



DRAFT FOR I&AP REVIEW

GLENCORE MERAPE VENTURE OPERATION BOSHOEK SMELTER EIA SCOPING REPORT & PLAN OF STUDY

Date: 23 April 2014
JMA / 10422
JMA MyFiles Reference: Prj5741
DMR Reference: XXXX
NW DEDECT Reference: NWP/EIA/101/2013
DEA Reference: XXXX

VOLUME 1 OF 2

COMPILED FOR



GLENCORE MERAPE VENTURE
OPERATION
Boshoek Smelter

COMPILED BY



JMA Consulting (Pty) Ltd
*Sustainable Environmental Solutions
through
Integrated Science and Engineering*

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EXECUTIVE SUMMARY

The Executive Summary will be compiled for inclusion into the Final Scoping Report and Plan of Study to be submitted to DMR after the I&AP Review Process.





1. METHODOLOGY APPLIED FOR SCOPING

The subject matter of this project comprises the addition, alteration and expansion of Ferrochrome Smelting beneficiation plant related infrastructure at the existing Glencore Merafe Venture Operation Boshhoek Mine and Smelter.

From a Scoping and EIA perspective, three environmental authorization processes need to be supported, namely:

- An EMPR Addendum in terms of the provisions of the MPRDA.
- A Scoping and EIA Process for activities as defined in the Listing Notices of the EIA Regulations GNR 544, 545 and 546 of NEMA.
- A Scoping and EIA Process for waste management activities as listed in Regulation GNR 921 of NEMWA.

In order to support the EMPR Addendum Process, all documentation compiled for this Scoping and EIA Process will contain both:

- the existing infrastructure and process description as relevant to the currently approved EMPR as adapted for the current operations, as well as
- the infrastructure and process descriptions of the proposed new activities for which the relevant applications for environmental authorizations will be made.

However, the actual Environmental Impact Assessment (EIA), the determination of Management Objectives, the conceptualization and specification of Environmental Management Measures and the Monitoring Proposals (EMP), **will focus on the new proposed activities for the site.**

The EMP for the existing activities will also be contained in the documents.



1.1 IDENTIFIED COMMUNITIES

The Guideline for the compilation of a Scoping Report and Plan of Study uses the NEMA definition for a community in relation to environmental matters pertaining to prospecting, mining, exploration, production or a related activity, which reads:

In relation to environmental matters pertaining to prospecting, mining, exploration, production or related activity on a prospecting, mining, exploration or production area, means a group of historically disadvantaged persons with interest or rights in a particular area of land on which the members have or exercise communal rights in terms of an agreement, custom or law: Provided that where as a consequence of the provisions of this Act (inserted NEMA) negotiations or consultations with the community are required, the community shall include the members or part of the community, directly affected by prospecting, mining, exploration or production on land occupied by such members or part of the community.

Following this definition, no defined communities are present in the area of both the existing or the proposed new activities.

1.1.1 Names of Communities

No “communities” as defined, are directly affected by the current or planned future activities at Glencore Boshhoek Mine and Plant.

1.1.2 No Community Explanation

The current, and future, Glencore Merafe Boshhoek Mine and Plant activities are all located on land belonging to one of the following:

- Rustenburg Platinum Mines Ltd
- Royal Bafokeng Nation
- South African Ferrochrome and Mining (Pty) Ltd
- Lechaba Tsietji Johannes
- Struthio (Pty) Ltd
- Undetermined Land Owner – No Information in Deeds Office – most probably the Royal Bafokeng Nation

No “communities” as defined, are currently present on any of the properties belonging to the owners listed above.

1.2 COMMUNITY LANDOWNER STATUS

No “community” as defined owns any land on which the Glencore Merafe Boshhoek Mine and Plant currently operates, or plan to operate in future. The proposed new activities are all located on land already occupied by the Glencore Merafe Boshhoek Mine and Plant.

1.3 INVOLVEMENT STATUS OF DEPARTMENT OF LAND AFFAIRS

The Department of Rural Development and Land Reform was consulted directly with regard to possible Land Claims but is not otherwise actively involved in this project.

1.4 LAND CLAIM STATUS

JMA Consulting formally requested the Land Claim Status of the relevant properties from a Mr Serumula, the Project Coordinator at the Department of Rural Development and Land Reform (Land Claims Commissioner).

The properties in question, which are located in the North West Province, are as follows:

- Portion 21 of the farm Boschhoek 103 JQ
- Portion 66 of the farm Boschhoek 103 JQ
- Portion 67 of the farm Boschhoek 103 JQ
- Portion 71 of the farm Boschhoek 103 JQ
- Portion 138 of the farm Boschhoek 103 JQ
- Portion 13 of the farm Bultfontein 259 JQ
- The Remaining Extent of Portion 2 of the farm Bultfontein 259 JQ
- The Remaining Extent of Portion 10 of the farm Bultfontein 259 JQ
- Portion 4 of the farm Boekenhoutfontein 260 JQ
- The Remaining Extent of Portion 27 of the farm Boekenhoutfontein 260 JQ
- Portion 28 of the farm Boekenhoutfontein 260 JQ
- Portion 29 of the farm Boekenhoutfontein 260 JQ
- Portion 30 of the farm Boekenhoutfontein 260 JQ
- Portion 31 of the farm Boekenhoutfontein 260 JQ
- Portion 114 (consolidated under portion 116 in terms of the Title Deed 64932/1998) of the farm Boekenhoutfontein 260 JQ
- The Farm Stellite 255 JQ

Confirmation was received from the Chief Director; Restitution Support: Mr LJ Bogatsu; Department of Rural Development and Land Reform; Gauteng and North West Provinces that according to their Landbase, currently no registered land claims have been lodged on the properties listed above.

Copies of the confirmation letters received from the Land Claims Commissioner are attached as **APPENDIX 1.4 (A)**.

1.5

RELEVANT TRADITIONAL AUTHORITY

The Royal Bafokeng Nation (RBN) is a Setswana speaking traditional community situated in the Bojanala District, Rustenburg Municipality, North West Province. The RBN is the ethnic homeland of the Bafokeng people.

The Bafokeng community covers 1400 square kilometres with the administrative capital in Phokeng, near Rustenburg. The twenty-nine villages of the RBN are clustered into five regions, namely the Central, North East, South East, North and Capital Regions. The RBN is located in the middle of the Bushveld Igneous Complex, the most abundant source of platinum group metals in the world. The RBN pride them to be a forward thinking traditional community. They are committed to invest the proceeds/mining royalties to develop a socially, economically and environmentally sustainable community true to its African heritage and traditions. The current king of the Bafokeng is Kgosi Leruo Tsheledi Molotlegi and he is the 36th monarch of the Bafokeng people. Although this is a traditionally governed community, the RBN falls under the South African constitution. For more background information refer to <http://www.bafokeng.com>

The Royal Bafokeng Nation owns several pieces of land on which the Glencore Mine and Plant is located and operates, and as such therefore represents the relevant Traditional Authority.

- Portion 21 of the farm Boschhoek 103 JQ
- Portion 66 of the farm Boschhoek 103 JQ
- Portion 67 of the farm Boschhoek 103 JQ
- The Remaining Extent of Portion 27 of the farm Boekenhoutfontein 260 JQ
- Portion 28 of the farm Boekenhoutfontein 260 JQ
- Portion 29 of the farm Boekenhoutfontein 260 JQ
- Portion 31 of the farm Boekenhoutfontein 260 JQ

The relevant Royal Bafokeng Nation contact person for this project is:

Khalid Patel: Tel: (011) 789 7170
E-mail: khalid@eims.co.za

1.6 DESCRIPTION OF LAND OWNERS

Refer to Table 1.6 (a) and Figure 1.6 (a) below for the Land Owner Status, Zoning Status as well as the Deed of Transfer numbers for each property for which Glencore Merafe Boshhoek Mine has **mining rights** or on which the Glencore Merafe Smelter Plant is **currently operating** on. The formal Legal Property Assessment is attached as **APPENDIX 1.6 (A)** and the available Title Deeds are attached as **APPENDIX 1.6 (B)** to this report.

Table 1.6 (a): Current Property Ownership, Zoning Status and Deed of Transfer numbers.

Farm	Property	Owner	Zoning Status	Deed of Transfer Number
Boschhoek 103, JQ	Portion 21	Royal Bafokeng Nation (RBN)	Agricultural	T2061/2002
	Portion 66	Royal Bafokeng Nation (RBN)	Agricultural	T123771/99
	Portion 67	Royal Bafokeng Nation (RBN)	Agricultural	T90206/2001; T46072/1999
	Portion 71	Rustenburg Platinum Mine Ltd	Agricultural	T60685/1997
	Portion 138	South African Ferrochrome & Mining (Pty) Ltd	Agricultural	T2060/2002
Bultfontein 259, JQ	Portion 13	South African Ferrochrome & Mining (Pty) Ltd	Agricultural	T60084/2003
	RE of Portion 2	Lechaba Tsietsi Johannes	Agricultural	T123314/2004
	RE of Portion 10	Struthio (Pty) Ltd	Agricultural	T31668/2000
Boschkoppie 104, JQ	Entire Farm	Government of Bophuthatswana	Agricultural	T12173/1937
Boekenhoutfontein 260, JQ	Portion 4	Rustenburg Platinum Mine Ltd	Agricultural	T8976/2001
	RE of Portion 27	Royal Bafokeng Nation (RBN)	Agricultural	T8976/2001
	Portion 28	Royal Bafokeng Nation (RBN)	Agricultural	T124084/2001
	Portion 29	Royal Bafokeng Nation (RBN)	Agricultural	T138349/2001
	Portion 30	Cross Point Trading 67 (Pty) Ltd	High Potential / Unique Agricultural	T56166/2008

Farm	Property	Owner	Zoning Status	Deed of Transfer Number
	Portion 31	Royal Bafokeng Nation (RBN)	High Potential / Unique Agricultural	T124085/2001
	Portion 114	Kedar Country Retreat (Pty) Ltd	High Potential / Unique Agricultural	T64934/1998



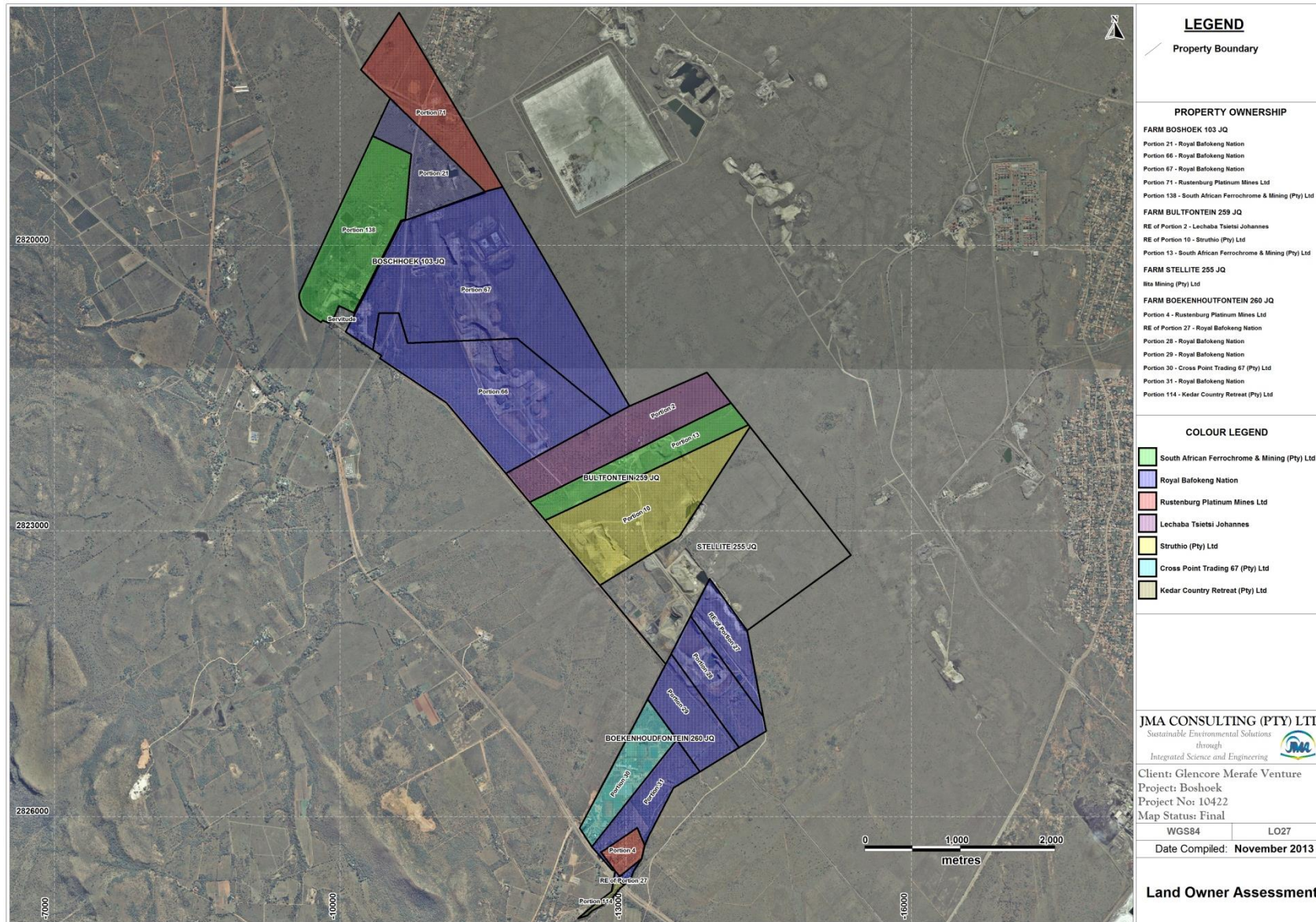


Figure 1.6 (a): Current Property Ownership

1.7 **LAWFUL LAND OCCUPIERS**

Glencore Merafe Boshhoek Mine and Plant currently only operates on some of the properties on which they have a mining right. As such they are the only lawful land occupiers on the properties on which they currently operate. The other properties within their mining rights area, and on which they are not operating at present, are legally still occupied by the legal land owners as listed in Table 1.6(a).

These lawful land occupiers are:

- Royal Bafokeng Nation
- Rustenburg Platinum Mines Limited
- Lechaba Tsietsi Johannes
- Struthio (Pty) Ltd
- Ilitha Mining (Pty) Ltd
- Cross Point Trading 67 (Pty) Ltd
- Kedar Country Retreat (Pty) Ltd
- Government of Bophuthatswana

1.8 **DIRECT SOCIO-ECONOMIC IMPACT ZONE**

Glencore Merafe Boshhoek Mine and Plant (GBMP) consist of Boshhoek Mine and Boshhoek Ferrochrome Plant. The complex is situated 30 km northwest of Rustenburg in the North West Province, South Africa. The settlement of Boshhoek is located within 1 km to the south-west of GBMP. The settlements Rasimone, Frischgewaagd and Chaneng are situated to the north, Mogono and Ga-Luka to the east and Pudunong, Phokeng and Masobobane to the south-east.

GBMP consists of:

- (a) opencast mining operations and a concentrator plant
- (b) ferrochrome beneficiation plant that includes a pelletizing plant, two closed-arc furnaces, a metal extraction / beneficiation plant, as well as the associated water management/containment and waste disposal/management facilities.

The GBMP complex employs close to 800 people and has a production capacity of 240 000 tonnes of ferrochrome per annum. The ferrochrome plant largely processes UG2 chromite – a by-product from local platinum mining activities whereas chrome is mined in the adjacent Boshhoek mine. Chrome from the mine is processed in another nearby Glencore Plant (Waterfall) close to Rustenburg. There are at least 3 other mines operating within a 10 km radius of the area including Rasimone Bafokeng Platinum, Impala Platinum and Wesizwe Platinum mines.

The site is situated within the administrative boundaries of the Rustenburg local municipality in the Bojanala district in the central part of the North West Province. The closest residential areas within a 5 km radius of the complex are Boshhoek and Rasimone.

Boshoek is mainly a small residential area with various economic establishments including a PPC cement plant, mechanical workshop, plant hire, steel works, some small establishments providing tourist accommodation, a small supermarket and other small retail and manufacturing units.

Rasimone is a small low income residential settlement. Home vegetable gardens were observed on several plots. In the surrounding rural areas farming activities include cattle, goat and maize farming.

Phokeng and Ga-Luka are other small residential areas within a 10km radius of the complex. Of these, Phokeng is the larger urban area with various economic activities including a shopping centre and various small service and retail industries.

It is further expected that the proposed development could also potentially impact on the economies of the Rustenburg municipality with the major impacts focussed on the smaller areas of Boshoek, Rasimone with lesser impact on Phokeng, Ga-Luka and other smaller settlements.

1.9 DETAILS OF MUNICIPALITY

1.9.1 Local Municipality

Local Authority:	Rustenburg Local Municipality
Directorate:	Senior Environmental Health Practitioner
Contact Person:	Kgabo James Masebe
Telephone no:	(014) 590 3109
Fax no:	(014) 590 3411
Cellular Phone:	072 277 0279
E-mail:	kjmasebe@rustenburg.gov.za
Postal address:	PO Box 16, Rustenburg, 0300

Local Authority:	Rustenburg Local Municipality
Directorate:	Ward 1 Councillor - Phatsima, Boshoek, Phokeng, Windsor
Contact Person:	J. Mzizi
Cellular Phone:	073 666 0161

1.9.2 District Municipality

Local Authority:	Bojanala District Municipality
Directorate:	Integrated Environment Management Unit Bojanala Municipality
Contact Person:	Fannie Mnisi
Telephone no:	(014) 594 2332 / (014) 590 4502
Fax no:	(014) 592 3949 / (014) 597 0306
E-mail:	FannieMn@bojanala.gov.za / fnmnisi@bojanala.gov.za
Postal address:	P.O Box 1993, Rustenburg, 0300

1.10 DETAILS OF RELEVANT GOVERNMENT AUTHORITIES

1.10.1 National Authorities/Agencies/Institutions

Department of Environmental Affairs (DEA)

National Department:	Department of Environmental Affairs - Head Office - Pretoria
Directorate:	Authorizations and Waste Disposal Management
Contact Person:	B R Dlamini
Telephone no:	(012) 310 3230
Cellular Phone:	+ 27 71 872 4637
E-mail:	brdlamini@environment.gov.za
Postal address:	Private Bag X 447, Pretoria, 0001

Department of Water Affairs (DWA)

Regional Office:	North West Department of Water Affairs, Hartbeespoort
Contact Person:	Lethabo Ramashala
Cellular Phone:	+ 27 82 908 3177
Telephone no:	(012) 253 1026/207 9911
Fax no:	(012) 253 2761 / 086 602 3414
E-mail:	ramashalal@dwa.gov.za
Postal address:	Private Bag X 352, Hartbeespoort, 0216

1.10.2 Provincial/Regional Authorities/Agencies/Institutions

Department of Rural Development and Land Reform

Regional Department:	Regional Land Claims Commission: Gauteng and North West Provinces
Directorate:	Restitution Support
Contact Person:	R M Ramotswa
Telephone no:	(018) 389 9600
Fax no:	(018) 392 3083
E-mail:	rmmramotswa@ruraldevelopment.gov.za
Postal address:	Private Bag X 08, Mmabatho, 2735

North West Department of Economic Development, Environment, Conservation & Tourism (NW DEDECT)

Provincial Department:	NW - DEDECT - Mmabatho
Contact Person:	Steven Mukhola
Telephone no:	(018) 389 5959
Fax no:	
E-mail:	smukhola@nwpg.gov.za
Postal address:	Private Bag X 2039, Mmabatho, 2735

**North West Department of Economic Development, Environment,
Conservation & Tourism (NW DEDECT)**

Provincial Department:	NW - DEDECT - Mmabatho
Contact Person:	Percy Matlaping
Telephone no:	(018) 389 5006
Fax no:	086 581 7533
E-mail:	pmatlaping@nwpg.gov.za
Postal address:	Private Bag X 2039, Mmabatho, 2735

Department of Mineral Resources (DMR)

Provincial Department:	Klerksdorp
Contact Person:	Pieter Swart
Telephone no:	(018) 487 9830
Fax no:	(018) 462 9039
E-mail:	pieter.swart@dmr.gov.za
Postal address:	Private Bag A1, Klerksdorp, 2570

1.10.3 Other Authorities/Agencies/Institutions

South African Heritage Resources Agency (SAHRA)

National Department:	Cape Town, Western Cape
Contact Person:	Jenna Lavin
Telephone no:	(021) 462 4502
Fax no:	(021) 462 4509
E-mail:	jlavin@sahra.org.za
Postal address:	P O Box 4637, Cape Town, 8000

1.11 PROOF OF NOTIFICATIONS TO RELEVANT PARTIES

Copies of notifications sent to the relevant parties listed below, are attached as **APPENDIX 1.11 (A)** to this report.

1.11.1 Land Owners

- South African Ferrochrome and Mining (Pty) Ltd
- Royal Bafokeng Nation
- Kedar Country Retreat (Pty) Ltd

1.11.2 Land Occupiers

- Royal Bafokeng Nation
- Kedar Country Retreat (Pty) Ltd

1.11.3 Interested and Affected Parties

Refer to Appendix 1.11(A) for the a comprehensive list of all the I&AP's that were notified.

1.12 DETAILS OF AND DECLARATION BY THE EAP

The EIA and associated EMP for this project have been compiled by fully qualified and duly registered Professional Scientists and Engineers. Synoptic CV's of all personnel which contributed to the project are attached in **APPENDIX 1.12 (A)**. The duly appointed **EAP for the Project is JMA Consulting (Pty) Ltd**.

Table 1.12 (a): Details of Project Consultancy

Project Consultancy:	JMA Consulting (Pty) Ltd
Company Registration:	2005/039663/07
Professional Affiliation:	South African Council for Natural Scientific Professions (SACNASP)
Contact Person:	Mr Jasper Muller (Pr.Sci.Nat.)
Physical Address:	15 Vickers Street DELMAS 2210
Postal Address:	P O Box 883 DELMAS 2210
Telephone no:	(013) 665 1788
Fax no:	(013) 665 2364
E-mail:	jasper@jmaconsult.co.za

JMA Consulting sub-contracted the services of the following Professional Consultancies and Certified Laboratories for specialist inputs into the project:

Professional Consultancies

TABACKS Attorneys and Corporate Law Advisors
Roos Social Risk Solutions Ltd (RS²)
Dr Julius CC Pistorius Archaeological and Heritage Management Consultant
Southern Economic Development Services
ITS Engineers (Pty) Ltd
Red Earth CC
Introcon Consulting Engineers CC
Scientific Aquatic Services CC
EnviroNGaka (Pty) Ltd
M2 Environmental Connections CC
Zeli Design

1.12.1 Details and Expertise of the Principal EAP

The principle Environmental Assessment Practitioner on this project is Mr Jasper L Muller (Pr.Sci.Nat.) Jasper Muller holds a M.Sc. (cum laude) in Geohydrology from the University of the Free State and has been active as an Earth Scientist and Environmental Scientist since 1986. He has, since 1993, been involved in the compilation of more than 200 EMPR's, EIA's, IWWMP's and EMP's.

He holds Professional Registrations with SACNASP as both an Earth Scientist, as well as an Environmental Scientist.




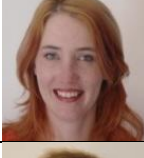

















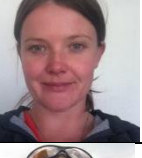


Jasper L Muller (Pr.Sci.Nat.)
(M.Sc. Geohydrology)



Jasper Muller is responsible for the overall project and specifically for EIA and PPP Processes and Time Line Management, Project Technical Management (commissioning of specialist studies), and finally all the EIA/EMP Report Compilation including the full integration of all specialist study findings into the EIA/EMP.

1.12.2 Details and Expertise of the EIA and EMP Team

The following Scientists and Engineers were directly (specific inputs into this project) and indirectly (inputs incorporated from previous studies) involved with the Environmental Impact Assessment as well as with the scoping and design of the Environmental Management Plan for this project:

Photo	Name Qualification Registration	Consultancy	Responsibility
	Jasper Muller M.Sc. Geohydrology Pr.Sci.Nat.	JMA Consulting	Principal EAP
	Riaan Grobbelaar M.Sc. Geohydrology Pr.Sci.Nat.	JMA Consulting	Principal EAP
	Jaco van der Berg M.Sc. Geohydrology Pr.Sci.Nat.	JMA Consulting	Geology Ground Water Mine Planning Materials Balance Ground Water Balance
	Genevieve Cloete B.Sc.Hons. Environmental Sciences Pr.Sci.Nat.	JMA Consulting	GIS Topography
	Shane Turner M.Sc. Geohydrology Geology Pr.Sci.Nat.	JMA Consulting	Geology Ground Water Meteorology Process and Materials
	René Wolmarans M.Sc. Zoology Pr.Sci.Nat.	JMA Consulting	Project EAP
	Kobus du Plessis B.Sc. Conservation Ecology Cand.Sci.Nat.	JMA Consulting	Public Participation
	James Cross	TABACKS	Enviro-Legal
	Candice Gibson	TABACKS	Enviro-Legal
	Nonka Byker	Roos Social Risk Solutions Ltd (RS [®])	Socio - Cultural Aspects
	Johan Oosthuizen	Roos Social Risk Solutions Ltd (RS [®])	Socio - Cultural Aspects

	Juta Mentz	Roos Social Risk Solutions Ltd (RS²)	Socio - Cultural Aspects
	An Kritzinger	Southern Economic Development Services	Socio-Economics
	Julius Pistorius	Dr JCC Pistorius	Archaeology/Heritage
	Pieter Pretorius	ITS Engineers	Traffic
	Jaco Stolp	ITS Engineers	Traffic
	Bruce McLeroth	Red Earth	Soils
	Pierre du Toit	Inprocon	Civil Designs Surface Water Storm Water Balances
	Stephen van Staden	Scientific Aquatic Services	Wetlands Terrestrial Ecology Aquatic Ecology
	Michelle de Klerk	Scientific Aquatic Services	Plant Life Wetlands
	Marc Hannekom	Scientific Aquatic Services	Animal Life
	Jan Potgieter	EnviroNgaka	Air Quality

	Morne de Jager	MENCO	Noise
	Izelle Muller	Zeli Design	Visuals

1.12.3 Declaration by EAP

<p>I, Jasper Lodewyk Muller, acting as independent Environmental Practitioner on this project, declare that:</p> <ul style="list-style-type: none"> • I act as the independent environmental practitioner in this application • I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant • I declare that there are no circumstances that may compromise my objectivity in performing such work; • I have expertise in conducting environmental impact assessments, including knowledge of the National Environmental Management Act (107 of 1998), the Environmental Impact Assessment Regulations of 2010, and any guidelines that have relevance to the proposed activity; • I will comply with the Act, regulations and all other applicable legislation; • I will take into account, to the extent possible, the matters listed in regulation 8 of the regulations when preparing the application and any report relating to the application; • I have no, and will not engage in, conflicting interests in the undertaking of the activity; • I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; • I will ensure that information containing all relevant facts in respect of the application is distributed or made available to interested and affected parties and the public and that participation by interested and affected parties is facilitated in such a manner that all interested and affected parties will be provided with a reasonable opportunity to participate and to provide comments on documents that are produced to support the application; • I will ensure that the comments of all interested and affected parties are considered and recorded in reports that are submitted to the competent authority in respect of the application, provided that comments that are made by interested and affected parties in respect of a final report that will be submitted to the competent authority may be attached to the report without further amendment to the report; • I will keep a register of all interested and affected parties that participated in a public participation process; and • I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not • all the particulars furnished by me in this form are true and correct; • will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations; and • I realise that a false declaration is an offence in terms of regulation 71 and is punishable in terms of section 24F of the Act. <p>Disclosure of Vested Interest</p> <ul style="list-style-type: none"> • I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2010.
<p>_____ Signature of the environmental practitioner:</p> <p><u>JMA CONSULTING (PTY) LTD</u> Name of company:</p> <p>_____ Date:</p>
<p>_____ Signature of the Commissioner of Oaths:</p> <p>_____ Date:</p> <p>_____ Designation:</p>

1.13 LEGISLATION AND GUIDELINES CONSIDERED

1.13.1 Listing of Relevant Acts, Regulations and Technical Guidance

Act 1
Constitution of the Republic of South Africa No. 108 of 1996

Act 2
Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA)
Regulations
GNR 527 of 23 April 2004: Mineral and Petroleum Resources Development Regulations
Guidelines
DMR Guideline for the Compilation of a Scoping Report
DMR Guideline for Consultation with Communities and Interested and Affected Parties
DMR Guideline for the Compilation of an Environmental Impact Assessment and an Environmental Management Programme
DMR Guideline for A Mining and Work Programme to be submitted for Applications for a Mining Right
DMR Guideline for the Submission of a Social and Labour Plan

Act 3
National Water Act 36 of 1998 (NWA)
Regulations
GNR 3208 of 29 August 1969 – Regional Standards for Industrial Effluents
GNR 2274 of 23 October 1981 – Regulation Promulgated in terms of Section 30(2) of the Water Act 54 of 1956 in respect of Subterranean Water Control Areas
GNR 991 of 18 May 1984 – Requirements for the Purification of Waste Water or Effluent
GNR 1560 of 25 July 1986 – Regulations in terms of Section 9C (6) of the Water Act, 1956, Relating to Dams with a Safety Risk
GNR 704 of 4 June 1999 – Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources
GNR 1160 of 1 October 1999 – Establishment of the Water Management Areas and their Boundaries as a Component of the National Water Resource Strategy in terms of Section 5(1) of the National Water Act (Act No 36 of 1998)
GNR 1352 of 12 November 1999 – Regulations Requiring that a Water Use be Registered
GNR 398 of 26 March 2004 – General Authorisations in terms of Section 39 of the National Water Act
GNR 399 of 26 March 2004 – General Authorisations in terms of Section 39 of the National Water Act
GNR 1198 of 18 December 2009 – General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No 36 of 1998) in terms of Section 21(c) and (i) for the purpose of Rehabilitating a Wetland for Conservation Purposes
GNR 810 of 17 September 2010 – Regulations for the Establishment of a Water Resource Classification System
GNR 665 of 6 September 2013 – Revision of General Authorizations in terms of Section 39 of the National Water Act, 1988 (Act No. 36 of 1998)
Guidelines
1. External Guideline: Generic Water Use Authorisation Application Process, 2007
2. Internal Guideline: Generic Water Use Authorisation Application Process, 2007
3. External Guideline: Section 21(c) and (i) Water Use Authorisation Application Process (impeding or diverting the flow of water in a watercourse and /or altering the bed, banks, course or characteristics of a watercourse)
4. Internal Guideline: Section 21(a) and (b) Water Use Authorisation Application Process (taking and/or storing water)
5. Internal Guideline: Section 21(c) and (i) Water Use Authorisation Application Process (impeding or diverting the flow of water in a watercourse and /or altering the bed, banks, course or characteristics of a watercourse)
6. Internal Guideline: Section 21(e), (f), (g), (h) and (j) Water Use Authorisation Application Process (waste discharge related)
7. Operational Guideline: Integrated Water and Waste Management Plan, 2010
8. Best Practice Guideline A1 – Small-Scale Mining (Standard format); 2006
9. Best Practice Guideline A1.1 – Small-Scale Mining (User Format); 2006
10. Best Practice Guideline A2 – Water Management for Mine Residue Deposits; 2008
11. Best Practice Guideline A3 – Water Management in Hydrometallurgical Plants; 2007
12. Best Practice Guideline A4 – Pollution Control Dams; 2007
13. Best Practice Guideline A5 – Water Management for Surface Mines; 2008
14. Best Practice Guideline A6 – Water Management for Underground Mines; 2008
15. Best Practice Guideline G1 – Storm Water Management; 2006
16. Best Practice Guideline G2 – Water and Salt Balances; 2006
17. Best Practice Guideline G3 – Water Monitoring Systems; 2007
18. Best Practice Guideline G4 – Impact Prediction; 2008
19. Best Practice Guideline G5 – Water Management Aspects for Mine Closure; 2008
20. Best Practice Guideline H1 – Integrated Mine Water Management; 2008
21. Best Practice Guideline H2 – Pollution Prevention and Minimization of Impacts; 2008
22. Best Practice Guideline H3 – Water Reuse and Reclamation; 2006
23. Best Practice Guideline H4 – Water Treatment; 2007
24. Water Conservation and Water Demand Management Guideline for the Mining Sector in South Africa; DWA, 2011.
25. Guidelines for the Utilization and Disposal of Wastewater Sludge – Volume 1: Selection of Management Options; 2006.

26. Guidelines for the Utilization and Disposal of Wastewater Sludge – Volume 2: Requirements for the Agricultural Use of Sludge; 2006.
27. Guidelines for the Utilization and Disposal of Wastewater Sludge – Volume 3: Requirements for the On-site and Off-site Disposal of Sludge; 2006.
28. Guidelines for the Utilization and Disposal of Wastewater Sludge – Volume 4: Requirements for the Beneficial Use of Sludge; 2006.
29. Guidelines for the Utilization and Disposal of Wastewater Sludge – Volume 5: Requirements for Thermal Sludge Management Practices and for Commercial Products Containing Sludge; 2006.

Act 4
National Environmental Management Act 107 of 1998 (NEMA)
Regulations
GNR 543 of 18 June 2010: Environmental Impact Assessment Regulations
GNR 544 of 18 June 2010: Environmental Impact Assessment Regulations - Listing Notice 1 of 2010 – Basic Assessment
GNR 545 of 18 June 2010: Environmental Impact Assessment Regulations - Listing Notice 2 of 2010 – Scoping and EIA
GNR 546 of 18 June 2010: Environmental Impact Assessment Regulations - Listing Notice 3 of 2010 – Basic Assessment in Geographical Areas
GNR 805 of 10 October 2012: Publication of the Companion Guideline on the Implementation of the Environmental Impact Assessment Regulations, 2010.
GNR 807 of 10 October 2012: Publication of Public Participation Guideline
GN 792 of 5 October 2012: Draft Guideline on Need and Desirability in Terms of the Environmental Impact Assessment (EIA) Regulations, 2010.
Guidelines
1. Integrated Environmental Management, Information Series 0, Overview of Integrated Environmental Management
2. Integrated Environmental Management, Information Series 1, Screening
3. Integrated Environmental Management, Information Series 2, Scoping
4. Integrated Environmental Management, Information Series 3, Stakeholder Engagement
5. Integrated Environmental Management, Information Series 4, Specialist Studies
6. Integrated Environmental Management, Information Series 5, Impact Significance
7. Integrated Environmental Management, Information Series 6, Ecological Risk Assessment
8. Integrated Environmental Management, Information Series 7, Environmental Resource Economics
9. Integrated Environmental Management, Information Series 8, Cost Benefit Analyses
10. Integrated Environmental Management, Information Series 9, Project Alternatives in EIA
11. Integrated Environmental Management, Information Series 10, Environmental Impact Reporting
12. Integrated Environmental Management, Information Series 11, Review in EIA
13. Integrated Environmental Management, Information Series 12, Environmental Management Plans
14. Integrated Environmental Management, Information Series 13, Environmental Auditing
15. Integrated Environmental Management, Information Series 14, Life Cycle Assessment
16. Integrated Environmental Management, Information Series 15, Strategic Environmental Assessment
17. Integrated Environmental Management, Information Series 16, Cumulative Effects Assessment
18. Integrated Environmental Management, Information Series 17, Environmental Reporting
19. Integrated Environmental Management, Information Series 18, Environmental Assessment of Trade Related Agreements and Policies in South Africa
20. Integrated Environmental Management, Information Series 19, Environmental Assessment of International Agreements
21. Integrated Environmental Management, Information Series 20, Linking EIA and EMS
22. Integrated Environmental Management, Information Series 21, Environmental Monitoring Committees
23. Integrated Environmental Management, Information Series 22, Socio-Economic Impact Assessment
24. Integrated Environmental Management, Information Series 23, Risk Management
25. Guideline 3: General Guide to the Environmental Impact Assessment Regulations
26. Guideline 4: Public Participation
27. Guideline 5: Assessment of Alternatives and Impacts
28. Guideline 6: Environmental Management Frameworks
29. Guideline 7: Detailed Guide to Implementation of the EIA Regulations

Act 5
National Environmental Management : Protected Areas Act 57 of 2003 (NEMPAA)
Regulations
GNR 1061 of 28 October 2005 – Regulations for the Proper Administration of Special Nature Reserves, National Parks and World Heritage Sites

Act 6
National Environmental Management : Biodiversity Act 10 of 2004 (NEMBA)
Regulations
GNR 151 of 23 February 2007 – Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species

Act 7
National Environmental Management : Air Quality Act 39 of 2004 (NEMAQA)
Regulations
GNR 365 of 21 April 2006 – Declaration of the Vaal Triangle Air-Shed Priority Area in Terms of Section 18(1) of the National Environmental Management : Air Quality Act, No. 39 of 2004
GNR 1138 of 11 September 2007 – Notice to Establish the National framework in Terms of Section 7(1) of the National Environmental Management : Air Quality Act, No. 39 of 2004
GNR 1123 of 23 November 2007 – Declaration of the Highveld as Priority Area in Terms of Section 18(1) of the National Environmental Management : Air Quality Act, No. 39 of 2004
GNR 1210 of 24 December 2009 – National Ambient Air Quality Standards
GNR 248 of 31 March 2010 – List of Activities which result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage

Act 8
National Environmental Management : Waste Act 59 of 2008 (NEMWA)
Regulations
GNR 921 of 29 November 2013 – List of Waste Management Activities that have, or are likely to have, a Detrimental Effect on the Environment
GNR 634 of 23 August 2013 – Waste Classification and Management Regulations
GNR 635 of 23 August 2013 – National Norms and Standards for the Assessment of Waste for Landfill Disposal
GNR 636 of 23 August 2013 – National Norms and Standards for Disposal of Waste to Landfill
GN 233 of 19 March 2012 - Draft Norms and Standards for the Remediation of Contaminated Land
Guidelines
1. Waste License Application Process for Waste Activities in terms of the National Environmental Management : Waste Act No.59 of 2008
2. Framework for the Management of Contaminated Land. DEA 2010
3. DWAF, Second Edition, 1998. Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste.
4. DWAF, Second Edition, 1998. Waste Management Series. Minimum Requirements for Waste Disposal by Landfill.
5. DWAF, Second Edition, 1998. Waste Management Series. Minimum Requirements for Water Monitoring at Waste Management Facilities.
6. South African National Standard, SANS 10234:2008, Edition 1.1, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), SABS Standards Division

1.13.2 Authorizations

All relevant existing Environmental Authorizations for the project are listed below, whilst copies of the relevant authorization documents are attached in **APPENDIX 1.13.2 (A)** to this report.

Sequential Number	Existing Environmental Authorizations
1	EIA ROD in terms of Environmental Conservation Act issued on 11 December 2000
2	Mining Right issued on 23 August 2007
3	Approval of Environmental Management Programme (EMPR) on 23 August 2007
4	Integrated Water Use License (03/A22F/ACGIJ/580) issued on 19 July 2011
5	Waste License (12/9/11/L239/7) for Salvage Yard issued on 23 March 2010
6	Atmospheric Emissions Licence (AEL) issued on 26 November 2013 (NWPG/Merafe/AEL4.5 & 4.9/Nov13)

1.13.3 Other Environmental Authorizations Required for the Project

Based on the Enviro-Legal framework and having regard to the relevant and specific project attributes, a number of authorizations will be applied for during the course of the Environmental Authorization Phase of this addition/expansion/upgrade project for the Glencore Merafe Boshhoek Mine and Smelter.

- In view of the fact that the Boshhoek Smelter is operated as part of the Boshhoek Mine, the proposed additions, expansions and upgrades, the majority of which relate to Smelter Activities, will require an EMPR Addendum in terms of the provisions of the MPRDA.
- The proposed additions, expansions and upgrades, the majority of which relate to Smelter Activities, will require an EIA Record of Decision in terms of the provisions of the NEMA.
- The proposed additions, expansions and upgrades, the majority of which relate to Smelter Activities, will require an Integrated Water Use License in terms of the provisions of the NWA.
- The proposed additions, expansions and upgrades, the majority of which relate to Smelter Activities, will require a Waste License in terms of the provisions of the NEM:WA.

1.14 THE SCOPING & EIA PROCESS

The Scoping and EIA process is required for Environmental Applications done in terms of the provisions of the National Environmental Management Act (NEMA), the National Environmental Management: Waste Act (NEMWA), the National Environmental Management: Air Quality Act (NEMAQA), as well as the Mineral and Petroleum Resources Development Act (MPRDA).

Detailed requirements for the Scoping and EIA process are defined in the provisions as contained in the Environmental Impact Assessment (EIA) Regulations published on 18 June 2010 (GNR 543 of 18 June 2010), as well as in the Mineral and Petroleum Resources Development (MPRDA) Regulations published on 23 April 2004 (GNR 527 of 23 April 2004).

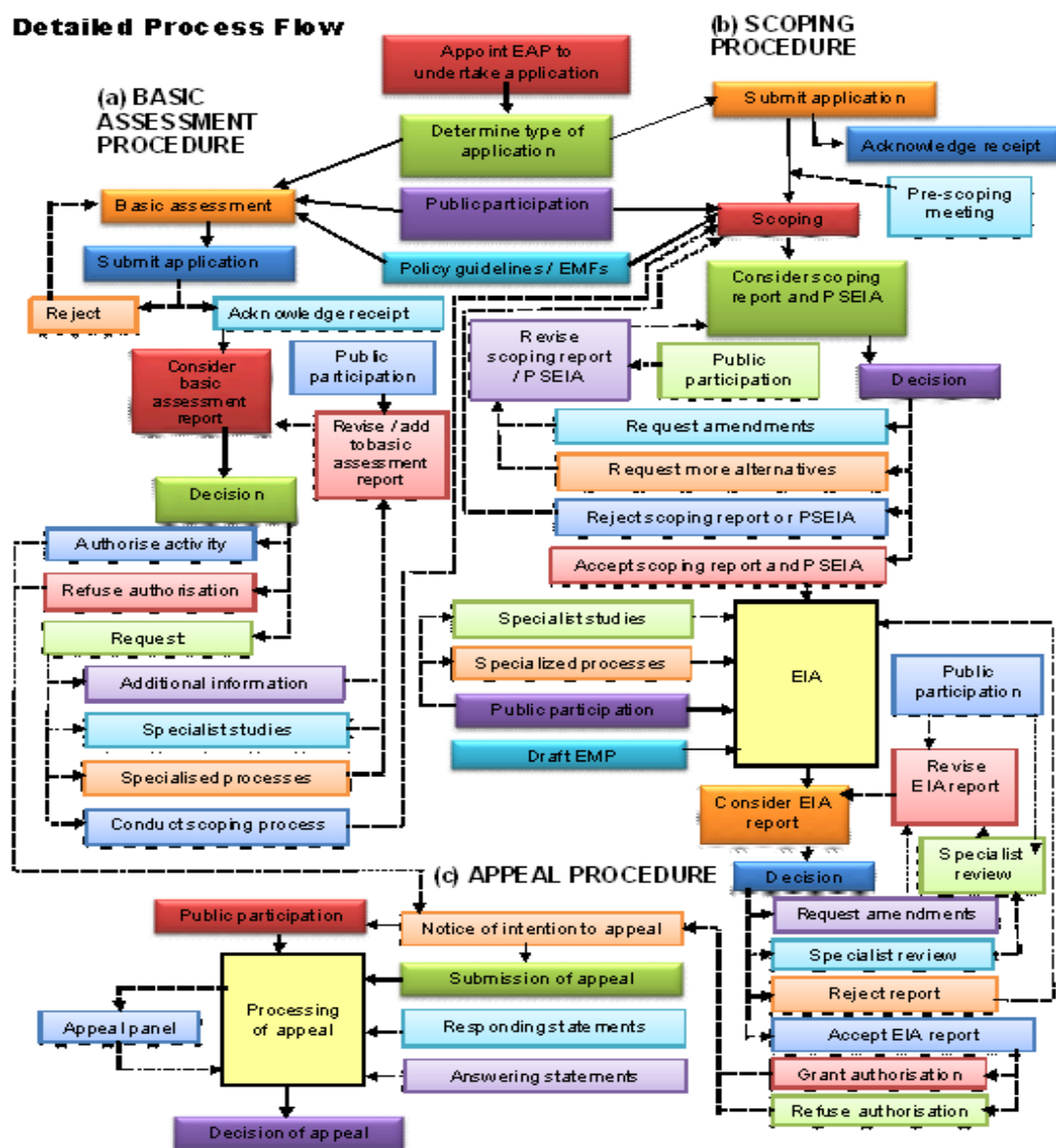


Figure 1.14 (a): Process flow Diagram for NEMA EIA Processes

Practical implementation of the Scoping and EIA Process comprises five stages:

- Stage 1: Pre-Application and Application
- Stage 2: Scoping
- Stage 3: Environmental Impact Assessment
- Stage 4: Consideration and Decision
- Stage 5: Appeal

1.14.1 EIA Stage 1: Pre-Application & Application

This Stage comprises the following activities:

- Appointment of EAP by Applicant
- Determination of Type of Application
- Identification of the Competent Authority
- Pre-application Consultation with the Competent Authority
- Identify and Notify Property/Land Owners
- Submit Application to Competent Authority
- Notification of Decision on Application

1.14.2 EIA Stage 2: Scoping

- Initiate and Conduct Public Participation Process
- Compile Notification and Information Documents
- Notify all I&AP's of Project and Meetings (Newspapers, Site Notices, Letters, etc.)
- Written Notification to Relevant Regulating Authorities
- Compilation of Scoping Report and Plan of Study as per Regulations and Guidelines
- Scoping Public Meeting
- Make Scoping Report available for Review
- Capture and Consider Comments from I&AP's and Relevant Authorities
- Finalize and Submit Scoping Report and Plan of Study to I&AP's and Authorities
- Authority Review & Decision
- Notification of Decision on Scoping Report

1.14.3 EIA Stage 3: Environmental Impact Assessment

- Commence to Implement Plan of Study
- Continue Public Participation Process
- Conduct Specialist Studies
- Prepare EIA Report (EIAR comprising EIA, EMPr as per Regulations and Guidelines)
- EIA/EMP Public Meeting
- Make EIAR available for Review
- Capture and Consider Comments from I&AP's and Relevant Authorities
- Finalize and Submit EIAR to I&AP's and Authorities

1.14.4 EIA Stage 4: Consideration and Decision

- Authority Review & Decision
- Notification of Decision on the EIAR
- Granting of Environmental Authorization
- Inform I&AP's of Decision/Approval and of Opportunity to Appeal

1.14.5 EIA Stage 5: Appeal

- Appellant to give notice of intention to Appeal to Authority and Applicant
- Consultation between Applicant and Appellant to Resolve Issues
- Submission of appeal to Authority and Applicant
- Submission of Responding Statement from Respondent/Applicant to Authority and Appellant
- Submission of Answering Statement by Appellant to Authority and Applicant
- Acknowledgment of all by Authority within 10 days
- Processing of Appeal
- Decision on Appeal
- Notification of Decision on Appeal to Appellant and Respondents by Authority

2

EXISTING STATUS OF ENVIRONMENT

The existing status of the environment that could potentially be impacted on by the Glencore Merafe Boshhoek Mine and Smelter (GMBS) was originally described in the currently approved EMPR for the site. The EMPR was submitted for approval during 2004 and subsequently approved. The mining right for the Glencore Merafe Boshhoek Mine and Site was issued on 23 August 2007.

As the mine and plant has now been in operation for a number of years, GMBS deemed it prudent to appoint JMA Consulting to re-assess the current status of the environment in support of the new environmental authorizations now being contemplated. Not only will this enable an assessment of the efficiency of the environmental management measures contained in the current EMPR, but it will also provide an updated environmental base line on which to base the design, and from which to assess the efficiency, of management measures proposed for the new activities now to be authorized.

A number of specialists were therefore appointed to review the existing environmental base line descriptions and to update and /or expand them in support of the new applications. The following updated/new base line descriptions are summarized in this Scoping Report, with the full specialist Base Line Reports being attached as APPENDICES to this report:

- Socio-Cultural Base Line Description
- Heritage and Archaeological Base Line Description
- Land Use Base Line Description
- Socio-Economic Base Line Description
- Infrastructure Base Line Description
- Meteorology/Climate Base Line Description
- Topography Base Line Description
- Soils and Land Capability Base Line Description
- Geology/Geochemistry/Palaeontology Base Line Description
- Ground Water Base Line Description
- Surface Water Base Line Description
- Plant Life Base Line Description
- Animal Life Base Line Description
- Wetlands Base Line Description
- Aquatic Ecosystems Base Line Description
- Air Quality Base Line Description
- Noise Base Line Description (see Traffic Specialist Report)
- Traffic Base Line Description
- Visual Base Line Description

The I&AP's are given the opportunity to review and comment on the base line information provided in this report during the Scoping Phase Public Participation Process.



2.1 I&AP CONFIRMATION ON EXISTING ENVIRONMENTAL STATUS

Registered I&AP's were given the opportunity to review and comment on the base line information provided in this report during the Scoping Phase Public Participation Process. Any comments received from I&AP's are documented in column 2 of Table 2.1(a), requests for any alterations to the descriptions or additional studies are reflected in column 3, and the response from, or action taken by, the Environmental Assessment Practitioner (EAP) is documented in column 4.

Table 2.1 (a) will only be completed after I&AP's have had the opportunity to comment on the Draft Scoping Report.

Table 2.1 (a): I&AP Confirmation on Existing Environment Status

Environmental Component	I&AP Comment	Proposed Alterations to Descriptions or Additional Studies Required	Response by EAP
Socio-Cultural			
Heritage			
Land Use			
Socio-Economic			
Infrastructure			
Meteorology/Climate			
Topography			
Soils & Land Capability			
Geology/Geochemistry/Palaeontology			
Ground Water			
Surface Water			
Plant Life			
Animal Life			
Wetlands			
Aquatic Ecology			
Air Quality			
Noise			
Traffic			
Visuals			



2.2 SOCIO-CULTURAL BASELINE

This summary is a condensed version of the Socio-Cultural Base Line Description Report that was completed in April 2013 by Roos Social Risk Solutions (RS2) and which is attached as **APPENDIX 2.2 (A)** to this report.

Below is a short overview of the social dynamics and trends of the receiving local environment in terms of geographic-, demographic-, institutional & legal, and socio-cultural change processes, as well as summary tables of the expected social impacts, which will be verified and expanded during the detailed Impact Assessment Phase.

Glencore Merafe Boshhoek Mine and Ferrochrome Smelter is a producer of chrome and ferrochrome concentrates. The company presently operates a mine and smelter in the Boshhoek region of the North West Province. Whilst the mining operation is currently approaching its end of life, the Ferrochrome Smelter requires some refurbishment, expansion and upgrading to ensure continued operations with externally sourced ore and other raw materials.

The Glencore Merafe Boshhoek Mine and Smelter (GMBS) is located approximately 30 km to the north-west of Rustenburg in the North West Province of South Africa. The mine is located in the Rustenburg Local Municipality, within the Bojanala Platinum District Municipality.

2.2.1 Objectives

The overall objective of the Scoping Phase was to identify issues and concerns to focus the detailed assessment to follow in the Impact Assessment Phase, and to provide a framework within which the assessment is to be undertaken. A number of secondary objectives have been derived from the overall objective. These included:

- Gain an understanding of the proposed project, including the nature and timeframe of proposed activities,
- Assess the affected local area in terms of:
 - **Geographical Processes:** the land use pattern within the (affected) area,
 - **Demographical Processes:** the number and composition of the local population,
 - **Economic Processes:** the way in which people make a living and the economic activities within a specific (affected) area,
 - **Institutional and Legal Processes:** the efficiency and operation of local authorities and other significant organisations, and
 - **Socio-Cultural Processes:** the way in which humans interact and relate to each other within the context of their environment, and how this interaction is guided by value systems.
- Identify socially sensitive areas,
- Identify key issues and impacts of significance that would have to be addressed during the Impact Assessment phase, and
- Identify information requirements and describe the proposed studies for the Impact Assessment Phase.

2.2.2 Methodology

The compilation of the base line report for scoping included the following:

- Desktop research, during which the following documents were reviewed:
 - Integrated Development Plan of the Rustenburg Local Municipality (2011/2012);
 - Integrated Development Plan of the Bojanala District Municipality (2011/2012);
 - Census data;
 - Community Survey;
 - IHS Global Insight data; and
 - Northwest Management Series 7: Spatial Development Framework.
- Compilation of a Baseline Social profile of the study area, which involved analysing the geographical, demographical, economic, institutional and legal, and socio-cultural characteristics (as per the change processes mentioned above) of the study area from a social perspective;
- Site visits on the 18th and 25th of January 2013 with the aim to identify and verify social sensitive areas;
- Preliminary social sensitivity mapping using Google Earth, based on the available project information to date along with the data obtained from the site visits;
- Preliminary Impact Assessment, which involved superimposing the description of the proposed project on the baseline social profile of the study area; and
- Outline of detailed studies for Impact Assessment Phase, which included identifying information requirements and the methodology to be employed during these detailed investigations.

2.2.3 Baseline Profile

The baseline profile focused on the macro environment of the GMBS, i.e. the Rustenburg Local Municipality (RLM) within the Bojanala District Municipality.

The various subsections below provide a brief summary of the respective baseline social processes and the potential impacts that could be experienced by the receiving environment as a result of introduction of the proposed project. For a more detailed description of the baseline profile, please refer to the Socio-Cultural Specialist Report (RS2, April 2013) attached as **APPENDIX 2.2(A)**.

2.2.3.1 Geographical Processes

Geographical processes relate to the land use patterns and established and planned infrastructural developments in an area. Land use is defined as “... the human modification of the natural environment or wilderness into a built environment such as fields, pastures, and settlements.”

The project area is located in the Rustenburg Local Municipality, which in turn forms part of the Bojanala District of the Northwest Province. Mining plays an important role in the economy of the region, and is the district’s major source of employment.

The district is commonly a very dry area, and therefore primary agricultural activities include livestock farming, poultry farming (for eggs) and citrus cultivation (BDM, 2012).

The land use adjacent to the Glencore Merafe Boshhoek Smelter (GMBS) is dominated by agricultural and mining related activities.

The mining operations take the form of opencast and underground mining operations that exploit the Rustenburg Layered Suite of the Bushveld Igneous Complex for its chrome, platinum and platinum group element (PGE) content.

The LG-6 chromite layer, UG-2 chromite layer and the Merensky Reef are the main reefs that are currently being mined at and to the east of GMBS.

Major settlements, as well as their respective orientations and distances from the site location are provided in the Table below:

Table 2.2.3.1 (a): Settlements Surrounding GMBS

Town	Distance from Site (km)	Direction from Site
Chaneng	9.01	North
Ga-Luka	7.37	East
Freedom Park	15.33	South East
Boitekong	23.95	South East
Pudunong	8.22	South
Rustenburg	21.45	South

Taken as a whole, the overall preliminary social sensitivity map of the surrounding area in relation to the project site is depicted in Figure 2.2.3.1 (a) below.

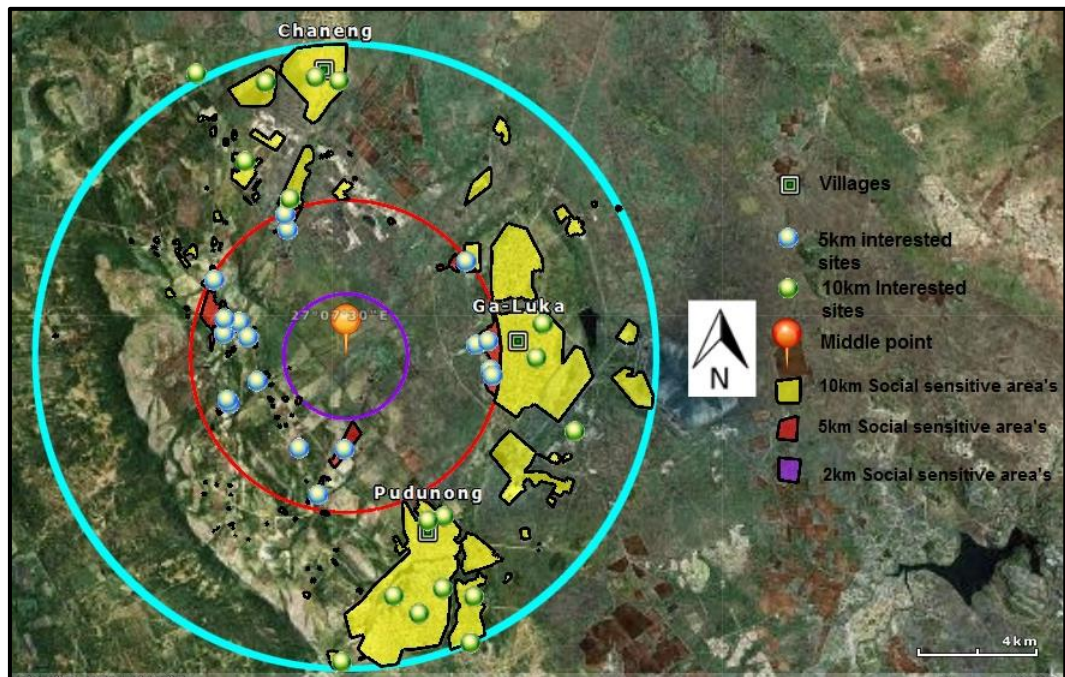


Figure 2.2.3.1 (a): Overall Preliminary Social Sensitivity Map

2.2.3.2 Demographical Processes

Demographic processes refer to the composition of a population in terms of age, gender, race, etc. and can be summarised as follows:

- The RLM had a 16% population increase from 2001 to 2007; this might be due to the large number of mining developments in the area;
- The current total population within the affected area is close on 147 000 people with an average population density of 3.1 people per km²;
- The total number of households in the RLM in 2007 stood at 146 542, which is an additional 33 147 households from 2001's 113 394;
- The predominant race in the RLM is Black African (86.0%);
- The dominant gender is male at 54%;
- The economically active population (those aged between 15 and 65) comprised about 70.88% of the population in 2011;
- The average occupancy was estimated at 3.1 persons per household during 2007, which is a minimal change from 2001;
- The number of students completing their secondary level education increased from 72.1% (2007) to 75.7% (2011), while those that are in the process of completing primary level education decreased from 13.6% (2007) to 11.1% (2011).

2.2.3.3 Institutional and Legal Processes

Institutional and Legal processes refer to the role and efficiency of the local authority and other service providers in the area in terms of their capacity to deliver a quality and uninterrupted service to local communities, and is summarised as follows:

- The baseline municipal profile suggests that the area is not well supplied with basic services such as electricity, refuse removal, sanitation services, or water supply, and that the overall numbers of households who use these services have increased between 2001 and 2007,
- The RLM upgraded some of their road infrastructure as part of the 2010 World Cup hosting beneficiaries,
- Rustenburg is the main public transport sector in the Bojanala District municipality in which most public transport trips originate and end.

2.2.3.4 Socio-Cultural Processes

Socio-cultural processes relate to the way in which humans behave, interact and relate to each other and their environment, as well as the belief and value systems which guide these interactions.

As mentioned in the demographic section of this report, the main groups of people in the municipal area are Black African people (86%) who are Setswana speakers. The Tswana are a tribe who migrated from East Africa in the 14th century. Tswana history is filled with dissension and splintering and today around 59 different groups in South Africa hold the overall name of Tswana.

The Tswana are closely related to the Sotho (of Lesotho and South Africa). The Sotho-Tswana are bonded in language and customs. They claim a common ancestor, Mogale. They share an agrarian culture, social structures, political organization, religious and magical beliefs and also a family life.

All the Sotho and Tswana languages are inherently intelligible, but for political and historical reasons, they have generally been considered as three languages. The larger sub-tribes are often considered as separate tribes with their separate languages.

Traditional Tswana society included men, women, children and “badimo” (ancestors, living dead, having metaphysical powers). A Tswana does not think in terms of individual rights, but of responsibilities to his family and tribe. The father is to be obeyed and respected by his wife and children at all times.

The Sotho-Tswana are organized by lineages, which developed as the tribe grew. The lineages are organized in subunits and communities. Every level exhibits the same social organization, such as the Kgotla, the traditional court, with various officials assigned various duties in the social structure at each level. In traditional Tswana religion (tribal animism) “Modimo” is the great god, or “The Great Spirit.”

The Royal Bafokeng Nation owns several pieces of land on which the Glencore Merafe Boshhoek Mine and Smelter is located and operates, and as such therefore represents the relevant Traditional Authority.

The Royal Bafokeng Nation (RBN) is a Setswana speaking traditional community situated in the Bojanala District, Rustenburg Municipality, North West Province. The RBN is the ethnic homeland of the Bafokeng people.

The Bafokeng community covers 1400 square kilometres with the administrative capital in Phokeng, near Rustenburg. The twenty-nine villages of the RBN are clustered into five regions, namely the Central, North East, South East, North and Capital Regions.

The RBN is located in the middle of the Bushveld Igneous Complex, the most abundant source of platinum group metals in the world. The RBN pride them to be a forward thinking traditional community. They are committed to invest the proceeds/mining royalties to develop a socially, economically and environmentally sustainable community true to its African heritage and traditions.

The current king of the Bafokeng is Kgosi Leruo Tshekedi Molotlegi and he is the 36th monarch of the Bafokeng people. Although this is a traditionally governed community, the RBN falls under the South African constitution. For more background information refer to <http://www.bafokeng.com>

2.2.4 Socio-Cultural Base Line Conclusions

The key conclusions of the Socio-Cultural Baseline Study conducted for Scoping are as follows:

- The proposed site is surrounded by a number (and great variety) of socially significant variables. In addition, the nature of the existing and proposed new activities at GMBS might attract the interest and concerns of people from further afield than merely the immediate study area.
- It is expected that the sensitivity of social receptors will decrease the further away they are located from the site. Depending on the issues raised during the public participation process and the availability of more technical information from the project proponent in the Impact Assessment Phase, the social sensitive radii might be extended (or reduced).
- At this stage it is not foreseen that the project site would lead to a drastic land use change within the surrounding environment as it will be located in a 'brown fields' area.
- The proposed developments might lead to a population influx in the form of a construction team (migratory workers and job seekers).
- The existing baseline municipal profile suggests that large parts of the area do not have adequate basic municipal services.
- At the time of the study the social specialist was unaware of any pertinent conflict situations between the neighbouring residents the project proponent, but the possibility of future conflict situations does exist.
- At this stage, no issues emerged that can be considered as fatal flaws from a social perspective.

2.3 HERITAGE BASELINE

The existing status of the Heritage Environment was investigated by Dr Julius Pistorius, an independent Archaeological and Heritage Consultant. The comprehensive Specialist Baseline Report produced by him is attached as **APPENDIX 2.3 (A)** to this report. However, for the purpose of the Scoping Report a concise summary of his findings was compiled and is given below.

2.3.1 Background Information on the Project Area

The Boschoek area has been subjected to development for longer than a century. The most pronounced development consists of the cultivation of land for citrus and tobacco farming. Both farming practices are historical and the extent of these agricultural pursuits can be witnessed on the 1:50 000 map of Sun City [2527CA] which was printed and published in 1964 (by the Government Printer). The agricultural industry led to the establishment of a railway siding at Boschoek in order to transport agricultural produce to markets and cities such as Pretoria and the Witwatersrand.

Platinum mining commenced in the early 1920's and 1930's and was soon followed by chrome mining. Both platinum and chrome mining activities currently surround GMBS and have contributed to the transformation of the larger Project Area which cannot be described as an unaffected piece of land any longer.

GMBS currently consists of opencast mining operations as well as a ferrochrome beneficiation plant that includes a pelletizing plant, two closed-arc furnaces, a metal extraction/ beneficiation plant, as well as the associated water containment and waste disposal/management facilities. The Project Area therefore can be divided into a totally transformed western part where the beneficiation plant and associated infrastructure and mining activities are located and an eastern part where relatively undisturbed patches of veld can be found. The western part of the Project Area therefore represents an industrial and mining zone with the only infrastructure with heritage significance to occur some of the houses and shops which were built when the town of Boschoek was established in the nineteenth century. These heritage resources, however, occur outside the Project Area.

The eastern flat part of the Project Area includes agricultural fields as well as some patches with undisturbed bush. Several heritage surveys, which have been done for power lines which run across this flat piece of veldt which extends as far as the Thaba-ea-Maralla norite hills in the east, have not revealed the presence of any heritage resources of significance in this area.

The discontinuous nature of the northern tip of the Magaliesberg was important for the movement of people (such as traders) between the Western Bankeveld and the Central Bankeveld. During the first half of the 19th century and decades thereafter, this part of the mountain served as a trail through which wagons passed on their way to Rustenburg and further to the east and north.

Traders such as Schoon and McLuckie (1829), who were the first white people to visit the area north of the Magaliesberg, missionaries such as Robert Moffat (1829), scientists such as Andrew Smith (1835) and the adventurer Cornwallis Harris (1836) trekked through the Magaliesberg (and west of Boschkoppe) on their way to the east where the first Colonists established settlements at places such as Schaapkraal, Tierpoort, Garsfontein and Pretoria.

2.3.2 Contextualising the Project Area

Several studies for developers have been conducted in the larger Project Area (see Part 13 ‘Select Bibliography’ of Specialist Baseline Report). These studies have indicated that the most common heritage resources which occur in the region are the following:

- Stone walled sites which date from the Late Iron Age are relatively common in the region and can be associated with various pre-historical and historical Tswana spheres of influence.
- Farmstead complexes which can be associated with colonial farmers.

Heritage resources which are scarce in the larger Project Area include the following:

- Stone Age sites with dense concentrations of stone tools on the surface of the land.
- Historical platinum and chrome mining activities which sometimes are associated with limited infrastructure.

An overview of pre-historical, historical and cultural evidence that outline the type and range of heritage resources which do occur across the larger Project Area are briefly discussed below.

2.3.2.1 Stone Age and Rock Art Sites

Stone Age sites are marked by stone artefacts that are found scattered on the surface of the earth or as parts of deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age (ESA) (covers the period from 2.5 million years ago to 250 000 years ago), the Middle Stone Age (MSA) (refers to the period from 250 000 years ago to 22 000 years ago) and the Late Stone Age (LSA) (the period from 22 000 years ago to 200 years ago).

The Project Area is not known to contain significant numbers of Stone Age sites from any of the different periods identified for the Stone Age. The insignificant amount of information about Stone Age sites can partly be attributed to the fact that the divide between the Magaliesberg and the Thaba-ea-Maralla range of mountains comprises outstretched grass veld with limited volcanic rock to manufacture stone tools. Stone Age hunters probably utilized the grass veld to hunt antelope and other small game but settled in the surrounding mountainous areas where there are adequate rock shelters and caves for semi-permanent settlements.

2.3.2.2 Iron Age Sites

The Iron Age is associated with the first agro-pastoralists or farming communities who lived in semi-permanent villages and who practised metal working during the last two millennia.

The Iron Age is usually divided into the Early Iron Age (EIA) (covers the 1st millennium AD) and the Later Iron Age (LIA) (covers the first 880 years of the 2nd millennium AD). It seems as if no Early Iron Age sites occur in the Rustenburg area. However, this region is known for its former and current occupation by clans of the Tswana people.

The oldest legends state that the Phokeng entered the Transvaal through Tweedepoort, under the leadership of Nape, the earliest known Phokeng chief. This was before c. 1700 AD. The group moved south-eastwards and settled on the banks of the Elands River (Kgetleng). Phokeng groups detached them from the main branch and moved southwards on different occasions settling along the Thaba-ea-Maralla mountain range at various places such as Serutube, Marikana, Tsitsing (Kanana), Thekwane and Photsaneng (or Bleskop) when they arrived in the Rustenburg district, from as early as the 17th century. Simultaneously, other clans occupied Phokeng, the original town lands of what later became Rustenburg and the foothills of the Magaliesberg. The Phokeng then gradually expanded their influence and presence over the great divide between the Magaliesberg in the west and the Thaba-ea-Maralla mountain range in the east (Môkgatle 1971, Coertze 1987).

Sotho-Tswana clans such as the Tlôkwa and Kgatla occupied the Pilanesberg further to the north whilst the Kwena Modimosana chiefdoms of Mmatau and Ramanamela occupied the mega stone walled complexes known as Molokwane and Bôitsemagano to the west of the Magaliesberg (Schapera 1942, Breutz 1954, 1986; Pistorius 1994, 1996). The Batlowa occupied the area directly to the north of the Project Area as they established their capitals at Marothodi and Pilwe (north-west) on the farm Vlakfontein 207JP (Breutz 1954, 1986). The Project Area therefore corresponds and coincides with the former spheres of influence of the Bafokeng who lived further to the south and the Batlowa who lived further to the north. This occupation occurred at mountains and kopjes in the region from as early as the Late Iron Age (17th century to the 19th century), during the Historical Period (second half of the 19th century to the 20th century) and in the more recent past (the last sixty years).

Numerous pre-difaqane and difaqane wars took place in the Central Bankeveld during the last quarter of the 18th century and the first three decades of the 19th century. These wars led to the displacement of large numbers of Tswana clans in the Bankeveld. Refugee sites occupied by dislodged Tswana became a common sight (Lye 1975). The Matebele of Mzilikazi caused chaos and havoc in the Bankeveld. The Matebele established several settlement complexes in this region from whence they maintained a grip on the indigenous population (Rasmussen 1978). One of these Zulu/Nguni residences (imisi) and military kraals (amakhandu) was discovered during an archaeological survey in the newly developed Tlhabane-West suburb, north of Rustenburg (Pistorius 1996). The Matebele intermarried with the Phokeng.

One of Mzilikazi's sons, Nkulumane, was buried in Phôkeng. His grave is today wrongly indicated as 'Mzilikazi's grave' in the main street in Phôkeng (Pistorius 1997a, 1997b & 1998).

2.3.2.3 Remains Relating to Mining Heritage

The earliest mining activities in South Africa which were done by Colonists were confined to the mining for salt, lead and limestone. Gold mining followed in the second half of the 19th century whilst the mining for other minerals followed after the discovery of the platinum bearing deposits in the Merensky Reef in the late 19th century (Wagner 1973).

Andries Lombaard's discovery of platinum nuggets in the Moopetsi River on the farm Maandagshoek in the Steelpoort area in 1924 can be considered the initial discovery of the Merensky Reef.

The Merensky Reef occurs, geographically, in the westerly and the easterly parts of the Bushveld Complex. These two limbs of the Complex are confined to the North-West Province and to the Northern and the Mpumalanga Provinces of South Africa. The Merensky Reef has been traced for a total distance strike extent of 283km, 138 kilometres of which is in the eastern limb and 145 kilometres in the western limb of the Bushveld Complex. Vertical depths of 1 900m have been registered along the Reef, which also indicates its continuity.

The eastern limb of the Reef is geologically less well known than the western limb because mining activities in this part of the Reef have been limited.

During the great platinum boom of 1925 over fifty companies were started in the Union of South Africa to exploit the mineral resources of the Bushveld Complex and the Waterberg district. Oxidized ores were initially taken from the Merensky Reef. When these ores had been exhausted, they were replaced by sulphide ores (Wagner 1973).

Chrome deposits also proved to be an important resource in the geology of Rustenburg and chrome mining activities accelerated during the last decades with the opening of several chrome mines in this area (Viljoen & Reimold 1999).

Remains associated with old platinum, chrome and other mining activities still exist in the Rustenburg District. These include shafts, headgear, infrastructure and even underground workings. Access to underground mines could be gained through incline shafts or adits dug into kopjes or into the level ground, at a slight angle.

The infrastructure of early 20th century platinum mines consisted mainly of cement and brick buildings covered with corrugated iron. Important plants included treatment plants, power plants as well as mills. Other conspicuous structures were the towering headgear of vertical shafts and incline shafts, a limited number of which may still be found in the Rustenburg, Potgietersrust and Lydenburg areas.

2.3.2.4 Remains from the Historical Period and from the Recent Past

The discontinuous nature of the northern tip of the Magaliesberg mountain range, near the Project Area, was important for the movement of people such as traders between the Western Bankeveld and the Central Bankeveld. During the 19th century this part of the mountain served as a trail through which wagons passed on their way to Rustenburg and further to the east.

Traders such as Schoon and McLuckie (1829), who were the first white people to visit the area north of the Magaliesberg, missionaries such as Robert Moffat (1829), scientists such as Andrew Smith (1835) and the adventurer Cornwallis Harris (1836) trekked through the Magaliesberg (and over the farm Boschoek) on their way to the eastern part of the Central Bankeveld, where some of them visited Mzilikazi of the Matabele (Ndebele) who occupied at least three villages complexes in the region (Horn 1996, Harris 1963, Lye 1975).

Rustenburg is the third oldest town established by Colonials (Voortrekkers) in the former Transvaal area during the first half of the 19th century. The governor of the Zuid-Afrikaanse Republiek proclaimed the town in September 1851. The Transvaal Volksraad met in the town in 1852.

Other important decisions relating to the church and the state were also taken in this town. Rustenburg also served as the seat for the Zuid-Afrikaanse Republiek before Pretoria became the capitol (Bergh 1992, Pretorius 1967).

Paul Kruger, who served as President of the Zuid-Afrikaanse Republiek, owned the farm Boekenhoutfontein, south of Boschoek. His family occupied the farm during the second half of the 19th century. The buildings on the farm were destroyed during the Anglo-Boer War. The farm was declared a national heritage site in 1936 and has been preserved by the Simon van der Stel Foundation until recently.

The town of Boschoek's name is derived from that of the farm Boschhoek. The town is located along the railway line from Pretoria and was formerly a terminus. The town was known for its citrus and for the cultivation of Virginia tobacco (Erasmus 1995).

Several old houses and shops still stand along the sides of the town's main street. The character of the town has gradually changed due to the expansion of platinum and chrome mining industries

2.3.3 Fieldwork Survey

The Project Area was subjected to a survey with a vehicle and a pedestrian survey. The western part of the Project Area was totally transformed as a result of industrialisation and mining activities. These modern development activities were superimposed on older agricultural activities although dense patches with pristine bush still exist.



Figure 2.3.3(a): The western part of the Project Area was transformed into an Industrial and Mining Landscape



Figure 2.3.3(b): The eastern part of the Project Area incorporates older abandoned Agricultural Fields as well as infrastructure related to Mining Activities

2.3.4 Types and Ranges of Heritage Resources

The Phase I HIA for GMBS revealed the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in the Project Area, namely:

- Two graveyard and three single graves.

(No archaeological [pre-historical] remains were recorded.

The localities of these resources are shown on Figure 2.3.4(a) on the next page.

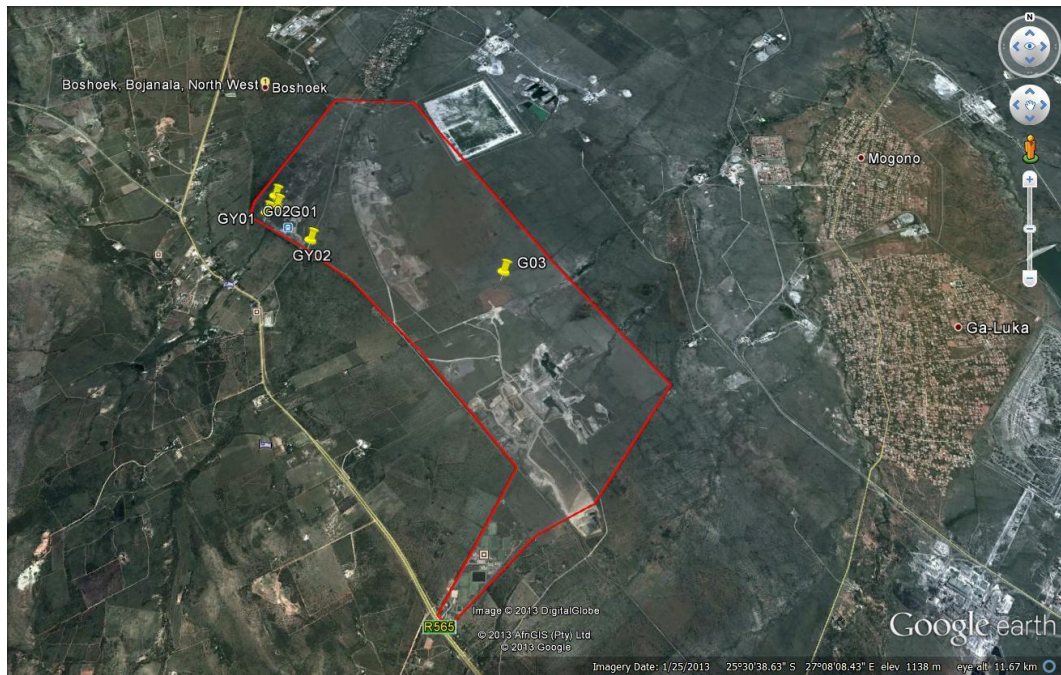


Figure 2.3.4 (a): Localities of two Graveyards and three Single Graves at GMBS

2.3.4.1 Graveyards and Graves

Two graveyards and three single graves were recorded in the Project Area, namely:

Graveyard 01

This graveyard (GY01) is located next to the Boschoek railway line in the western part of The Project Area and in close proximity to the Beneficiation Plant. GY01 comprises nine graves which are edged with upright stones. None of the graves are fitted with headstones. However, it is highly likely that some of the graves are older than sixty years. GY01 is demarcated with a fence, holds a signpost ('Graveyard 01') and is neatly maintained.



Figure 2.3.4.1 (a): GY01 is located near a Railway Line and holds nine Graves all of which are edged with upright stones

Graveyard 02

This graveyard (GY02) is located next to the Boschoek railway line (further south of GY01) in the western part of The Project Area. GY02 comprises the decorated grave of Danie Joubert and a heap of stones which possibly represents the grave of a child.

The inscription on Danie Joubert's tombstone reads as follow:

- 'Hier rus in vrede ons geliefde seun en ons broer Jacobus Daniel Francois Joubert Geb 23 Sep 1915 Oorlede 22 April 1940 Rus sag liefste Danie tot Jezus u wek Ps 116:11 Ik sal met vreugde in ... huis des Heeren gaan'

Both graves in GY02 are probably older than sixty years.



Figure 2.3.4.1 (b): The grave of Danie Joubert in GY02 which is located near the junction of Road D1813 and the Railway Line

Grave 01

This single grave (G01) is located in dense bush near a stream. It is edged with stones and is not fitted with a headstone. It is located near the Beneficiation Plant.

G01 is demarcated with a fence, holds a signpost ('Graveyard 02') and is neatly maintained.

G01 may be older than sixty years.

Grave 02

G02 is located near the Beneficiation Plant. It is fitted with a granite-cross, edged with cement strips and covered with rubble. G02 is demarcated with an iron palisade fence, holds a signpost ('Graveyard 03') and is neatly maintained.

This grave may also be older than sixty years.



Figure 2.3.4.1 (c & d): G01 is located in dense bush near a stream. It is edged with stones and holds no headstone with inscriptions (above). GY02 is demarcated with an iron palisade fence and is neatly maintained (below).



Grave 03

This single unmarked grave is located in open veld in the Andru Mining area in the south-east of the Project Area.

It is merely covered with a few stones and is possibly older than sixty years.



Figure 2.4.3.1 (e): The single, abandoned Grave (G03) which is marked with a few stones near Eskom's Power Lines in the Andru Mining Area



2.4 LAND USE BASELINE

The Existing Status of the Soils, Land Capability and Land Use within the bounds of the Glencore Merafe Boshhoek Mine and Smelter (GMBS) Project Area was assessed by Red Earth CC, specialist consultants in Soils, Land Capability and Land Use. A Specialist Soils, Land Capability and Land Use Study Report compiled by Red Earth, detailing a full base line description, is attached as **APPENDIX 2.4 (A)** to this report.

However, a synoptic summary in terms of Present Land Use was extracted from the Specialist Report and is presented below.

The numerous varied industrial and mining related structures, features and landscapes have been mapped, classified, quantified, and summarized in detail on Figure 2.4 (a), as well as in Table 2.4 (a).

The diverse present land use is presented in Table 2.4 (a). The survey area is comprised of the following:

- diverse range of industrial / mining related man-made features (310.45 ha, 28.42 %);
- vegetation in terrestrial soil areas, including a mix of grasses/shrubs/trees (447.76 ha, 40.99 %);
- vegetation in wetland soil areas, including a mix of grasses/shrubs/trees (158.64 ha, 14.52 %);
- natural wetland drainage features (streams 5.43 ha, 0.50 %; and donga 6.10 ha, 0.56 %), including a mix of grasses/sedges/shrubs/trees (11.53 ha, 1.06 %);
- vegetation in riparian areas adjacent to the Matlapyana stream, including a mix of grasses/shrubs/larger trees (8.21 ha, 0.75 %); and
- vegetation in rehabilitated soil areas, including grasses/rare small trees (155.67 ha, 14.25 %).

The vegetated areas are grazed by a number of large to small herds of cattle belonging to members of the Royal Bafokeng community, while a limited number of areas were cultivated long ago, the natural vegetation having returned to these areas. A small 'game reserve' (fenced camp) is located between the main infrastructure (plant) area and the tar road that lies to the east.

Map 4. Present Land Use

MAP REFERENCE NUMBER: REIS7-4

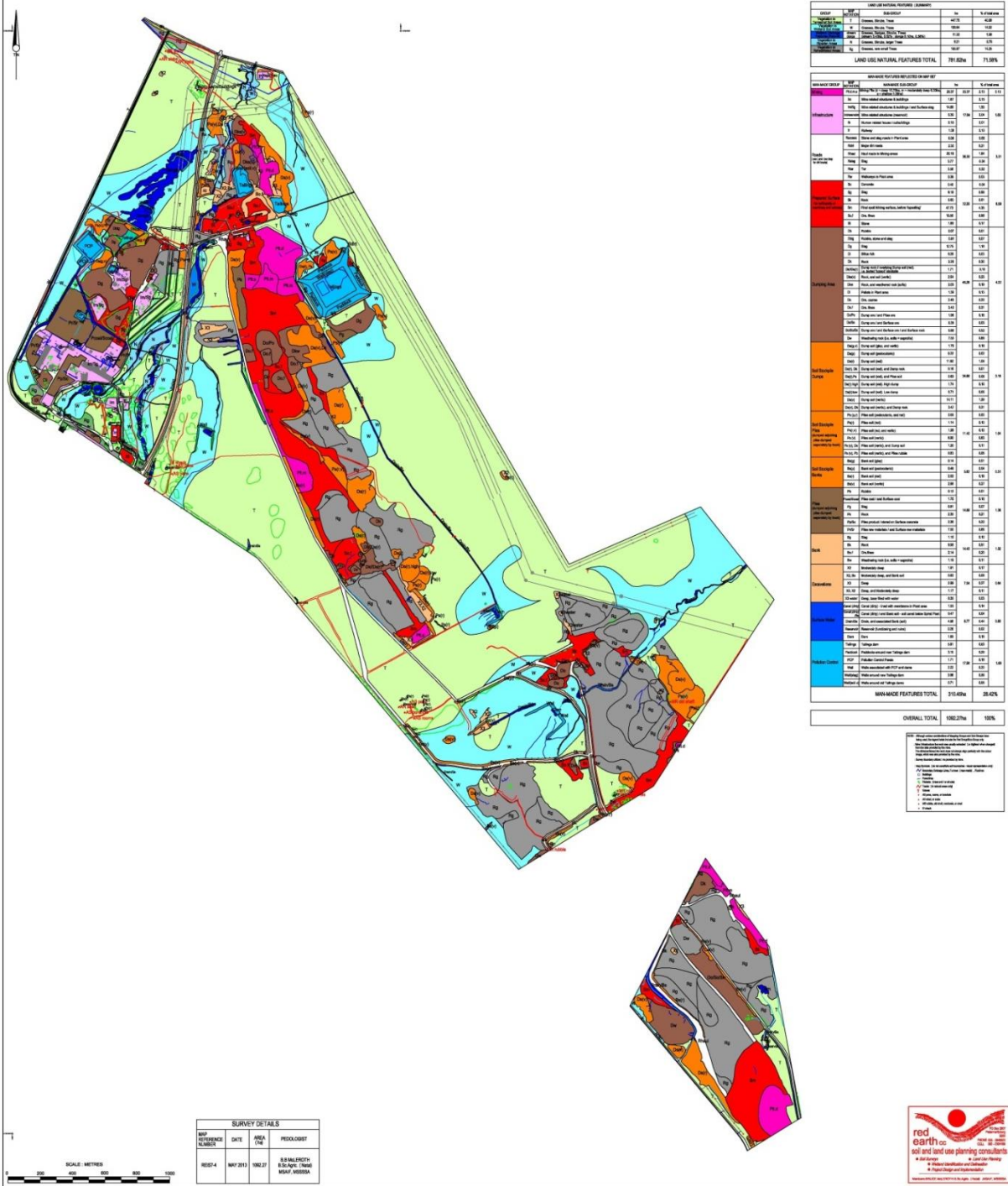


Figure 2.4 (a): Present Land Use within the GMBS Operational Area

Table 2.4 (a): A Summary of the Present Land Use within the GMBS Operational Area

LAND USE NATURAL FEATURES (SUMMARY)				
GROUP	MAP NOTATION	SUB-GROUP	ha	% of total area
Vegetation in Terrestrial Soil Areas	T	Grasses, Shrubs, Trees	447.76	40.99
Vegetation in Wetland Soil Areas	W	Grasses, Shrubs, Trees	158.64	14.52
Wetland Drainage Features (Natural)	stream donga	Grasses, Sedges, Shrubs, Trees (stream 5.43ha, 0.50% ; donga 6.10ha, 0.56%)	11.53	1.06
Vegetation in Riparian Areas	N	Grasses, Shrubs, larger Trees	8.21	0.75
Vegetation in Rehabilitated Areas	Rg	Grasses, rare small Trees	155.67	14.25
LAND USE NATURAL FEATURES TOTAL			781.82ha	71.58%

MAN-MADE FEATURES REFLECTED ON MAP SET						
MAN-MADE GROUP	MAP NOTATION	MAN-MADE SUB-GROUP	ha		% of total area	
Mining	Pit.d.m.s	Mining Pits (d = deep 15.75ha, m = moderately deep 6.33ha, s = shallow 1.29ha)	23.37	23.37	2.13	2.13
Infrastructure	Im	Mine related structures & buildings	1.67	17.84	0.15	1.63
	Im/Sg	Mine related structures & buildings / and Surface slag	14.60		1.33	
	Im/reservoirs	Mine related structures (reservoir)	0.39		0.04	
	Ih	Human related house / outbuildings	0.10		0.01	
	Ir	Railway	1.08		0.10	
Roads (see Land Use Map for dirt tracks)	Raccess	Stone and slag roads in Plant area	6.08	36.30	0.55	3.31
	Rdirt	Major dirt roads	2.35		0.21	
	Rhaul	Haul roads in Mining areas	20.16		1.84	
	Rslag	Slag	3.77		0.34	
	Rtar	Tar	3.58		0.32	
	Rw	Walkways in Plant area	0.38		0.03	
Prepared Surface (for trafficability of machinery and vehicles)	Sc	Concrete	0.40	72.29	0.04	6.59
	Sg	Slag	6.18		0.56	
	Sk	Rock	5.60		0.51	
	Sm	Final spoil Mining surface, before 'topsoiling'	47.73		4.35	
	So.f	Ore. fines	10.50		0.96	
	St	Stone	1.88		0.17	
Dumping Area	Db	Rubble	0.07	46.26	0.01	4.22
	Dbtg	Rubble, stone and slag	0.81		0.07	
	Dg	Slag	12.75		1.16	
	DI	Silica rich	0.28		0.03	
	Dk	Rock	3.26		0.30	
	Dk/Ds(r)	Dump rock // overlying Dump soil (red). i.e. buried 'topsoil' stockpile	1.71		0.18	
	Dks(v)	Rock, and soil (veritic)	2.54		0.23	
	Dkw	Rock, and weathered rock (softs)	2.03		0.19	
	DI	Pellets in Plant area	1.39		0.13	
	Do	Ore. coarse	2.45		0.22	
	Do.f	Ore. fines	3.43		0.31	
	Do/Po	Dump ore / and Piles ore	1.98		0.18	
	Do/So	Dump ore / and Surface ore	0.35		0.03	
	Do/So/Sk	Dump ore / and Surface ore / and Surface rock	5.66		0.52	
	Dw	Weathering rock (i.e. softs = saprolite)	7.55		0.69	

Soil Stockpile Dumps	Ds(g,v)	Dump soil (gley, and vertic)	1.75	34.66	0.16	3.16
	Ds(p)	Dump soil (pedocutanic)	0.22		0.02	
	Ds(r)	Dump soil (red)	11.92		1.09	
	Ds(r), Dk	Dump soil (red), and Dump rock	0.16		0.01	
	Ds(r),Ps	Dump soil (red), and Piles soil	0.63		0.06	
	Ds(r).high	Dump soil (red). High dump	1.74		0.16	
	Ds(r).low	Dump soil (red). Low dump	0.71		0.06	
	Ds(v)	Dump soil (vertic)	14.11		1.29	
	Ds(v), Dk	Dump soil (vertic), and Dump rock	3.42		0.31	
Soil Stockpile Piles (dumped adjoining piles dumped separately by truck)	Ps (p,r)	Piles soil (pedocutanic, and red)	0.05	11.40	0.00	1.04
	Ps(r)	Piles soil (red)	1.14		0.10	
	Ps(r,v)	Piles soil (red, and vertic)	1.28		0.12	
	Ps (v)	Piles soil (vertic)	6.90		0.63	
	Ps (v), Ds	Piles soil (vertic), and Dump soil	1.20		0.11	
	Ps (v), Pb	Piles soil (vertic), and Piles rubble	0.83		0.08	
Soil Stockpile Banks	Bs(g)	Bank soil (gley)	0.14	5.62	0.01	0.51
	Bs(p)	Bank soil (pedocutanic)	0.48		0.04	
	Bs(r)	Bank soil (red)	2.02		0.18	
	Bs(v)	Bank soil (vertic)	2.98		0.27	
Piles (dumped adjoining piles dumped separately by truck)	Pb	Rubble	0.12	14.89	0.01	1.36
	Pcoal/Scoal	Piles coal / and Surface coal	1.75		0.16	
	Pg	Slag	0.81		0.07	
	Pk	Rock	2.35		0.21	
	Pp/Sc	Piles product / stored on Surface concrete	2.36		0.22	
	Pr/Sr	Piles raw materials / and Surface raw materials	7.50		0.68	
Bank	Bg	Slag	1.15	14.43	0.10	1.32
	Bk	Rock	9.95		0.91	
	Bo.f	Ore.fines	2.14		0.20	
	Bw	Weathering rock (i.e. softs = saprolite)	1.19		0.11	
Excavations	X2	Moderately deep	1.91	7.04	0.17	0.64
	X2, Bs	Moderately deep, and Bank soil	0.62		0.06	
	X3	Deep	2.99		0.27	
	X3, X2	Deep, and Moderately deep	1.17		0.11	
	X3 water	Deep, base filled with water	0.35		0.03	
Surface Water	Canal (dirty)	Canal (dirty) - lined with membrane in Plant area	1.53	8.77	0.14	0.80
	Canal (dirty) /Bs	Canal (dirty) / and Bank soil - soil canal below Spiral Plant	0.47		0.04	
	Drain/Bs	Drain, and associated Bank (soil)	4.88		0.44	
	Reservoir	Reservoir (functioning and ruins)	0.28		0.02	
	Dam	Dam	1.63		0.15	
Pollution Control	Tailings	Tailings dam	5.81	17.58	0.53	1.60
	Paddock	Paddocks around new Tailings dam	3.15		0.29	
	PCP	Pollution Control Ponds	1.71		0.16	
	Wall	Walls associated with PCP and dams	2.22		0.20	
	Wall(slag)	Walls around new Tailings dam	3.98		0.36	
	Wall(soil.v)	Walls around old Tailings dams	0.71		0.06	
MAN-MADE FEATURES TOTAL			310.45ha	28.42%		
OVERALL TOTAL			1092.27ha	100%		

2.5 SOCIO-ECONOMIC BASELINE

Socio-Economic Aspects relevant to the SMBP Operations were investigated and is discussed with reference to the information generated by Socio-Economic Specialist An Kritzinger. A Comprehensive Specialist Baseline Report is attached as **APPENDIX 2.5 (A)** to this report.

2.5.1 Introduction

Glencore Merafe Boshhoek Mine and Smelter (GMBS) consist of Boshhoek Mine and Boshhoek Ferrochrome Plant. The complex is situated 30 km northwest of Rustenburg in the North West Province, South Africa.

GMBS currently consists of:

- (a) opencast mining operations, as well as
- (b) ferrochrome beneficiation plant that includes a pelletizing plant, two closed-arc furnaces, a metal extraction / beneficiation plant, as well as the associated water containment and waste disposal/management facilities.

The complex employs close to 800 people and has a production capacity of 240 000 tonnes of ferrochrome per annum. The ferrochrome plant largely processes UG2 chromite – a by-product from local platinum mining activities whereas chrome is mined in the adjacent Boshhoek mine. Chrome from the mine is processed in another nearby Glencore Merafe plant (Waterfall) close to Rustenburg. For purposes of this study the project consists of both the existing operations as well as planned extensions/expansions/additions to the ferrochrome beneficiation plant.

The baseline and scoping was based on the analysis of literature reviews, secondary data sourced from Statistics South Africa, IHS Global Insight, public documents drafted by the national, provincial and local governments and selected interviews with local officials.

The proposed site is situated within the administrative boundaries of the Rustenburg local municipality in the Bojanala district in the central part of North West Province. The closest residential areas within a 5km radius of the complex are Boshhoek and Rasimone. Boshhoek is mainly a small residential area with various economic establishments including a PPC cement plant, mechanical workshop, plant hire, steel works, some small establishments providing tourist accommodation, a small supermarket and other small retail and manufacturing units. Rasimone is a small low income residential settlement. Home vegetable gardens were observed on several plots. In the surrounding rural areas farming activities include cattle, goat and maize farming.

Phokeng and Ga-Luka are other small residential areas within a 10km radius of the complex. Of these, Phokeng is the larger urban area with various economic activities including a shopping centre and various small service and retail industries.

It is expected that the proposed development could potentially impact on the economies of the Rustenburg municipality with the major impacts focussed on the smaller areas of Boshhoek, Rasimone with lesser impact on Phokeng, Ga-Luka and other smaller settlements. Since economic data is limited to local municipal level, the baseline will focus on a description of the current economic status of the local municipality of Rustenburg municipality. It could however be expected that the profile of the different towns within the respective municipal boundaries would display many similarities in economic structure and basic economic conditions.

The economic baseline discusses the current status of the zone in terms of the broader economic outcomes/objectives of local economic systems. These economic objectives include outcomes in terms of the traditional focus area of **economic efficiency** (economic growth and employment), **economic equity** (income distribution and poverty alleviation) as well as long term **economic stability** (including long term environmental sustainability and potential macro-economic risks).

2.5.2 Economic Efficiency

2.5.2.1 The Labour Force and Employment

Rustenburg municipality has the most economic activities and largest population in the district. In 2007, 35% (approximately 450 000 people) of the total population of Bojanala Platinum District lived in the Rustenburg municipal area. Other local municipalities in the district are primarily rural (Bojanala Platinum District Municipality, 2010). In 2011, the Rustenburg population comprised 15% of the total population of North West. The population growth from 2000 to 2011 was on average 2.2% per annum, compared to the national growth of 1% (IHS Global Insight, 2012). This high growth rate is mainly the result of in-migration of people due to the large amount of employment opportunities created by the mining sector in recent years.

In 2009, the spatial composition of the population was as follows:

- 60% of the population lived in municipal settlements,
- 24% in tribal settlements;
- 11% in rural areas; and
- 5% in mining hostels

An area within a radius of 50km of each mine provides 36% of the labour. The remainder of the workforce comes from the rest of the North West province (18%), other provinces in South Africa (39%) and other countries (7%) (Rustenburg Local Municipality, 2011).

An earlier socio economic impact assessment for the GMBS operation ((DPR Projects, 2009) assessed that a far larger portion of workers originates from areas adjacent to the mine 39% (including Rasimone, Ga-Luka, Chaneng and Phokeng) whereas a further 36% live in Rustenburg. The remainder comes from the rest of North West province 22%) whereas the remaining 3% are from further afield such as Johannesburg, Mogwase and Hartebeespoort.

The population pyramid below shows the distribution of the age and gender of the population of the Rustenburg municipal area compared to the rest of the province. The pyramid shows a large portion of the population in the economically active age group range (20-64 years). In 2011, 63% of the population of the Rustenburg municipal area was in the economically active age groups (20-64 years), compared to 56% of the population of the province as a whole (IHS Global Insight, 2012).

The higher proportion males to females in the economically active age groups (20-59 years) for the Rustenburg area, gives a clear indication of the in-migration pattern of males into the area in search of employment opportunities in the mines. The proportion of males to females is more even for the province as a whole.

Source: IHS Global Insight Database 2012

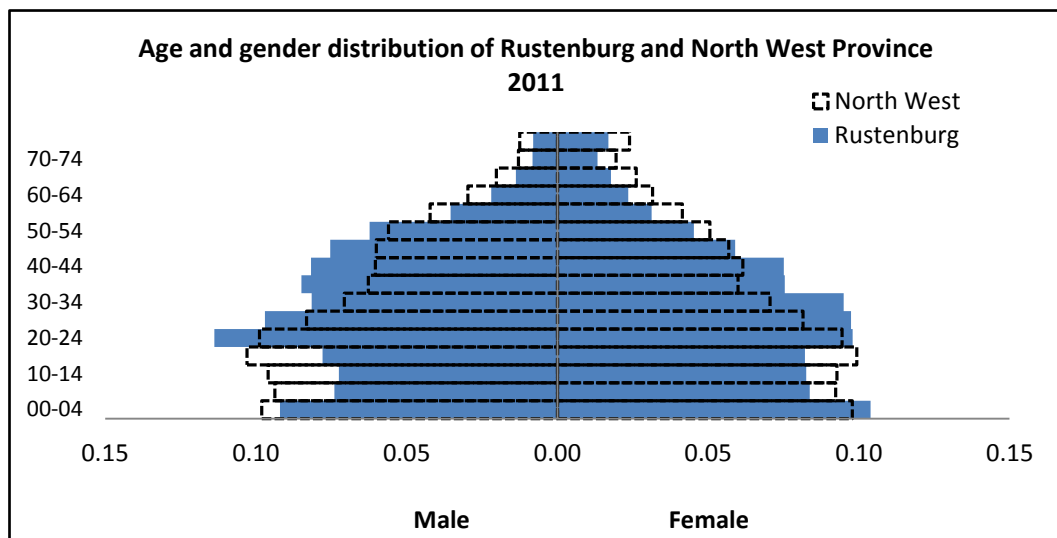


Figure 2.5.2.1(a): Age Profile in Rustenburg and North West Province, 2011

As illustrated in the graph in Figure 2.5.2.1(b) below, there has been a shift in the age distribution of Rustenburg with a shift towards a higher proportion of males in the economically active age groups 15-24 years and 45-64 years. At the same time the proportion of males in the economically active age group 25-44 years has decreased. This could be attributed to the high HIV/AIDS incidence rate of 13% in the Rustenburg municipal area, compared to 10% nationally; the AIDS related mortality rate is the highest for men in the 30-50 years age group. There has also been a relative decline in the proportion of females in the economically active age group 30-39 years and corresponding decline in the 5-14 years age group. This could be an indication of females migrating to Gauteng in search for employment in the service sectors taking their children along. Although the unemployment rate for females has decreased from 25.5% in 2000 to 11.7% in 2011, the unemployment rate for females in the Rustenburg municipal area is still significantly higher than for males at 4.5% in 2011.

As a sub region, Boshhoek reflects similar trends in the age structure. The majority of the population is of working age, so the demand for employment is high. The distribution of males to females seems to indicate that mining activity in the area has encouraged men to stay to work. This also shows that the area has seen the migration of males from other areas, usually those seeking employment (DPR Projects, 2009).

Source: IHS Global Insight database 2012

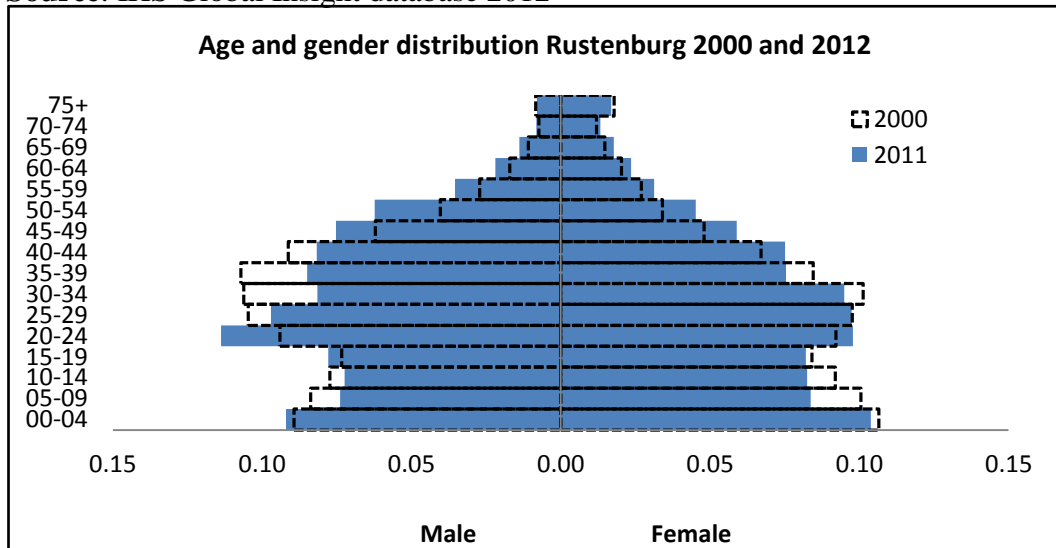


Figure 2.5.2.1(b): Age Profile in Rustenburg 2000 and 2012

In 2011, unemployment in the Rustenburg municipal area was 6.9%; significantly lower than the unemployment rate for South Africa (24.7%) and the province as a whole (23.1%) (IHS Global Insight, 2012).

Although unemployment rates are relatively low for the municipal area, youth employment has been identified as a serious issue in 2010 (Rustenburg Local Municipality, 2011). The graph in Figure 2.5.2.1 (c) below shows that the level of unemployment in the Rustenburg municipal area has decreased from 14.6% in 2000 to 6.9% in 2011 (IHS Global Insight, 2012).

Source: IHS Global Insight database 2012

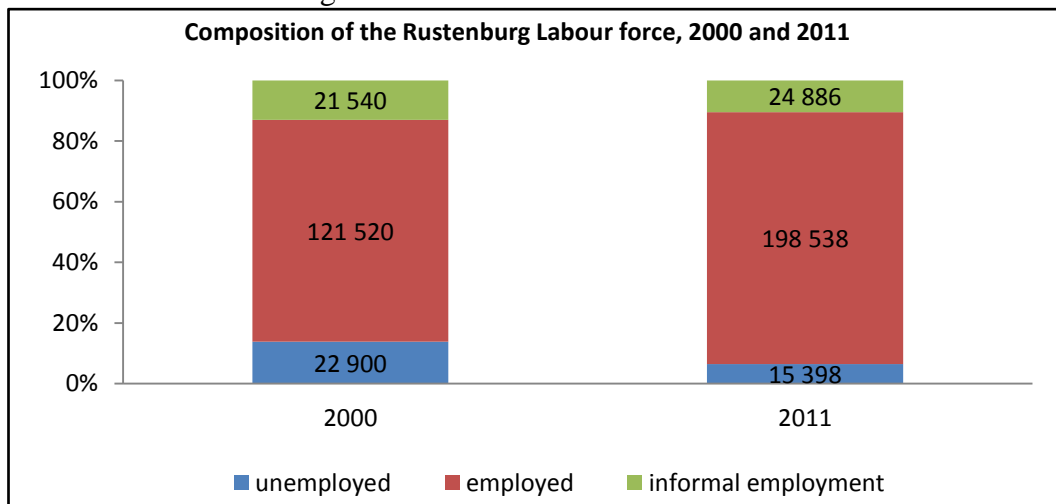


Figure 2.5.2.1(c): Composition of Labour Force of Rustenburg

The relatively low unemployment rates discussed above should however be interpreted with caution based on the following:

- there is evidence that the proportion of the population in areas adjacent to the mine that is economically inactive, is high, being either too sick to work or too old to be informally employed and discouraged job-seekers not interested in finding formal employment (DPR Projects, 2009).
- the potential lay-off of 14 000 workers of Rustenburg-based platinum mine Anglo American Platinum is still on the cards despite the recent agreement between the company, government and unions to briefly postpone plans to close shafts and enter into extensive consultations with stakeholders. In the consultations Anglo Platinum is considering the redeployment of 9000 workers at their other operations where vacancies exist and targeting to create replacement jobs through reskilling of workers (e.g. brick laying for informal settlement housing, small business creation) to balance the number of jobs that may be affected by the proposed restructuring. Depending on the outcomes of these interventions, the unemployment rate for the larger Rustenburg area could be seriously affected by these changes.
(<http://www.theaustralian.com.au/business/mining-energy/anglo-platinum-to-lay-off-14000-workers-unions-threaten-strikes/story-e6frg9df-1226554795189>)

The Table below shows the skill levels of the economically active population. Although 28% of the economically active population of the Rustenburg area has a senior certificate or matric compared to 24% for South Africa and 23% for North West province as a whole, skills are still at a low level. In Rustenburg, 63% of the population doesn't have a senior certificate or a matric, compared to 65% in South Africa and 69% in the province as a whole. Post-matric qualifications for the area are lower, at 8% of the economically active population compared to 10% nationally.

Table 2.5.2.1(a): Education Levels of the Labour Force, 2011

2011	South Africa	North West	Rustenburg
No schooling	7.75%	9.38%	4.92%
Grade 0-2	1.44%	1.90%	1.18%
Grade 3-6	9.22%	11.85%	9.91%
Grade 7-9	22.64%	23.72%	23.12%
Grade 10-11	23.56%	22.33%	23.65%
Certificate/diploma without matric	0.81%	0.59%	0.74%
Matric only	24.40%	22.98%	28.21%
Matric & certificate / diploma	6.73%	5.25%	6.04%
Matric & Bachelor's degree	2.31%	1.37%	1.56%
Matric & Postgrad degree	1.13%	0.62%	0.68%

Source: IHS Global Insight database 2012

The graph in Figure 2.5.2.1(d) below shows the dominant role of the metal ore (platinum and chrome) mines as employment provider in the Rustenburg municipal area.

Source: IHS Global Insight database 2012

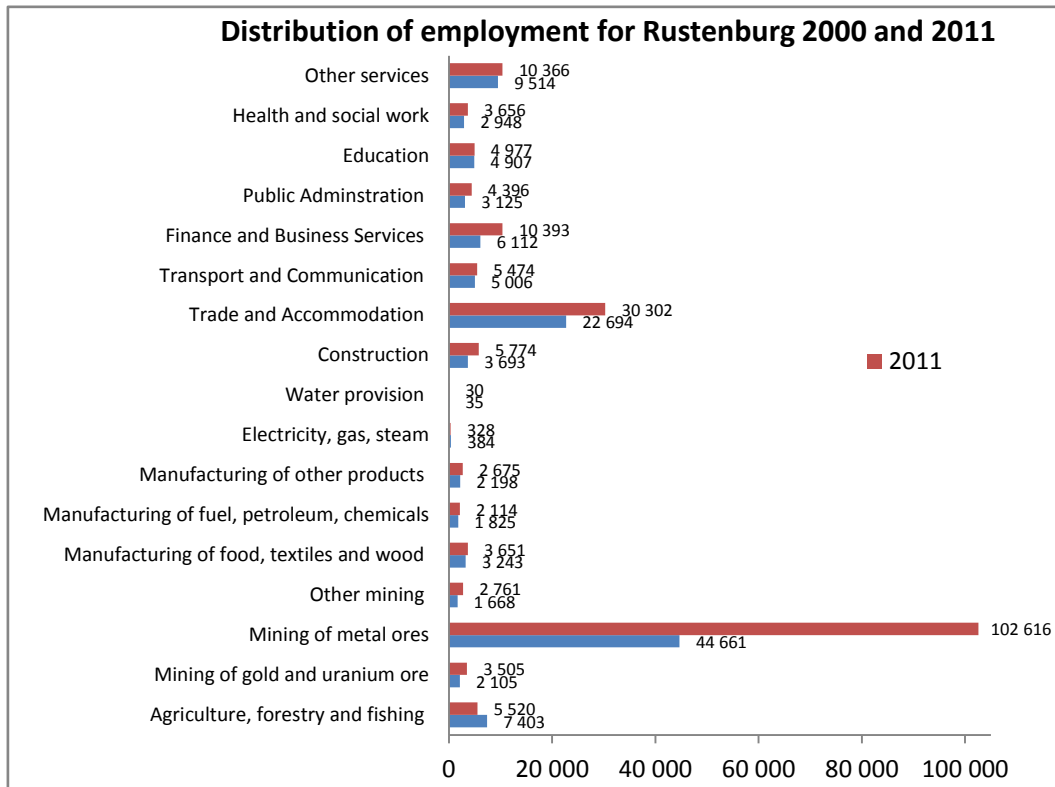


Figure 2.5.2.1 (d): Formal Employment by Sector in Rustenburg

The graph shows that the platinum and chrome mine segment employed 37% of the total workforce in 2000. In 2011, this percentage has increased to 52%. Although the percentage of people employed by the trade and services sector has declined from 19% in 2000 to 15% in 2011, it remains the second largest employer in the area. This reflects the strong role Rustenburg plays as service centre in the Bojanala Platinum district. Agriculture's share in employment in the area has declined from 6% in 2000 to only 3% in 2011. The increase in the number of jobs in the construction and finance and business services sectors from 2000 to 2011 is a flow on from the high growth experienced in the mining sector during the same period. Although there has been a small increase in manufacturing jobs, this sector's contribution to employment in the area remains relatively small.

2.5.2.2 Output

The following graph shows the production structure of the Rustenburg economy compared to the composition of employment. The graph shows that 64.7% of the GVA generated in Rustenburg municipality comes from the metal ore mining sector, thus reflecting the resource based character of the economy. The higher output value of the platinum and chrome mining sector compared to employment, suggests this sector as a fairly capital intensive sector. The mining sector will be discussed in more detail later in this section.

Source: IHS Global Insight database 2012

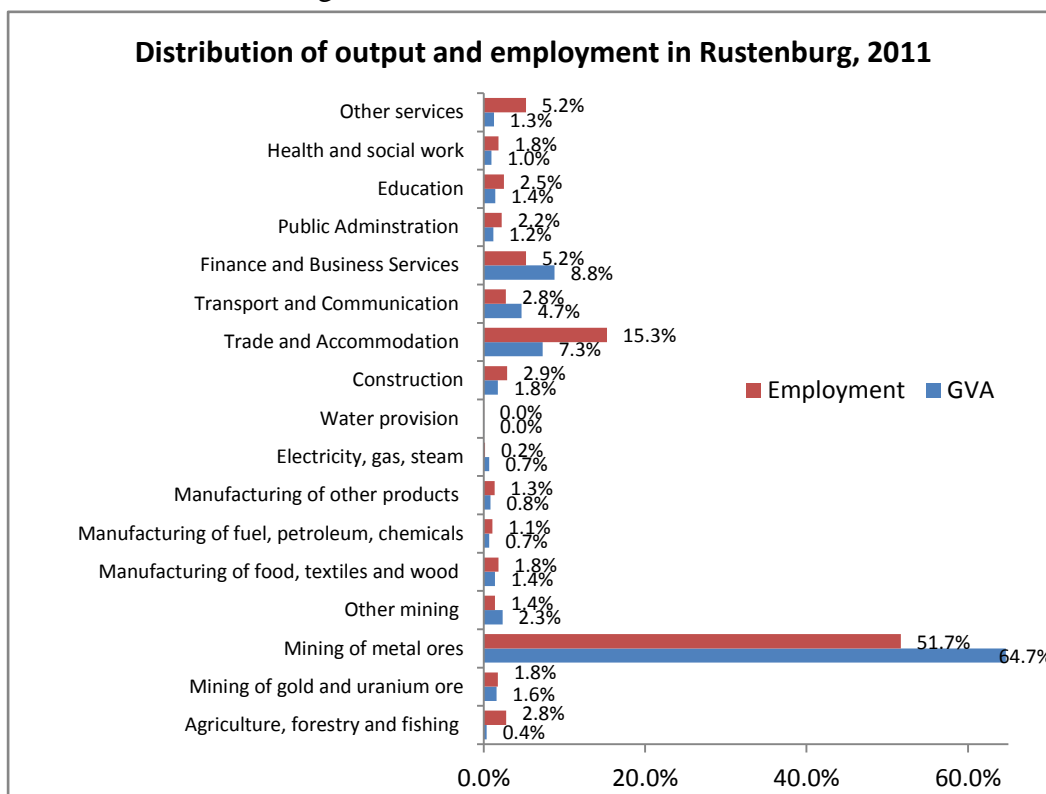


Figure 2.5.2.2 (a): Rustenburg Employment & Output – 2011

The service sectors are also characterized by higher output values relative to employment levels. These include the finance and business services and the transport and communication sectors. Although the trade and accommodation service make a relatively large contribution towards employment, its output value is significantly smaller. This gives an indication that a relatively large number of people are employed in this sector at fairly low wages.

While the agricultural sector's contribution to employment was 3% in 2011, the output value was an almost insignificant 0.4% of the total output value of the area. This demonstrates the labour intensive and low-wage nature of the sector.

The real economic output growth rate of the Rustenburg municipality was on average 4.3% per year between 2000 and 2011, compared to the growth rate of 2.8% for the North West Province and the national average of 3.5% for the same period. The driving force behind this high growth was the metal ore (platinum and chrome) mining sector, which experienced a real economic output growth of 4.4% per year between 2000 and 2011. A large number of other sectors also experienced high real economic output growth for the same period, possibly as a flow on to the high growth of the metal ore sector. However, their contribution to the total output value of the area still remains relatively small in comparison to the contribution of the metal ore mining sector.

The Table below sets out the performance of various sectors in the Rustenburg municipal area between 2000 and 2011.

Table 2.5.2.2(a): Growth Rate per Sector – 2011

Average annual growth between 2000 - 2011	Rustenburg
Negative growth sectors (<0%)	Mining of gold and uranium ore (-9.4%)
Low growth sectors (0-2%)	Agriculture (0.8%) Education (1.8%)
Medium growth sectors (2-3%)	Other mining (2.9%) Trade and Accommodation (3.0%) Other services (2.2%)
High growth sectors (>3%)	Mining of metal ores (4.4%) Manufacturing of food, textiles and wood (5.1%) Manufacturing of fuel, petroleum and chemicals (3.4%) Manufacturing of other products (5.2%) Electricity, gas, steam (5.8%) Water provision (4.7%) Construction (7.2%) Transport and Communication (5.4%) Finance and Business Services (6.7%) Public Administration (3.2%) Health and Social Work (4.1%)

Source: IHS Global Insight database 2012

The Table below shows that the growth in formal employment was slightly higher than the growth in real output for the Rustenburg municipality between 2000 and 2011. This demonstrates the success of the metal ore mines in providing employment in the area. The currently contentious issue of sustainable employment in the mining sector will be further discussed later in the section.

Table 2.5.2.2(b): Employment and Output Growth 2000 – 2011

2000-2011	National	North West	Rustenburg
employment growth (p.a.)	2.1%	2.1%	4.6%
real output growth (p.a.)	3.5%	2.8%	4.3%
Employment elasticity (% growth in employment/ % growth in real output)	0.60	0.75	1.07

Source: IHS Global Insight database 2012

Mining

Approximately 90% of the world's platinum and 70% of the world's chrome reserves are found in the geological belt, known as the Bushveld Igneous Complex (BIC), which stretches across the Rustenburg Municipal Area. The economy of Rustenburg is largely shaped by the mining activities in the municipal area.

Approximately 70% of South Africa’s platinum (approximately 50% of world production) is produced in the Rustenburg municipality. Impala Platinum, Anglo Platinum and Lonmin Platinum are the three companies dominating production in the area. Platinum is used worldwide in the automobile industry, in catalytic converters that are installed in the exhaust pipes of vehicles, to reduce harmful emissions. The widespread use of platinum in fuel cells in electric-powered vehicles is also anticipated by 2015 (Rustenburg Local Municipality, 2011).

Between 2003 and 2011, the world demand for platinum has steadily increased from 197 tons/annum to 252 tons/annum. During the same period the world supply was on average lower than world demand at 198 tons/annum (Johnson Matthey Plc, 2012).

The main uses for platinum are set out in the graph below.

Source: Johnson Matthey Plc, 2012

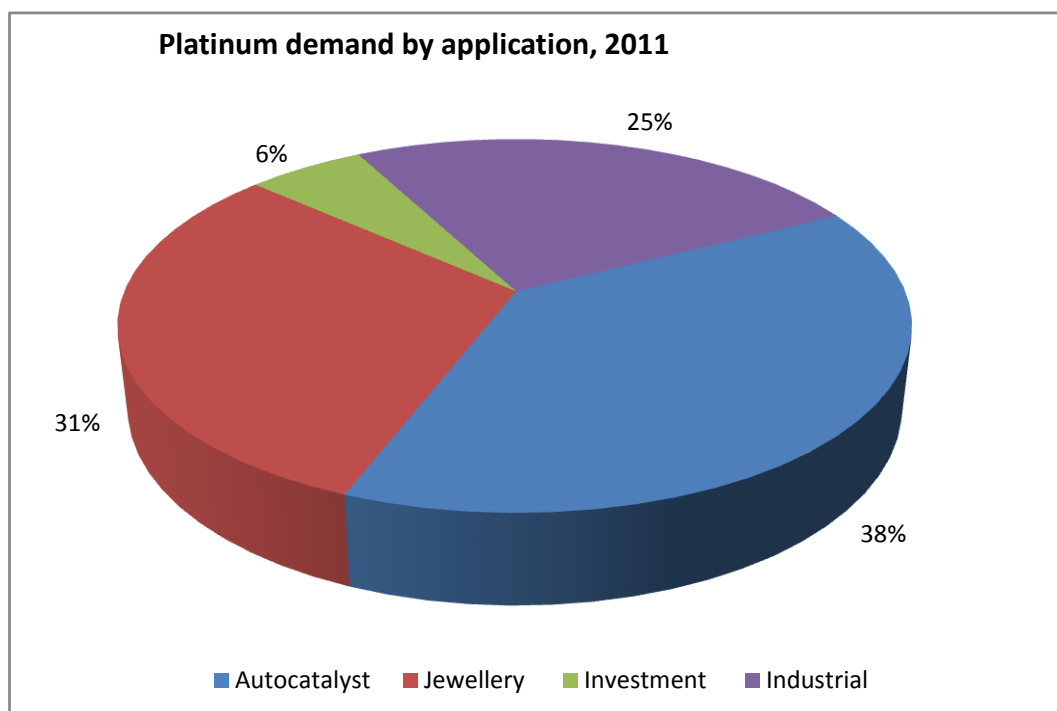


Figure 2.5.2.2(b): Worldwide Applications for Platinum, 2011

Chrome mining in Rustenburg municipal area falls into three categories:

- Chromite mining – The main companies in the Rustenburg municipality that mine chromite (a chrome ore that contains large amounts of chromium) are Xstrata Alloys, Samancor Chrome and Chromex.
- Production of UG2 chrome (a chrome ore which is a by-product of platinum mining) – The platinum mines as well as some of the chromite operations produce UG2 chrome.
- Ferrochrome smelters – Chrome ores (chromite and UG2 chrome) are used in the production of ferrochrome (a raw material used in the production of stainless steel). Ferrochrome is an alloy of chromium and iron, produced in smelters which operate at high temperatures of 2800°C (Corathers et al, 2009). A huge amount of electricity is used in the smelting process – Xstrata operates smelters in Rustenburg, Boshhoek and Wonderkop

- Production of ferrochrome is considered to be part of the mining sector, although it involves a level of beneficiation of mined ore.

South Africa is the world’s largest producer of chrome ore and ferrochrome. In 2011, South Africa produced approximately 38% of the world’s ferrochrome and 48% of the world’s chrome ore (Craig Fossey, 2012). Originally platinum mines considered UG2 chrome ore, which has a lower chrome content compared to chromite, as a waste product. However, recent technological developments have made it possible to use this by product as a raw material for ferrochrome. UG2 chrome now accounts for more than 50% of South Africa's total chrome ore exports (Reuters, 2012). The South African supply of cheaper UG2 chrome to Chinese ferrochrome smelters has recently put competing South African ferrochrome producers at a disadvantage against their Chinese counterparts (Adam Leach, 2012).

Four major concerns were raised in the district with regard to the mining sector (Bojanala Platinum District Municipality, 2010):

- Low levels of beneficiation of precious metals;
- A large proportion of inputs and products that is utilised by the mining sector is obtained from outside the district (in this regard, a mining supplier park has been planned in Rustenburg);
- Sensitivity of the mining sector to international commodity prices and economies;
- The pressure of the mining industry on available water resources.

Tourism

The graph below shows a decrease of 17% in the number of overnight tourists for Rustenburg municipal area between 2000 and 2011. The overall provincial decrease was 18%.

Source: IHS Global Insight database 2012

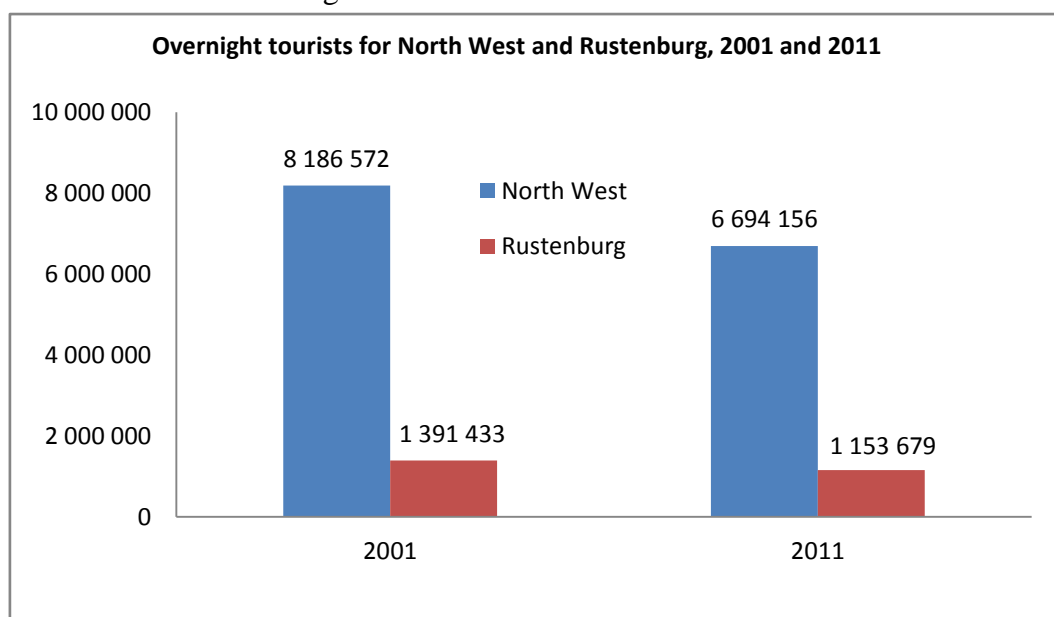


Figure 2.5.2.2(c): Overnight Tourists, 2001 and 2011

The cost of mining activities to the tourism sector has also been identified in the provincial framework. While the province is seen to have tourism potential, the most economically viable sites are close to mining and manufacturing industries with their negative impact on the environment (North West Provincial Government, 2005).

Tourism has been identified as a sector of increasing importance in terms of creating income and employment in the district. The district municipality has adopted a Tourism Master Plan for the region, to address the sub-optimal utilization of natural resources for tourism development. A marginally higher development target of 8.3% has been set for the tourism sector relative to the 7.2% target set for the mining sector (Bojanala Platinum District Municipality, 2010).

Boshoek is situated in the Pilanesberg Mountain range in close proximity to internationally known tourist attractions such as Sun City and the Pilanesberg Nature Reserve. A number of bed and breakfasts, guest houses and lodges operate in the area.

Regional Exports

Products from mining activities make out the majority of exports from Rustenburg municipality. These products include platinum, chromite, UG2 chrome ore and ferrochrome.

The graph below shows Rustenburg municipality’s contribution to the province’s exports in 2000 and 2011.

Rustenburg’s share in provincial exports has decreased from 89.7% in 2000 to 51.2% in 2011. In 2000, 6% of total South African exports came from Rustenburg. In 2011 the value of Rustenburg exports contributed only 1% to total national exports (IHS Global Insight, 2012).

Source: IHS Global Insight database 2012

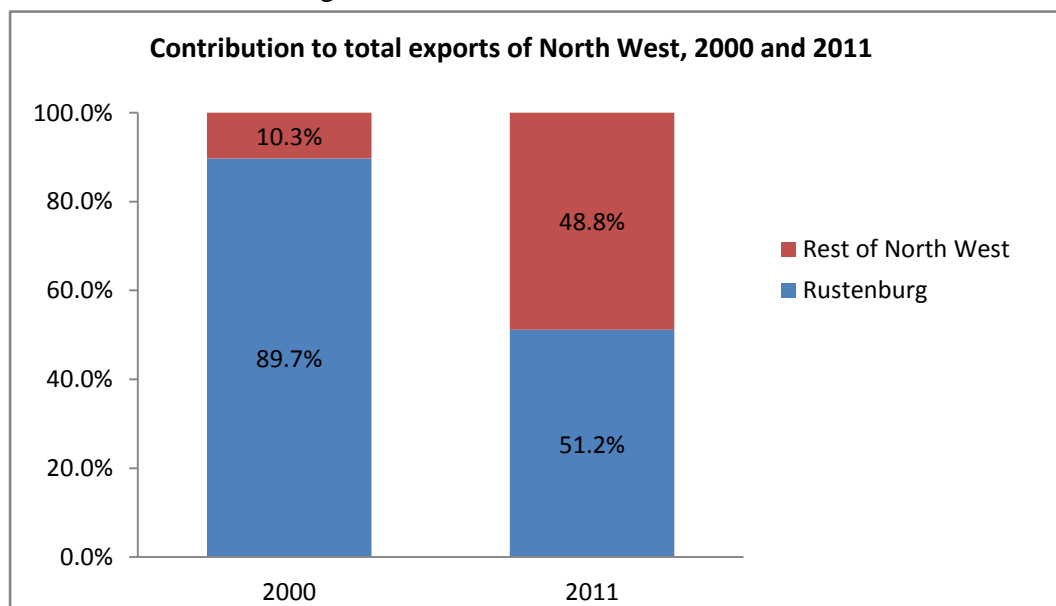


Figure 2.5.2.2(d): Contribution to Provincial Exports, 2000 and 2011

The decrease in real export value could be attributed to a slow world economy. Due to the industrial use of platinum, the price of platinum tends to decrease during an economic down turn, due to a reduced industrial demand (<http://www.speculative-investor.com/new/article150402.htm>).

Another contributing factor to the lower real export value in 2011 has been the increased export of lower value UG2 ore relative to higher value chromite and ferrochrome. UG2 ore is exported to China where it is used in the production of ferrochrome. As UG2 ore is relatively cheaper than chromite, the supply of UG2 ore to Chinese ferrochrome producers is giving them a competitive advantage over South African producers. Thus South Africa is in effect substituting exports of higher value ferrochrome for the exporting of lower value UG2 chrome ore.

The graph below shows the decrease in the share of South African ferrochrome relative to Chinese ferrochrome from 2007 to 2011.

Source: Reuters, 2012

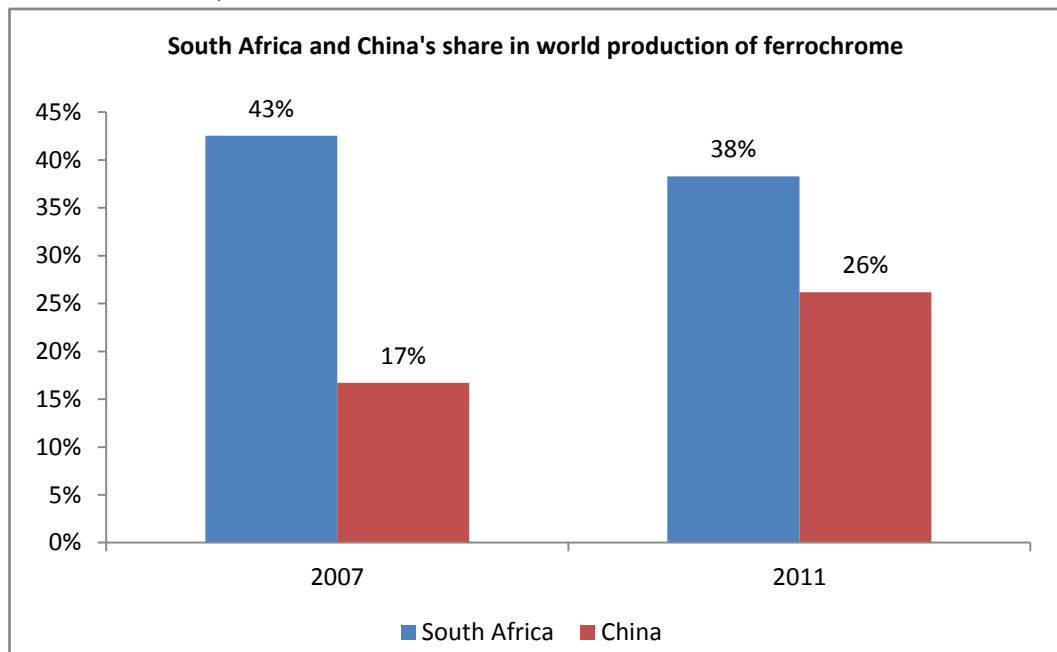


Figure 2.5.2.2 (e): Distribution of Ferrochrome Exports, 2007 and 2011

Agriculture

The agricultural sector makes a relatively small contribution to the Rustenburg economy. It employs 2.8% of the labour force and contribute 0.4% to the GVA of the municipality ((IHS Global Insight, 2012). Although agriculture's share of the GVA is small, it is seen as important in terms of employment (Rustenburg Local Municipality, 2011).

The decline in the agricultural sector in the whole of the district could be attributed to several factors, including land reform, high input costs, high risk compared to return, water quality and scarcity, competition for land usage from mining industry and insufficient government support.

The main agricultural products in the district include maize, groundnuts, sunflower and cattle.

Agro-processing, with a specific focus on food and vegetable processing, as well as the production of high value agricultural produce such as spices, herbs and indigenous teas have been identified as potential growth areas in the district (Bojanala Platinum District Municipality, 2012). Boshhoek, with its close proximity to the urban Rustenburg and Gauteng markets, has agricultural potential in line with the district's aims of growing the agro-processing industry and producing high value agricultural produce. Its close proximity to the Pilanesberg Nature Reserve also holds potential for cattle and game farms tied in with the tourism industry.

2.5.3 Economic Equity

2.5.3.1 Poverty

Poverty levels vary significantly within the municipal areas in the Bojanala district. There is a large discrepancy between basic services available in the rural parts of the district and the urban parts, which mostly consists of the Rustenburg core area, in close proximity to the business area. Although the mining sector is the district's main source of employment, many of those working on the mines are migrant labourers from other parts of the country. The unemployment rates and poverty in the rural municipalities are significantly higher than the Rustenburg municipality. A total of 67% of households in the district earn R1 600 per month or less (Bojanala Platinum District Municipality, 2010).

The Gross value added/production income (GVA) per capita for the Rustenburg municipal area is much higher than the national and provincial averages. In GVA/capita for the Rustenburg municipality was R138 000 per current prices in 2011 compared to the national and provincial averages of R53 000 and R50 000 respectively.

The graph below shows the percentage of people living in poverty for Rustenburg municipality compared to the country and North West province as a whole.

Source: IHS Global Insight database 2012

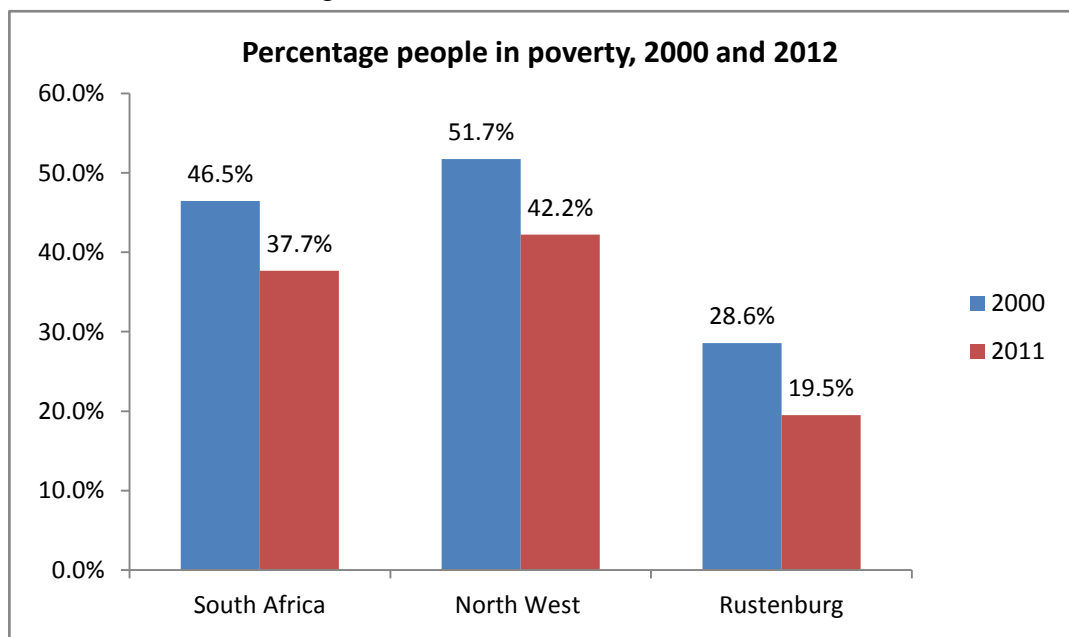


Figure 2.5.3.1 (a): Poverty Levels – 2000 and 2011

While the income poverty levels are low in comparison to the country as a whole, housing and sanitation in the Rustenburg area are well below national standards. The following Table shows basic service delivery levels in the Rustenburg municipal area, compared to North West and the country as a whole. The poverty indicators, relating to basic shelter and sanitation needs in the Rustenburg municipality, shows severe backlogs compared to the country as whole, with 45% of people not living in a formal dwelling, 36% without adequate sanitation and 83% without formal refuse removal. This shows the immense pressure that the influx of people into the area had on basic infrastructure, such as housing and sanitation.

In 2010, the issues of adequate sanitation and decent housing were raised as serious concerns that need to be addressed (Rustenburg Local Municipality, 2011)

Table 2.5.3.1(a): Basic Service Delivery Levels – 2000 and 2011

Year	National	North West	Rustenburg
Formal dwelling backlog - % of households not living in a formal dwelling			
2000	32%	25%	37%
2011	26%	26%	45%
Sanitation backlog - % of households without hygienic toilets			
2000	41%	53%	44%
2011	34%	48%	36%
Water backlog - % of households below RDP-level			
2000	25%	30%	25%
2011	20%	24%	5%
% of households with no electrical connection			
2000	30%	31%	31%
2011	19%	17%	23%
% of households with no formal refuse removal			
2000	44%	67%	63%
2011	38%	50%	83%

Source: IHS Global Insight database 2012

The large housing backlog, growth of informal settlements, the illegal occupation and unlawful evictions are some of the key issues identified in the district's development plans (Bojanala Platinum District Municipality, 2010).

2.5.3.2 Income Inequality

The economy of the Rustenburg municipal area reflects the high level of inequality associated with the South African economy. In 2011, a relatively lower Gini coefficient of 0.58 (0= perfect equality and 1= perfect inequality) was recorded for the Rustenburg economy, compared to a national Gini coefficient of 0.63 and provincial Gini coefficient of 0.61. The income inequality has slightly improved since 2000, when a Gini coefficient of 0.60 was recorded (IHS Global Insight, 2012). The relatively lower levels of income inequality in the area could mainly be ascribed to the lower than national unemployment rates underscoring access to employment as a major determinant of income inequality in South Africa (Seekings and Nattrass 2006).

The graph below shows the relatively high portion of households in Rustenburg municipality of 47% that falls in the higher income categories (R96 000-R1200 000+/year), compared to South Africa (36%) and North West (28%) as a whole.

Source: IHS Global Insight database 2012

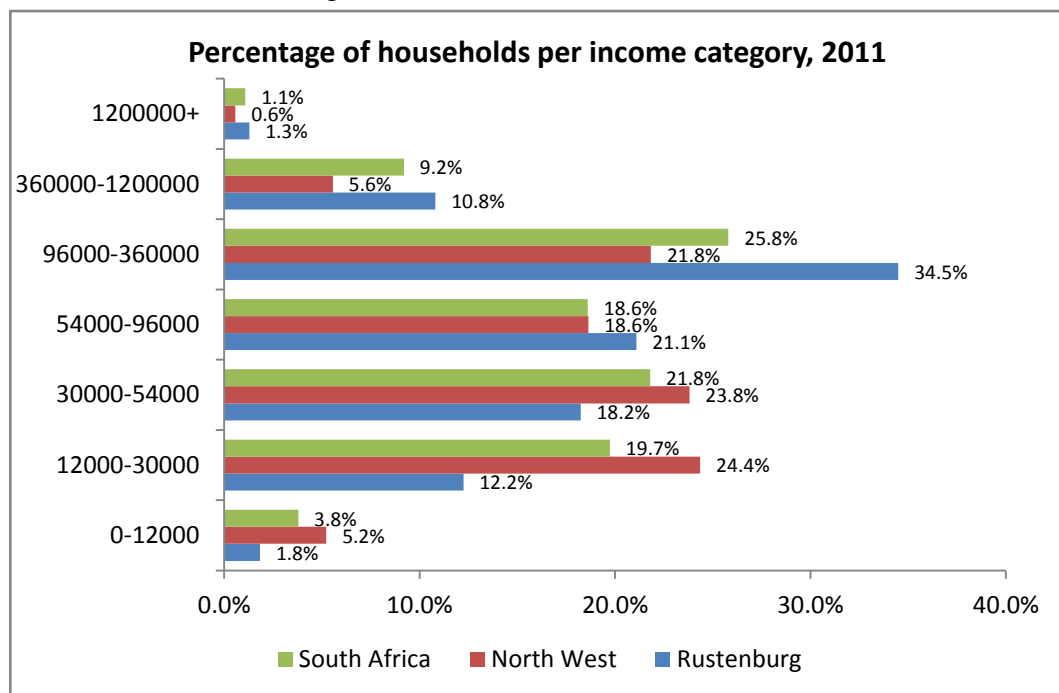


Figure 2.5.3.2 (a): Households per Income Category

2.5.4 Economic Stability

2.5.4.1 Diversity

The stability of an economy is in part determined by its reliance on a variety of sectors. A more diverse economy will be less exposed to the influence of exogenous factors (e.g. climate or external markets).

The tress index measures the extent of economic concentration in a small number of sectors. The higher the index value, the higher is the rate of economic concentration within an economy and the more its long term stability could be at risk. The tress indices below show the significantly higher level of economic concentration in Rustenburg municipal area, compared to national as well as provincial economies. Furthermore, the tress index of Rustenburg shows signs of increasing since 2000. This could mainly be ascribed to large growth of the metal ore mining sector relative to the other sectors in the local economy. Another mining project for the area will certainly add to this trend.

Table 2.5.4.1(a): The Level of Economic Concentration

TRESS INDEX	National	North West	Rustenburg
2000	41.15	52.18	70.87
2011	40.67	56.80	77.54

Source: IHS Global Insight database 2012

It is a major concern that a province the size of the North West is dependent upon one district for 31 % of its economic activity. It is suggested that fluctuations within the mining industry affect economic growth for other sectors, such as, manufacturing, construction, trade and community services. This is most concerning at a community service level, as local economic development relies upon income drawn from the mining industry, which is in turn affected by the supply and demand for metals and minerals. In effect, it places both the Province and Rustenburg at the mercy of international commodity price fluctuations, something that government has virtually no control over (DPR Projects, 2009).

The high extent of economic concentration in the region has received attention on a provincial, district and local level:

- The district has a comparative advantage in the mining sector, but besides this sector, other sectors in the district are seen as underdeveloped and not competitive on a provincial level (Bojanala Platinum District Municipality, 2010).
- Economic diversification together with food security were identified as some of the most important socio-economic issues to be addressed in North West Province (North West Provincial Government, 2005)
- The Rustenburg Municipality has developed the LED 2015 plan and established the Rustenburg Development Agency to drive the economic diversification of Rustenburg (Rustenburg Local Municipality, 2011).

2.5.4.2 Resource Use

Land: Current land-use activities in the surrounding area include mining activities, retail, construction, manufacturing, agriculture, tourist accommodation and cattle farming. However, since the proposed developments are on land already utilized for Ferrochrome smelting it is unlikely to lead to pressure on adjacent property prices and land-use practices in the area.

Water availability and quality: Water is a scarce natural resource in North West Province and often the limiting factor in development. Mining and agricultural activities put pressure on the limited water supply in the province. The mines in particular, are using a disproportionate amount of potable water (Bojanala Platinum District Municipality, 2010). In 2005, the provincial framework mentioned that available water sources in the province were not adequate to meet future demand. Ground and surface water had high levels of pollution and the quality and quantity of Rustenburg's water supply, in particular, was described as unsatisfactory. The district had to import water to meet its demand (North West Provincial Government, 2005).

In 2004, a public-private partnership, the Rustenburg Water Services Trust (RWST) was formed to supply water to the Rustenburg municipal area. At the same time, the area's mining companies agreed to use lower grades of water for their operations. This allowed Rand Water, which had been under pressure to supply sufficient water to the town and mines, to spend time and money on maintenance and new pipelines.

In 2011, RWST was planning to spend a considerable amount on water and sanitation expansion projects in and around Rustenburg (<http://www.northwestbusiness.co.za>).

Labour: Since August 2012, labour strikes, that started at Lonmin's Marikana mine, has spread to the surrounding Rustenburg mining sector (Francesca Freeman, 2012). The labour unrest that is gradually spreading to other sectors of the South African economy has put the spotlight on the much-criticized migrant labour system and the low standards of living conditions of a vast number of miners (Andrew England, 2012).

Recruitment policies of platinum mining companies that encourage employment of migrant workers have been under scrutiny after the Marikana strike. The mining companies have also been accused of failing to improve the bad living conditions of many of their workers (Paul Vecchiato, 2012).

With the current low levels of local employment expected to rise with down-scaling of activities in major mines such as Anglo Platinum and the relatively higher levels of unemployment in the local rural economy, there should be surplus local rural labour available for recruitment without affecting local labour costs for other producers in the area.

Energy: The Glencore Merafe Boshhoek Smelter was ISO 9000 certified in May 2004 and is characterised by high metallurgical and energy efficiency. Based on successful implementation of ISO 9001:2000 Management system, a fully Integrated Management system was put in place, incorporating all the principles of the 17 Xstrata Corporate Standards and working towards certification in accordance with ISO 18001. EIA (Environmental Impact Assessment) and EMPR (Environmental Management Programme Report) processes were followed successfully.



2.6 INFRASTRUCTURE BASELINE

When considering infrastructure base line conditions for any specific project, the first step is to identify which types of infrastructure would/could be affected by any of the project activities. When the original EMPR was compiled for the mining and smelting activities, two potential impacts on infrastructure were identified as possible issues of concern:

- impact of blasting in the mine on surrounding infrastructure
- impact of the transport of raw materials, ore and product to and from the mine and smelter, along existing public roads on road conditions and traffic safety

During the current project planning, these two aspects were once again considered for assessment. However, as it was confirmed that the mine would close down its open cast operations before the end of 2013 (no blasting is currently occurring as the mine is currently being rehabilitated), the need to assess the blasting related impact and therefore the current infrastructure base line conditions as pertaining to this potential impact, fell away.

For the purposes of this study therefore, only aspects related to impacts on road conditions and traffic safety will be considered. ITS Engineers was subcontracted by JMA Consulting to perform a Traffic Base Line and Impact Assessment for the Glencore Merafe Boshhoek Mine and Smelter (GMBS). A summary of this full Base Line Report is presented in section 2.19 and the complete Traffic Specialist Baseline Report is attached as **APPENDIX 2.19 (A)** to this report.

The discussion in this section represents an extract of relevant information from this Traffic Specialist Report, supplemented with a photographic survey conducted by JMA Consulting to document the current conditions along the access roads and at relevant intersections.

2.6.1 Identification of Public Roads used for Access

In order to assess the current condition of public roads and buildings that could potentially be damaged by GMBS activities, all roads along which access could be gained to the site were identified and assessed from a traffic perspective by Specialist Engineers ITS.

Figure 2.6.1.1(a) shows all the access routes to and from the GMBS site.

- R565 Road;
- D1813 Road;
- D556 Road; and
- Mafenya Road.

Critical road access points and crossings are shown on the map depicted in Figure 2.6.1.1 (b) and are numbered 1 through 5.



Figure 2.6.1.1(a): Access Routes to and from the GMBS Site

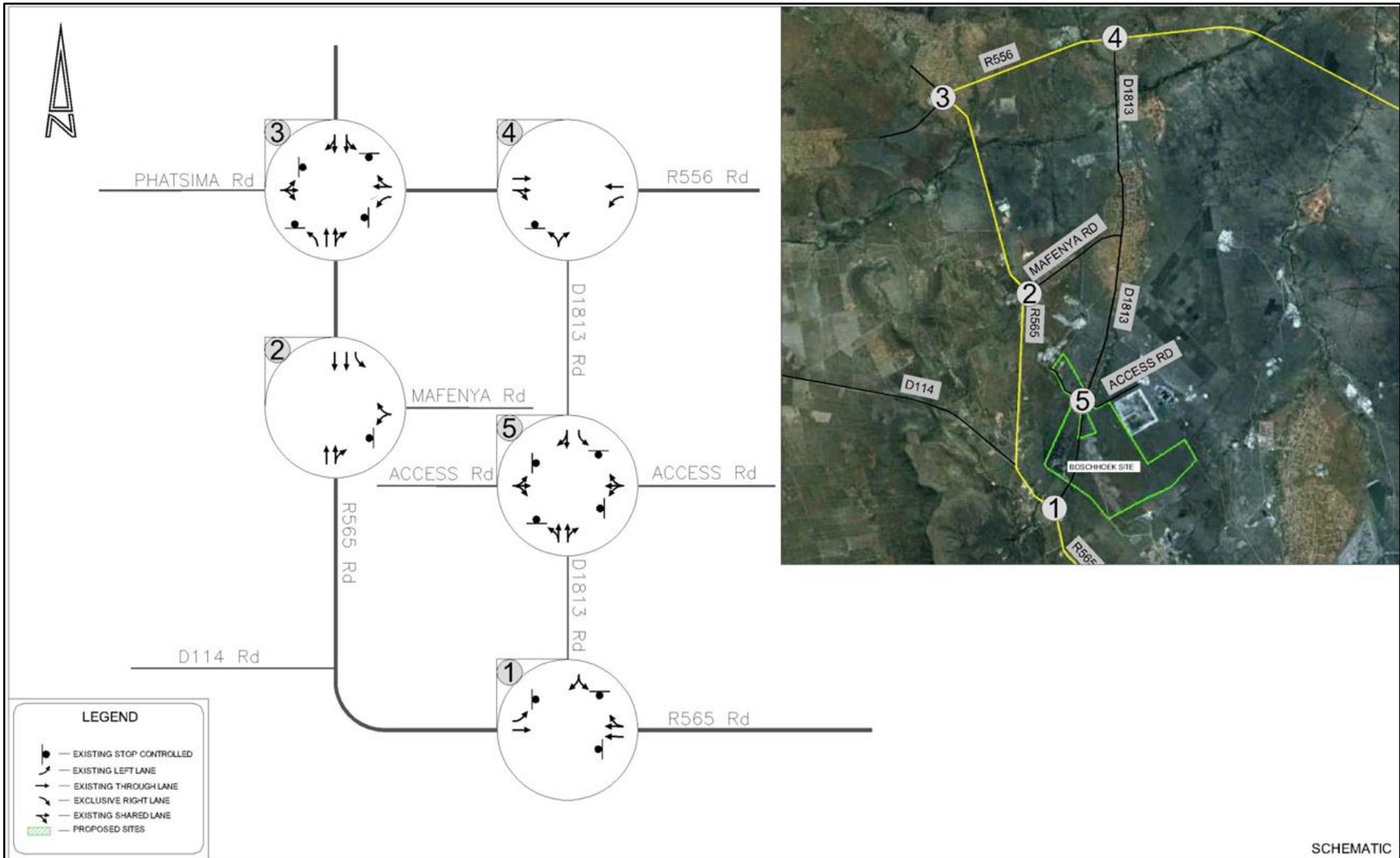


Figure 2.6.1.1(b): Critical Access Points and Crossings

2.6.2 Current Traffic on Access Roads

Classified Traffic counts were carried out on Wednesday, 11th April 2013 for 12 hours (6:00 - 18:00) at the above mentioned intersections. Light vehicles, heavy vehicles (1 – 4 axles) and very heavy vehicles (>5 axles), were counted at the intersections.

The AM and PM Peak hour was determined based on the highest traffic volumes registered during the morning and afternoon periods respectively. The AM Peak was found to be from 05:45 to 06:45 and the PM Peak hour was recorded at 17:30 to 18:30.

Approximately 17% of the counted AM peak hour traffic volumes and approximately 12% of the counted PM peak hour volumes are heavy vehicles.

The baseline AM and PM peak hour total traffic volumes are analysed in more detail in Traffic Specialist Report. The analysis indicate that the intersections are currently operating satisfactory on level of service (LOS) ranging between A and D during the morning AM and afternoon PM peak hour.

The R565 and R556 roads are currently used as the major access roads for operational purposes of the GMBS operations. The D1813 road, a north-south road and the D513, an east-west road carries relatively low volumes of traffic during the morning and afternoon peak hours.

The R565 road is an existing two lane surfaced road and forms part of the major road network from Rustenburg to the rest of the road network in the North West Province. The R556 road is an existing two lane surfaced road and links the R565 road with the Pilanesberg area and currently the major link road between Sun City and the Gauteng area.

The traffic volumes on the R565 / R556 road are mainly traffic from Rustenburg to the Pilanesberg area as well as to the surrounding mining and farm areas. The R565 and R556 carries approximately 1 200 vph and 290 vph in both directions respectively. During the afternoon peak hour the main direction on the R565 is southbound towards Rustenburg with approximately 460 vph in a southerly direction.

The traffic volumes on the Mafenya Village road, D1813 and D513 are less than 100 vph in both directions during the peak hours. Traffic on the Mafenya Village road and D1813 is mainly traffic to and from Chaneng Village and between Rustenburg and the mining areas.

The main road intersections are indicated on Figure 2.6.1.1 (b).

- The D565 / D1813 road intersection is currently a priority controlled intersection with priority on D565.
- The D565 / Mafenya road intersection is currently a priority controlled intersection with turning lanes on the approaches of the D565 road.
- The D565 / D556 road intersection is currently a four way stop controlled intersection with turning lanes on the approaches of the D565 road.

- The D556 / D1813 road intersection is currently a priority controlled intersection with priority on D556 and with turning lanes on the approaches of the D556 road.

All the intersections analysed are currently operating at acceptable levels of service and delay.

2.6.3 Current Condition of Roads and Intersections

In order to document the current condition of relevant roads and intersections, JMA Consulting conducted a photographic survey of selected points along the access roads and at the major intersections. The localities at which the photographs were taken are shown on Figure 2.6.3(a). The photographic record is presented in Table 2.6.3(a).

The following base line condition observations are relevant:

- The 12 localities at which photographs were taken are representative of all access routes to GMBS and also include the 5 major intersections described in the base line description.
- At 10 of the 12 localities the road condition is good. These photographs indicate the general road condition along all access roads and intersections shown in green on Figure 2.6.3(a).
- At 2 localities, (AP-3 and AP-12) evidence of deteriorating road conditions could be observed.
- The deterioration observed at AP-3 is related to public traffic which leaves the road onto the road shoulder and then re-enters the road.
- The deterioration observed at AP-12, is deemed to be related to GMBS traffic. This intersection represents the major road traffic access point to the GMBS Mine and Plant.

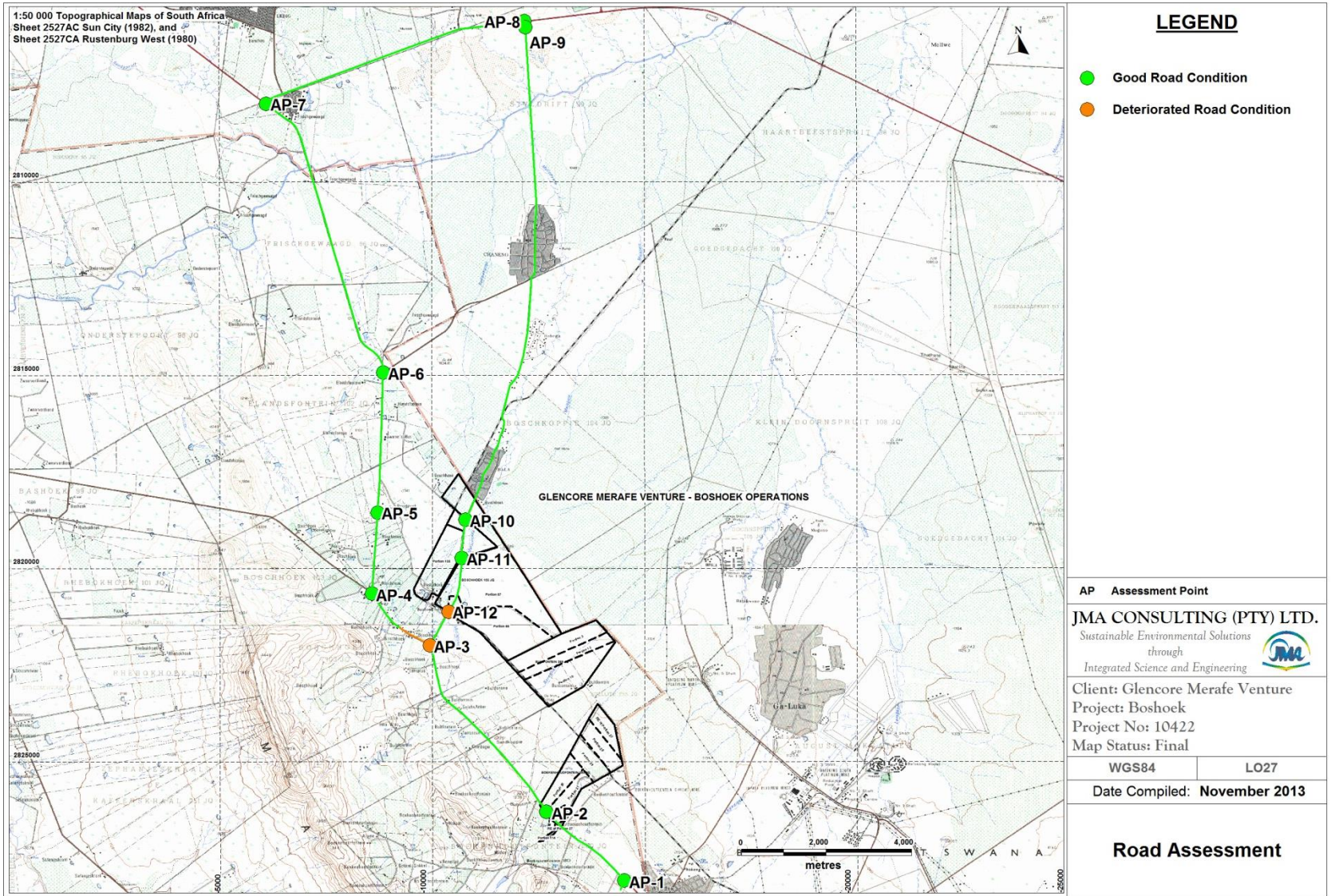


Figure 2.6.3(a): Localities at which Road Condition Photographs were taken

Table 2.6.3(a): Photographic Record of Road and Intersection Condition

<p>AP-1) Phokeng Circle</p>	<p>AP-2) Bafokeng Sports Campus Intersection</p>
<p>AP-3) R565 Rd/D1813 Rd Intersection</p>	<p>AP-3) R565 Rd/D1813 Rd Intersection</p>
<p>AP-4) D114 off-ramp</p>	<p>AP-5) R565 Rd</p>
<p>AP-6) R565 Rd/Mafenya Rd Intersection</p>	<p>AP-6) R565 Rd/Mafenya Rd Intersection</p>



AP-7) R565 Rd/ R556 Rd Intersection



AP-7) R565 Rd/ R556 Rd Intersection



AP-8) R556 Rd/ D1813 Intersection



AP-8) R556 Rd/ D1813 Intersection



AP-9) D1813



AP-10) D1813 Rd/ Access Road Intersection



AP-10) D1813 Rd/ Access Road Intersection



AP-11) D1813 Rd/ Mine Access Gravel Road



AP-12) Boshhoek Entrance Intersection



AP-12) Boshhoek Entrance Intersection



2.7 CLIMATE/METEOROLOGY BASELINE

Information on climate and meteorology was generated during the compilation of two specialist studies, namely the Surface Water study conducted by Inprocon and the Air Quality study conducted by EnviroNgaka. The discussion below comprises summary extracts from these reports. Copies of these two specialist study reports are contained in **APPENDIX 2.12 (A)** and **APPENDIX 2.17 (A)** respectively.

2.7.1 Regional Climate

The climate of the region is typical of the middelveld climate zone. During the summer the average midday temperatures for Rustenburg range from 19.3°C in June to 29.4°C in January but cool slightly down during the evening at low to mid-teens.

Summer (mid-October to mid-February) is characterised by hot, sunny weather often with afternoon thunderstorms of short duration.

In winter (May to July) day time temperatures range in the band from 19°C to early twenties dropping the mercury at night on average to 1,7°C in July, which is the coldest month.

Frost occurrence during winter occurs but is not common. The rainfall occurs mostly in summer – some 85% of the annual being recorded during this period. There is a distinct seasonal variation in rainfall and the evaporation follows a less spikey variation but a seasonal trend during the year.

2.7.2 Mean Annual and Monthly Rainfall

The local rainfall for the site was considered by scrutinising the rain gauge stations closest to the site - see Table 2.7.2 (a). The historic information from rainfall stations within a 25 km radius of the site and with record length of more than 30 years is summarised also in the Table below.

Table 2.7.2 (a): Mean Annual Rainfall (MAP) for Boshhoek Region

Weather Bureau Gauge No	Station Name	Latitude		Longitude		Record Used	No of Years	MAP (mm)
		D	M	D	M			
510817	Rietfontein (SKL)	25	38	26	28	1934-1989	56	595
511251	Weidemann M Rustenburg	25	41	27	9	1946-1983	36	579
511310	Donkerhoek Rainhill	25	40	27	11	1914-1975	50	732
511400	Rustenburg POL	25	40	27	15	1928-1988	60	665
547831	Mahobieskraal	25	21	26	58	1923-1953	31	640
Adopted MAP for Boshhoek Site								665

Figure 2.7.2 (a) indicates the positions of all the rain gauge stations in the region and also confirms when considering the upstream catchment at GMBS, the subject site falls within a MAP range of 600 to 700mm.

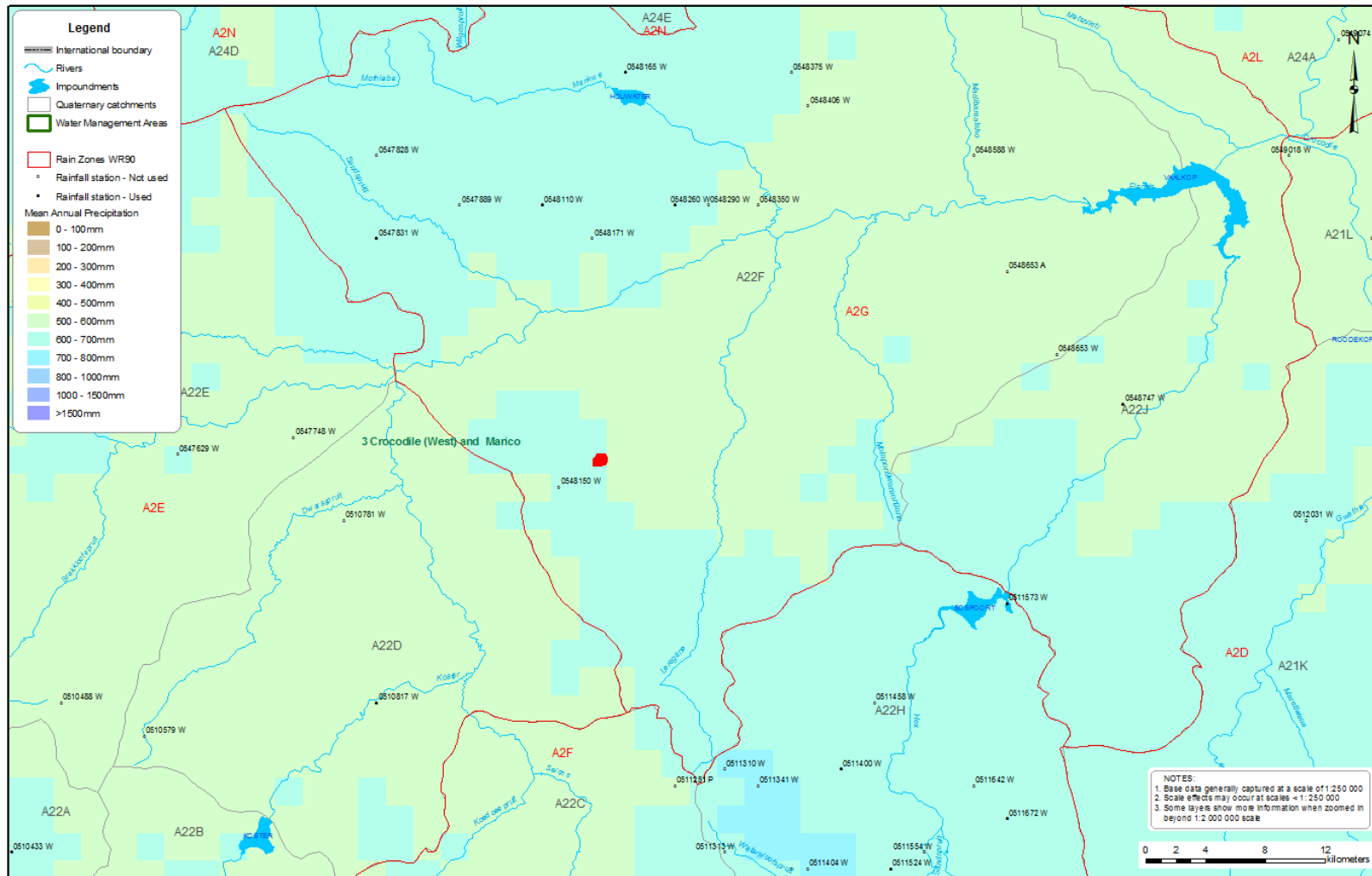



Figure 1 : Rainfall

 Water Resources of South Africa 2005
 Location: \\WR2005\data\gis\mapsw\2005\maps\Figure 1 Rainfall_2005.mxd
 Date: April 2008

Figure 2.7.2 (a): Positions of all the Rain Gauge stations in the Boshhoek region.

The rain gauge stations are not all active anymore and only Rustenburg Pol (511 400) with the longest historical record and Station No. 510 817, Rietfontein (SKL) has recent rainfall data. The Boshhoek site, similar to Rustenburg resides on the eastern slopes of the Magaliesberg range with rainfall isohyets to be very similar and slight steeper than on the western side of the mountain range. Rietfontein SKL is to the west of the Magaliesberg in a region with flatter rainfall gradient. Station 511400 Rustenburg Pol is therefore regarded representative of the subject site and is also adopted for the subject site.

2.7.3 Rainfall Intensities

2.7.3.1 Mean Monthly Rainfall Intensities

The mean monthly distributions of rainfall for the rainfall zone A2G and of Rustenburg gauged at the Police Station are included in Table 2.7.3.1 (a). The emphasis is on the similarity (value and distribution) implying that the monthly intensity over a given year is rather fairly constant for the region despite the rainfall isohyet

Table 2.7.3.1 (a): Mean Monthly Rainfall (mm)

Month	511400	A2G	Month	511400	A2G
Oct	52	52	Apr	50	47
Nov	95	89	May	18	17
Dec	109	116	Jun	9	8
Jan	128	124	Jul	5	5
Feb	89	98	Aug	8	6
Mar	83	86	Sep	20	17

2.7.3.2 Maximum 24 hour Rainfall Intensities

The maximum annual maximum recorded intensity for a 24 hour rain event as well as expected rainfall for various recurrence intervals statistically derived by PT Adamson and published in TR 102 are tabled in Table 2.7.3.2 (a) for the Rustenburg (Pol) rainfall gauge.

Table 2.7.3.2 (a): Maximum Rainfall Intensities (mm) for 24 hour duration

Maximum Recorded	Recurrence Interval (Years)				
	10	20	50	100	200
140	101	120	148	172	199

2.7.4 Evaporation (Annual & Monthly)

The Mean annual evaporation (MAE) for Evaporation Zone 2B in which the site resides is given in WR2005 as 1800 mm for S-pan evaporation. Evaporation, in terms of spatial variation, is fairly constant over the area.

Refer to Figure 2.7.4 (a): Evaporation (WR90 S-pan). The MAE (S-Pan) of 1800 mm (see Table 2.7.4 (a)) was adopted for the site.

The monthly S-pan evaporation has a distribution as in Table 2.7.4 (a) according to WR90.

Table 2.7.4 (a): Monthly Average S Pan Evaporation (mm)

Month	Oct	Nov	Dec	Jan	Feb	Mar	
Ave	200.7	198.18	204.3	199.8	162.54	154.98	
%	11.15	11.01	11.35	11.1	9.03	8.61	
Month	Apr	May	Jun	Jul	Aug	Sept	Total
Ave	118.26	97.92	82.08	90.9	124.74	165.6	1800
%	6.57	5.44	4.56	5.05	6.93	9.2	100

The Monthly Lake Evaporation is derived by a monthly adjustment and is indicated in Table 2.7.4 (b). These figures are therefore applicable in compiling water balances for dirty water impoundments. In the case of saline water the lake evaporation must be reduced.

Table 2.7.4 (b): Monthly Average Lake Evaporation (mm)

Month	Oct	Nov	Dec	Jan	Feb	Mar	
mm	200.7	198.18	204.3	199.8	162.54	154.98	
Lake Convert	0.81	0.82	0.83	0.84	0.88	0.88	
Lake Evap mm	163	163	170	168	143	136	
Month	Apr	May	Jun	Jul	Aug	Sep	Annual
mm	118.26	97.94	82.08	90.9	124.74	165.6	1800
Lake Convert	0.88	0.87	0.85	0.83	0.81	0.81	0.84
Lake Evap mm	104	85	70	75	101	134	1512

In contrast with the rainfall, the annual evaporation has much less seasonal variation with only 62% of the evaporation taking place during the same 6 month summer period. It is very high and the average Mean Annual Evaporation (MAE) exceeds the MAP almost 2.3 times.

Evaporation also does not display the same significant spatial gradients as the rainfall and is thus quite stable in terms of both spatial and temporal distribution.

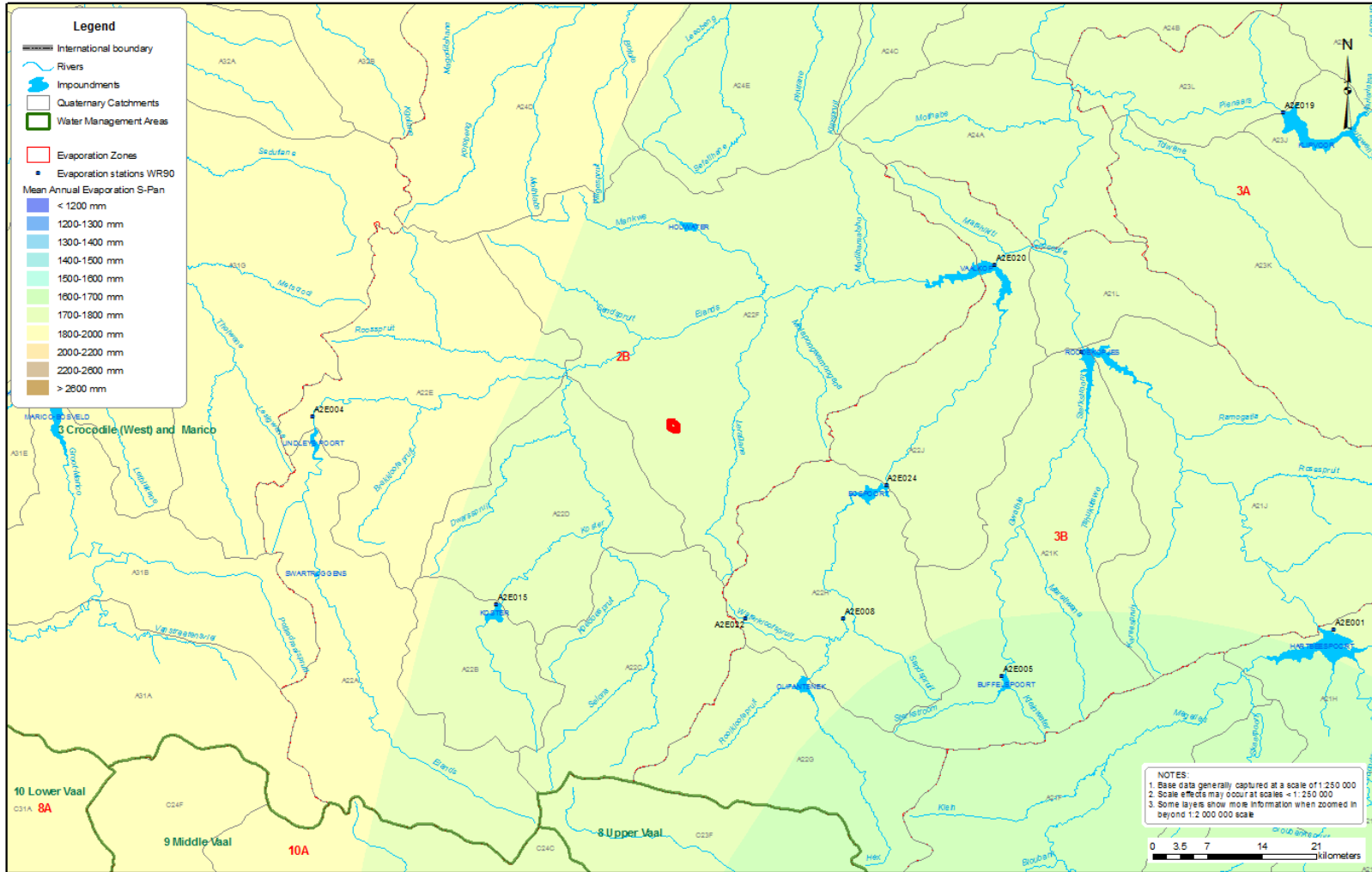


Figure 2.7.4 (a): Evaporation (WR90 S-pan).

