportunity to review this scoping report.

### 3.4 POTENTIAL CULTURAL ENVIRONMENT IMPACTS

A list and description of potential impacts identified within the cultural environment is provided below as part of archaeological and heritage impacts.

### 3.5 POTENTIAL HERITAGE ENVIRONMENT IMPACTS

A list and description of potential impacts identified on the archaeological, heritage and cultural environment is provided below.

#### 3.5.1 ARCHAEOLOGICAL, HERITAGE AND CULTURAL RESOURCES

##### 3.5.1.1 Issue: Loss of or damage to heritage resources

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

No heritage resources of significance were observed at the mine. However, should there be any chance finds of any heritage resources the damage to these resources and the related impacts can be significant if the incorrect management steps are taken.

The additional work required to address this issue is outlined in Section 6.1.11 of the scoping report.

#### 3.5.2 PALEONTOLOGICAL RESOURCES

##### 3.5.2.1 Issue: Loss of or damage to paleontological resources

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

Based on the findings of desktop palaeontological reviews conducted for nearby prospecting operations (PGS, May 2014), the palaeontological sensitivity of the area is found to be low. In addition to this, the approved open pit mine plan remains unchanged. Taking this into account, the proposed project is



unlikely to influence palaeontological resources. However, should there be any chance finds of any palaeontological resources the damage to these resources and the related impacts can be significant if the incorrect management steps are taken.

The additional work required to address these issues is described in Section 6.1.12 of the scoping report.

### 3.6 POTENTIAL SOCIO-ECONOMIC ENVIRONMENT IMPACTS

A list and description of potential impacts identified on the socio-economic conditions of any person on the property, and on any adjacent or non-adjacent property who may be affected by the proposed mining operation, is provided below.

#### 3.6.1 LAND USE

##### 3.6.1.1 Issue: Impact on site and surrounding agricultural and residential uses

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

The impact on surrounding land use (mainly residential and grazing activities) was assessed as part of the approved EIA and EMP. Of concern to surrounding land owners are the following issues:

- Littering
- Use of veld for ablutions
- Veld fires
- Impacts of dust on grazing veld
- Gates being left open by employees of the mine/contractors
- Death of livestock on roads
- Theft of livestock
- Encroachment onto adjacent farming land

The implementation of the proposed project is not envisaged to have any significant additional direct impacts towards the surrounding land use as all the infrastructure changes are located within the existing mining right and surface use area.

The additional work required to address this issue as described in section 6.1.4.1 of the scoping report.

### 3.6.2 BLASTING

#### 3.6.2.1 Issue: Impacts associated with blasting activities

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
N/A		N/A	N/A

#### Discussion

Blasting impacts relating to the current open cast operations at the Tshipi Borwa Mine are associated with three pathways: fly rock, vibrations and air blast. Fly rock can harm structures, people and livestock. Vibrations and air blasts can damage structures.

Infrastructure changes associated with the proposed project will not influence current blasting activities associated with the Tshipi Borwa Mine or Mamatwan Mine. Some of infrastructure changes may reduce the previously assessed risks.

Following from the scoping meetings, it was found that there are concerns relating to the damages to houses from blasting as well as the impacts of blasting on livestock behaviour.

The approach to this issue is outlined in section 6.1.4.2 of this scoping report.

### 3.6.3 TRANSPORT SYSTEM

#### 3.6.3.1 Issue: Disturbance of roads by project-related traffic

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
			N/A

#### Discussion

The main entrance to the Tshipi Borwa Mine is located along the D3457 gravel road which is accessed via an intersection off the provincial R380 road. As part of the approved EIA and EMP it was noted that the increase in traffic associated with the mine along this local road network could result in an inconvenience to current road users, greater accidents (for people and animals) and increased road damage if unmanaged. As per the approved EIA and EMP increased traffic volumes are expected during the construction and operational phases by vehicles transporting staff, construction materials, mining equipment and product to and from site. Similar levels of traffic are likely to be expected during the decommissioning phase. It should be noted that current conditions of roads in the area are of concern to land owners.

It is not anticipated that the proposed project will result in an increase in traffic volumes along the D3457 and R380.

The additional work required to address this issue is outlined in section 6.1.4.3 of this scoping report.

### 3.7 POTENTIAL IMPACTS ON EMPLOYMENT OPPORTUNITIES, COMMUNITY HEALTH, COMMUNITY PROXIMITY AND LINKS TO THE SOCIAL AND LABOUR PLAN

A list of potential impacts (positive and negative) on: employment opportunities, community health, community proximity and links to the Social and Labour Plan, is provided below.

#### 3.7.1 POSITIVE AND NEGATIVE SOCIO-ECONOMIC IMPACTS

##### 3.7.1.1 Issue: Economic impact

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

The proposed project will not result in the creation of any additional job opportunities as Tshipi will make use of existing contractors and workers on site. The change to the approved infrastructure layout allows Tshipi to carry out their mining operations effectively and efficiently. This allows for the continued stimulation of the local, regional and national economy through job, capital investment, increase in service-sector jobs and the sale of manganese. Upon closure, there may still be some positive impacts through maintenance and aftercare activities and the fact that the mine would have contributed to a greater economic critical mass, skills, and wealth that can be used in other economic opportunities. The predicted positive economic impact therefore remains in accordance with the approved EIA and EMP.

##### 3.7.1.2 Issue: Social impact

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

There is potential for the following impacts to occur during the construction, operational and decommissioning phases:

- Influx of people into the area in search of work, leading to informal settlements and associated problems of crime, disease, and social disruption
- Continued pressure on housing and related services (water, power, sanitation, rubbish removal, schooling)

The most significant impact at and after closure will be the loss of income with respect to the local, regional and national economies.

The additional work required to address all of these negative socio-economic issues is described in Section 6.1.14 of the scoping report. Positive socio-economic impacts have been discussed under Section 6.1.14.

### 3.8 POTENTIAL BIOPHYSICAL ENVIRONMENT IMPACTS

A list and description of potential impacts identified with the biophysical environment including but not limited to impacts on: flora, fauna, water resources, air and noise etc; is provided below.

#### 3.8.1 GEOLOGY

##### 3.8.1.1 Issue: Loss and sterilisation of mineral resources

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

By the nature of mining projects the geology is exploited for target minerals therefore the impact will be high in all project phases. It is also important that no future resources become sterilised through the disposal of mineralised waste (tailings and waste rock) on surface and the use of waste rock as backfill in the open pit. In this regard, there are no anticipated impact changes between the proposed project changes and what was assessed as part of the approved EIA and EMP

The additional work required to address this issue is outlined in section 6.1.1 of this scoping report.

#### 3.8.2 TOPOGRAPHY

##### 3.8.2.1 Issue: Hazardous excavations and infrastructure

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

##### Discussion

Hazardous excavations and infrastructure include all structures into or off which third parties and animals can fall and be harmed, and structures that can fail like the tailings dam. Hazardous excavations and infrastructure occur in all mine phases from construction through operation to decommissioning and closure.

The impacts associated with hazardous excavations and infrastructure was assessed as part of the approved EIA and EMP. Taking this into account, the relocation of approved infrastructure (western waste rock dump, low grade and fines stockpiles, offices, plant workshops and related infrastructure), and

design changes (combined stormwater dam, and railway siding) within the surface use and mining rights area will not present hazards and safety risks that are new to the mine, albeit that the position of these hazards and risks will be different.

The establishment of the eastern waste rock dump, contractors' stormwater dam and the expansion of the diesel storage facility and sewage treatment plant presents additional hazardous excavations and infrastructure that has the potential to harm third parties and animals.

The additional work required to address this issue is described in Section 6.1.2 of this scoping report.

### 3.8.3 SOIL AND LAND CAPABILITY

#### 3.8.3.1 Issue: Loss of soil and change in land capability through sterilisation, erosion and contamination

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

#### Discussion

Topsoil is generally a resource of high value containing a gene bank of seeds of indigenous species. Soil resources can be compromised through physical disturbance (erosion and compaction) and/or pollution. A loss of soil resources would result in a decrease in the natural rehabilitation and future land use potential of any land.

The changes to the approved infrastructure layout have resulted in an infrastructure footprint increase from 1 046ha to 1 056ha. The soil types and land capability within the increased area are uniform and as such the impact of the establishment of infrastructure within this area is not expected to differ significantly from what was previously assessed. Refer to Figure 4 and Figure 5 for an illustration of the approved and current surface use area respectively.

The additional work required to address this issue is described in Section 6.1.3 of this scoping report.

### 3.8.4 FAUNA AND FLORA (NATURAL PLANT AND ANIMAL LIFE)

#### 3.8.4.1 Issue: Loss of natural vegetation and animal life

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Placement of infrastructure and mining activities has the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality, including the disturbance of sensitive/endangered species and habitats.

The impact on plant and animal life within and surrounding the mining right and surface use area was previously assessed as part of the approved EIA and EMP process. The proposed project will change the mine footprint but the change is not expected to result in significant impacts.

It should however be noted that landowners have raised concerns relating to the difficulties associated with re-establishing vegetation during rehabilitation and the effects of fuel fumes on plants.

The additional work required to address this issue is described in Section 6.1.5 of this scoping report.

**3.8.5 HYDROLOGY (SURFACE WATER)****3.8.5.1 Issue: Alteration of surface drainage patterns**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

The infrastructure changes will not encroach on any water resources. However it is noted that the construction of existing infrastructure has already impacted upon run off/drainage flow by containing dirty water and diverting clean water away from dirty areas as required by GN 704. Infrastructure changes may result in further alteration of drainage patterns during construction, operation and decommissioning.

The additional work required to address this issue is described in Section 6.1.6 of this scoping report.

**3.8.5.2 Issue: Contamination of surface water**

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

Discussion

Projects of this nature will generally present a number of pollution sources that can have a negative impact on surface water quality throughout the duration of the projects if there are discharges of contaminated substances into nearby resources.

The impact associated with the contamination of surface water resources was assessed as part of the approved EIA and EMP. Taking this into account the relocation of approved infrastructure (western waste

rock dump, low grade and fines stockpiles, offices, plant workshops and related infrastructure), and design changes (combined stormwater dam and railway siding) within the surface use and mining rights area will not present pollution sources that are new in concept to the mine.

Potential additional pollution sources associated with the establishment of additional infrastructure (expansion of the sewage treatment plant and diesel storage facility and establishment of the contractor's stormwater dam and the eastern waste rock dump) include: sewage, fuel, non-mineralised waste (hazardous and general), seepage, run-off from erosion of particles from exposed soils in the form of suspended solids. These sources are similar in nature to what has already been assessed for the mine.

The additional work required to address this issue is described in Section 6.1.6 of this scoping report.

### 3.8.6 GROUNDWATER

#### 3.8.6.1 Issue: Reducing groundwater levels and availability

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure
N/A			

#### Discussion

Dewatering impacts associated with the mine will remain unchanged. Although the quantity impacts on groundwater is of concern to surrounding land owners.

The approach to this issue is described in Section 6.1.7 of this scoping report.

#### 3.8.6.2 Issue: Contamination of groundwater

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

#### Discussion

Projects of this nature will generally present a number of pollution sources that can have a negative impact on groundwater quality throughout the duration of the projects.

The relocation of approved infrastructure (relocation of western waste rock dump, low grade and fines stockpiles), design changes of approved infrastructure (combined stormwater dam design) may result in the deterioration of groundwater quality through run-off/seepage and ad-hoc spills. It should however be noted that the impact of these facilities towards groundwater resources are located within the approved surface use and mining rights area and as such were assessed as part of the approved EIA and EMP process.

There is a potential for the establishment of additional infrastructure (expansion of the sewage treatment plant and diesel storage facility and establishment of the contractors stormwater dam and the eastern waste rock dump) to contaminate groundwater resources through run-off/seepage, ad-hoc spills, sewage and fuel. These sources are similar in nature to what has already been assessed for the mine.

The additional work required to address this issue is included in Section 6.1.7 of this scoping report.

### 3.8.7 AIR QUALITY

#### 3.8.7.1 Issue: Pollution from emissions to air

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

#### Discussion

Due to the nature of mining activities, a number of pollution sources (dust in particular) can have a negative impact on air quality if unmanaged. Typically, the following pollution sources may exist: wind erosion from exposed surfaces, vehicle tail-pipe emissions and fugitive dust from un-surfaced roads, vegetation and soil stripping and materials handling.

The impact associated with the pollution of air quality was assessed as part of the approved EIA and EMP. Taking this into account the relocation of approved infrastructure (western waste rock dump, low grade and fines stockpiles, offices, plant workshops and related infrastructure) and design changes (combined stormwater dam and railway siding) within the surface use and mining rights area will not present any significant additional pollution sources.

Vegetation and topsoil stripping and material handling associated with the establishment of an additional stormwater dam, the expansion of the diesel storage facility and sewage plant and the establishment of the eastern waste rock dump associated with the proposed project will generate dust, as will vehicle movement. In addition to this, the handling of diesel has the potential to result in the release of volatile organic compounds/vapours into the surrounding atmosphere.

The potential impact of mining on the local micro-climate is also of concern to surrounding land owners.

The additional work required to address this issue is included in Section 6.1.8 of this scoping report.



### 3.8.8 NOISE

#### 3.8.8.1 Issue: Increase in disturbing noise levels

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

#### Discussion

The impact associated with the increase in disturbing noise levels was assessed as part of the approved EIA and EMP process. The relocation of approved infrastructure (western waste rock dump, low grade and fines stockpiles, offices, plant workshops and related infrastructure) and approved infrastructure design changes (stormwater dam and railway siding) are located within the approved surface use and mining rights area. Taking this into consideration these infrastructure changes are not expected to have an additional impact towards the generation of disturbing noise levels as part of the proposed project.

Site clearing, construction activities and vehicle movements associated with the establishment of an additional stormwater dam, the expansion of the diesel storage facility and sewage treatment plant and the establishment of the eastern waste rock dump has the potential to increase ambient noise levels in all project phases prior to closure. However it is noted that current construction activities already generate noise so it is not expected that significant additional impacts will be noticeable.

The additional work required to address this issue is as described in Section 6.1.9 of this scoping report.

### 3.8.9 VISUAL ASPECTS

#### 3.8.9.1 Issue: Negative visual impacts

Project phase/s in which impact could occur

Construction	Operational	Decommissioning	Closure

#### Discussion

Negative visual impacts as a result of the Tshipi Borwa Mine were assessed as part of the approved EIA and EMP process. Taking this into account the relocation of approved infrastructure (western waste rock dump, low grade and fines stockpiles, offices, plant workshops and related infrastructure) and approved infrastructure design changes (combined stormwater dam and railway siding) within the surface use and mining rights area are not expected to influence existing negative visual impacts.

Similarly, the additional infrastructure (contractor's stormwater dam, expansion of sewage treatment plant, diesel storage facility and the eastern waste rock dump) is not expected to materially influence existing negative visual impacts.

The additional work required to address this issue is as described in Section 6.1.10 of this scoping report.

### 3.9 POTENTIAL CUMULATIVE IMPACTS

Potential cumulative impacts are those for which the incremental changes associated with the proposed projects will cumulatively add to existing environment which may already be experiencing impacts. In this regard, the following are considered cumulative impacts and these will be assessed in accordance with the terms of reference for each individual impact set out in Section 6:

- Fauna and flora – loss of natural vegetation and animal life (only temporarily)
- Surface water – alteration of surface drainage patterns or contamination of surface water
- Groundwater –contamination of groundwater resources
- Air quality - pollution from emissions to air (specifically associated with the expansion of the diesel storage facility)
- Noise – increase in disturbing noise levels
- Visual – negative visual aspects
- Socio-economic impacts
- Land use impacts.

## **4 PROJECT ALTERNATIVES**

This section describes land use or development alternatives, alternative means of carrying out the operation, and the consequences of not proceeding with the proposed operation.

The main project alternatives to be considered include:

- Alternative land use
- Project alternatives
- The “no-go” alternative

### **4.1 LAND USE ALTERNATIVES**

The Tshipi Borwa Mine and associated infrastructure has been approved for mining in terms of NEMA and the MPRDA. Given this, no alternative land use is identified.

### **4.2 LAND DEVELOPMENTS WHICH MAY BE AFFECTED BY THE PROPOSED PROJECT**

This section provides a description of land developments identified by IAPs that are in progress and which may be affected by the proposed mining operation.

In this regard, no land developments have been identified which may be affected by the proposed project.

All objections, issues and concerns raised throughout the Scoping Phase have been captured into the issues and concerns report provided in Appendix D.

### **4.3 PROJECT ALTERNATIVES AND IAP PROPOSALS TO ADJUST PROJECT PLAN**

#### **4.3.1 INFRASTRUCTURE LAYOUT ALTERNATIVES**

The new surface infrastructure is located within the Tshipi mining rights area and surface use area and/or adjacent to existing mine infrastructure and as a result no alternative sites were considered.

#### **4.3.2 IAP PROPOSALS TO ADJUST THE PROJECT PLAN**

No specific proposals have been raised to date in the consultation process to adjust the operational plans of the mine to accommodate the needs of the landowners and IAPs.

All issues and concerns raised throughout the Scoping Phase have been captured into the issues and concerns report provided in Appendix D.

IAPs will have an opportunity to review the scoping report.

#### **4.4 THE “NO-GO” OPTION**

This section provides information in relation to the consequence of not proceeding with the proposed mining operation.

The assessment of this option requires a comparison between the options of proceeding with the project with that of not proceeding with the project. The assessment of this option requires input from the additional work described in Section 6 so that the full extent of environmental, social and economic considerations can be taken into account.

The method to be used for assessing this option is outlined in Section 6.3 of the scoping report.

#### **4.5 PROJECT PLAN**

A description of the most appropriate procedure to plan and develop the proposed project is provided in Section 3.1.

##### **4.5.1 AVOIDANCE OF POTENTIAL IMPACTS**

This section provides information on the response to the findings of the application process and the possible options to adjust the mine project proposal to avoid potential impacts identified in the consultation process.

The overall project team aims to adjust the project plan to accommodate the changes to approved infrastructure which have already taken place as well as the proposed changes to infrastructure in a manner which will prevent impacts to the socio-economic, cultural and biophysical environment. Should any impacts related to the amended project scope be unavoidable, the emphasis will be on impact minimisation and mitigation.

##### **4.5.2 PROJECT PLAN TO AVOID POTENTIAL IMPACTS**

This section describes the most appropriate procedure to plan and develop the proposed mining operation with due consideration of the issues raised in the consultation process

As indicated above, the overall project team aims to develop the project plan in a manner which will prevent impacts to the socio-economic, cultural and biophysical environment. Should impacts relating to the amended project scope be unavoidable, the emphasis will be on impact minimisation and mitigation. The input provided by the EIA team will be used to inform any required changes to the project plan during the EIA phase of the project.

## **5 DESCRIPTION OF THE PROCESS OF ENGAGEMENT OF IAPS, INCLUDING THEIR VIEWS AND CONCERNS**

### **5.1 INFORMATION SHARING**

This section describes the information provided to the community, landowners and IAPs.

#### **5.1.1 DATABASE**

The projects public involvement database compiled as part of the approved EIA and EMP process was updated by verifying details of landowners and adjacent landowners through a deed search. In addition to this the database was supplemented with information on IAPs provided in the scoping meetings and a social scan. A copy of the projects public involvement database is included in Appendix C.

#### **5.1.2 BACKGROUND INFORMATION DOCUMENT (BID)**

A BID was compiled and distributed by hand (during the social scan and at the scoping meetings) and e-mailed to IAPs and authorities on the project's public involvement database. The purpose of the BID was to inform IAPs and authorities about the infrastructure changes, the environmental assessment process, possible environmental impacts, and means of providing input into the environmental assessment process. Attached to the BID was a registration and response form, which provided IAPs with an opportunity to submit their names, contact details and comments on the project. A copy of the BID is provided in Appendix B.

#### **5.1.3 NOTIFICATION**

The landowners, land users, ward councilor, and regulatory authorities (provincial and local) were informed in writing. Proof of this notification is provided in Appendix A and Appendix B.

Site notices in English and Afrikaans were placed at key conspicuous positions in and around the project site. A figure illustrating the location of where the site notices were placed is included in Appendix B. Block advertisements were placed in the Kalahari Bulletin and Kathu Gazette newspapers on 04 and 5 July 2013 respectively. Photographs of the site notices and copies of the newspaper advertisements are provided in Appendix B.

IAPs were notified of the infrastructure changes and the public meetings in the following manner:

- Distribution of background information documents to IAPs
- Advertisements placed in the Kalahari Bulletin and Kathu Gazette (Appendix B)
- Site notices placed in and around the project sites (Appendix B)
- Notification letters sent to landowners and adjacent landowners (Appendix B).

Authorities were notified of the infrastructure changes and the regulatory authorities meeting in the following manner:

- Distribution of background information documents
- Telephonic discussions to notify regulatory authorities of the proposed date for the authorities meeting
- Formal invitations to the regulatory authorities meeting.

#### 5.1.4 SCOPING MEETINGS

The following scoping and regulatory authority meetings were held:

- One authorities meeting was held on 30 July 2013 at the Hotazel Recreation Club; and
- One public scoping meeting was held on 30 July 2013 at the Hotazel Recreation Club.

The meetings provided background information for the project and the environmental process being followed. The meetings were therefore focussed on:

- Informing IAPs and regulatory authorities about the infrastructure changes
- Informing IAPs about the stakeholder engagement process and how IAPs can have input into the process
- Providing information about the existing status of the environment at the project sites and obtaining input thereon
- Providing information about the potential impacts of the project and obtaining input thereon
- Providing an opportunity for IAPs and regulatory authorities to raise issues and concerns. These issues and concerns have been documented in the Issues and Concerns Report (Appendix D) and used to inform the Plan of Study for the EIA Phase.

Meeting attendance registers, minutes, the meeting presentation and the issues and concerns report are provided in Appendix B.

#### 5.1.5 REVIEW OF THE SCOPING REPORT

The scoping report was made available for public review from **Tuesday 27 August 2013 to 07 October 2013**. Full copies of the scoping report were made available for public review as agreed to during the scoping meetings at the following venues:

- Joe Morolong Local Municipality
- John Taolo Gaetsewe District Municipality
- Hotazel Public Library
- Kathu Public Library
- SLR's offices in Johannesburg
- Electronically on a CD, will be made available to IAPs on request.

Summaries of the scoping report were sent by post or e-mail to all IAPs and authorities that are registered on the public involvement database. In addition, IAPs were notified when the scoping report was available for review via SMS.

Subsequent to the submission of the scoping report in August 2013 for public review, there were changes in the project scope. The scoping report was therefore updated and has been redistributed to the public for review from 31 August 2015 to 12 October 2015. Full copies of the updated scoping report were made available for public review at the venues listed above. Summaries of the updated scoping report were sent by post or e-mail to all IAPs and authorities that are registered on the public involvement database. In addition, IAPs have been notified when the updated scoping report will be available for review via SMS.

## **5.2 IAPs CONSULTED DURING SCOPING PHASE**

IAPs including the identified communities, landowners, or lawful occupiers and other IAPs that are registered on the project database (Appendix B) have been consulted during the scoping phase. The proof of consultation is in the form of signed attendance registers and proof of landowner notification (Appendix B).

## **5.3 IAP VIEWS ON EXISTING ENVIRONMENT**

All views, issues and concerns raised throughout the Scoping Phase with regard to the existing cultural, socio-economic or biophysical environment have been captured into the issues and concerns report provided in Appendix B.

Following from the scoping meetings it was confirmed that IAPs agreed on the status of the existing environment as laid out in the BID and scoping meeting presentation. It was however suggested that the prevailing wind direction be amended to reflect both south-easterly and north-easterly. In the regard the status of the existing environment has been updated accordingly.

## **5.4 IAP VIEWS ON POTENTIAL IMPACTS**

All views, issues and concerns raised throughout the Scoping Phase on how the existing cultural, socio-economic or biophysical environment could potentially be impacted upon by the proposed mining operation have been captured into the issues and concerns report provided in Appendix B.

Following from the scoping meetings it was confirmed that IAPs agreed on the potential impacts as laid out in the BID and in the scoping meeting presentation.

## **5.5 OTHER IAP CONCERNS**

All views, issues and concerns raised throughout the Scoping Phase have been captured into the issues and concerns report provided in Appendix B. Issues pertained to:

- Procedural related issues
- Technical/project related issues
- Biodiversity issues
- Rehabilitation issues
- Blasting issues.

## **5.6 MEETING MINUTES AND RECORDS OF CONSULTATIONS**

Copies of the scoping meeting attendance register, minutes, and scoping meeting presentation are included in Appendix B, and the issues and concerns report is provided in Appendix B.

## **5.7 IAP OBJECTIONS**

All views, issues and concerns raised throughout the Scoping Phase have been captured into the issues and concerns report provided in Appendix B. To date no objections relating to the proposed project have been received.



## **6 FURTHER INVESTIGATIONS AND EIA PLAN OF STUDY**

This section describes the nature and extent of further work required in the Environmental Impact Assessment, and sets out the proposed approach to the EIA and EMP phase.

### **6.1 FURTHER INVESTIGATIONS**

The proposed terms of reference for further work required for the completion of the EIA study are discussed below. The results of these studies will be collated into a combined EIA and EMP report.

#### **6.1.1 GEOLOGY**

It is proposed that no specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.2 TOPOGRAPHY**

It is proposed that no specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.3 SOIL AND LAND CAPABILITY**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.4 LAND USE**

##### **6.1.4.1 On site and surrounding agricultural and residential uses**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA (Metago, May 2009) report and consider additional land use issues raised by IAPs during the scoping process. The assessment and detailed management measures will be provided in the EIA and EMP report by SLR.

##### **6.1.4.2 Blasting activities**

It is proposed that no specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). SLR will also take into account landowner concerns relating to the effects of blasting on housing as well as livestock. The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.4.3 Disturbance of roads by project related traffic**

It is proposed that no further investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The current condition of roads in the area are of concern to land owners and this will be taken into account during the EIA and EMP phase. The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.5 NATURAL VEGETATION AND ANIMAL LIFE (FLORA AND FAUNA)**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009) and the biodiversity specialist study (EMS, November 2008) undertaken for the approved EIA and EMP. SLR will also consider landowners concerns relating to the limitations around vegetation re-establishment for rehabilitation and the effect of fuel fumes on plants albeit that there is limited quantitative data on the latter issue. The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.6 HYDROLOGY (SURFACE WATER)**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.7 GROUNDWATER**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.8 AIR QUALITY**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.9 NOISE**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009). The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.10 VISUAL ASPECTS**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009) report. The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.11 ARCHAEOLOGICAL, CULTURAL AND HERITAGE RESOURCES**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009) and specialist report (PGS, March 2009) undertaken for the approved EIA and EMP. The impacts will be assessed by SLR and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.12 PALEONTOLOGICAL RESOURCES**

No specialist investigations are required. This has been confirmed in consultation with the SAHRA. The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

#### **6.1.13 ECONOMIC AND SUSTAINABILITY ANALYSIS**

With reference to the DMR EIA and EMP report template an economic and sustainability analysis is required to determine the impact that mining activities would have towards the alternative land use to meet the requirements of Regulation 50 of the MPRDA. It should be note that the Tshipi Borwa Mine has already been approved for mining related activities and as such no alternative land use exists. Given this, no economic and sustainability analysis is proposed.

#### **6.1.14 SOCIAL ISSUES**

It is proposed that no further specialist investigations are required. SLR will make use of the information provided in the original EIA and EMP report (Metago, May 2009) report. The impacts will be assessed and detailed management measures will be provided in the EIA and EMP report by SLR.

### **6.2 METHODOLOGY FOR THE ASSESSMENT OF ENVIRONMENTAL ISSUES**

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

**TABLE 6: CRITERIA FOR ASSESSING IMPACTS**

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

<b>PART A: DEFINITION AND CRITERIA*</b>					
<b>Definition of SIGNIFICANCE</b>		<b>Significance = consequence x probability</b>			
<b>Definition of CONSEQUENCE</b>		<b>Consequence is a function of severity, spatial extent and duration</b>			
<b>Criteria for ranking of the SEVERITY of environmental impacts</b>	<b>H</b>	Substantial deterioration (death, illness or injury). Recommended level will often be violated. Vigorous community action.			
	<b>M</b>	Moderate/ measurable deterioration (discomfort). Recommended level will occasionally be violated. Widespread complaints.			
	<b>L</b>	Minor deterioration (nuisance or minor deterioration). Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.			
	<b>L+</b>	Minor improvement. Change not measurable/ will remain in the current range. Recommended level will never be violated. Sporadic complaints.			
	<b>M+</b>	Moderate improvement. Will be within or better than the recommended level. No observed reaction.			
	<b>H+</b>	Substantial improvement. Will be within or better than the recommended level. Favourable publicity.			
<b>Criteria for ranking the DURATION of impacts</b>	<b>L</b>	Quickly reversible. Less than the project life. Short term			
	<b>M</b>	Reversible over time. Life of the project. Medium term			
	<b>H</b>	Permanent. Beyond closure. Long term.			
<b>Criteria for ranking the SPATIAL SCALE of impacts</b>	<b>L</b>	Localised - Within the site boundary.			
	<b>M</b>	Fairly widespread – Beyond the site boundary. Local			
	<b>H</b>	Widespread – Far beyond site boundary. Regional/ national			
<b>PART B: DETERMINING CONSEQUENCE</b>					
<b>SEVERITY = L</b>					
<b>DURATION</b>	Long term	<b>H</b>	<b>Medium</b>	<b>Medium</b>	<b>Medium</b>
	Medium term	<b>M</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
	Short term	<b>L</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
<b>SEVERITY = M</b>					
<b>DURATION</b>	Long term	<b>H</b>	<b>Medium</b>	<b>High</b>	<b>High</b>
	Medium term	<b>M</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Short term	<b>L</b>	<b>Low</b>	<b>Medium</b>	<b>Medium</b>
<b>SEVERITY = H</b>					
<b>DURATION</b>	Long term	<b>H</b>	<b>High</b>	<b>High</b>	<b>High</b>
	Medium term	<b>M</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Short term	<b>L</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
			<b>L</b>	<b>M</b>	<b>H</b>
			Localised Within site boundary Site	Fairly widespread Beyond site boundary Local	Widespread Far beyond site boundary Regional/ national
<b>SPATIAL SCALE</b>					
<b>PART C: DETERMINING SIGNIFICANCE</b>					
<b>PROBABILITY (of exposure to impacts)</b>	Definite/ Continuous	<b>H</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Possible/ frequent	<b>M</b>	<b>Medium</b>	<b>Medium</b>	<b>High</b>
	Unlikely/ seldom	<b>L</b>	<b>Low</b>	<b>Low</b>	<b>Medium</b>
			<b>L</b>	<b>M</b>	<b>H</b>
<b>CONSEQUENCE</b>					

PART D: INTERPRETATION OF SIGNIFICANCE	
Significance	Decision guideline
High	It would influence the decision regardless of any possible mitigation.
Medium	It should have an influence on the decision unless it is mitigated.
Low	It will not have an influence on the decision.

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

### 6.3 METHODOLOGY FOR THE ASSESSMENT OF PROJECT ALTERNATIVES

#### 6.3.1 ASSESSMENT OF THE “NO-GO OPTION”

The assessment of the implications of the “No-Go option” will require a high level comparison between the existing situation without the project and the possible future situation with the project, as assessed in the EIA and EMP report. This comparison will take existing and future impacts into account, including both positive and negative impacts.

#### 6.3.2 ASSESSMENT OF PROJECT ALTERNATIVES

As discussed in Section 4 of the scoping report, there are no realistic alternatives. The proposed methodology for the assessment of any alternatives still to be identified is a relative comparison that also applies the assessment method described above to each of the listed assessment criteria, where possible.

### 6.4 ENGINEERING DESIGN

The underground and surface infrastructure will be designed by appropriately qualified professional engineers in accordance with the requirements of Regulation 73 of the Mineral and Petroleum Resources Development Act, 28 of 2002, and Regulation 704 of the National Water Act, 36 of 1998.

### 6.5 CLOSURE COST ESTIMATE

The Tshipi Borwa Mine closure cost estimate will be updated and revised by SLR Consulting using the current DMR model.

### 6.6 PLAN OF STUDY FOR THE EIA PHASE

#### 6.6.1 EIA PHASE OBJECTIVES

The main objectives of the EIA phase are to:

- Assess the potential cultural, heritage, socio-economic and biophysical impacts of the project

- Where impacts are unavoidable, identify and describe procedures and measures that will mitigate potential negative impacts and enhance potential positive impacts
- Liaise with IAPs including relevant government departments on issues relating to the proposed development to ensure compliance with existing guidelines and regulations
- Undertake consultations with IAPs and provide them with an opportunity to review and comment on the outcomes of the environmental assessment process and acceptability of mitigation measures
- Update the environmental management programme and a conceptual closure/decommissioning plan
- Provide measures for on-going monitoring (including environmental audits) to ensure that the project plan and proposed mitigation measures are implemented as outlined in the detailed EIA and EMP report.

### 6.6.2 EIA PROJECT TEAM

The proposed EIA project team is outlined in the table below and is similar to the team used for the scoping phase with the inclusion of additional specialists.

**TABLE 7: PROPOSED EIA TEAM**

Team	Name	Designation	Tasks and roles	Company
Project management	Natasha Daly	Project manager	Process management, stakeholder engagement, and report compilation.	SLR Consulting (Africa) (Pty) Ltd
	Caitlin Pringle	Project administrator		
	Brandon Stobart	Project reviewer	Report and process review	
Specialist investigations	Steve van Niekerk	Engineer	Closure cost estimate report	SLR Consulting (Africa) (Pty) Ltd

### 6.6.3 EIA AND EMP PHASE ACTIVITIES AND TIMING

An overview of the EIA and EMP phase and corresponding activities are outlined in the table below.

**TABLE 8: EIA AND EMP ACTIVITIES AND TIMING**

Objectives	Corresponding activities and estimated dates
<i>EIA and EMP phase (August 2015 to first quarter of 2016)</i>	
<ul style="list-style-type: none"> <li>• Assessment of potential environmental impacts</li> <li>• Design requirements and management and mitigation measures</li> <li>• Receive feedback on application</li> </ul>	<ul style="list-style-type: none"> <li>• Compilation of EIA and EMP report (August to September 2015).</li> <li>• Distribute EIA and EMP report to IAPs, DMR and other regulatory authorities for review (October 2015 to November 2015).</li> <li>• Public feedback meetings with IAPs (if required) (November 2015).</li> <li>• Record comments (June 2015).</li> <li>• Forward IAP comments to DMR (November 2015 to early December 2015)</li> <li>• Circulate record of decision to all registered IAPs (First quarter of 2016).</li> </ul>

#### 6.6.4 STAGES OF CONSULTATION WITH THE COMPETENT AUTHORITY IN EIA PHASE

Proposed consultation meetings for the EIA phase include:

- A site visit and meeting with DMR if requested
- A general authorities meeting at the end of the EIA phase to present the main findings of the EIA prior to submission of the EIA and EMP report if requested.

#### 6.6.5 PUBLIC INVOLVEMENT PROCESS IN EIA PHASE

The proposed public involvement process can be separated into focussed and general involvement. Each of these is described below:

##### **Focussed involvement**

As part of the various investigations that form part of the EIA tasks focussed meetings with certain IAPs will be held, as required. These meetings will be arranged and facilitated by SLR.

##### **General involvement**

As with the scoping report, full copies of the EIA and EMP report will be distributed to the agreed venues and summaries (available in English and Afrikaans) will be distributed to registered IAPs. Full copies of the report will also be provided electronically (on a CD) on request.


At the end of the review period, a public open day/ feedback meeting will be arranged (if required). The purpose of the public open day will be as follows:

- Provide IAPs with the opportunity to have discussions with members of the EIA project team. This is intended to assist with IAP review of the EIA and EMP amendment and related reports.
- Provide IAPs with a final chance to submit comments on the EIA and EMP report

All comments received from IAPs in the review period will be forwarded to the DMR.

Once the DMR, have issued their respective decisions, the IAPs will be notified by e-mail, and post in accordance with the instructions from the relevant departments.

**7.2 IDENTIFICATION OF THE REPORT**

<b>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 the results of consultation as contemplated in Section 16 (4) (b) or 27 (5) (b) of the Act as the case may be</b>	
<b>Full names and surname</b>	PULE EZECHIEL LOTCHARE
<b>Identity number</b>	6901017970081
<b>Signature</b>	



## 8 SUMMARY AND CONCLUSIONS

The scoping phase of the EIA catering for the changes to surface infrastructure at the Tshipi Borwa Mine is almost complete. The way forward for the remainder of the scoping phase is as follows:

- Distribute the scoping report and a summary thereof for review by the IAPs (one hard copy per venue), the DMR (six hard copies) and other regulatory authorities (one hard copy per regulatory authority expect for the SAHRA who will receive an electronic copy)
- Receive comments from IAPs and other regulatory authorities
- Receive comments from DMR.

Thereafter, SLR will proceed with the EIA phase in accordance with the scoping report terms of reference and any IAP and regulatory authority feedback.



**Natasha Daly**  
Project Manager



**Brandon Stobart**  
Reviewer

## 9 REFERENCES

Airshed Planning Professionals (Pty) Ltd, Air Quality Impact Assessment for the Proposed Ntsimbintle Manganese Mining Operations, April 2009.

ARC-Institute for Soil, Climate and Water, Soil Information for the Proposed Mining Operation for Ntsimbintle Mining, Near Hotazel, October 2008.

Ecological Management Services, Ecological Survey for the Proposed Ntsimbintle Manganese Mine, Near Hotazel, Northern Cape, November 2008.

John Taolo Gaetsewe District Municipality, Spatial Development Framework, 2012.

Metago Environmental Engineers (Pty) Ltd, Ntsimbintle Feasibility Study – Tailings Storage Facility, March 2009.

Metago Environmental Engineers (Pty) Ltd, Environmental Impact Assessment and Environmental Management Programme for the Proposed Ntsimbintle Manganese Mining Project, May 2009.

PGS, Heritage Impact Assessment, Ntsimbintle Mining (Pty) Ltd on Portions 1, 2, 3 and 8 of the farm Mamatwan 331 and the farm Moab 700 in the Kgalagadi District Municipality of the Northern Cape Province, March 2009.

PGS, Ntsimbintle Mining (Pty) Ltd, Prospecting activities on the farm Gloria 266, near Hotazel in the Northern Cape Province, Heritage Impact Assessment, May 2013.

PGS, Tshipi é Ntle Manganese Mining, Prospecting on Remaining extent of the farm Wessels 227 and Portions 1 and 2 and the remaining extent of the farm Dibiaghomo 226, near Black Rock in the Northern Cape Province, Heritage Impact Assessment, May 2013.

Siyazi Limpopo (Pty) Ltd, Proposed New Manganese Mining Operation Located Near the Town of Hotazel, on Portions 1, 2, 3, 8 and Remaining Extent (re) of the farm Mamatwan 331 and the farm Moab 700.

SLR Consulting (Africa) (Pty) Ltd, Hydrogeological Assessment for Mine Closure Planning - Pit Lake Formation - Site Report and Analytical Model, November 2012

Synergistics Environmental Services, Tshipi Borwa Mine – Water Quality Monitoring, 1<sup>st</sup> Annual Water Quality Monitoring Reports, February 2015

Water Geosciences Consulting, Groundwater Investigation for the Ntsimbintle Mine, February 2009.

## **APPENDIX A: INFORMATION SHARING WITH AUTHORITIES**

- DMR notification letter
- Submission of NEMA application
- Submission of NEM:WA application
- Confirmation from land affairs
- Authorities meeting minutes
- Signed attendance register
- Comments received from authorities during the scoping phase
- Proof of submission of the scoping report regulatory authorities
- Proof of submission of the scoping report summary to regulatory authorities

## **APPENDIX B: INFORMATION SHARING WITH IAPS**

- Proof of landowner notification
- Site notice in English and Afrikaans, photographs and map showing the placement of site notices
- Advertisements
- Background Information Document
- Meeting minutes
- Signed attendance registers
- Comments received from IAPs during the scoping phase
- Proof of submission of scoping report to IAPs
- Scoping report summary in English and Afrikaans
- Proof of submission of the scoping report summary to IAPs

**APPENDIX C: IAPS DATABASE**

**APPENDIX D: ISSUES AND CONCERNS REPORT**

## RECORD OF REPORT DISTRIBUTION

<b>Project Number:</b>	710.20008.00008
<b>Title:</b>	Scoping report for the changes to surface infrastructure at the Tshipi Borwa Mine
<b>Report Number:</b>	1
<b>Proponent:</b>	Tshipi e Ntle Manganese Mining

Name	Entity	Copy No.	Date issued	Issuer
Raisibe Sekepane	Department of Mineral Resources	1 - 6	August 2015	N Daly
Magdalene Schuping	Joe Morolong Local Municipality – ward councillor	7	August 2015	N Daly
Seneo Seleka	Joe Morolong Local Municipality	8	August 2015	N Daly
M Bokgwathile	John Taolo Gaetsewe District Municipality	9	August 2015	N Daly
Katie Smuts	South African Heritage Resource Agency	Electronic copy	August 2015	N Daly
Dawn Le Fleur	Department of Water Affairs	10	August 2015	N Daly
Obed Mvula	Department of Rural Development and Land Reform	11	August 2015	N Daly
Jacoline Mans	Department of Agriculture, Forestry and Fisheries	Electronic copy	August 2015	N Daly
Thembela Sukazi	Hotazel Library	12	August 2015	N Daly
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Carol Kenyon	SLR Library	14	August 2015	N Daly
James Manis	Tshipi	15	August 2015	N Daly
Brendan Robinson		16	August 2015	N Daly

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