DENC REFERENCE: NC/EIA/12/JTG/GAE/KAT2/2013
NCP/EIA/0000242/2013
DMR REFERENCE: (NC) 30/5/1/2/2/ (10037) MR

# FINAL SCOPING REPORT

FOR THE PROPOSED MASHWENING IRON ORE MINE ON REMAINING EXTENT OF MASHWENING 557 FARM, KURUMAN DISTRICT, NORTHERN CAPE PROVINCE

## PROPOSED MASHWENING OPEN-CAST IRON ORE MINE

**Prepared For:**

# WIDE INVESTMENTS 100 (PTY) LTD

**Prepared by:**

JOMELA Consulting (Pty) Ltd

Reg. No. (2013/023450/07)

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## EXECUTIVE SUMMARY

### Introduction and project description

The proposed Mashwening Iron Ore Mine is situated approximately 20 km southeast from the town of Kathu on the remaining extent of the farm Mashwening 557 located in the Magisterial District of Kuruman in the Northern Cape Province.

Wide Investments 100 (Pty) Ltd, herein after referred to as Wide Investments, is the holder of the Prospecting Right for Iron and Manganese ore in terms of Section 17(1) of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002). A total of 46 Diamond core boreholes were drilled by Orex Exploration CC to inform the Mine Work Programme (MWP) about the mineral deposition, quality, quantity, economic viability, and the life of mine. Prospecting samples were submitted to SGS for analysis. In addition, detrital iron ore trenching was also undertaken on the southern periphery of the farm.

The total estimated resource to be mined is 14 million tons of ore in the ground. However, the total recoverable and saleable ore for the resource is 6.5 million tons.

On August 2013, Wide Investments 100 (Pty) Ltd applied to the Department of Mineral Resources for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). The Department of Mineral Resources must first authorize the application before mining of Iron and Manganese ore can commence.

The infrastructure proposed for the Mashwening Iron Ore mining operations on the above-mentioned properties includes:

- Mine pit;
- Office and workshop facilities;
- Plant and processing facilities;
- Overburden and topsoil storage area;
- Waste and tailings dam;
- Haulage and access roads, stores and bulk fuel supply.

***N.B- Mashwening intends to use mobile facilities as well as enter into agreement with the neighbouring mine for use of existing infrastructure***

**Legislative requirements**

*National Environmental Management Act, 1998 (Act 108 of 1998) [as amended)*

The proposed mine development and operations requires compliance with the EIA Regulations of 2010, promulgated in terms of the National Environmental Management Act, Act 107 of 1998 (as amended). The proposed activity requires a Scoping and EIA process as listed activities 9,11, 13 18, 22, 37, 47 & 53 under Government Notice No R. 544 as well as listed activities 15 and 20 of Government Notice No R. 545 of the EIA 2010 Regulations are triggered.

*National Water Act, 1998 (Act 36 of 1998)*

The proposed mine development and operations further also requires compliance with the National Water Act, 1998 (Act 36 of 1998). An application for an integrated water use licence in terms of Section 21 to undertake the following activities will be applied for:

*(a) taking water from a water resource;*
*(b) storing water;*
*(c) impeding or diverting the flow of water in a watercourse;*
*(i) altering the bed, banks, course or characteristics of a watercourse;*
*(g) Disposing of waste in a manner which may detrimentally impact on a water resource;*

The requirements of the following legislation have also been considered in this Application for environmental authorisation:

- Constitution of South Africa (Act No. 108 of 1996);
- National Biodiversity Act (Act No.10 of 2004);
- National Environmental Management Air Quality Act (Act No. 39 of 2004);
- National Environmental Waste Management Act (Act No. 59 of 2008);
- National Heritage Resource Act (Act No. 25 of 1999);
- National Forest Act (Act 84 of 1998);
- Conservation of Agricultural Resources Act (Act 43 of 1983);
- Minerals and Petroleum Resources Development Act (Act No. 28 of 2002); and
- Occupational Health and Safety Act (Act No. 85 of 1993).

**Alternatives**

Alternatives are defined in the NEMA EIA Regulations (2010) as "different means of meeting the general purpose and requirements of the activity, which may include alternatives to: (a) the property on which or location where it is proposed to undertake the activity; (b) the type of activity to be undertaken; (c) the design or layout of the activity; (d) the technology to be used in the activity; and (e) the operational aspects of the activity and (f) the option of not implementing the activity".

For the purpose of this application, the following Alternatives will be considered:

- Mining methodology alternatives);
- Processing Plant types (Design alternatives);
- Layout alternatives;
- Location alternatives; and
- Proceed without the mine (No – Go alternative).

**Impact statement**

The following key issues and potential impacts (direct and cumulative), was identified during the Scoping phase, which will together with potential cumulative impacts, be assessed during the Environmental Impact Assessment phase of the project and appropriate mitigation measures to reduce the identified impacts will be proposed.

***Potential Direct Impacts identified***

| IMPACT | |
|---|---|
| **SURFACE WATER** | Alteration of the characteristics of a water resource<br>Hydrological modification on storm water flow and watercourses. |
| | Deterioration of water quality |
| | The impact on ground and surface water by migration of contaminated water from the construction and operational phases. |
| | Impacts on surface water during the construction and operational phases. |
| **GROUNDWATER** | Impact on dewatering of the groundwater aquifer due to mining operations. |
| | Impact on ground and surface water by migration of contaminated water from the construction and operational phases. |
| | Deterioration of water quality |

| | |
|---|---|
| **AIR QUALITY** | Dust impacts on air quality during the construction and operational phases. |
| **SOIL, GEOLOGY AND MINERAL RESOURCE** | Impact of vegetation clearance on soil erosion and surface water runoff during the construction and operational phase |
| | Soil pollution during the construction and operational phase |
| | Mining of resource underlying the site |
| **TOPOGRAPHY** | Alteration of the surrounding topography |
| **ECOLOGICAL** | Destruction of sensitive habitat |
| | Destruction of faunal habitat and faunal displacement |
| | Reduction in natural migratory routes and faunal dispersal patterns |
| **VISUAL** | Minimisation of aesthetics and/or sense of place of the surrounding areas. |
| **SOCIO-ECONOMICAL** | Development and upliftment of the surrounding communities and infrastructure |
| | Development of the economic environment |
| **HERITAGE** | Alteration of archaeological, historical and paleontological features |

***Potential Cumulative Impacts identified***

| IMPACT | |
|---|---|
| **TRAFFIC** | Increased traffic volumes within the mine and surrounding communities. |
| **AIR QUALITY** | Decrease in air quality in the immediate surroundings of the mine. |
| **HYDROLOGICAL** | Cumulative loss of surface water functionality as a result of an increase in pollutants. |
| | Cumulative impact of hydrological modifications and stormwater. |
| **ECOLOGICAL** | Cumulative destruction of sensitive habitat. |
| | Cumulative impact of faunal habitat and displacement. |
| | Cumulative impact on natural migratory routes and faunal dispersal patterns. |
| **VISUAL** | Cumulative impact of visual disturbances |
| **NOISE, VIBRATION AND SHOCK** | Cumulative impact of construction and operational noise as well as noise due to blasting, vibrations and shocks. |
| | Cumulative impact of vibration and shocks. |

| | |
|---|---|
| **SOCIO-ECONOMICAL** | Positive - Cumulative impact of development on the surrounding communities. |
| | Positive - Cumulative impact of development on the economic environment. |
| | Positive - Cumulative impact of the employment opportunities provided. |

**Public Participation**

A joint Public Participation Process (PPP) is undertaken for the proposed mining development. The process is undertaken to ensures compliance with regard to the requirements in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), the National Environmental Management Act, 1998 (Act No. 107 of 1998) [as amended], National Water Act, 1998 (Act No. 36 of 1998) and the Environmental Impact Assessment Regulations (2010).

The PPP tasks conducted to date includes:

1. *Identification of key interested and affected parties (affected and adjacent landowners) and other stakeholders (organs of state and other parties)*

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

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

**Interested and Affected Parties**

An Interested and Affected Party is a juristic person or an association of persons with a direct interest in the proposed or existing operation or who may be affected by the proposed or existing operation.

The majority of the stakeholders on the database are comprised of individual, associations, companies, organisations, municipal representatives, and government departments. Refer to **Appendix B** for the Interested and Affected Party list.

**Project Announcement and Invitation to Participate**

Interested and Affected Parties were informed about the proposed mining operation by means of telephone conversations, email correspondences, faxes, and registered mail. Refer to **Appendix D** for record of communication with stakeholders.

**Background Information Document**

Interested and Affected Parties were provided with the project Background information Document (BID) describing the proposed mining activity, environment likely to be affected, the likely impacts envisaged, and the consultation process to be followed. Refer to **Appendix B** for the BID.

**Advertisements and Site Notices**

**Newspaper Advert**

Advertisements were placed in the following two newspapers in both English and Afrikaans languages to announce the project and to invite interested and affected parties to register:

- Diamonds Fields Advertiser (02 October 2013);
- Khathu Gazette (05 October 2013);

These newspapers covers the both the local communities and the whole of Northern Cape Province. Refer to **Appendix B** for copies of newspaper advertisements.

A3 colour sized English notices were placed at the following sites on the 26 October 2013:

- Kuruman Post Office;
- Khathu Post Office;
- Dingleton Post Office;
- Kuruman Library;
- Gamagara Library;
- Kuruman Local Municipality;
- Gamagara Local Municipality;
- John Taolo Gaetsewe District Municipality;
- Mashwening 557 farm entrance point;
- Diro Mining entrance and offices;
- Helpebietjie Mine security gate office.

Refer to **Appendix E** for site notices.

**Public Meeting**

A public meeting will be held with interested and affected parties for the compilation of the Environmental Management Programme (EMP) amendment report.

Authorities' pre-application meetings were held with the Department of Water affairs and the Department of Environment and Nature Conservation at the Northern Cape Region.

**Public Review**

Interested and Affected parties will be provided with a review period in which they will be allowed to review the. This is to offer the public an opportunity to get acquainted with the Final Scoping Report (FSR) report and to give comments. Communications lines will be established between the consultant (Jomela Consulting (Pty) Ltd) and interested and Affected Parties (I & Aps) through the use of electronic mail, telephone, post mail and fax mail. The FSR will be available for public review at the Gamagara Local Municipality Library from 17 September 2014 to 9 October 2014. All comments received from the public will be forwarded to the department , any comments received after acceptance of the scoping report will be incorporated into the Draft EIA Report.

*Distribution of Draft Scoping Report and Plan of Study*

The Draft Scoping Report (DSR) and Plan of Study (POS) were released for public review and comment for 40 calendar days from 17 November 2013 to 18 January 2014. copies of the DSR were submitted to all Organs of State and relevant authorities. Hardcopies of the DSR were available at the Gamagara Local Municipality Library.

*Distribution of Final Scoping Report and Plan of Study*

The Final Scoping Report (FSR) and Plan of Study (POS) were released for public review and comment for 21 calendar days 17 September 2014 to 9 October 2014.

***Conclusion***

The FSR report describe the activities that will be undertaken for the proposed mining project at Mashwening Iron Ore Mine. It provides a description of the biophysical, cultural and socio-economic environment to ensure that all risks and issues are taken into consideration in all

phases of the planned development. Mashwening mining activities will have the potential to change the status of the environment.

Comments from the Interested and Affected Parties about the Final Scoping Report will be forwarded to the department. All comments raised by stakeholder after submission of the FSR will be incorporated within the Draft EIA Report which will be available for public review for 21 days.

Public Participation Process will be continuous through the overall environmental impact assessment. The plan of study has been described in full for the whole FSR process.

| | |
|---|---|
| **EIA** | Environmental Impact Assessment Report |
| **EAP** | Environmental Assessment Practitioner |
| **PPP** | Public Participation Process |
| **SAHRA** | South African Heritage Resources Agency |
| **SAHRA** | South African Heritage Resources Agency |
| **SANBI** | South African National Biodiversity Institute |
| **SANBI** | South African National Biodiversity Institute |

**GLOSSARY OF TERMS**

**Anthropogenic:** Change induced by human intervention.

**Applicant**: Any person who applies for an authorisation to undertake an activity or undertake an Environmental Process in terms of the Environmental Impact Assessment (EIA) Regulations – National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA] as contemplated in the scheduled activities listed in Government Notice (GN) No 543, 544 and 545.

**Archaeological resources:** This includes:

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

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

**Cultural significance:** This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

**Cumulative Impact:** In relation to an activity, cumulative impact means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Environment**: All physical, chemical and biological factors and conditions that influence an object.

**Environmental Impact Assessment:** In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

**Environmental Impact Assessment Report:** In-depth assessment of impacts associated with a proposed development. This forms the second phase of an EIA and follows on the Scoping Report (SR).

**Heritage resources:** This means any place or object of cultural significance. See also archaeological resources above.

**Precipitation:** Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

**Red Data species**: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

**Riparian**: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

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# 1 INTRODUCTION

## 1.1 Background

The mining industry in South Africa plays an important role in the nation`s Gross Domestic Product (GDP) and employment ratio. The discovery of Iron and Manganese ore deposits contributed significantly to the socio-economic status of the Northern Cape Province.

The proposed Mashwening Iron Ore Mine is situated approximately 20 km southeast from the town of Kathu on the remaining extent of the farm Mashwening 557 located in the Magisterial District of Kuruman in the Northern Cape Province.

Wide Investments 100 (Pty) Ltd, herein after referred to as Wide Investments, is the holder of the Prospecting Right for Iron and Manganese ore in terms of Section 17(1) of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002). A total of 46 Diamond core boreholes were drilled by Orex Exploration CC to inform the Mine Work Programme (MWP) about the mineral deposition, quality, quantity, economic viability, and the life of mine. Prospecting samples were submitted to SGS for analysis. In addition, detrital iron ore trenching was also undertaken on the southern periphery of the farm.

The total estimated resource to be mined is 14 million tons of ore in the ground. However, the total recoverable and saleable ore for the resource is 6.5 million tones.

On August 2013, Wide Investments 100 (Pty) Ltd applied to the Department of Mineral Resources for a Mining Right in terms of Section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). The Department of Mineral Resources must first authorize the application before mining of Iron and Manganese ore can commence.

According to the MWP, Wide Investments will utilize open-cast mining method to extract the Iron and Manganese ore minerals deposit. In common with other mining operations, Mashwening Iron Ore Mine has activities that fall within the ambit of section 21 of the National Water Act, 1998 (Act No. 36 of 1998) (“NWA”). Wide Investments (Pty) Ltd is required to apply for a Water Use Licence in terms of provisions of Chapter 4 of the NWA.

Furthermore, Wide Investments is required to develop an Integrated Water and Waste Management Plan (IWWMP) which will support the Integrated Water Use Licence Application (IWULA) for the planned activities at Mashwening Iron Ore Mine.

Jomela Consulting (Pty) Ltd has been appointed by Wide Investments (Pty) Ltd to facilitate the implementation of the EIA-EMP for the proposed mining operation.

### 1.2 Prospecting and Mining Right Status

Prospecting Right

The Prospecting Right was granted on the 12th of April 2011 in terms of Section 17(1) of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002).

Invasive Prospecting

Prospecting activities commenced on the 29th August 2011 whereby a total of 46 Diamond core boreholes were drilled.

Mining Right Application

The Mining Right application was lodged with the Department of Mineral Resources on 14 August 2013, and subsequently accepted on 18 September 2013.

Application for Environmental Authorisation

An application for environmental authorisation for Listed Activities was submitted on the 26 September 2013.

Water Use Licence Pre-application Meeting

Water Use Licence (WUL) pre-application meeting was held at the Department of Water Affairs Northern Cape region on the 26 September 2013.

### 1.3 Property Information

The details of the relevant property are described in Table 1.1 below

**Table 1**: Properties of the land to which the application relates.

| FARM NAME | PORTION NO. | COORDINATES | SIZE (ha) | SURFACE RIGHT OWNER | TITLE DEEDS |
|---|---|---|---|---|---|
| Mashwening 557 | Remaining Extent | Longitude: 23.05<br>Latitude: -27.86 | 1679.5094 | Sishen Iron Ore Mining Company (Pty) Ltd | T3280/2001 |

### 1.4 Regional Setting and Location of the Project

The study area is situated in the north-eastern part of the Northern Cape Province. The proposed mining operation is located approximately 70 km south west from the town of Kuruman in the Gamagara Local Municipality of the John Taolo Gaetsewe District Municipality. The project is located approximately 20 km south east of the town of Kathu, to the east of the N14 National Road. Sishen Mine is located about 17 km northwest from the proposed project.

The highest altitude is about 1247 above mean see level (AMSL), while the lowest is in the range between 1225-1229 m AMSL. Moreover, the project lies at longitude 28.23685 and latitude -24.63827. The project area is represented in **Figure 1** and in **Figure 2** below:

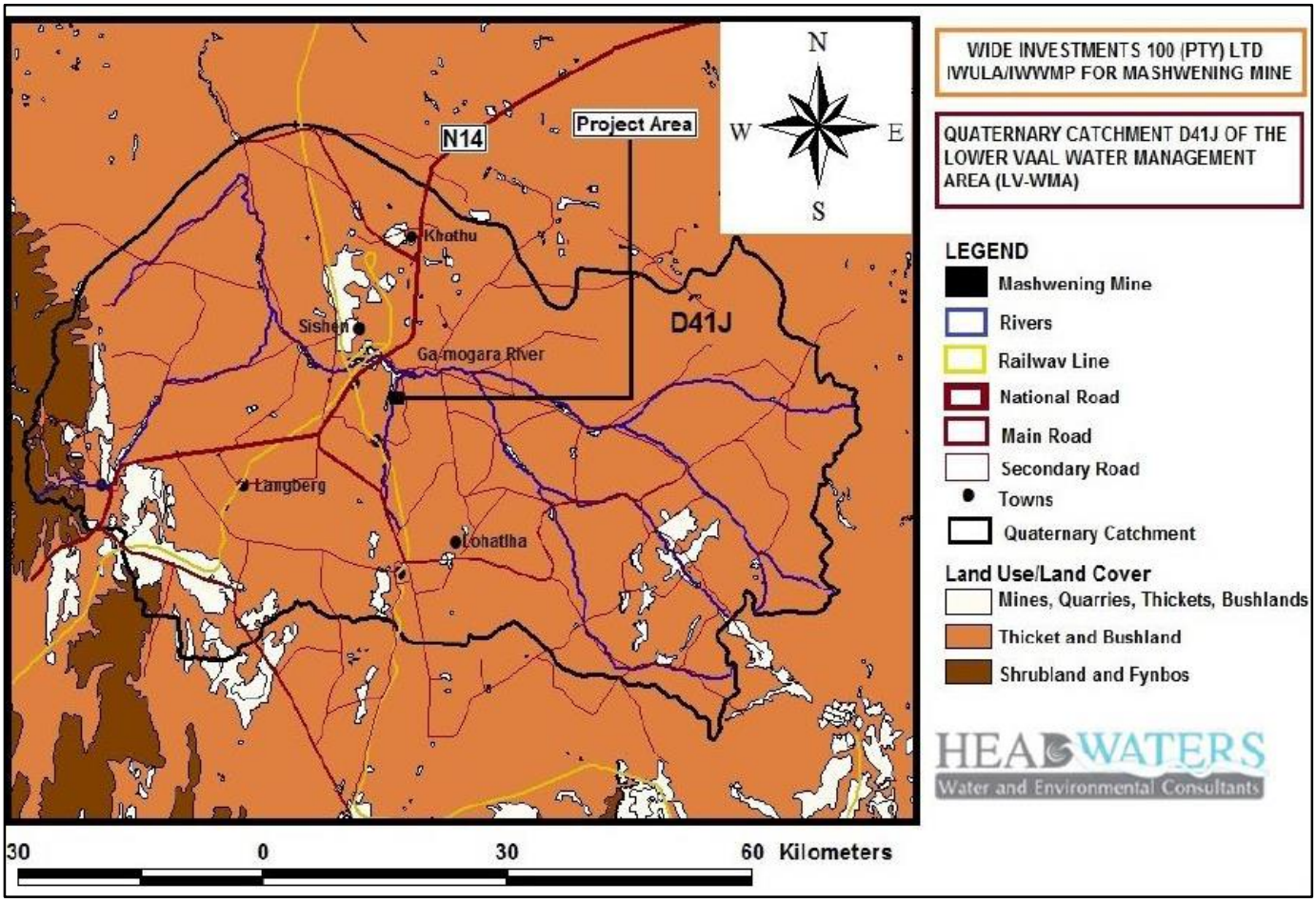


**Figure 1**: Location of the remaining extent of Mashwening 557 farm

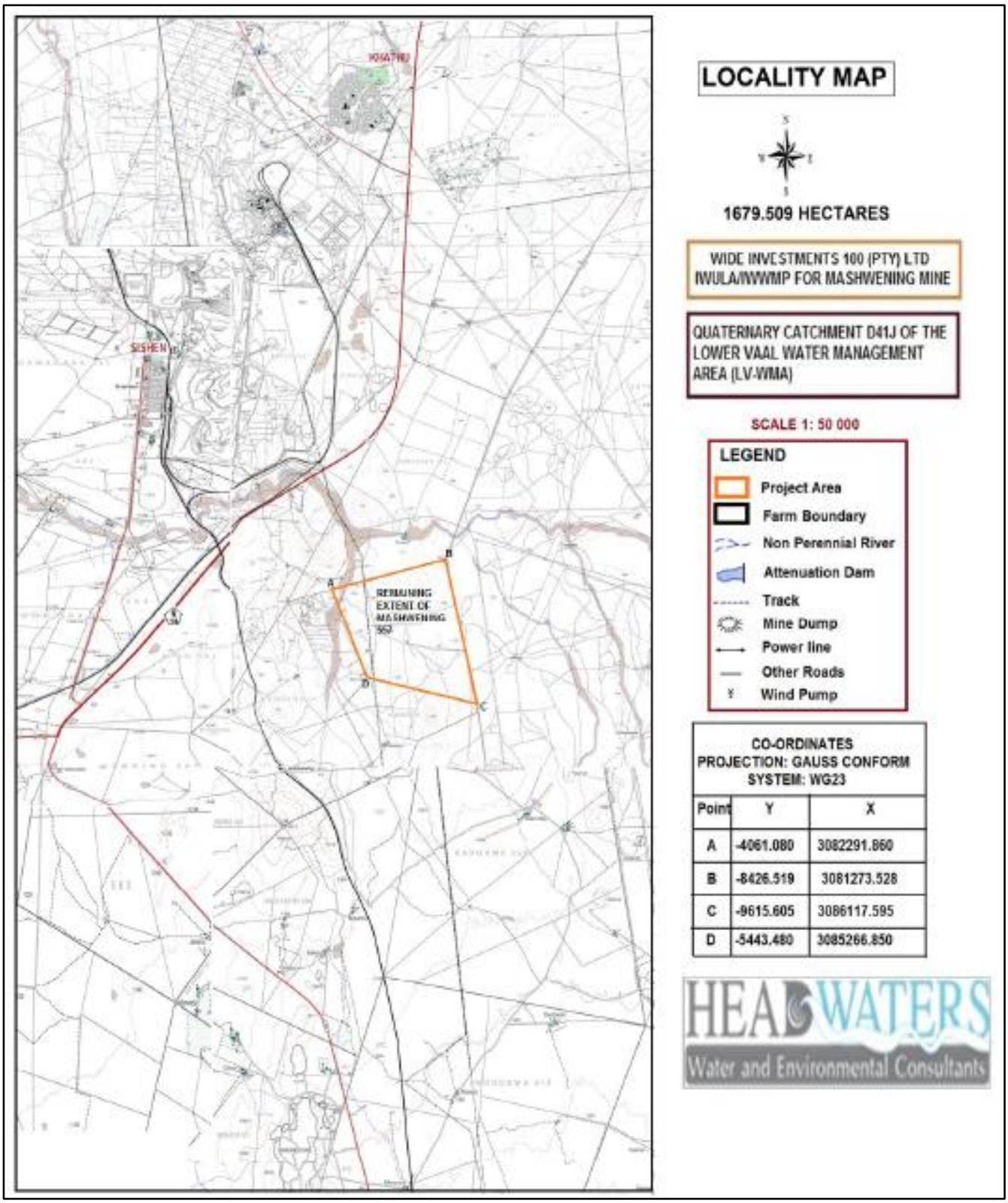


**Figure 2**: Locality of the project area (showing the whole Mashwening project area)

### 1.4.1 Brief Description of the area and sounding land use

The remaining extent of the Farm Mashwening 557 is currently not occupied, but Mr. Janse van Rensburg (a surface owner of Legoko 460) rents the property from Sishen for livestock grazing as the area is classified with 8 land capability. The remainder of the portion of the farm

is currently used for open cast mining. Wide Investments 100 (PTY) Ltd plans to operate an opencast iron ore mine on the proposed area in the Kuruman district near Kathu in the Northern Cape Province. The area required for mining is approximately 320 hectares whereas the area required for infrastructure, roads, servitudes etc. is approximately 53 hectares. The area was previously prospected for manganese with a number of historical sampling pits found on the 1670 hectare farm area. The proposed mining area does not hold a high agricultural land use capability. This largely due the combination of land use stressors associated with property size, inconsistent topography, soil depths and ultimately soil structures. The majority of area has very shallow rocky soils with rocky outcrops and has a class 8 land capability Mining activities will irreversibly impact the land capability of the soil hence proper management measures need to be implemented during construction, operations and decommissioning to prevent soil loss due to contamination. Soils need to be stock piled so that they can be used for rehabilitation.

The land is owned by Sishen Iron Ore Mining Company (Pty) Ltd (SIOC). The said company is mining one of the largest iron ore mines in the world, about 15 km adjacent to Mashwening.

The land in question is under lease by the landowner, Sishen Iron Ire Mining Company (Pty) Ltd has, to Dihan Eiendoms Trust which is represented by Dihan Janse van Rensburg. Mr. van Rensburg is farming with cattle on the land, specifically on the portions of the farm that are currently excluded from the current mining plan. There are no communities in the immediate surroundings of the proposed mine. The area is under the jurisdiction of the Gamagara Local Municipality. Gamagara Municipality is located in the North Eastern sector of the Northern Cape, on the N14 National Road between Upington and Vryburg. It lies approximately 200km North East of Upington and 280km North West of Kimberley.

Kathu is the main town in the municipality and the Central Business District (CBD) is located here. The other three towns in Gamagara Municipality are Sesheng, just outside Kathu, and Dingleton and Dibeng, as well as Olifantshoek with the inclusion of two farms namely Hartley and Cox. The only nearby community is Dingleton, a mine village is located in the vicinity of Khumani Iron Ore Mine owned by Assmang Limited about 15km from Mashwening. The Department of Land Affairs has indicated that there are no registered land claims on the property.

The following neighboring persons and or entities may be affected by the proposed mining operations:

(a) Diro Resources (Pty) Ltd / (Burk Mining (Pty) Ltd)

(b) Mr. Frans Briedenhann - lawful owner of the farm Magobi near Kathu.

(c) Andre Posthumus Familie Trust of Helpebietjie Mine who are currently conducting mining operations on the adjacent farm Helpebietjie 738. Helpebietjie Mine uses the same acces roads envisaged for use by the proposed mine

(d) Department of Defense's SA Army Training Formation is situated on the Gathlose Native Reserve 548 (Portion 0) which is adjacent to the proposed mining operations. Noise and dust impacts are potential issues that need to be considered when developing and operating the mine.

(e) Although located much further from the proposed mine, Assmang Limited's Khumani Iron Ore Mine operations have to be considered as the transport of material from the said mine to the Transnet siding.

(f) Sishen Iron Ore Mine is also operating immediately adjacent to Khumani Iron Ore Mine.

The adjacent mining operations listed above pose potential cumulative environmental impacts that were investigated in the EIA process. There are no existing wetlands, dams, national parks within the proposed mining area

## 1.5 Legal Framework

### 1.5.1 The South African Constitution

The South African Constitution (Act 108 of 1996) constitutes the supreme law of the country and guarantee the right of all people in South Africa. Furthermore, the Bill of Rights (Chapter 2- Section 24 (a) (b) under the South African Constitution ( Act 108 of 1996) emphasize that "*Everyone has the right (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-*

*(i) Prevent pollution and ecological degradation;*

*(ii) Promote conservation; and*

*(iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development"*

### 1.5.2 National Environmental Management Act

The NEMA (Act No.107 of 1998) is regarded as one of the important pieces of general environmental legislation as it provides a framework for environmental law reform. The main objective of this act is to ensure that ecosystem services and biodiversity are protected and maintained for sustainable development. Furthermore, Section 28 (1) of the NEMA requires

that "*every person who causes has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring".*

The National Environmental Management Waste Act (Act No. 59 of 2008) under the NEMA (Act No.107 of 1998) is the statutory regulator of all hazardous wastes generated by any form of development. This act further provides the identification of activities which will cause environmental degradation through the promulgation of GNR 343, GNR 544, and GNR 546 Listed Activities published on 18 June 2010, in terms of Section 24(2) and 24D of the NEMA.

The proposed mine will comprise of processing plant, main mine offices, pit offices, warehouses, change house facilities, workshops, electricity sub-station, explosives storage area, fuel depot, laboratory, sewage conservancy tank, and emergency care facilities. The establishment of these infrastructures on site will trigger NEMA listed Activities (**See Appendix A**).

An application for Environmental Authorisation was launched on the 26 September 2013 to the Department of Environment and Nature Conservation, Northern Cape Region. The project was assigned the following reference numbers ***NC/EIA/12/JTG/GAE/KAT2/2013*** and ***NCP/EIA/0000242/2013***.

### 1.5.3 Mineral and Petroleum Resources Development Act

Wide Investment 100 (Pty) Ltd is the holder of a Prospecting Right ***(NC 30/5/1/1/2/ (1440) PR)*** for Iron and Manganese Ores granted by the Department of Mineral Resources (DMR) on the 12th of April 2011 in terms of Section 17(1) of the Mineral and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002).

The bulk of the known ore body is situated on Pit 1 (north) and Pit 2 (south) within the Mashwening 557 project area. The extent of an area requiring mining is estimated to be 320 hectares.

The Department of Mineral and Petroleum Resources (DMR) must however first approve an Application for a Mining Right, before mining of the ore can commerce. The Mining Right Application was launched on August 2013.

An EIA process is required for the Mining Right Application in terms of Section 39(1) of the MPRDA. In addition, two separate Scoping processes and one combined Environmental Impact Assessment process will be conducted for the NEMA and MPRDA.

### 1.5.4 National Environmental Biodiversity Act

The National Environmental Management Biodiversity Act (NEM:BA), 2004 (Act No.10 of 2004), provides for:

(i) the management and conservation of South Africa`s biodiversity within the framework of the National Environmental Management Act, 1998;

(ii) the protection of species and ecosystems that warrant national protection;

(iii) the sustainable use of indigenous biological resources;

(iv) the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources;

(v) the establishment and functions of a South African National Biodiversity Institute;

(vi) and for matters connected therewith.

An ecological impact assessment will be undertaken within the proposed mining areas to inform the MPRDA and NEMA-EIA reports.

### 1.5.5 National Heritage Resources Act

The National Heritage Resources Act (NHRA), 1999 (Act No. 25 of 1999) provides for the management of national heritage resources to set norms and maintain national standards for the management of heritage resources in South Africa, and to protect heritage resources of national significance, so that heritage resources may be bequeathed to future generations.

Section 35(4) of the NHRA related to archaeology, paleontology, and meteorites, and states that: no person may, without a permit:

*(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;*

*(b) destroy, damage, excavate or remove from its original position, collect or own any archaeological material or palaeontological material or object or meteorite;*

*(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object;*

*(d) bring onto or use any equipment which assists in the detection or recovery of metals or archaeological and paleontological material or objects.*

Section 38(1) of the NHRA, requires that any person who intends to undertake certain categories of development (see below) must notify the South African Heritage Resources Agency (SAHRA) at the very earliest stage of initiating such development and must furnish details of the location, nature and extent of the proposed development.

(a) The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) The construction of a bridge or similar structure exceeding 50 m in length;

(c) Any development or other activity which will change the character of a site:

(i) Exceeding 5 000 m² in extent;

(ii) Involving three or more existing erven or subdivisions thereof; or

(iii) Involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) The re-zoning of a site exceeding 10 000 m2 in extent; or

(e) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

The proposed mining project will cover an area of about 1679.5094 hectares (16 795 094 m2), of which 372 ha is required for mining and related infrastructure. A Phase 1 Archaeological and Heritage Impact Assessment (**See Appendix B**) was undertaken before the prospecting phase commenced.

### 1.5.6 National Water Act

The NWA (Act No. 36 of 1998) objectively ensures that water or water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all people. Water use refers to all activities that have direct or indirect impact on the source, environment, quality, and quantity of water. Authorisation of water use for any designated activities above Schedule 1 of the NWA (Act No. 36 of 1998), is subjected Water Use Licence Application (WULA). The conditions of WULA are based in terms of Section 21 principles of the NWA (Act No. 36 of 1998), which includes:

*(a) Taking water from a water resource;*

*(b) Storing water;*

*(c) Impeding or diverting the flow of water in a watercourse;*

*(d) Engaging in a stream flow reduction activity contemplated in section 36;*

*(e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);*

*(f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;*

*(g) Disposing of waste in a manner which may detrimentally impact on a water resource;*

*(h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;*

*(i) Altering the bed, banks, course or characteristics of a watercourse;*

*(j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and*

*(k) Using water for recreational purposes.*

**Section 3 of the NWA: Public trusteeship of nation's water resources**

*(1) As the public trustee of the nation's water resources the National Government, acting through the Minister, must ensure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner, for the benefit of all persons and in accordance with its constitutional mandate.*

*(2) Without limiting subsection (1), the Minister is ultimately responsible to ensure that water is allocated equitably and used beneficially in the public interest, while promoting environmental values.*

*(3) The National Government, acting through the Minister, has the power to regulate the use, flow and control of all water in the Republic.*

**Section 19 of the NWA: Prevention and remedying effects of pollution**

*(1) An owner of land, a person in control of land or a person who occupies or uses the land on which -*

*(a) any activity or process is or was performed or undertaken; or*

*(b) any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.*

*(2) The measures referred to in subsection (1) may include measures to -*

*(a) cease, modify or control any act or process causing the pollution;*

*(b) comply with any prescribed waste standard or management practice;*

*(c) contain or prevent the movement of pollutants;*

*(d) eliminate any source of the pollution;*

*(e) remedy the effects of the pollution; and*

*(f) remedy the effects of any disturbance to the bed and banks of a watercourse.*

*(3) A catchment management agency may direct any person who fails to take the measures required under subsection (1) to -*

*(a) commence taking specific measures before a given date;*

*(b) diligently continue with those measures; and*

*(c) complete them before a given date.*

*(4) Should a person fail to comply, or comply inadequately with a directive given under subsection (3), the catchment management agency may take the measures it considers necessary to remedy the situation.*

*(5) Subject to subsection (6), a catchment management agency may recover all costs incurred as a result of it acting under subsection (4) jointly and severally from the following persons:*

*(a) Any person who is or was responsible for, or who directly or indirectly contributed to, the pollution or the potential pollution;*

*(b) the owner of the land at the time when the pollution or the potential for pollution occurred, or that owner's successor-in-title;*

*(c) the person in control of the land or any person who has a right to use the land at the time when -*

*(i) the activity or the process is or was performed or undertaken; or*

*(ii) the situation came about; or*

*(d) any person who negligently failed to prevent -*

*(i) the activity or the process being performed or undertaken; or*

*(ii) the situation from coming about.*

*(6) The catchment management agency may in respect of the recovery of costs under subsection (5), claim from any other person who, in the opinion of the catchment management agency, benefitted from the measures undertaken under subsection (4), to the extent of such benefit.*

*(7) The costs claimed under subsection (5) must be reasonable and may include, without being limited to, labour, administrative and overhead costs.*

*(8) If more than one person is liable in terms of subsection (5), the catchment management agency must, at the request of any of those persons, and after giving the others an opportunity to be heard, apportion the liability, but such apportionment does not relieve any of them of their joint and several liability for the full amount of the costs.*

**Section 35 of the NWA: Verification of existing water uses**

*(1) The responsible authority may, in order to verify the lawfulness or extent of an existing water use, by written notice require any person claiming an entitlement to that water use to apply for a verification of that use.*

*(2) A notice under subsection (1) must -*

*(a) have a suitable application form annexed to it;*

*(b) specify a date before which the application must be submitted;*

*(c) inform the person concerned that any entitlement to continue with the water use may lapse if an application is not made on or before the specified date; and*

*(d) be delivered personally or sent by registered mail to the person concerned.*

*(3) A responsible authority -*

*(a) may require the applicant, at the applicant's expense, to obtain and provide it with other information, in addition to the information contained in the application;*

*(b) may conduct its own investigation into the veracity and the lawfulness of the water use in question;*

*(c) may invite written comments from any person who has an interest in the matter; and*

*(d) must afford the applicant an opportunity to make representations on any aspect of the application.*

*(4) A responsible authority may determine the extent and lawfulness of a water use pursuant to an application under this section, and such determination limits the extent of any existing lawful water use contemplated in section 32(1).*

*(5) No person who has been required to apply for verification under subsection (1) in respect of an existing lawful water use may exercise that water use -*

*(a) after the closing date specified in the notice, if that person has not applied for verification; or*

*(b) after the verification application has been refused, if that person applied for verification.*

*(6) A responsible authority may, for good reason, condone a late application and charge a reasonable additional fee for processing the late application.*

**Section 39 of the NWA: General authorisation to a water use**

*(1) A responsible authority may, subject to Schedule 1, by notice in the Gazette -*

*(a) generally;*

*(b) in relation to a specific water resource; or*

*(c) within an area specified in the notice, authorise all or any category of persons to use water, subject to any regulation made under section 26 and any conditions imposed under section 29.*

*(2) The notice must state the geographical area in respect of which the general authorisation will apply, and the date upon which the general authorisation will come into force, and may state the date on which the general authorisation will lapse.*

*(3) A water use may be authorised under subsection (1) on condition that the user obtains any permission or authority required by any other specified law.*

*(4) Before issuing a general authorisation, the responsible authority must -*

*(a) publish a notice in the Gazette -*

*(i) setting out the proposed general authorisation; and*

*(ii) inviting written comments to be submitted on the proposed general authorisation, specifying an address to which and a date before which comments are to be submitted, which date may not be earlier than 60 days after publication of the notice;*

*(b) consider what further steps, if any, are appropriate to bring the contents of the notice to the attention of interested persons, and take those steps which the responsible authority considers to be appropriate; and*

*(c) consider all comments received on or before the date specified in paragraph (a)(ii).*

*(5) An authorisation to use water under this section does not replace or limit any entitlement to use water which a person may otherwise have under this Act.*

**Section 40 of the NWA: Application for licence**

*(1) A person who is required or wishes to obtain a licence to use water must apply to the relevant responsible authority for a licence.*

*(2) Where a person has made an application for an authorisation to use water under another Act, and that application has not been finalised when this Act takes effect, the application must be regarded as being an application for a water use under this Act.*

*(3) A responsible authority may charge a reasonable fee for processing a licence application, which may be waived in deserving cases.*

*(4) A responsible authority may decline to consider a licence application for the use of water to which the applicant is already entitled by way of an existing lawful water use or under a general authorisation.*

**Section 41 of the NWA: Procedure for licence applications**

*(1) An application for a licence for water use must -*

*(a) be made in the form;*

*(b) contain the information; and*

*(c) be accompanied by the processing fee, determined by the responsible authority.*

*(2) A responsible authority -*

*(a) may, to the extent that it is reasonable to do so, require the applicant, at the applicant's expense, to obtain and provide it by a given date with -*

*(i) other information, in addition to the information contained in the application;*

*(ii) an assessment by a competent person of the likely effect of the proposed licence on the resource quality; and*

*(iii) an independent review of the assessment furnished in terms of subparagraph (ii), by a person acceptable to the responsible authority;*

*(b) may conduct its own investigation on the likely effect of the proposed licence on the protection, use, development, conservation, management and control of the water resource;*

*(c) may invite written comments from any organ of state which or person who has an interest in the matter; and*

*(d) must afford the applicant an opportunity to make representations on any aspect of the licence application.*

*(3) A responsible authority may direct that any assessment under subsection (2)(a)(ii) must comply with the requirements contained in regulations made under section 26 of the Environment Conservation Act, 1989 (Act No. 73 of 1989).*

*(4) A responsible authority may, at any stage of the application process, require the applicant -*

*(a) to give suitable notice in newspapers and other media -*

*(i) describing the licence applied for;*

*(ii) stating that written objections may be lodged against the application before a specified date, which must be not less than 60 days after the last publication of the notice;*

*(iii) giving an address where written objections must be lodged; and*

*(iv) containing such other particulars as the responsible authority may require;*

*(b) to take such other steps as it may direct to bring the application to the attention of relevant organs of state, interested persons and the general public; and*

*(c) to satisfy the responsible authority that the interests of any other person having an interest in the land will not be adversely affected.*

### 1.5.7 Other Legal Requirements

Other Acts, legally binding documents and guidelines may also be applicable the proposed mining project, including;

(a) Environment Conservation Act, 1989 (Act No. 73 of 1989);

(b) National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004);

(c) Mine Health and Safety Act, 1996 (Act No. 29 of 1996);

(d) Hazardous Substances Act, 1973 (Act No. 15 of 1973);

(e) Roads Ordinance Amendment Act, 1998 (Act No. 17 of 1998);

(f) South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998);

(g) Government Notice R.77 National Water Act, 1998 (Act 36 of 1998), Regulations on use of water for mining and related activities aimed at the protection of water resources, 2010;

(h) The Department of Water Affairs: Best Practice Guidelines (BPG)

- A2: Water Management for Mine Residue Deposits (July 2008);
- A5: Water Management for Surface Mines (July 2008);
- G1: Storm Water Management (August 2006);
- G2: Water and Salt Balances (August 2006);
- G3: Water Monitoring Systems (July 2007);
- G4: Impact Prediction (December 2008);
- H1: Integrated Mine Water Management (December 2008);

(i) Occupational Health and Safety Act (OHSA), 1993 (Act No. 85 of 1993).

## 2 DETAILS OF THE APPLICANT

**Table 2: Applicant Details**

| | |
|---|---|
| **Company Name:** | Wide Investments 100 (Pty) Ltd |
| **Company Reg.** | **No.:** 2007/022620/07 |
| **Property:** | Remaining Extent of Mashwening 557 |
| **Postal Address:** | P. O. Box 2449<br>Houghton<br>2041 |
| **Physical Address:** | 19 Periwinkle Complex, Edgar Street<br>Noordwyk Extension 2,<br>Midrand<br>687 |
| **Contact Person:** | Mzamani Mdaka |
| **Mobile Number:** | (+27) 82 819 5398 |
| **Facsimile Number:** | (+27) 11 475 1649 |
| **Email Address:** | mzamanim@vodamail.co.za |

# 3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

**Table 3: EAP Details**

| | |
|---|---|
| **Company:** | Jomela Consulting (Pty) Ltd |
| **Company Reg. No.:** | 2013/023450/07 |
| **Postal Address:** | P. O. Box 415<br>Celtis Ridge<br>Centurion<br>0130 |
| **Physical Address:** | 3695 Platanus Close<br>Amberfield Valley, Rooihuiskraal<br>Centurion<br>0157 |
| **Contact Persons:** | Cecil Khosa<br>Mandla Masango |
| **Mobile Number:** | (+27) 71 471 3771<br>(+27) 72 714 8556 |
| **Facsimile:** | (+27) 86 626 4839 |
| **Email**: | cecilkhosa@jomela.co.za<br>mandlamasango@jomela.co.za |

Jomela Consulting (Pty) Ltd was established in 2013. The company was established with a view to joint efforts of various associate specialists to provide a one-stop environmental management service. The associates bring collectively to the company a wealth of experience and skills obtained through qualifications, work experience and also interactions over the years with different stakeholders such as industry, government and civil society. This experience and skill in environmental management ranges from policy analysis and development, regulatory compliance and enforcement, environmental impact assessment, development and/or review of environmental management plans.

The associates constituting Jomela Consulting have previously worked for the government both in the mining and environmental sectors and still maintain a close liaison with these departments to ensure that they are kept abreast of any policy shifts and developments, including amendments to legislation.

# 4 GEOLOGICAL SETTING AND POTENTIAL OF THE MASHWENING IRON AND MANGANESE DEPOSITS

The rock stratigraphy, within the Griqualand West depository, forms part of the early, Proterozoic-Transvaal Supergroup sequence. The Postmasburg Manganese Field is located along the western margin of the Kaapvaal Craton and on the eastern limb of the Maremane Dome.

In Griqualand West the succession can be broadly subdivided into a basal, chemical sedimentary unit, referred to as the Ghaap Group, which is overlain by a mixed volcanic clastic-chemical sequence, known as the Postmasburg Group. The Ghaap and Postmasburg Groups represent two separate, major unconformity-bounded sequences.

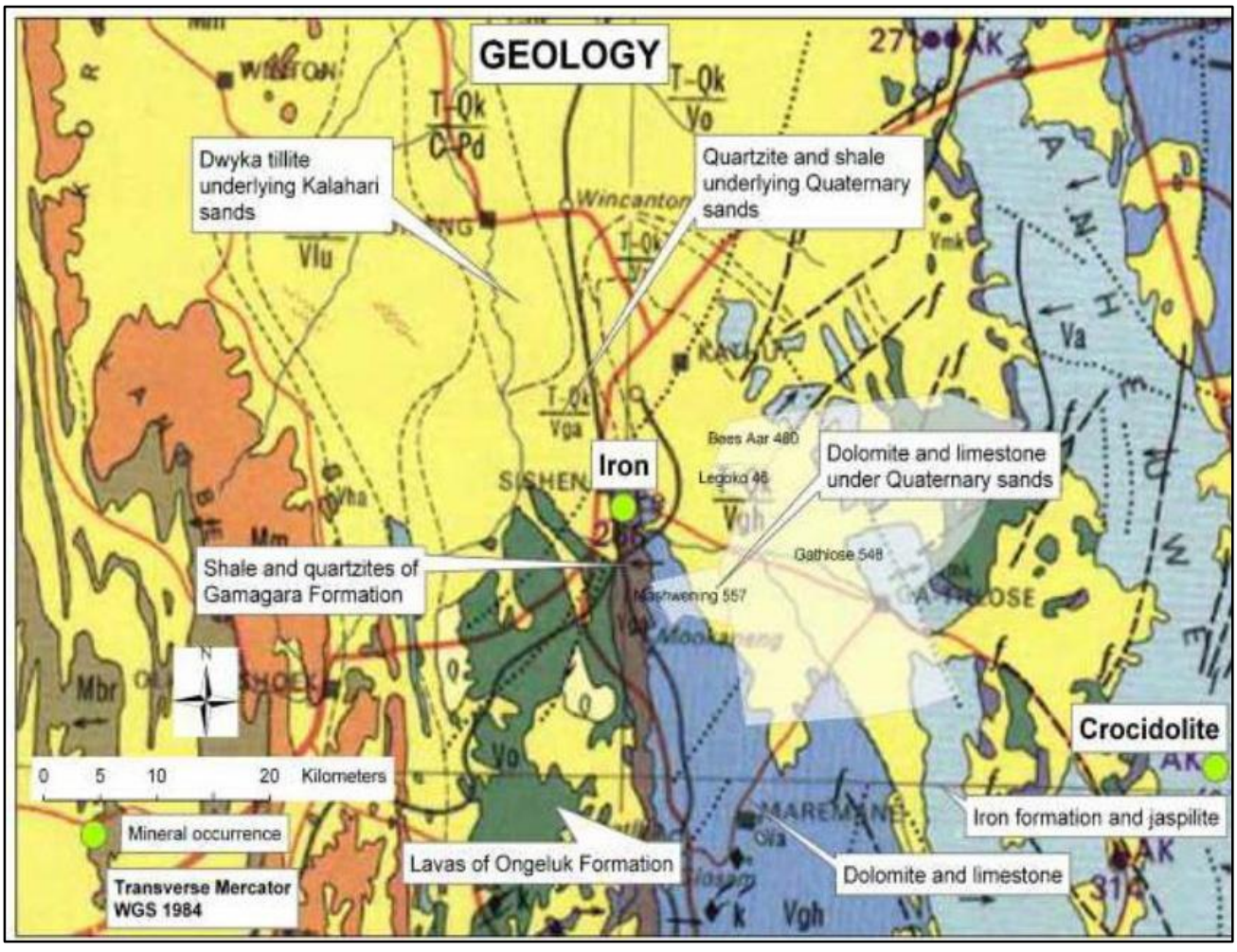


**Figure 3**: Local geological Setting

Deposition of the Transvaal sequence in Griqualand West took place on a continental margin or trailing edge and was controlled by three tectonic-sedimentary elements:

- A shallow water platform on the Kaapvaal Craton.

- A platform edge (shelf margin) located parallel to the Griquatown fault zone (A growth fault across which there are a number of facies changes).
- A deep basin along the western margin of the Kaapvaal Craton.

The Postmasburg Mineral Field is located on a structurally related dome, referred to as the Maremane dome. The Maremane dome extends from Sishen in the north to Beeshoek mine in the south, near Postmasburg.

The floor rocks on the Maremane dome comprise dolomites and limestones of the Campbell Rand Sub-Group. Mineralization is confined to two belts, known as the western and eastern belts. Paleosinkhole development and supergene enrichment, which took place during the erosional period, preceding the deposition of the Gamagara Formation, played an important part in the development of the deposits.

### 4.1 Hematite Iron Ore Mineralisation

Hematite iron ore is developed within the Manganore Iron Formation. The Manganore Iron Formation represents a lateral equivalent of the Kuruman Iron Formation that slumped into sinkhole structures during the period of erosion that preceded the deposition of the overlying Gamagara Formation.

The Kuruman Iron Formation represents the basal part of the Asbesheuwel-Sub Group, resting directly on Campbell Rand dolomite.

Rain-water is enriched in carbon which results in the formation of carbonic acid which reacts with the carbonate-rich dolomite to produce soluble bicarbonate. Removal of the bicarbonate eventually results in the collapse of the overlying rock sequence into the underlying caves. The result of sinkhole formation is folding, brecciation and structural thickening of the sequence.

Hematization of the Manganore Iron Formation took place prior to the deposition of the Gamagara Formation as suggested by the presence of a hematite conglomerate at the base of the Gamagara Formation. During the period of erosion and slumping, silica was leached from the Kuruman Iron Formation by alkaline ground water solutions and ferrous minerals were oxidized to hematite ore (Manganore Iron Formation) present along the eastern belt on the Maremane Dome and at the junction of the two belts at Postmasburg and Sishen.

Iron ore is also present within the western belt toward the north and south as one move from the central part of the dome.

Based on the structural and stratigraphic grounds, the iron ore found on Mashwening is classified as the Massive Gamagara type, which consists of sand-to silt-sized grains of haematite and represents ferruginised, haematitic sandstone and shale.

Iron ore is present as follows:

- Detrital ore present within debri fans along hill slopes and within topographic lows. The detrital ore comprises rounded to sub-rounded iron ore pebbles and boulders.
- In situ ore preserved within karst structures and along the fringes of the sinkhole.

In situ iron ore mineralization is restricted to two isolated hills, located towards the northern farm boundary with Demaneng 546 where it is developed in the Manganore Iron Formation, preserved within a karst structures within the underlying dolomite.

A second in situ iron ore resource is present toward the south, where it is preserved in a small sinkhole structure.

The iron ore (Fe) in the area is graded as follows:

- High-grade - 69.9 - 66.0% Fe, with SiO2 + insolubles of 0.8 – 4.5%
- Medium-grade - 69.9 - 66.0% Fe, with SiO2 + insolubles of 0.8 – 4.5%
- Low-grade- 69.9 - 66.0% Fe, with SiO2 + insolubles of 0.8 – 4.5%

The eastern belt hills are circular in shape displaying steep bedding plane dips along the circumference varying between 20-60 degrees toward the center of the hills. Brecciation is a common feature.

### 4.2 Manganese Ore Mineralisation

The Manganore Iron Formation grades downward into the Wolhaarkop Breccia.

The source of manganese is considered to be from the Campbellrand dolomite, which in places contain up to 5%Mn. The manganese present within the western belt was sourced from the Ulco Member of the Reivilo Formation whilst the manganese within the eastern belt came from the Fairfield Formation. Chemical weathering (leaching) extracted manganese from the dolomites and was carried in ground water to sites of precipitation. Paleo-sinkhole development and supergene enrichment, which took place during the period of erosion, that preceded the deposition of the Olifantshoek Group, played an important part in the development and preservation of the deposits.

Along the eastern belt, manganese mineralization occurs within a slumped chert breccia, known as the Wolhaarkop Breccia, which consists of chert fragments set in a ferruginous and manganiferous matrix. The Wolhaarkop Breccia is thought to represent accumulations of the insoluble residue of the dolomite in sink holes.

The eastern belt is marked by an arc of detached breccia hills, the so-called Klipfontein Hills, which links with the western belt at Beeshoek in the south and at Sishen in the north. Braunite is the dominant ore mineral but since it forms the matrix within the chert breccia, the primary mining product contains much silica.

The western belt trends north-south extending from Beeshoek in the south to Sishen in the north. The manganese deposits represent replacement deposits within the basal part of the Sishen shales. The deposits are extremely irregular in shape, occurring as slump features on a floor of dolomite between closely spaced dolomite pinnacles and within solution cavities. The dominant ore mineral is iron-rich bixbyite. Bixbyite contains iron as an essential part of the molecule causing the ore to be ferruginous.

Manganese mineralization is confined to the basal part of the Wolhaarkop breccia, near the top of the Campbell Rand dolomite.

Field observations indicate the presence of two main ore types:

- Siliceous ore containing visible quartz and displaying a speckled appearance.
- Dark black, massively bedded braunite ore with no visible quartz present.

The siliceous ore generally contains Mn values ranging between 20-38 % Mn and 10-40 % SiO2. The massive ore grades vary between 38-55 % Mn and 0-10 % SiO2. The manganese (Mn) ore grade is classified as follows:

High Grade ore- ore with greater than 44% Mn content

Medium Grade ore- ore with greater than 30% but less than 43% Mn content

Low Grade- ore with less than 305 Mn content

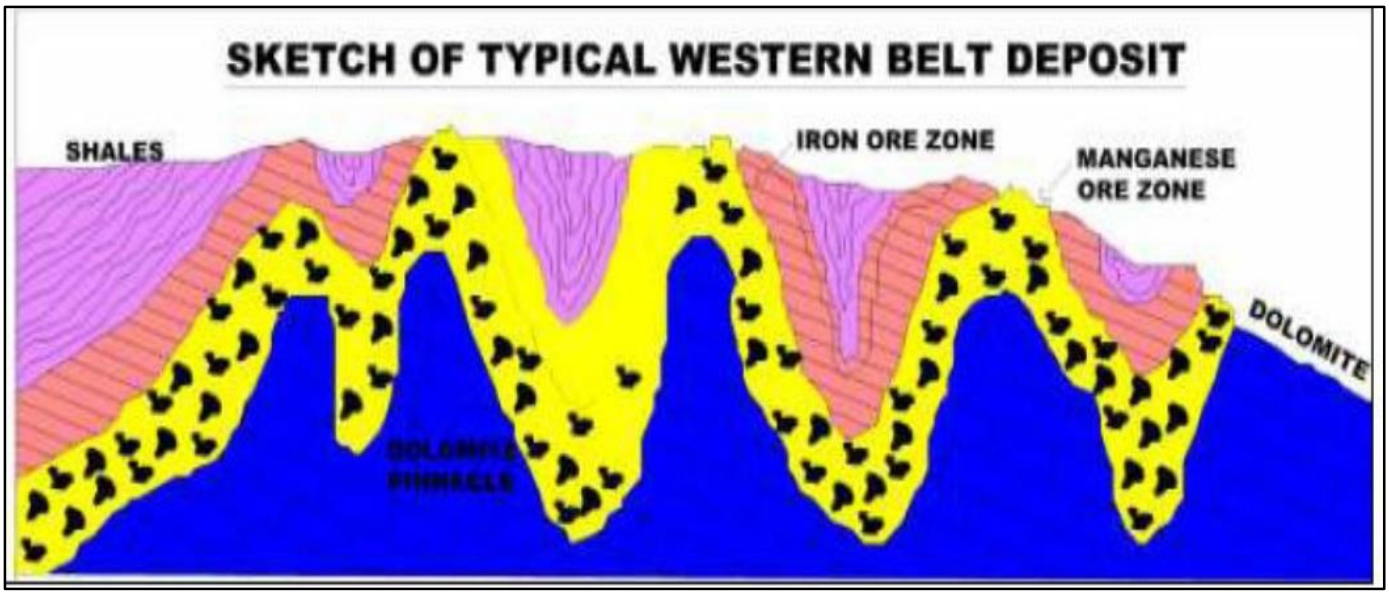


**Figure 4**: Western belt mineralisation

### 4.3 Mineral Resources Estimation

The estimation of the mineral resource was based on the methodology as stipulated by the South African Code for Reporting Mineral Resources and Mineral Reserves ("the SAMREC CODE). The total estimated mineral resource includes in-situ tonnages for both manganese and iron ore obtained from the sampling and drilling results.

A total of 46 boreholes were drilled at a spacing of 25 m and 50 m centre to centre, with a total of 718 m drilled at an average depth of 17 m. The boreholes were surveyed and plotted on the plan and sections drawn to show the stratigraphy; mineralization and related geological feature present in the area. The section was used to determine the volume of ore contained in the area covered by the boreholes. The total tonnage was calculated using the volume and the particular specific gravity of the in-situ and detrital ore, and grade values assigned to boreholes which formed a cluster.

The manganese tonnage was based on the average depth of the sampling pits, with 42 samples taken at different positions at an average depth of 2m; the area covered by the mineralized zone was used to calculate the tonnage of the manganese resource.

### 4.4 Products and their proportionate quantities

The mine is planned to produce two categories of product, namely lump ore and fine ore for both iron ore and manganese. Tailings will comprise mainly of small size materials and considered as waste product as this will have a low commercial potential and there is no market to sell the product.

This classification is based on the customer requirements and the processing plant will be designed and operated to generate a final product within the size ranges. The list of products

and annualized production quantities based on the different sizes are listed in the **Table 4:** below:

**Table 4**: List of products and their proportionate quantities

| Product | Grade Estimated | Size Distribution | Quantity |
|---|---|---|---|
| Lump Mn Ore | 36 - 38%Mn<br>54 - 64% | -75 mm + 6 mm for Mn<br>-25 mm +8 mm Fe for | 80 000 tons<br>300 000 tons |
| Fines | > 35% Mn<br>54 - 64% Fe | -6 mm + 1.5 mm for Mn<br>-8 mm + 1 mm for Fe | 30 000 tons<br>40 000 tons |
| Tailings | 20-25% Mn<br>< 54% Fe | -1.5 mm for Mn<br>-1 mm for Fe | 10 000 tons<br>20 000 tons |
| **TOTAL ANNUAL PRODUCT TONS** | | | **480 000 tons** |

Mineral recovery rate takes into account a 20% mining waste, a daily plant feed of and a plant recovery rate of 60% based on the losses expected from crushing and screening the ore into the required sizes. It is expected that from a ROM feed of 1000 000 tons, 48% will be product whereas 52% will report to waste as tailings. When annualized, the mine will have a ROM tonnage of 1000 000 tons from which 200 000 tons will be accounted for as mining waste and discarded by crushing and screening processes. In addition a plant recovery of 60% will result in 320 000 tons reported to waste product and deposited in a slimes dam as above. When taking into account the above losses, a final saleable plant product of 480 000 tons a year will be produced. A total of 6.5 mt of product will be recovered over the 15-year duration of the life of mine, from a resource of 7.8 mt. This results in the overall mineral recovery rate of 83% for the mine over 15 years.

In most cases, iron ore and manganese producers sell the production from the mines directly to steel producers, where the main beneficiation takes place by smelting iron ore and manganese, with other input materials such as coking coal, in blast furnaces to produce steel. However, some upstream beneficiation takes place in the production process where the ROM material is beneficiated through dense medium separation (DMS) or jigging at the mine site. This process allows for the conversion of the poor quality ore into a saleable product and/or to increase its value in use for local and international steel producers. Certain ore produced from Mashwening mine will be beneficiated through the use of a jigging process on the mine and thus increase the value and make the product saleable. This will be the low grade ore which would have been unsalable and discarded as waste without jigging beneficiation.

## 5 PROPOSED MASHWENING OPEN-CAST MINE

The Mashwening Iron Ore Mine planned to utilize the open cast mining method for the whole life span of the mine. This type of mining involves considerable depth and will reach a maximum depth of about 49 m below the earth surface. The method involves pre-stripping of

vegetation to clear the pit area, followed by the removal of topsoil and overburden to expose the ore.

Topsoil will be stockpiled separately to prevent mixing of the soil layers. Overburden material will be stockpiled separately from any topsoil. The iron and manganese ore will be removed, the overburden will be returned to the pit and the topsoil replaced.

The initial phase of mining will be to first exploit the detrital ore using excavators and later the hard ore which will require blasting. In addition, the detrital ore will be loaded into a truck and transported to a crusher and in-field screening facilities for processing.

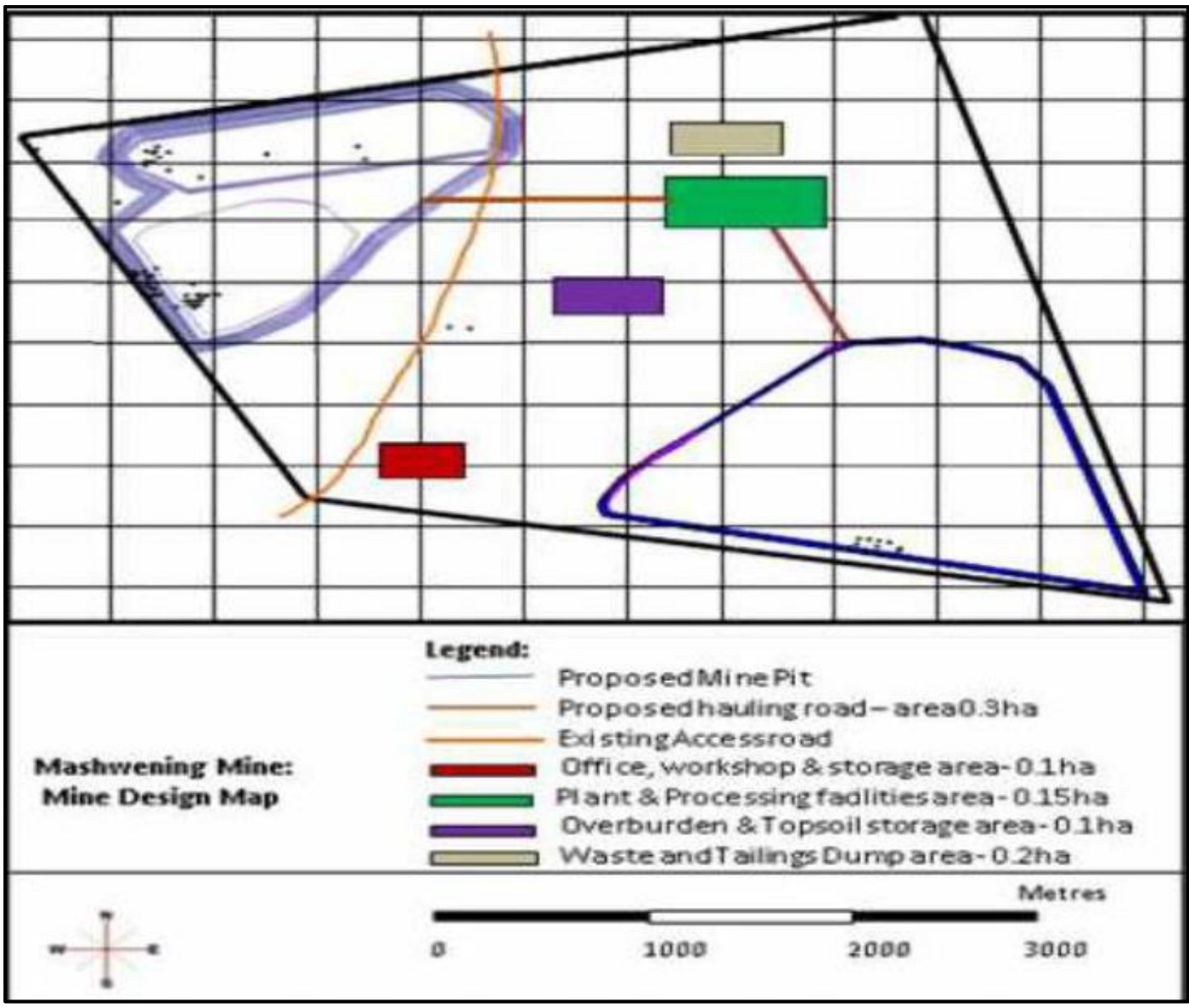


**Figure 5**: Conceptual Mine layout plan

After the depletion of detrital ore, and loose overburden having been removed to expose the hard ore and waste, mining benches will be created by drilling blast holes of between 150 and 160 mm in diameter to a depth of 6 m. These blast holes will be charged with explosives and blasted to fragment the ore and waste which will be loaded using excavators onto haul trucks for transportation to the crusher and in-field screening units. The blasting operations will be done on 6 m high benches, whilst loading operations will be done on 3 m high benches as a cycle. These bench heights will allow minimum contamination and maximum recovery of ore during the blasting and cleaning mining cycles. The cycle of blasting and loading activities being carried out on the specified bench heights will be achieved by separating the blasted rock into two platforms.

# 6 THE PROPOSED ORE PROCESSING PLANT

## 6.1 Plant Layout

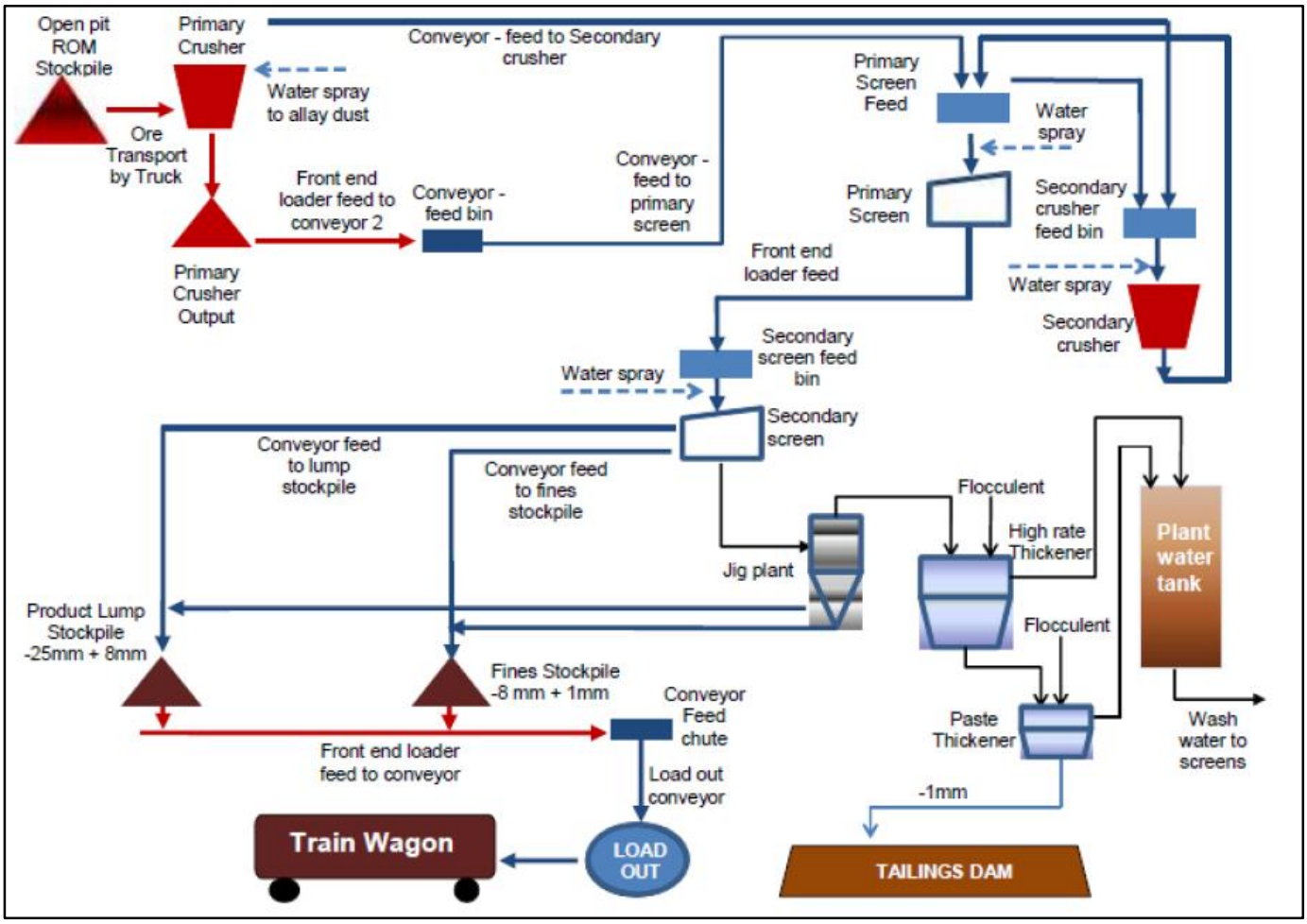


**Figure 6**: Processing plant flow process

### 6.2 Process

The plant and processing facilities will cover an area of about 0.15 hectares. The plant design will consist of two crusher units (primary and secondary crusher); two skid-mounted scalping screen units and a jigging plant to treat 100 tons/hour of -25+8mm feed material. Ore will be conveyed from the tipping point to the crusher units with a 1.5 m conveyor belt equipped with a variable speed drive, tipping the ROM material onto a 6.5 m3 feed bin. A sloped grizzly with 800 mm square apertures will be constructed above the feed bin for the protection of the jaw crusher. The crusher breakdowns the ROM into smaller size and in the process separate waste rock from ore.

After the crushing process is completed the ore will be passed through scalping screens to remove other waste and silica material as well as to produce the required product sizes. The first scalping screen will have a 50 mm top deck and a 25 mm bottom deck, whilst the second screen a 25 mm top deck and 8mm bottom deck. The second screen will also utilize water to wet the product. The undersize materials from the two screens will be a saleable product of either -25 +8 mm or -8 +1mm. A jig plant will also be installed and will utilize water for a gravity separation process to upgrade the product for the two category sizes. Any material from the screens and the jig plant with a size of -1mm will be tailings and a cyclone will be installed for dewatering of fines prior to disposal at the slimes disposal site.

### 6.3 General Wastes Streams

The waste streams generated will be as follows:

**Table 5**: Waste streams identification

| **Infrastructures** | **Waste Streams Identification** |
|---|---|
| Mine offices | (i) General wastes generated by the offices |
| Stockpiles | (i) Overburden stockpiles<br>(ii) Ore stockpiles<br>(iii) Waste rock stockpiles |
| Workshops | Hydrocarbon wastes generated by:<br>(i) spillages<br>(ii) operations of vehicles<br>(iii) Diesel generators |
| Processing Plant | (i) Processing wastewater from thickener dam<br>(ii) Tailings dam<br>(iii) Sedimentation basin |

### 6.4 Project Alternatives

The EIA process, supported by the results of specialist studies will consider alternatives for the proposed developments under the following elements:

**Alternatives for mining**

The proposed mining method is open-cast. This method is depended on the nature of the ore body derived from the exploration results. Underground mining for this ore body is not feasible at this stage.

**Alternatives for mineral processing**

Processing option include processing and beneficiation technologies to achieve the required grade. Technologies for crushing, screening, selection, blending, dense medium separation and jigging of ore will be considered.

**Alternatives for transport, power and water supply systems & services**

Water Supply

- Options for mine water supply include Vaal-Gamagara Scheme (water pipeline), borehole water, mine water from the pit, surface run-off. All these option are considered with the understanding of the scarcity of water in the area.

Power Supply

- Power will be tapped from the existing power line traversing the farm by establishing a sub-station specifically for the mine.
- Diesel powered generators will also be used.
- Solar panels will be considered as an alternate green energy source.

Transport

- Ore will be transported by trucks from the pit to the processing area.
- The use of conveyor belts will be considered.
- Transport of product from the mine to the market is by road and rail. The best cost-effective and environmentally friendly method must be evaluated.

**No-go Option**

This option means the project may not proceed, and this may have serious implications on the part of the proponent, seeing that a lot of resources were invested to bring the project to its current state. The area has been widely prospected and the results thereof are compatible with the other existing mining operations in the area. The no-go option implies that the mineral resources proven to be on the ground will be sterilized if not mined. This can be regarded as an economic opportunity loss.

# 7 BASELINE ENVIRONMENTAL SITUATION

## 7.1 Climate

The proposed mining operational area comprises of summer and autumn rainfall with very dry winters. The actual Mean Annual Precipitation (MAP) is about 358 mm. However, the maximum MAP can reach about 450 mm. The wet season occurs between the months of October to March. In addition, the mean monthly maximum and minimum temperatures is about 35.9°C and -3.3°C for January and June respectively. Frost is frequent usually occurs in winter seasons. The Mean Annual Evaporation (MAE) is in the range between 2200-2600 mm (Bassom and Rossouw, 2003).

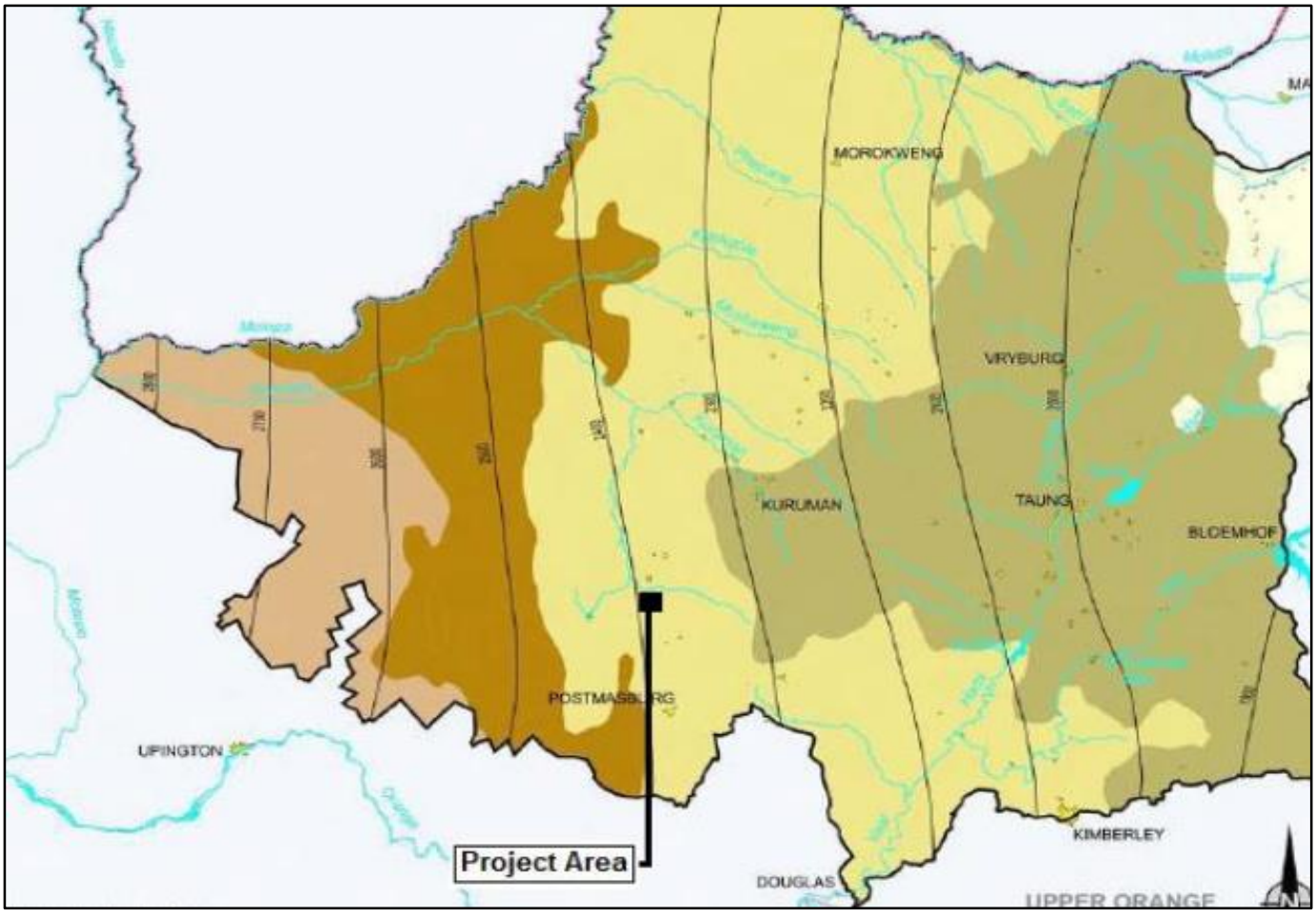


**Figure 7**: Climate of the study area (Bassom and Rossouw, 2003)

### 7.2 Wind

The most commonly occurring wind direction for Kathu region is SSE where the wind velocity is 3,0 m/s. Commonly the wind speed fluctuates between 1,6 m/s and 3,5 m/s although speeds in the range 3,6 m/s to 5,5 m/s are regularly recorded.

### 7.3 Soil and Land Capability

The project area is characterised by red wind-blown (0.3-1.2 m deep) sand (**See Picture 1 below**) and Hutton soil form mixed with manganese and iron ore rock deposits. The red wind-blown soil is mixed with the Hematite iron ore mineral deposits. Erosion is low due to the insufficient MAP and runoff volumes within the D41J catchment.


**Picture 1**: Example of the soil profile within the proposed mining area

The entire study area is considered to be of low agricultural potential due to the low clay content of the soils and the low rainfall and is only suited for grazing. This part of the Northern Cape is suited for grazing at best, and the grazing capacity of the region is very low, around 18-20 ha/LSU (ARC-ISCW, 2004) According to the criteria by Schoeman (2004), land in the Northern Cape is only considered to be of high potential if it is under permanent irrigation.

### 7.4 Water Management Area

Significant spatial variations in climate, water availability, level and nature of economic development and growth are typical in South Africa. To enable improved representation of the water resources situation in the Water Management Area (WMA) under such varied conditions, and to facilitate the applicability and better use of information for strategic management purposes, the WMA was divided into sub-areas. Delineation of the sub-areas was based on practical considerations such as size and location of Sub-catchment,

homogeneity of natural characteristics, location of pertinent water infrastructure, and economic developments (Basson and Rossouw, 2003).

The proposed mining project falls within the Lower Vaal Water Management Area (LV-WMA). This Water Management Area is one of the five WMA`s in the Orange River Basin. In addition, major rivers within the LV-WMA include the Vaal River, Harts River, and the Molopa River. The Vaal River and the Harts River are located about 134.1 km and 136.45 km (Straight line) southeast of the study area.

The Vaal River System supplies the water resources needs of 60% of the national economy and serves 20 million people.

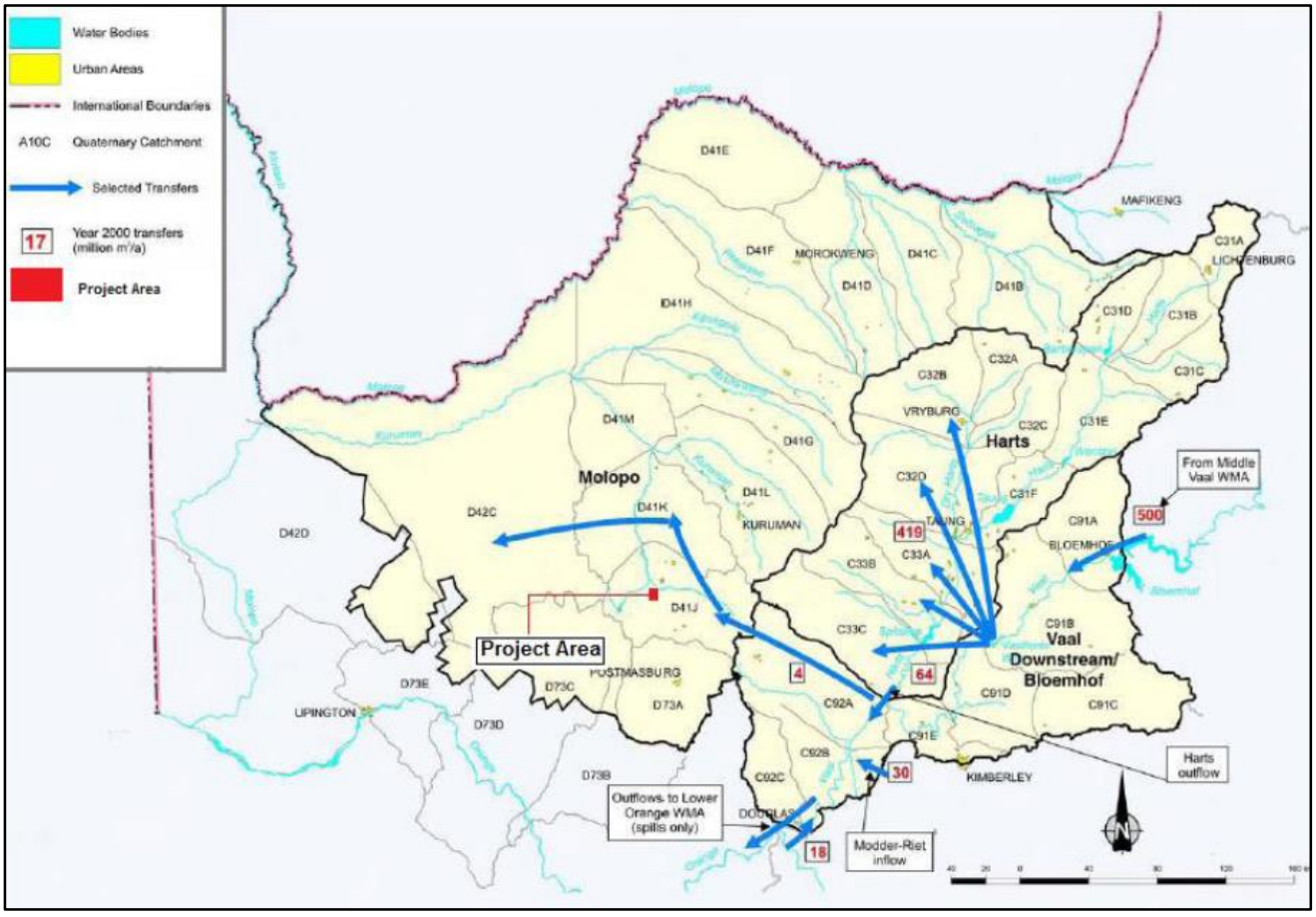


**Figure 8**: Lower Vaal Water Management Area (LV-WMA)

### 7.5 Hydrology

The proposed mining project falls within Quaternary Catchment D41J, with an area of about 3873.500 km2. The farm comprises of drainage lines that experience ephemeral flow after significant rainfall events. Furthermore, the Olifantsloop River and the Ga-mogara River are the most important watercourse within the catchment. These non-perennial streams are not sufficient enough to be utilised as water sources.

In addition, the Ga-mogara River (88.037 km in length) straddles the Mashwening farm on the northern west periphery. The Olifantsloop River (42.492 km in length) is situated approximately 26.51 km west of the study area.

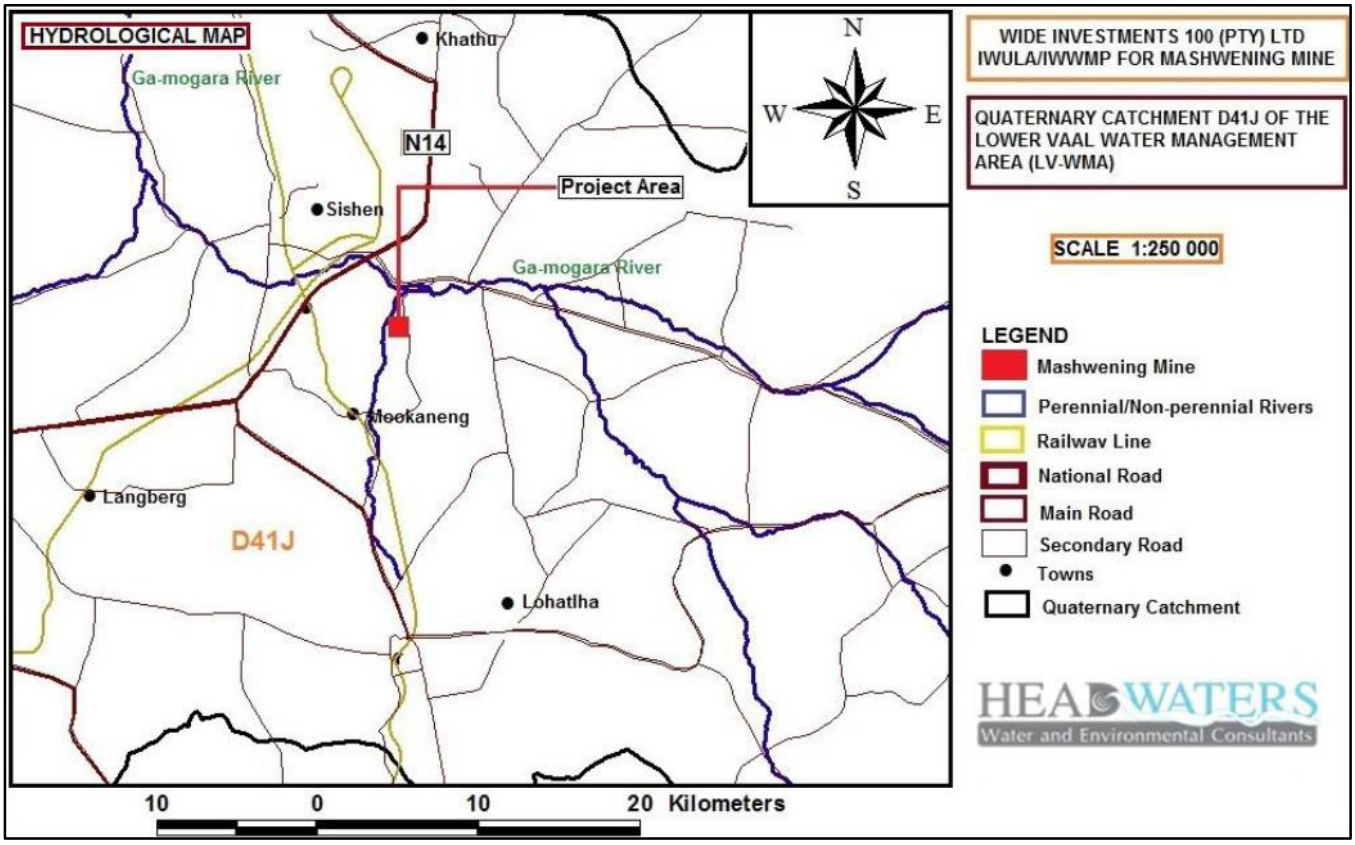


**Figure 9**: Hydrology of the Study Area

### 7.6 Surface Water Quality

South Africa is located in a predominantly semi-arid part of the world. The climate varies from desert and semi-desert in the west to sub-humid along the eastern coastal area, with an average rainfall for the country of about 450 mm per year, well below the world average of about 860 mm per year, while evaporation is comparatively high. As a result, South Africa's water resources are, in global terms, scarce and extremely limited in extent.

The Ga-mogara River as mentioned above is an intermittent water resource. There is a limitation is determining the water quality of this river as a results of insufficient base flow, low MAP, low runoff potential, and the depth of occurrence of the piezometric surface that is confined aquifers.

### 7.7 Mean Annual Run-off (MAR)

As a result of the low rainfall, flat topography and sandy soils over much of the water management area, little usable surface runoff is generated in the water management area. The runoff which does occur is highly variable and intermittent.

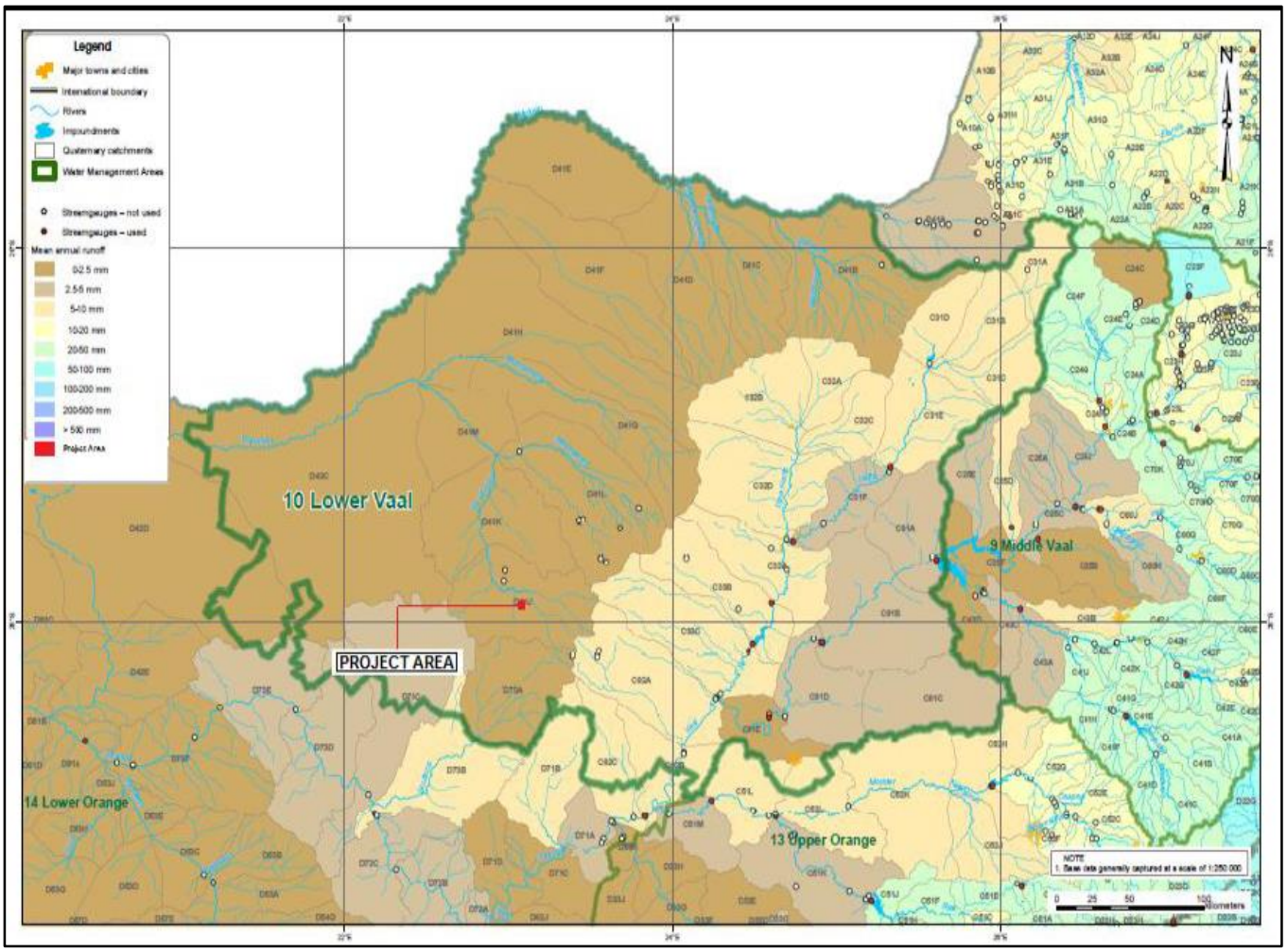


**Figure 10**: Runoff volume of the study area

The D41J Quaternary Catchment experiences a Mean Annual Runoff of about 1 mm (ArcView GIS 3.2a, 2000). Low runoff potential results due to high soil infiltration/percolation rates and vegetation cover. Rainfall infiltration into the soil depend upon soil moisture content, that is, if previously rainfall storm was sufficient, soil moisture content will be high given low evaporation rates.

### 7.8 Surface Water User Survey

Many mining operations, industries, and agricultural activities depend upon groundwater sources for water supply due to the lack of perennial surface water resources within the vicinity of the Khathu region including Sishen. The Vaal Gamagara Water Supply Scheme, abstracting water from the Vaal River just below the Harts River confluence. Furthermore, the scheme is situated approximately 80 km west of town of Kimberley, just outside Delportshoop. It consists of a raw water pump station, purification works, 6 booster pump station, several reservoir facilities, and a pipeline network of about 1700 km.

This scheme is of great importance to the Northern Cape Province, supplying water for domestic, industrial, and mining use. The water is abstracted, then purified and pumped by

means of a high lift pump station to Kneukel some 20km away. From the Kneukel pump station the water flow is boosted to the Tredwill pump station and Clifton reservoirs, which is situated near Lime Acres about 117 km from the purification plant. Clifton, the main storage facility, consists of 4 reservoirs with a combined capacity of 27 000m³. From Clifton water gravitates past Postmasburg and Kathu to reservoirs at Blackrock.

The scheme runs through six Water Service Authorities, that is, four Local Municipalities (Dikgatlong, Kgatelopele, Tsantsabane and Gamagara) and two District Municipalities (Kgalagadi and Frances Baard).

### 7.9 Water User Association

The proposed project falls under the Tshiping Water User Association (TWUA). The TWUA aims to promote sustainable use of water resources for the benefit of the ecology and all water users within the LV-WMA in Quaternary Catchment D41J and D73A of the Northern Cape Province. The association objectively aims to:

- Monitor and control the use of water from and on all water sources in the area of operation by way of privately owned waterworks;
- To make sure persons or organisations use and abstract water in accordance with water use authorizations as provided for in Sections 22(1) and 32 (1) (a) of the NWA.
- To exercise cost accounting from the user and user groups

Water requirements on the mine will include the supply of water for the screens; processing plant; general office use; cleaning of equipment; watering to allay dust in the plant; workshops and hauling roads. Potable water will also be needed for human consumption and change house facilities. The mine will source its water supply from the Vaal Gamagara water scheme which is under the management of Sedibeng Water. A pipe connection will be used to direct the water supply to the mine, where it will be stored in a mounted tank, with enough capacity to hold at least 200m³ required for daily consumption. There is an existing pipeline within a 15km distance supplying water to Khumani and Sishen mines. Other sources of water will include water from a borehole; ground water seepage into the mining pits and storm water in the event of heavy rains. Any excess water will be channeled into settling ponds and used as make-up water in the event of losses associated with plant processing, discard streams and evaporation.

### 7.10 Sensitive Areas Survey

There are no existing wetlands, dams, national parks, and archeological artifacts within the proposed mining area

### 7.11 Vegetation

The study falls within the Kuruman Thornveld (also known as Kalahari Thornveld and Shrub Bushveld and Kalahari Plains Thorn Bushveld) vegetation of the Savanna biome within the Eastern Kalahari Bushveld bioregion. The Savanna biome constitutes about 32% of South Africa`s biomes. Moreover, it is distributed (**See Figure 11 below**) in most parts of North-West Province and Northern Cape Province usually on the flats plains.

This type of vegetation has been largely disturbed by mining activities (Iron and Manganese Ore) and most disturbed areas are characterised by *Aristida adscensions, A. congesta, Enneapogon scoparius, Geigeria ornativa, Melhania rehmanii, Rhigozum trichotomum,* and *Sericorema remotiflora* and the absence of *Acacia erioloba, A. haematoxylon* and *Grewia flava* (Mucina and Rutherford, 2006).

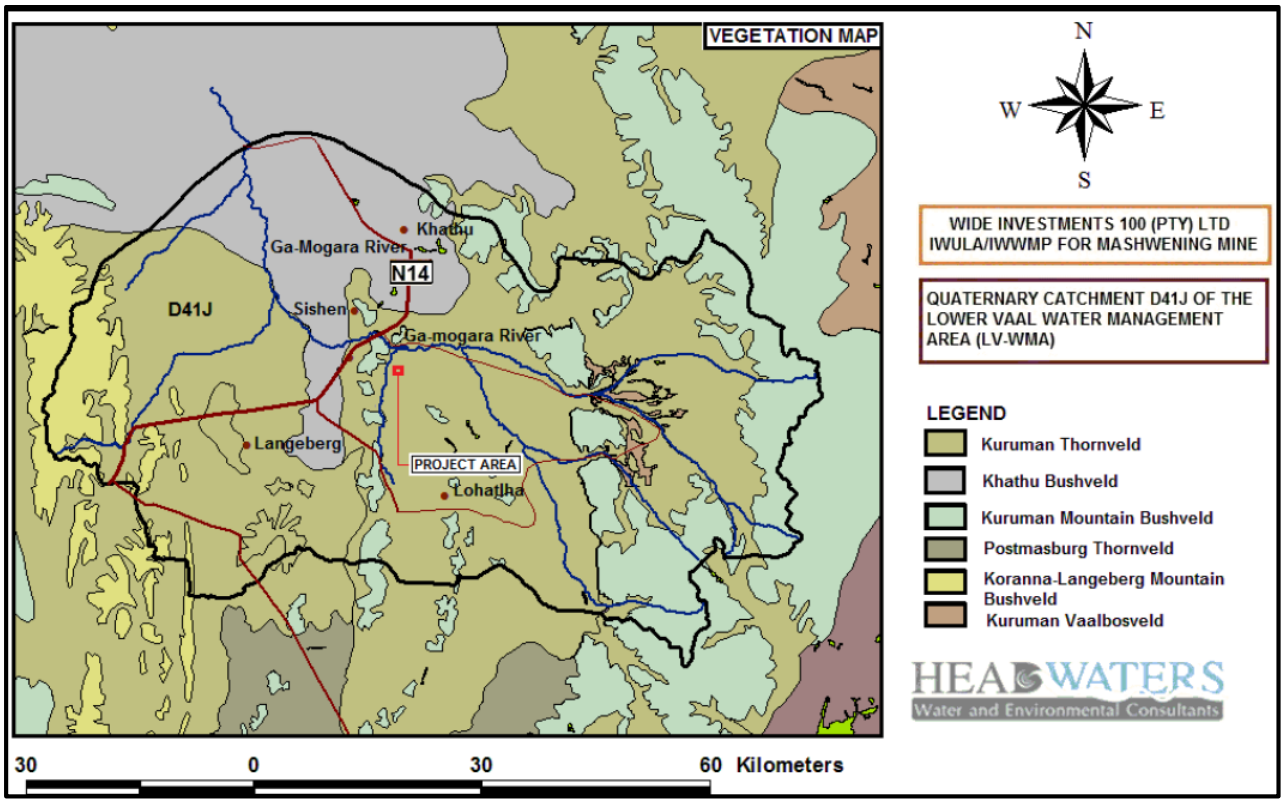


**Figure 11**: Vegetation distribution within the vicinity of the study area

**Picture 2**: The Kuruman Thornveld Vegetation

### 7.11.1 Flora

**Tall Trees:** *Acacia erioloba*

**Small Trees:** *Acacia mellifera Subsp. Detinens, Boscia albutrunca*

**Tall Shrubs:** *Grewia flava, Lycium hirsutum, Tarchonanthus camphorates, Gymnosporia buxifolia*

**Low Shrubs:** *Acacia hebeclada subsp. Hebeclada, Monechma divaricatum, Gnidia polycephala, Helichrysum zeyheri, Hermannia comosa, Pentzia calcare, Plinthus sericeus*

**Geoxylic Suffrutex:** *Elephantorrhiza elephantine*

**Graminiods:** *Aristida meridionalis, A. stipitata subsp. Stipitata, Eragrostis lehmanniana, E. echinochloidea, Melinis repens*

**Herbs:** *Dicoma schinzii, Gisekia Africana, Harpagophytum procumbens subsp. Procumbens, Indigofera daleoides, Limeum fenestratum, Nolletia cilliaris, Seddera capensis, Tripteris aghillana, Vahlia capensis subsp. vulgaris*

### 7.11.2 Other important Flora Species

**Small Trees:** *Acacia luederitzi var. luederitzii, Terminalia sericea;*

**Tall Shrub:** *Acacia haematoxylon*

**Low Shrubs:** *Blespharis marginata*

**Graminoid:** *Digitaria polyphylla*

**Herb:** *Corchorus pinnatipartitus*

### 7.11.3 Conservation Importance

The Kuruman Thornveld is a least threatened type of vegetation. Only about 2% of this vegetation is transformed. Soil erosion in the area is very low, due to the rocky environment providing soil stability during rainfall events. The 2 % which is transformed is largely due to the mining of Manganese and Iron ore minerals.

### 7.12 Topography

The vicinity of the proposed project is characterised by flat rocky plains and sloping hills with well developed, closed shrub layer and well-developed open tree stratum consisting of *Acacia erioloba*. There are more 8 manganese and iron ore mining operations located within the sides of the N14 national road following the mountainous terrains.

The Mashwening farm is rich in Manganese and Iron Ore minerals. The proposed mining operation lies between longitude 23.05 and latitude -27.86 at an altitude range of 1226-1247 above mean sea level (AMSL).

### 7.13 Groundwater

Many towns in the Northern Cape Province rely on dolomitic groundwater as their main source of water. Mining expansion programs in the Northern Cape Province are dependent on water being available both for mining and domestic water supply. Current water supplies consists of local groundwater resources (boreholes and mine de-watering), and bulk water supplies from the Vaal Gamagara Water Supply Scheme pipeline. The groundwater exploitability potential within the D41J Quaternary catchment is in the range of 15 000- 25 000 m3/km2/a.

Major de-watering of groundwater aquifers for mining purposes occurs at Sishen, where up to 28 million m3 per year is abstracted from groundwater.

### 7.14 Groundwater Quality

The quality of groundwater in the water management area is generally good, although brackish (mineralised) water is found in the drier areas (Basson and Rossouw, 2003).

# 8 SOCIO-ECONOMIC STATUS

### 8.1 Socio-economic Status

The discovery of Iron and Manganese Ore minerals in the Northern Cape Province has instigated economic growth of the province and the country as well, that is, increase in the GDP. The single largest factor that has guided the development of the Gamagara area is the iron ore mine at Sishen. Not only does the mine provide jobs to thousands of people, but it was also the reason for the establishment of the town of Kathu. Kathu is the largest town within the municipality and not just an administrative centre for the municipality but is also serves as an economic centre for Gamagara Local Municipality.

### 8.2 Population

The population of the Gamagara municipal area has increased from 23 202 in year 2001 to 41 617 in 2011. According to the Gamagara 2013/2014 Integrated Development Plan (IDP) the population has increased by 5.84% per annum from 2001 to 2011. Furthermore, the Gamagara population consists mainly of black African, colored, white, and Indian or Asian people.

### 8.3 Employment

Majority of the population within the vicinity of the Gamagara region are employed and followed by those that are not economically active. Approximately 2% of the population falls under the discouraged workers category, while 8% of the population is unemployed

**Table 6: Expected number of people to be employed by Mashwening Iron Ore mine**

| Grade | Category | Budgeted Number of Mine Personnel | | | |
|---|---|---|---|---|---|
| | | Year 1 | Year 2 | Year 3 | Year 4 |
| | | 2016 | 2017 | 2018 | 2019 |
| | | Mine Commissioning Phase | Mine Build-up Phase | Mine Build-up | Mine Steady State Production |
| F | Top Management | 0 | 0 | 0 | 0 |
| E | Senior management | 5 | 5 | 5 | 5 |
| D | Professionally qualified and experienced specialists and mid-management | 12 | 12 | 12 | 12 |
| C | Skilled technical and academically qualified workers, junior management, supervisors, foremen and superintendents | 20 | 20 | 20 | 20 |
| B | Semi-skilled and discretionary decision-making | 45 | 45 | 45 | 45 |
| A | Unskilled Personnel | 24 | 24 | 24 | 24 |
| **Total Budgeted Employees** | | **106** | **106** | **106** | **106** |

### 8.4 Housing

On commencement of the mining operations, employees will be accommodated in the nearby towns of Kathu, Dingleton and Deben in rental homes and living quarters. Certain measures that will be taken by the company to address the living conditions for its employees will include the following:

- The company will conduct a survey amongst employees during the recruitment process and determine the preferred housing and living conditions of the employees;

- In order to allow the employees opt to purchase their own homes, the company will provide such employees with a housing subsidy and assist them in securing an affordable home loan from the financial institutions;

- Facilitate the leasing of houses on behalf of employees who chose not to purchase their own homes, providing them with proper living for families;

- Single employees will be accommodated in flats or living quarters, equipped with self-catering facilities, with each person occupying a single room.

The company will recruit and employ the majority of the employees from the local communities, who are likely to have their own accommodation. However, the measures stated above will also be considered for the employees recruited from the local area to ensure that their living conditions are dignified and allow for individual privacy.

### 8.5 Transportation

Transportation to and from the site will be provided for all employees in the form of buses and or other vehicles. Pick up schedules at designated points will be determined and informed to any and all employees.

### 8.6 Water and Waste

The following section describes the different waste streams which will be generated during operations.

Sewage

The mining project will make use of two types of sewage systems:

- A French Drain will be constructed at the site office.
- Chemical toilets, of which eight are hired for all the employees housed on the site. These enclosed chemical toilets are serviced every two weeks by the hire company.

Domestic Waste

Domestic waste and paper waste, mainly generated from the employees housed on site and the administration/office facilities, is collected within a skip. This skip is emptied by a waste contractor once a month or when full.

Industrial and domestic waste which has no alternate value will be collected by the local waste removal company. Sewage would be picked up through the Municipal sewage lines or via

honey suckers. Hazardous waste generated by the mine would be collected by an approved contractor and disposed of at a hazardous waste facility. Scrap material that have salvageable value will be collected, sorted, reused where possible or establish a local based organisation to recover, sell for self-empowerment.

**Table 7: Waste Management – Sewage Waste**

| GOALS AND OBJECTIVES | ACTION PLANS / MANAGEMENT COMMITMENTS | TIMEFRAME | RESPONSIBILITY |
|---|---|---|---|
| Maintain the Chemical Toilets | Ensure that the chemical toilets are serviced every two weeks and inspected for leaks. The mine needs 1 chemical toilet per 10 persons. | Every two weeks. | Mine Manager |
| If a leaking toilet is identified, the mine will contact the toilet suppliers immediately and request them to replace the leaking toilet. | | As and when required. | Mine Manager |
| **Waste Management – Domestic Waste** | | | |
| Avoid littering and attracting vermin with domestic waste. | Bins are to be provided in common area throughout the mine. Bins are to be emptied into a skip every 3 days or when full. | Emptied every 3 days | Mine Manager |
| The skip is to be emptied every month or when full. The mine will designate a responsible person to check the amount of waste in the skip. | | Monthly | Mine Manager/ Designated person |
| **Management – Mining Waste** | | | |
| Minimise the potential for pollution from mining waste | | Mining waste is to be dealt with as follows: | |
| Scrap metal<br>▪ All scrap metal will be stored in a demarcated area next to the workshop and sold when there | | As and when required | Mine Manager/ Mine Personnel |

| | | |
|---|---|---|
| is enough to justify a trip to the scrap metal dealer.<br>▪ Old vehicles with no future use will be sold as scra | | |
| • If used parts are stored as scrap and have the potential for leaking oil, they will be stored on concrete. | | |
| Old tyres<br>▪ All old tyres will be used to demarcate areas on the mining site or returned to the suppliers. | As and when required | Mine Manager/ Mine Personnel |

| | | | |
|---|---|---|---|
| Minimise the potential for pollution from mining waste | Oil contaminated waste<br>• All oil contaminated waste (e.g. oily rages) will be stored within an old oil drum, which will be stored in the concreted workshop area. When the drum is full, it will be removed by a certified contractor.<br>• The mine must have a copy of the contractors waste | As and when required | Mine Manager/ Mine Personnel |

| | | | |
|---|---|---|---|
| | disposal permit on file. | | |
| Old oil | • All old oil collected in the drip trays will be decanted into an old drum which will be kept within the concreted workshop. The collected oil will be disposed of by an authorised sub-contractor<br>• The mine must have a copy of the contractors waste disposal permit on file. | As and when required | Mine Manager/ Mine Personnel |
| Florescence tubes | • All old fluorescence tubes will be collected and disposed of by the electrician.<br>• A copy of the waste disposal permit for the company that deals with the florescence tubes must be maintained on file at the mine. | As and when required. | Mine Manager/ Mine personnel |

| | | | |
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| | | | |
| Batteries | • Old batteries will be stored within the concreted workshop area and will be disposed of by the supplier when possible.<br>• A copy of the waste disposal permit for the company that deals with the batteries must be maintained on file at the mine. | As and when required. | Mine Manager/ Mine personnel |
| **GOALS AND OBJECTIVES** | **ACTION PLANS / MANAGEMENT COMMITMENTS** | **TIMEFRAME** | **RESPONSIBILITY** |
| **Waste Management – Hydrocarbon Spillages** | | | |
| Hydrocarbon (e.g. petrol, diesel, oil) spillages will be cleaned up and rendered harmless through the implementation of bio-remediation measures on the site. | Bioremediation of hydrocarbon contaminated soils will occur in a demarcated, contained, concreted area. The mine will also maintain a store of suitable absorbent material, suitable bioremediation substance and a spill kit. All incidences/ spillages are to be | As soon as possible | Mine Manager/ Mine personnel |

| | | | |
|---|---|---|---|
| | recorded in an incident log book. | | |
| Bio-remediation Process | The process of bio-remediation can be completed in the following steps:<br>**STEP 1:** For larger spills (covering a surface area of more than 1m2), contain the spill using equipment provided in the spill kit/absorbent materials. For smaller spills (covering a surface area of less than 1m2), this step may not be necessary.<br>**STEP 2:** Lift contaminated soils/ gravels and place them on a concreted surface/ plastic lining/ drum where storm water run-off collected on this surface is contained.<br>**STEP 3:** Apply selected bio-remediation product to the contaminated soils/ materials. The volume of product used will depend on | | |

| | | |
|---|---|---|
| | the volume of the contamination in the soils and should be guided by the manufacturer's instructions.<br>**STEP 4:** Wet the contaminated soils/ gravels. The volume of water used should be guided by the manufacturer's instructions.<br>**STEP 5:** Till the soils/ gravels to mix in the bio-remediation products, ensure all contaminated material is wet and to aerate the contaminated material.<br>**STEP 6:** Cover the contaminated soils/gravel with plastic to contain moisture and heat.<br>**STEP 7:** Repeat steps 3 to 6 once a week until the soils appear and/or feel clean.<br>**STEP 8:** Send a sample of the contaminated material for testing to determine the hydrocarbon | |

| | | | |
|---|---|---|---|
| | contamination, in parts per million. As there is no guideline as to the allowable levels of hydrocarbons occurring in soils (due to the varying natural levels), a soil/ gravel sample from an un-polluted area of the site must be sent away for testing to determine the baseline condition which must be attained.<br>**STEP 9:** If the soils/ gravels are still contaminated, repeat steps 3 to 7 until the hydrocarbon content of the soils/ gravels equals the baseline condition described above.<br>**STEP 10:** Make use of the cleaned soils in concurrent rehabilitation. | | |
| Legalise proposed waste management activity | Obtain the relevant waste management license for the listed activities, in terms of the NEMWA (Act 59 of 2008). | Once off<br>Renew as required | Owner / Manager |
| **Complaints Register** | | | |

| | | | |
|---|---|---|---|
| Maintain a Complaints Register. | All complaints must be recorded in a complaints register, which must be kept on the site. In addition, an email address should be made available to the public for purposes of complaints. This makes it more user friendly and the stakeholder does not need to come to site to submit the complaint. | Daily | Mine Manager/ Designated administration official. |
| Investigate and address complaints. | All environmental complaints must be forwarded to the mine manager. | As and when a complaint is received. | Mine Manager |

# 9 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

An EIA is a good planning tool. It identifies the environmental impacts of a proposed development and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way. The EIA for this project complies with the NEMA (as amended) and the NEMA EIA Regulations (2010) of the DEA. The guiding principles of an EIA are listed below.

## 9.1 Guiding principles for an EIA

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the Applicant. Technical information must be communicated to

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

### 9.2 Potential Impacts for further investigation during the EIA Phase

Potential impacts resulting from the proposed iron ore and manganese mine were identified using input from the following:

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

The following major potential impacts were identified:

- Impact on ground- and surface water quality and quantify;
- Soil, geology and mineral resources;
- Agricultural potential and land capability;
- Biodiversity and sensitive habitats;
- Loss of flora and fauna;
- Socio-economic issues;
- Existing land use and surrounding land uses;
- Impact on heritage features;
- Dust and noise impacts;
- Visual impacts;
- Waste products;

- Traffic; and
- Service Infrastructure

### 9.2.1 Direct Impacts Identified

**Table 8**: Potential direct impacts identified

| IMPACT | | |
|---|---|---|
| HYDROLOGICAL | **SURFACE WATER** | Alteration of the characteristics of a water course<br><br>Hydrological modification on stormwater flow and watercourses |
| | | Altered drainage patterns and runoff flows |
| | | Deterioration of water quality |
| | | Contaminated runoff from concrete mixing and sediment release including spills and leaks of chemicals such as Hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles and other chemicals from construction activities e.g. paints, may lead to the infiltration of toxins into the groundwater |
| | | Subsidence, slumping and flooding of mining areas |
| | | Contamination of surface water by seepage and effluent discharges |
| | **GROUNDWATER** | Impact on dewatering of the groundwater aquifer due to mining operations |
| | | Contaminated runoff from concrete mixing and sediment release including spills and leaks of chemicals such as Hydrocarbon-based fuels and oils or lubricants spilled from construction vehicles and other chemicals from construction |

| | | |
|---|---|---|
| | | activities e.g. paints, may lead to the infiltration of toxins into the groundwater |
| | | Deterioration of water quality - Seepage from the tailings stockpiles and from mining operations causes a contamination plume deteriorating water quality. |
| **AIR QUALITY** | | Dust impacts on air quality during the construction and operational phases |
| | | Windborne dust and vehicle fumes may decrease the air quality |
| | | Dust settling on the surrounding area |
| | | Spreading of Particulate Matter $PM_{10}$ |
| SOIL, GEOLOGY AND MINERAL RESOURCE | | Impact of vegetation clearance on soil erosion and surface water runoff during the construction and operational phase |
| | | Soil pollution, compaction and loss of topsoil during the construction and operational phases |
| | | Mining of resource underlying the site |
| **TOPOGRAPHY** | | Alteration of the surrounding topography |
| **ECOLOGICAL** | | Destruction and removal of vegetation, including sensitive, protected species and species of special concern |
| | | Destruction and or deterioration of biodiversity on the study and surrounding area |
| | | Destruction of faunal habitat and faunal displacement |
| | | Reduction in natural migratory routes and faunal dispersal patterns |
| | | Increase in alien invasive species and bush encroachment |

| | |
|---|---|
| **VISUAL** | Impact on the visual character and or 'Sense of Place' of the area as a result of the establishment of mining infrastructure and related structures as well as waste dumps and stockpiles |
| | Decreased aesthetic appeal of the study area and surrounding areas |
| **NOISE, VIBRATION AND SHOCK** | Disturbance due to vibrations caused by vehicles and blasting |
| | Nuisance and health risks caused by an increase in the ambient noise level as a result of mine workings including: blasting activities; drilling, loading and hauling |
| | Nuisance and health risks caused by an increase in the ambient noise level as a result of waste dumps when rocks are falling while being dumped |
| | Nuisance and health risks caused by increased traffic on an adjacent to the study area including cars, busses and other heavy vehicles |
| **TRAFFIC** | The change in the traffic patterns as a result of traffic entering and exiting the new mine on the surrounding road infrastructure and existing traffic |
| | Impact on existing road infrastructure and increased need for maintenance |
| **SOCIO-ECONOMICAL** | Positive - Development and upliftment of the surrounding communities and infrastructure |
| | Positive - Development of the economic environment by job provision and sourcing supplies for and from local residents and businesses |
| | Positive - Creation of medium to long term employment during all the phases of mining for |

| | |
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| | local residents and skills transfer to unskilled and semi-skilled unemployed individuals |
| | Impact on value of the surrounding properties |
| | Veld fires |
| | Safety and injury or loss to workers or other persons on site |
| | Increased risk to public health and safety |
| | Trespassing of labour on other properties |
| | Influx of migrant workers to the area |
| | Need for services e.g. water, electricity and sewerage systems |
| **HERITAGE** | Alteration of archaeological, historical and paleontological features |

### 9.2.2 Cumulative Impacts Identified

**Table 9**: Potential cumulative impacts identified

| IMPACT | | |
|---|---|---|
| **TRAFFIC** | | Increased traffic volumes within the mine and surrounding communities. |
| **AIR QUALITY** | | Decrease in air quality in the immediate surroundings of the mine |
| **HYDROLOGICAL** | **SURFACE WATER** | Cumulative loss of surface water functionality as a result of an increase in pollutants |
| | | Cumulative impact of hydrological modifications and stormwater |
| | **GROUNDWATER** | Cumulative impacts on groundwater quality due to seepage from stockpiles and mining operations |
| | | Cumulative impacts on groundwater levels and availability of water to the surrounding landowners |
| **ECOLOGICAL** | | Cumulative impact of vegetation loss including sensitive vegetation |
| | | Cumulative impact of destruction and or deterioration of biodiversity |
| | | Cumulative impact of faunal habitat and displacement |
| | | Cumulative impact on natural migratory routes and faunal dispersal patterns |
| **VISUAL** | | Cumulative impact of visual disturbances |
| **NOISE, VIBRATION AND SHOCK** | | Cumulative impact of construction and operational noise as well as noise due to blasting, vibrations and shocks |

| | |
|---|---|
| | Cumulative impact of vibration and shocks |
| **SOCIO-ECONOMICAL** | Positive - Development and upliftment of the surrounding communities and infrastructure |
| | Development of the economic environment by job provision and sourcing supplies for and from local residents and businesses |
| | Creation of medium to long term employment during all the phases of mining for local residents and skills transfer to unskilled and semi-skilled unemployed individuals |
| | Cumulative impact on resources due to the need for services e.g. water, electricity and sewerage systems |
| | Cumulative impact of decrease in value of surrounding properties |

### 9.2.3 Proposed specialist studies to assess the environmental impacts

The following specialist studies were identified to be undertaken during the EIA:

- Geohydrological Assessment;
- Surface Water Assessment;
- Biodiversity and Ecological Assessment;
- Heritage Impact Assessment;
- Baseline Visual Assessment and
- Baseline Air Quality Assessment

### 9.3 Impact assessment methodology

A *"significant impact"* is defined as it is defined in the EIA Regulations (2010): *"an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect of one or more aspects of the environment".* The objective of this EIA methodology is to serve as framework for accurately evaluating impacts associated with current or proposed activities in the biophysical, social and socio-economical spheres. It aims to ensure that all legal requirements and environmental considerations are met in order to have a complete and integrated environmental framework for impact evaluations.

The process of determining impacts to be assessed is one of the most important parts of the environmental impact assessment process. It is of such high importance because the environmental impacts identified can and are often linked to the same impact stream. In this method all impacts on the biophysical environment are assessed in terms of the overall integrity of ecosystems, habitats, populations and individuals affected. For example the removal of groundcover for the sloping or scraping of an embankment can lead to higher amounts of water runoff which increases the rate of erosion, further down in the river the amount of sediment increases because of the increased erosion.

A number of fish species cannot endure the high amount of sediment and moves off. The habitat is thus changed or in the process of changing. Thus one needs to understand that the root of the problem (removal of groundcover) is assessed in terms of the degree of change in the health of the environment and/or components in relation to their conservation value. Thus if the impact of removal of groundcover of a definable system is high and the conservation value is also high then the impact of removal of groundcover is highly significant.

#### 9.3.1 Environmental impact assessment 2010 requirements

The EIA 2010 Regulations promulgated in terms of Sections 24(5), 24M and 44 of the NEMA requires that all identified potential impacts associated with the proposed project be assessed in terms of their overall potential significance on the natural, social and economic environments. The criteria identified in the EIA Regulations (2010) include the following:

- Nature of the impact;

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

The Impact Assessment Methodology is described in more detail in the Plan of Study.

# 10 PUBLIC PARTICIPATION PROCESS

It is a legal requirement of the South African constitution that interested and affected parties are provided with sufficient information for any proposed project which will involve altering the status of the environment. In terms of regulation 55(6) of the NEMA, the applicant must notify interested and affected parties about the designated project.

Furthermore, regulation 2(4)f under the principles of NEMA further states that: the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantage persons must be ensured.

The aim of the public participation process (PPP) is to provide interested and affected parties with an opportunity to:

- Inform interested and affected parties about the mining project
- To obtain stakeholder views and concerns;
- Promote integrity and human rights (Bill of Rights);

### 10.1.1 Interested and Affected Parties

An Interested and Affected Party is a juristic person or an association of persons with a direct interest in the proposed or existing operation or who may be affected by the proposed or existing operation.

The majority of the stakeholders on the database are comprised of individual, associations, companies, organisations, municipal representatives, and government departments. Refer to **Appendix B** for the Interested and Affected Party list.

### 10.1.2 Project Announcement and Invitation to Participate

Interested and Affected Parties were informed about the proposed mining operation by means of telephone conversations, email correspondences, faxes, and registered mail. Refer to **Appendix D** for record of communication with stakeholders.

**Background Information Document**

Interested and Affected Parties were provided with the project Background information Document (BID) describing the proposed mining activity, environment likely to be affected, the likely impacts envisaged, and the consultation process to be followed. Refer to **Appendix B** for the BID.

### 10.1.3 Advertisements and Site Notices

**Newspaper Advert**

Advertisements were placed in the following two newspapers in both English and Afrikaans languages to announce the project and to invite interested and affected parties to register:

- Diamonds Fields Advertiser (02 October 2013);
- Khathu Gazette (05 October 2013);

These newspapers covers the both the local communities and the whole of Northern Cape Province. Refer to **Appendix B** for copies of newspaper advertisements.

An A3 colour sized English notices were placed at the following sites on the 26 October 2013:

- Kuruman Post Office;
- Khathu Post Office;
- Dingleton Post Office;
- Kuruman Library;
- Gamagara Library;
- Kuruman Local Municipality;
- Gamagara Local Municipality;
- John Taolo Gaetsewe District Municipality;
- Mashwening 557 farm entrance point;
- Diro Mining entrance and offices;
- Helpebietjie Mine security gate office.

Refer to **Appendix E** for site notices.

### 10.1.4 Public Meeting

A public meeting will be held with interested and affected parties for the compilation of the Environmental Management Programme (EMP) amendment report.

Authorities' pre-application meetings were held with the Department of Water affairs and the Department of Environment and Nature Conservation at the Northern Cape Region.

### 10.1.5 Public Review

Interested and Affected parties will be provided with a review period prior to the final compilation and submission of the report to authorities. This is to offer the public an opportunity to get acquainted with the FS Report and to give comments. Communications lines will be established

between the consultant (Jomela Consulting (Pty) Ltd) and interested and affected parties (I & Aps) through the use of electronic mail, telephone, post mail and fax mail. The report will be available from the 17th of September 2014 for a 21 day commenting period.

**Table 10**: FSR Report distribution

| **DISTRIBUTION PLAN** | |
|---|---|
| **Objectives** | **Authorities** |
| **Submission for Review** | • Department of Environment and Nature Conservation (DENC);<br>• Department of Mineral Resources (DMR);<br>• Department of Water Affairs (DWA);<br>• South African Heritage Resources Agency (SAHRA) website (SAHRIS); |
| | Public Review |
| | • Gamagara Library;<br>• All identified I&APs |

### 10.1.6 Further Opportunities to Participate

Throughout the process the consultant has communicated with registered stakeholders by means of telephone conversations, email correspondences, faxes, and registered mail. All comments received through the process have been documented in the Issues register. This method of communication will be continued throughout the process until a decision is reached by authorities.

## 11 ASSUMPTIONS AND LIMITATIONS

- All information provided to the environmental team by the applicant and I&APs was correct and valid at the time that it has been provided;

- The strategic level investigations undertaken by specialists prior to the commencement of the EIA process, indicated that the development site is suitable and technically acceptable;
- It is not always possible to involve all I&APs individually, however every effort has been made to involve as many affected stakeholders as possible;
- The information provided by the applicant and specialists was accurate and unbiased; and
- The scope of this investigation is limited to assessing the environmental impacts associated with the construction, operation and decommissioning of the proposed manganese mine.

## 12 KNOWLEDGE GAPS

The aim of a SR is to summarise the potentially significant findings of the review process. The environment that is likely to be affected by the proposed project was assessed and the SR covers all prevailing conditions of the environmental aspects identified, including cumulative impacts. It is believed that the environment is well understood. Hence, no significant knowledge gaps exist in terms of the current state of the environment.

Due to the nature of the existing environment, the local conditions of the area and professional expertise, it is believed that the predictive measures are suitable and contain no limitations. Further work is constantly undertaken in the manganese fraternity and investigations in parallel with the impacts presented in this report could change, should new information become available, or as the project description is refined.

## 13 CONCLUSIONS

The FSR report describe the activities that will be undertaken for the proposed mining project at Mashwening Iron Ore Mine. It provides a description of the biophysical, cultural and socio-

economic environment to ensure that all risks and issues are taken into consideration in all phases of the planned development. Mashwening mining activities will have the potential to change the status of the environment.

Comments from the Interested and Affected Parties about the Final Scoping Report will be forwarded to the department. All comments raised by stakeholder after submission of the Final Scoping Report to the department will be considered and incorporated within the Draft EIA Report which will be available for public review for 21 days.

Public Participation Process will be continuous through the overall environmental impact assessment process. The plan of study has been described in full for the whole FSR process.

## APPENDIX A: NEMA LISTED ACTIVITIES APPLIED FOR

| **GNR 544 Listing Notice 1: Activities requiring an environmental authorisation subject to a Basic Assessment** | | |
|---|---|---|
| **Notice** | **Activity No (s) (in terms of the relevant or notice)** | **Description of the Listed Activity** |
| GNR 544 | Activity 9 | The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water-<br><br>(i) with an internal diameter of 0.36 metres or more; or<br><br>(ii) with a peak throughput of 120 litres per second or more, excluding where:<br><br>a. such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve. |
| GNR 544 | Activity 10 | The construction of facilities or infrastructure for the transmission and distribution of electricity<br><br>(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more. |
| GNR 544 | Activity 12 | The construction of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010. |
| GNR 544 | Activity 13 | The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where |

| | | |
|---|---|---|
| | | such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres; |
| GNR 544 | Activity 22 | The construction of a road, outside urban areas,<br><br>(ii) where no reserve exists where the road is wider than 8 metres. |
| **GNR 545 Listing Notice 2: Activities requiring an environmental authorisation subject to a Scoping and Environmental Impact Assessment.** | | |
| GNR 545 | Activity 15 | Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; |
| GNR 545 | Activity 19 | The construction of a dam, where the highest part of the dam wall, as measured from the outside 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 |
| GNR 545 | Activity 20 | Any activity which requires a mining right or renewal thereof as contemplated in sections 22 and 24 respectively of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). |

**APPENDIX B: PUBLIC PARTICIPATION- BID, Newspaper advertisement, I&AP list**

**APPENDIX C: HERITAGE IMPACT STUDY**

**APPENDIX D: RECORD OF COMMUNICATION WITH STAKEHOLDERS**

**APPENDIX E: SITE NOTICES**

**APPENDIX F: PLAN OF STUDY FOR EIA**