FINAL SCOPING REPORT FOR THE RHODIUM REEFS LIMITED PLATINUM OPERATION

LIMPOPO DEPARTMENT OF ECONOMIC DEVELOPMENT, ENVIRONMENT AND TOURISM

LDEDET Reference No: 12/1/9/2-GS24

NEAS No.: LIM/EIA/0000505/2012

February 2013

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This document has been prepared by **Digby Wells Environmental**.

Report Title: **Final Scoping Report for the Rhodium Reefs Limited Platinum Operation**

Project Number: **RHO1867**

Name	Responsibility	Signature	Date
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EXECUTIVE SUMMARY

Rhodium Reefs Limited plans to undertake underground mining of the UG2 platinum reef (and the associated platinum group metals (PGM) in the Limpopo Province of South Africa. The site is located near Steelpoort in the Waterberg area. A mining right application has been submitted (November 2011) and accepted (June 2012) by the Department of Mineral Resources (DMR). An Eastplats Group company, Spitzkop Platinum (Spitzkop), holds a mining right over the farm Spitskop 333KT, where it plans to develop a shallow underground mine. A platinum concentrator is being constructed by Rhodium Reefs Limited (Rhodium Reefs), another Eastplats Group company, on the farm Kennedy's Vale 361KT. Both developments are covered under the same EIA and approved environmental authorisation. Eastplats owns approximately 74% of both Spitzkop and Rhodium Reefs, however the 26% Black Economic Empowerment (BEE) component, is different for each entity.

The proposed project will exploit the UG2 platinum reef to a final depth of approximately 1 700 metres below surface. The platinum group metals, and all metals and minerals found in association therewith, will be mined and processed at the Rhodium Reefs platinum concentrator which is currently being constructed. Work on re-opening the existing vertical shaft is planned to commence in year 4 of operation and a sub-vertical shaft is planned to be sunk in year 22. At that point in time all environmental authorisations and licences will be in place.

The Rhodium Reefs project will have a limited footprint on the surface (vertical shaft with associated infrastructure), by making use of the existing Spitzkop operation and its infrastructure. It is not anticipated that the Rhodium Reefs project will have significant environmental impacts on the surface. The main environmental aspect of concern will be the impacts on groundwater. Although the entire array of specialist studies will be conducted (where necessary), the core focus will be on groundwater. The impacts that are anticipated relate to:

- A groundwater cone forming resulting in a loss of yield in the aquifer;
- Groundwater quality impacts as a result if the underground activities;
- Impacts of the groundwater make on Rhodium Reef's water balance; and
- Impacts on surrounding rivers, streams and wetlands which are groundwater fed.

In addition to this, the area also has a very large community structure that needs to be taken into consideration. The PPP has already commenced with a kick-off meeting, one-on-one meetings with the directly affected land owners and three public meetings. Rhodium Reefs is fully committed to running an open and transparent process with input from all the Interested and Affected Parties.

At the time of submitting this report there were no significant uncertainties. All knowledge gaps identified during the scoping phase will be addressed during the EIA phase, as per the plan of study (Section 6).

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Abbreviation	Definition
DMR	Department of Mineral Resources
DWA	Department of Water Affairs
Digby Wells	Digby Wells Environmental (Pty) Ltd
Eastplats	Eastplats Group Limited
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMPR	Environmental Management Programme Report
Ktpm	Kilotonnes per month
LDEDET	Limpopo Department of Economic Development and Tourism
mdgl	meters below ground level
mamsl	meters above mean sea level
NEMA	National Environmental Management Act, Act 107 of 1998
PPP	Public Participation Process
Rhodium Reefs	Rhodium Reefs Limited

1 INTRODUCTION

1.1 Background

Digby Wells Environmental (Digby Wells) was appointed as the independent environmental practitioner, on behalf of Rhodium Reefs Ltd (Rhodium Reefs), an Eastplats Group Ltd (Eastplats) company.

Rhodium Reefs plans to undertake underground mining of the UG2 platinum reef (and the associated platinum group metals (PGM) in the Limpopo Province of South Africa. The site is located near Steelpoort in the Waterberg area.

A mining right application has been submitted (November 2011) and accepted (June 2012) by the Department of Mineral Resources (DMR).

This report is intended to define the scope for the full Environmental Impact Assessment which intends to support the authorisation of listed activities as defined by the relevant government notices. In addition to this document and Environmental Management Programme Report will be submitted to the DMR (anticipated date of submission is early December 2012).

1.2 Terms of Reference

Digby Wells Environmental (Digby Wells) was appointed as the independent environmental practitioner, on behalf of Rhodium Reefs Ltd (Rhodium Reefs), an Eastplats Group Ltd (Eastplats) company. The scope of work requires investigating all potential environmental and social impacts, for various activities, in terms of the National Environmental Management Act, Act 107 of 1998 (NEMA); compiling an Environmental Management Programme Report (EMPR) in support of the Mining Right, in terms of the Mineral and Petroleum Resources Development Act, Act 28 of 2002 (MPRDA); and obtaining a waste licence in terms of the National Environmental Management; Waste Act, Act 59 of 2008 (NEM:WA). This includes all specialist studies required to identify the potential environmental impacts of the project and its related activities.

1.3 Regulatory Requirements

1.3.1 National Environmental Management Act, Act No. 107 of 1998 (NEMA)

The NEMA as amended, Environmental Impact Assessment (EIA) regulations GN R543 (“NEMA EIA Regulations”) were published on the 18 June 2010 and came into effect on 2 August 2010. Together with the NEMA EIA Regulations, the Minister also published the following Regulations in terms of sections 24 and 24D of the NEMA:

- Regulation GN R544 - Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and which must follow the basic assessment process as described in section 21 to 25 of the NEMA Regulations;

- Regulation GN R545 – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation and which must follow an environmental impact assessment process as describer in section 26 to 35 of the NEMA Regulations; and
- Regulation GN R546 – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies which if undertaken within the stipulated provincial boundaries will require environmental authorisation. The basic assessment process as described in section 21 to 25 of the NEMA Regulations will need to be followed.

Application for environmental authorisation will be made for any activities identified in terms of these listing notices. A provisional list of activities for which Rhodium Reefs require environmental authorisation is contained in Table 1.

Table 1: Provisional List of Activities identified for the Rhodium Reefs Platinum Operation

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice) :	Describe each listed activity as per project description:
R. 544, 18 June 2010	9	Construction of stormwater management infrastructure
		Construction of sewage management facilities
	11	Construction of stormwater management canals, pipes and dams
		Construction of dirty water containment facilities and infrastructure
	22	Construction of internal haul roads
	26	Any process or activity identified, during scoping phase, in terms of section 53(1) of the National Environmental Management: Biodiversity Act
R. 545, 18 June 2010	3	Storage and handling of fuel, lubricants, various process input chemicals, raw material stockpiles/bunkers, gas, burning oils and explosives
	5	Certain project related activities may require water use licensing
	19	Stormwater management and pollution control dams
	20	The activity requires a mining right

1.3.2 Mineral and Petroleum Resource Development Act, Act No.28 of 2002 (MPRDA)

Rhodium Reefs must be in possession of an approved Mining Right for the mining of platinum on the respective farms, before mining operations may commence. In terms of the MPRDA, various supporting documentation is required for the proposed project as part of the application for a Mining Right. In accordance with Section 23(5) of the MPRDA, the

Mining Right will only come into effect on approval of the EMPR. Following the submission of the Scoping Report, the EMPR will be submitted to the Department of Mineral Resources (DMR), on which a decision is expected to be made.

1.3.3 National Water Act, Act No. 36 of 1998 (NWA)

A water use licence application is being processed by the Department of Water Affairs (DWA), for the entire Eastplats Group companies. There will be a single licence which includes all of the operations, due to the inherently overlapping nature. Once this licence has been approved, an application for amendment will be made to include the activities at Rhodium Reefs. Operations will not commence until this licence is obtained.

1.3.4 Government Notice (GN) R. 704

GN 704 is concerned with regulating the use of water for mining and related activities. Some of the aspects that it addresses include:

- Regulation 4 states that no residue deposit, reservoir or dam may be located within the 1:100 year flood line, or less than a horizontal distance of 100 m from the nearest watercourse;
- Regulation 5 states that no person(s) may use substances for the construction of a dam or impoundment if that substance will cause water pollution.
- Regulation 6 is concerned with the capacity requirements of clean and dirty water systems; and
- Regulation 7 details the requirements necessary for the protection of water resources.

Where any of GN 704 regulations are contravened, the user will apply for exemption of the applicable regulations from the Minister. This application will be submitted to the Limpopo Department of Economic Development Environment and Tourism (LDEDET).

1.3.5 National Environmental Management: Waste Act, Act No. 59 of 2008 (NEMWA)

The waste management activities requiring a waste management licence in accordance with section 20(b) of the NEMWA are indicated in two separate categories, namely Category A and B:

- Category A describes waste management activities requiring a Basic Assessment process to be carried out in accordance with the EIA regulations supporting an application for a waste management licence. This category is for non-hazardous waste related activities; and
- Category B describes waste management activities requiring an Environmental Impact Assessment process to be conducted in accordance with the EIA regulations supporting a waste management licence application. This category is for hazardous waste related activities.

In addition to the NEMA environmental authorisation, application for a waste licence will be made for any activities that are triggered in terms of the NEM:WA.

1.4 Aims and objectives

This Scoping Report provides a desktop description of the current status of the environmental and social aspects in terms of the proposed project, prior to development. The information in the Scoping Report has been compiled from various sources, including consultation with the client, meetings, literature reviews and existing documentation.

The proposed project description and alternatives to the project have been described. This enables readers to gain an idea of what alternatives have been considered for the project and what the potential impacts on the environment may be.

The Public Participation Process (PPP) is valuable as it provides Interested and Affected Parties (I&APs) the opportunity to identify issues relevant to them and to ensure that local knowledge and values are understood and utilised. Their views have been taken into account when deciding between alternative actions, in exploring the importance of issues and management plans.

This report addresses the Scoping Phase requirements as outlined by the NEMA. The aims of the Scoping Report are to:

- Provide information to the authorities and to other interested and affected parties/stakeholders on the proposed project and to allow them to comment and raise issues of concern;
- Demonstrate that alternatives are being considered;
- Indicate how stakeholders are being afforded the opportunity to contribute to the project, and to allow them to verify that the issues they have raised have been recorded and considered;
- Provide a high level desktop description of the baseline receiving environment; and
- Highlight potential impacts that should be investigated further during the EIA process.

1.5 Qualification of Consultant

Digby Wells is an independent environmental solutions provider with extensive experience within the mining industry. The personnel of Digby Wells are qualified and competent within their field of expertise, and where required, junior consultants are guided and mentored by senior and experienced personnel. Suitably qualified sub-contractors are used, where necessary, to ensure that all requirements of the establishment of baseline environmental information are reported on.

Mr Johan Hayes of Digby Wells is the lead Environmental Assessment Practitioner (EAP) for this Project. He is a registered Professional Natural Scientist (Reg. No 400256/09) with ten years' experience as a consulting environmental scientist and EIA project manager.

Neither Digby Wells, nor Mr Hayes, has any vested interest in the proposed project or applicant company.

2 PROJECT DESCRIPTION

2.1 Project Background

An Eastplats Group company, Spitzkop Platinum (Spitzkop), holds a mining right over the farm Spitskop 333KT, where it plans to develop a shallow underground mine. A platinum concentrator is being constructed by Rhodium Reefs Limited (Rhodium Reefs), another Eastplats Group company, on the farm Kennedy's Vale 361KT. Both developments are covered under the same EIA and approved environmental authorisation. The ore mined at Mareesburg Platinum (Mareesburg), another Eastplats Group company, will also be directed to the Rhodium Reefs concentrator. Eastplats owns approximately 74% of both Spitzkop and Rhodium Reefs, however the 26% Black Economic Empowerment (BEE) component, is different for each entity.

A consolidated mining plan has been developed whereby it is proposed that mining from the farm Spitskop will extend through farm boundaries onto the farms De Goedeverwachting and Kennedy's Vale and later onto some of the adjacent portions of the farms Boschkloof 331 KT, Tweefontein 360 KT and Belvedere 362 KT. The extended area will enable the scale of mining operations to be increased (partly through the use of the existing vertical shaft infrastructure on Kennedy's Vale), the life of mine to be materially extended and increase the financial viability of the entire project. Exploration of the entire property has been undertaken and a mineral resource defined.

The proposed project will exploit the UG2 platinum reef to a final depth of approximately 1 700 metres below surface. The platinum group metals, and all metals and minerals found in association therewith, will be mined and processed at the Rhodium Reefs platinum concentrator which is currently being constructed.

Work on re-opening the existing vertical shaft is planned to commence in year 4 of operation and a sub-vertical shaft is planned to be sunk in year 22. At that point in time all environmental authorisations and licences will be in place.

2.2 Mining methods and Ore processing

2.2.1 Open cast mining

No opencast mining methods will be employed. The Rhodium Reefs project will only utilise underground mining techniques.

2.2.2 Underground mining

Trackless mining equipment will be utilised for primary development (haulages and strike drives), to develop and access the ore reserves whilst secondary development (raises, orepasses and step-overs) will be developed conventionally with hand-held rockdrills. Stoping will be done utilising a breast mining layout with hand-held rockdrills. The resources that will be mined include all PGMs and all metals and minerals found in association

therewith including gold, copper, nickel, cobalt and chrome.. Refer to Figure 1 for a mineral resource map.

A total of 9 levels will be accessed from the Spitskop decline system which was covered in a separate mining right application. The vertical shaft will provide direct access to a total of 7 levels below the Spitskop ones and a sub-vertical shaft will provide access to deeper ground.

Cleaning of the panels will be done by means of electrical gully and face winches positioned on strike. The ore will be scraped from the gullies into the centre gully, from where it will be pulled down the centre gully by a centre gully winch into the ore passes.

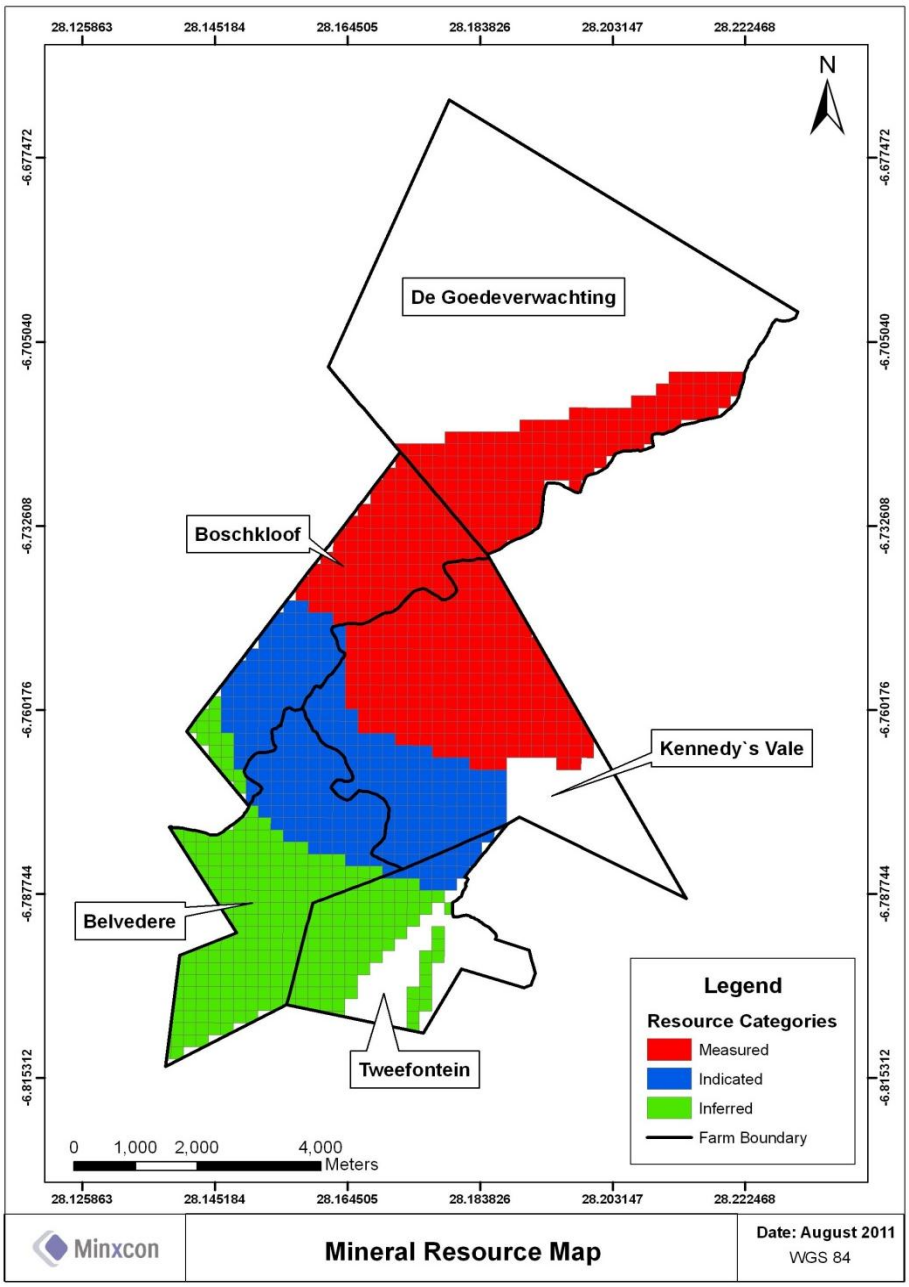

Figure 1: Mineral Resource Map

2.2.3 Ore processing

The concentrator that is currently being constructed will process reef, mined at the Spitzkop and Mareesburg operations. The plant is designed to initially treat 90 kilotons per month (ktpm) of UG2 ore, but is designed in such a way that the footprint can accommodate an expansion to treat 180 ktpm, with further possibility for expansion if required. The details below are specifications related to the 90 ktpm of UG2 ore flow as originally designed for.

Material will be delivered into a tipping bin for primary crushing, after which it will be stored in a coarse material silo with a capacity of 5 000 tonnes. From here it will be fed to the secondary crusher and then the fine material silo, also with a capacity of 5 000 tonnes. In this state the material is ready for primary milling and the various processing phases until the concentrated product is ready to be sent to the Impala Refining Services (IRS) smelter in Rustenburg.

Final tailings from the will be pumped to a 25 m diameter tailings thickener. The tails thickener overflow will gravitate to the process water tank, and thickener underflows will be pumped to the final tails disposal sump. Final tails will be pumped from the final tails disposal sump to the tailings dam using 2 pump sets, each with a 150 mm dedicated line. A common standby pump set will be provided.

The tailings dam will be an earth fill starter dam which during operations will be built up by cycloning. The dam has the capacity for all the planned production for an initial 35 year period; a second site has been identified on land owned by the company if required. Process water will be reclaimed from the dam and returned to the concentrator.

All of the above mentioned infrastructure and facilities are authorised.

2.3 Location and Site Description

2.3.1 Regional Setting

Rhodium Reefs is planning to develop new platinum mine on various portions of the farms Kennedy's Vale 361 KT, De Goedeverwachting 332 KT, Boschkloof 331 KT, Tweefontein 360 KT and Belvedere 362 KT. The project area is near Sekhukhune, Limpopo Province. The project is within the Greater Tubatse LM and the Greater Sekhukhune DM. The project will be located in quaternary drainage regions B41H and B41J. The main watercourses in the area are the Steelpoort and Dwars Rivers. Refer to Figure 2 for more information.

Figure 2: Regional locality map

2.3.2 Property Particulars

Rhodium Reefs is the owner of a significant portion of the surface land of the project area over the farms Kennedy's Vale and Belvedere. De Goedeverwachting and Boschkloof, which formed a part of the late Lebowa trustlands, are owned by the State and significant housing developments are located on parts of this land. Refer to Figure 3 for more information regarding land tenure.

2.3.3 Direction and Distance to Neighbouring Towns

The closest towns are Steelpoort and Burgersfort (15 km and 30 km northeast, respectively), and Lydenburg (70 km east).

2.4 Surface Infrastructure

A summary of the preliminarily identified infrastructure that is required is listed below:

- Temporary construction facilities and infrastructure;
- Waste management: temporary handling and storage of general and hazardous waste, on-site change houses and ablution facilities with sewage treatment plant;
- Surface water management: water supply dams, mine residue facility return water dams, pollution control dams, clean and dirty storm water controls (already obtained Record of decision (RoD);
- Storage and handling of hazardous substances: fuel, lubricants, various process input chemicals, raw material stockpiles/bunkers, gas, burning oils, explosives;
- Services: power lines, pipelines, conveyors, roads, telephone lines, communication and lighting masts;
- Access road and internal roads;
- Drainage structures; and
- Communication network.

Please refer to Figure 4 and 4a for an infrastructure map.

2.4.1 Road Infrastructure

From a regional perspective there is one main access road, the R555 between Middelburg and Steelpoort. The existing roads will be sufficient to access the main site, but access will need to be provided to the vertical shaft site which will service mining on De Goedeverwachting. The existing gravel roads will be utilised and tarred to provide access to the site. The environmental impacts related to the access road is therefore expected to be minimal.

Figure 3: Land tenure map

Figure 4: Conceptual Infrastructure Map

Figure 4a: Conceptual Level Infrastructure Map – Zoomed in

2.4.2 Electricity Requirements and Supply

Rhodium Reefs has already secured 3 MVA of power for the construction phase concentrator at the Kennedy's Vale site. In addition, an application has been made for 40 MVA of installed capacity, of which 20 MVA would be required for the initial 90 000 tonnes per month plant. The 40 MVA will be more than adequate for Rhodium Reefs' requirements. The necessary fees to initiate the acquisition of power have been made and Eskom has commenced the engineering work.

In addition, equipment and activities which will also require electricity are:

- Development;
- Stoping;
- Ventilation (fans);
- Conveyors;
- Lighting;
- Winches; and
- Pumping.

2.4.3 Water Supply

Rhodium Reefs has an existing water allocation from the Groot Dwarsrivier Irrigation Board, for which environmental authorisation has been obtained. This allocation, once converted to industrial usage will be sufficient to service mining up to the rate of 180 ktpm. If additional water is required Rhodium Reefs will apply for an allocation from the De Hoop Dam. Rhodium Reefs is an active participant of the Joint Water Forum which represents the interests of the Mining Industry in discussions with the DWA regarding water usage from the De Hoop Dam.

At a mining rate of 90 ktpm it is expected that raw water usage will be in the order of 3 Mℓ per day.

2.5 Waste Management Facilities

General waste management practices, training and procedures will be in line with the existing waste management plan of Spitskop Platinum.

2.5.1 Industrial and Domestic Waste

Tailings waste produced at the platinum concentrator will be stored in a tailings facility with enough capacity for at least the first 35 years of the mines life. Waste water in the tailings will be drained off and reused in the concentrator. The concentrator is already authorised and beyond this report's scope.

Waste rock from underground excavations (as a result of sinking the shaft), will be used for terracing. The terrace is required in certain areas of the rail loops to create the required

gradients. All dirty runoff from the footprint will be diverted to the PC dam which will have a capacity of 49 000 m^3.

Modern sewage treatment facilities will be installed to treat waste generated on site and discharge water returned to the PC Dam.

2.5.2 Hazardous Chemicals

Hazardous chemicals and waste (e.g. hydrocarbons), will be stored and handled according to the relevant material safety data sheet (MSDS), copies of which will also be kept on site and at the locations of such storage or disposal facilities. All hazardous waste will be removed by an approved contractor and disposed of at a licenced hazardous material landfill site.

2.6 Benefits of the Project

2.6.1 Employment

The project will have a socio-economic benefit in that it will create between 260 and 2 500 jobs (depending on where in the life cycle the project is), the majority of which will be permanent positions. The resultant employment and economic growth will result in the creation of secondary services as well.

2.6.2 National Commodity

Platinum is a precious metal with high demand internationally. The metal is used as an auto catalyst in motor vehicles. This sector is the largest consumer (33%) of platinum. Its industrial use (30%) is widespread. Platinum wire is used in the vapour of methanol, where is acts as a catalyst, converting it to formaldehyde. In addition to the platinum, secondary commodities that will be mined, and the total value of the operation, are given in Table 2.

Table 2: Total estimated quantities and value of commodities to be mined

Commodity	Unit	Mass	Estimated Value (ZAR '000)
Platinum	oz	4,355,842	4,506,206
Palladium	oz	3,007,352	1,561,044
Rhodium	oz	831,144	1,258,653
Gold	oz	76,624	54,852
Iridium	oz	257,891	92,781
Ruthenium	oz	1,085,990	81,862

Nickel	ton	21,510	242,411
Chrome Ore	ton	9,009,000	418,435

2.6.3 Sustainable development

The mine will promote sustainable local economic development, to give communities the skills required to remain economically viable and successful on the long-term, after mine closure.

2.7 Consideration of Project Alternatives

2.7.1 Land use and development alternatives

Some of the land is already used as tribal residential land and will not have another land use type suitable for it. For the remainder of the land, in accordance with the current land uses in the vicinity of the proposed project, parts of the proposed project site could, as an alternative to mining, be used for conservation (maintain the natural habitat where possible) and small scale subsistence farming (the soil would not support large agricultural activities). Although it is recommended that areas not used for mining be utilised or conserved, alternative land uses in some areas is limited by the relatively steep terrain and rockiness of the area. When considering the post rehabilitation land use alternatives, the only option considered to date is rehabilitation back to the current land use capability.

2.7.2 Project Alternatives

Alternatives are being considered for a number of the project components. For each component a set of selection criteria will be used to optimise environmental, technical and economic factors. This alternative selection process cannot be completed without more detailed input from certain specialist investigations still to take place in the EIA phase of this project.

2.7.3 Alternative mining methods

The chosen mining method is the most feasible way to mine this ore body as it is too deep for opencast mining. There are no other alternatives to the mining method.

2.7.4 Alternative processing options

Two options were considered for processing mined ore.

- Option 1: Develop a new site for the mineral processing plant, mine residue disposal facilities, and supporting services and facilities; and
- Option 2: Transporting the mined ore to a nearby mining facility where existing processing, residue disposal and support facilities will be used. This option may require the upgrading of existing infrastructure and/or additional infrastructure at the mine depending on available capacities.

Option 2 was chosen as the preferred option due to the following selection criteria:

- Technical considerations;
- Capacity issues;
- Environmental protection (air, soils, water, surrounding communities, visual aspects, and biodiversity); and
- Affordability.

2.7.5 Alternative transport options

Instead of transporting the ore to the concentrator using underground conveyors, trucks and the road networks could be used. This will increase the traffic on the existing road networks, but will decrease the start-up and maintenance costs. This is not feasible as it will increase the health, safety and environmental risks associated with the project.

2.7.6 Alternative power supply options

It is possible for Rhodium Reefs to generate their own power from diesel instead of taking power from the Eskom grid. However this will significantly increase the capital and operational expenditure as well as having significant impacts on the local social and natural environment. This is not a feasible option.

2.7.7 Alternative water supply options

Currently there are no alternatives in terms of water supply options. It is possible to obtain water from the municipality but currently this supply line is not stable and members of the community informed Digby Wells and the company that they do not receive water form the municipality. This option does not appear feasible at this stage.

2.7.8 Alternative surface infrastructure layout options

Alternative surface layout options are being investigated. The preferred alternative will be chosen with environmental, engineering and economic factors taken into consideration; thereby selecting the most optimal design and placement in terms of these aspects.

2.7.9 No-mining alternatives

The current use of land in the regional surrounding of the proposed project area is farming and agriculture. Although the proposed project area is not currently actively used for farming and agriculture, it has the potential to serve as grazing land or subsistence farming and agricultural land for surrounding communities. The no-mining option would result in the continuation of such land use. Although economically viable, the continuation of agriculture may not provide the level of short-term economic growth to the area that mining would offer, such as increased employment of residents in the area, greater economic input into the area allowing better development of the towns and surrounding areas, and greater socio-economic stability. It should be noted that the entire mine will be underground, with only a

small portion of land being disturbed by the new vertical shaft. All other areas are already disturbed and being utilised for mining and related activities.

3 DESCRIPTION OF PRE-MINING ENVIRONMENT

3.1 Physical Features and Characteristics

3.1.1 Geology

The project site is situated within the eastern limb of the Bushveld Complex in the Limpopo Province. The target minerals are the platinum group metals in the Merensky and UG2 reefs of the Main Zone of the Rustenburg Layered Suite. Both of the reefs outcrop on the farm Spitskop 333 KT (Water Geosciences Consulting, 2007).

The Merensky Reef has an average dip of 12° and the UG2 reef has an average dip of 15°; both to the southwest (Metago, 2009).

The area is underlain by layered igneous rocks of the Bushveld Complex (BC) which has intruded into the volcano-sedimentary strata of the Transvaal Supergroup. The BC is vertically subdivided into the basal Marginal Zone, Critical Zone, Main Zone and Upper Zone. The Critical Zone contains various layers of chromitite, which are of economic interest for chrome and platinum group elements (PGE). The Critical Zone contains the Lower Group Chromitite Layers (LG1 to LG7), the Middle Group Chromitite Layers (MG1 to MG4) and the Upper Group Chromitite Layers (UG1 to UG3). The PGE-enriched Merensky Pyroxenite, which only contains minor chromitite stringers, is developed well above the Upper Group Chromitite Layers (Water Geosciences Consulting, 2007).

The project area falls in the eastern limb of the Bushveld Complex and the upper Critical Zone to the lower Main Zone outcrop in the area, although it is largely obscured by soil cover. To the east of the project area a major succession of Marginal Zone is developed, while a major succession of Main Zone is developed to the west.

3.1.1.1 Structural Features

The dominant structure in the area is the Steelpoort fault. The Steelpoort fault comprises a west dipping (-30º) thrust zone comprising at least three main faults that cumulatively have an apparent throw of 800m in the south, decreasing towards the north. On Spitskop, the fault zone becomes sub-vertical, and has decreased to an apparent vertical displacement of only 80m to the west. Iron-rich replacement ultramafic pegmatite (IRUP) is common in the area, occurring on Spitskop and De Goedeverwachting. The origins and structure of the IRUP are enigmatic; steep dips are observed in drill core and magnetite occurs as well-layered units rather than massive bodies (Water Geosciences Consulting, 2007).

3.1.2 Climate

The project area falls within the Northern Transvaal Climate Zone, as defined by Schulze (1994). The climate is semi-arid and hot with rainfall occurring as a result of thunderstorms. The rainy season extends from November to March, with the peak rainfall occurring in January. Rainfall is somewhat variable with 12% of all years experiencing drought conditions. Frost is rare and generally only occurs during July to August.

Average daily maximum temperatures are about 32ºC in January and 22ºC in July, with extremes of 42ºC and 31ºC respectively. Average daily minima are about 18ºC in January and 4ºC in July, with extremes of the order of 8ºC and -7ºC respectively. There is no weather station on site and the closest SAWS Automated Weather Stations are in Mashishing (Lydenburg), about 50km to the southeast, and in Graskop (about 75km east-southeast). In order to get the prevailing conditions on site, a set of modelled meteorological data for the site location will be ordered.

3.1.3 Visual and Topography

The project area lies within the Steelpoort river valley. This river valley runs in a North-easterly direction, from Kennedy's Vale towards Steelpoort. Surrounding the project area, elevations rise to a maximum of 1 920 meters above mean sea level (mamsl) and within the valley elevations drop to as low as 760 mamsl The difference between the highest and lowest points (1 160 m.a.m.s.l) implies that the valley in which the project area lies is very deep. Slopes on site vary from almost flat (in the valley bottom) to steep, up to 22 degrees on the valley slopes.

3.1.4 Soil and Land Capability

Existing Land Type data was used to obtain generalised soil patterns and terrain types for the project area. The soils present in the project area are represented by three regional land types namely the Ic154, Ea88, Ae27, and Ib192 Land Types (Agis website, National Department of Agriculture, Land Type Survey Staff, 1989). The land types and soils for the project area are presented in Figure 5 and Figure 6. Land type Ae27 will have the highest agricultural potential in the project area; the survey will be focussed on this area.

3.1.4.1 Dominant soil forms contained in Land Type Ic154

According to the land type survey maps 87% of the area consists of midslope positions and generally has steep slopes of 15% or more. As a result these soils are shallow with 85% being rock outcrops. This will impact on the land capability and as a result this area will be non-arable.

3.1.4.2 Dominant soil forms contained in Land Type Ae27

According to the land type survey maps 90% of this land type consists of midslope and foot slope land positions, with 35% in the midslope and 55% in the foot slopes.

The dominant soils that can be expected are the well-drained red soils (Hutton), with soil depths of 500 mm and greater. These soils occupy about 52% of the Land Type. The clay percentages in these soils vary between 20% - 30% and as result of a combination of soil physical factors these soils will have a medium to high land capability.

21% of the Land Type consists of strongly structured duplex soils and the remainder of very shallow soils with depths less than 500 mm.

Figure 5: Land types around the project area

Figure 6: Soil forms of the project area

3.1.4.3 Dominant soil forms contained in Land Type Ea88

According to the land type survey maps 70% of this land type consists of foot slope positions and 25% of valley bottom positions. These positions have a gentle slope of 1% - 3%.

In the foot slopes the dominant soil form is the Arcadia (Ar) soil form, these soils are high in clays and have shrink swell properties. The valley bottom positions mainly consist of the wetter form of the Arcadia called the Rensburg (Rg) soil form which is typically associated with wetland areas.

3.1.4.4 Dominant soil forms contained in Land Type Ib192

According to the land type survey maps 70% of this land type consists of foot slope positions and 25% of valley bottom positions. These positions have a gentle slope of 1% - 3%.

This land Type is dominated by 65% rock outcrops and 25% shallow soils, which will place 90% of this area in the Non-arable class.

Most of the project area has extremely shallow soils and steep slopes, the fertility in these soils are of no value, however the soils that do have some depth, it can be assumed that fertility will be low due to leaching of base nutrients by rain and the natural vegetative use of nutrients. The Land type with some potential, Ae27, has a clay percentage of between 20%-30% which is good, however once again low fertility can be expected for the reasons discussed above.

The general degradation of the soil caused by the stripping and stockpiling that takes place during the opencast mining operation would result in land-use changes. Cultivated arable land suitable for crop cultivation will be reduced resulting in a change in land use. Normally this land use change is from arable agriculture to grazing due to a decrease in soil capability.

It is expected that only a small portion of the area is being used for commercial agriculture as the soils in this area should predominantly be shallow and non-arable.

3.1.5 Flora

The project area is located in the Sekhukhuneland Centre of Plant Endemism (SCPE) which is located within the Mixed Bushveld. The SCPE is formed by the surface outcrops of the Rustenburg Layered Suite of the eastern. The dominant vegetation type in the project area is Sekhukhune Plains Bushveld. A total of six vegetation communities are associated with the project area, these include Euclea-Petalidium (Plains Shrubland), Acacia-Terminalia (Plains Woodland), Acacia-Dichrostachys (Degraded Plains Woodland), Kirkia-Wilmsii (Mountain Woodland), Acacia-Combretum (Riparian Woodland) and Acacia-Olea (Riparian thicket). The Mixed Bushveld is generally considered to be under conserved.

Much of the vegetation within the project area has experienced considerable transformation as a result of mining and agriculture. These modified areas are classified as “No Natural Habitat Remaining”, while most of the remnant patches of indigenous vegetation within the study area have been classified as “Highly Significant”, or “Important and Necessary” in terms of the Mpumalanga Biodiversity Conservation Plan (MBCP). “Highly Significant” is a category in which areas of high biodiversity value are placed. The MBCP delineations for the

project area are presented in Figure 7. Within the context of mining, the MBCP land-use guidelines stipulate that no surface mining, and only restricted underground mining, should be permitted. Instead, land use compatible with biodiversity conservation, such as conservation management and game farming, should be encouraged.

The majority of the project area has been disturbed by agricultural practices and mining activities, these areas are generally classified at “Least Concern” and “No natural habitat”. The main concern from a biodiversity perspective is the threatened status of the remaining pockets of natural habitats and the potential for the woodland patches and rocky patches to support species of importance. Some 38% of the area is classified as having a low ecological sensitivity, 22% of the area is of a high ecological sensitivity and 40% is classified as medium sensitivity.

Conservation-important plants which either have Red Data status, are protected by legislation and / or those considered endemic to the SCPE have been considered. A total of 11 Red Data species potentially occur in the vicinity of the project area, of which eight have been confirmed for neighbouring areas. All eight Red Data species were found in Euclea – Petalidium Plains Shrubland, making it the most important community for Red Data plants within the project area. In addition to this, fifteen species endemic to the SCPE have been recorded for the project area as well as eleven species protected by legislation. The location of conservation-important plant species are most likely associated with area classified as “High Significant” and “Important and Necessary” according to the MBCP (Figure 7). The most important protected species are:

- *Rhus batophylla* (Bramble Currant) – has a National Red Data status of Vulnerable and a very restricted distribution within the Steelpoort River valley; several small colonies were found in incised stream lines within Euclea – Petalidium Plains Shrubland;
- *Lydenburgia cassinoides* (Sekhukhune Bushmans-tea) – has a National Red Data status of Near Threatened and a provincial status of Vulnerable; is restricted to the SCPE; scattered trees were found along incised stream lines within Euclea – Petalidium Plains Shrubland;
- *Jamesbrittenia macrantha* - has a National Red Data status of Near Threatened and is restricted to the SCPE; scattered in areas of bare soil within Euclea – Petalidium Plains Shrubland; and
- *Euphorbia enormis* – has a provincial status of Near Threatened; common throughout Euclea – Petalidium Plains Shrubland.

Figure 7: Mpumalanga C-Plan

3.1.6 Fauna

Mammals: *Acacia – Terminalia* Plains Woodland and *Kirkia wilmsii* Mountain Woodland each potentially support more than 30 species of conservation-important mammals.

Birds: The Lanner Falcon, which is classified as Near-Threatened, has been identified in the project area. A total of eight bird species which are all classified as Near-Threatened are expected to occur within the project area. *Acacia - Terminalia* (Plains Woodland) and *Acacia – Combretum* (Riparian Woodland) potentially support the most Red Data species.

Reptiles: The Water Monitor has been identified in the Steelpoort River and is the only reptile which has been confirmed for the project area. A total of 13 conservation-important reptiles possibly occur within the project area, of which one, the Southern African Python, has Red Data status.

Amphibians: A total of 10 amphibian species are expected to occur within the project area. All of the expected amphibian species are classified as Least Concern. The amphibian species are expected to occur predominantly within the local aquatic and wetland areas, namely the banks of pans, open water areas, rivers, inundated grasses and reedbeds. Selected species are also expected to occur within trees and open ground.

Invertebrates: A total of four Red Data Lepidoptera species are expected to occur within the project area. Three of these species are classified as Least Concern and only *Platylesches dolomitica* (Hilltop hopper), is classified as vulnerable.

It is assumed that the faunal species will be supported, as well as dependant on, the floral communities within the project area. The areas which have been delineated by the MBCP (Figure 7) as “High Significant” and “Important and Necessary” are expected to be the areas where the *Acacia – Terminalia* (Plains Woodland), *Kirkia wilmsii* (Mountain Woodland) and *Acacia – Combretum* (Riparian Woodland) are predominantly supported.

3.1.7 Surface Water

3.1.7.1 Catchment Description

The proposed project is located in the Steelpoort River catchment within the quaternary catchments of B41H and B41J of the Olifants Water Management Area (WMA 04). Approximately 40% of the project area footprint is in quaternary catchment B41H and the remainder in B41J. The sub-catchments within the quaternary catchments covering the proposed project area will be determined in the EIA phase of the study. The Dwars River, a tributary of the Steelpoort River (in the Olifants River basin) flows through the project area.

The surface water attributes in terms of the Mean Annual Runoff (MAR), Mean annual Precipitation (MAP) and Mean Annual Evaporation (MAE) of the quaternary catchments are summarised in Table 3 (WRC, 1994).

Table 3: Surface water attributes of the relevant quaternary catchments

Catchment	Area (km^2)	Rainfall Zone	MAP (mm)	MAR (mm)	MAE (mm)
B41H	410	B4B	621	18	1600
B41J	691	B4B	598	22	1550

3.1.7.1.1 Water Resources

There are two streams draining the proposed project area namely the Steelpoort and the Dwars Rivers. The Dwars River is a tributary of the Steelpoort River and flows in a northerly direction to confluence with the Steelpoort River within the proposed project area. The Steelpoort River drains through the project site flowing from southwest in a northeasterly direction.

In the EIA phase it will be determined which of the factors present (shallow groundwater and wetlands) sustain the streams

3.1.7.2 Surface Water Quality

The Olifants WMA water quality is under severe stress from current and historical coal mining activities. Based on the 2007 water quality data from the Spitzkop EIA (Metago, 2009), iron (Fe), aluminium (Al) and, to a lesser extent, manganese (Mn) were slightly elevated with these same parameters increasing slightly in concentration at the downstream point on the Steelpoort River. This could be indicative of the influence mining activities have around Spitzkop.

The EIA phase field survey and water quality sampling of the Dwars and the Steelpoort Rivers will be used to determine the baseline water quality.

3.1.7.3 Surface Water Quantity

Stream flow into the proposed study area is recorded at the DWA gauging station B4H009 on the Dwars River (S 24°54’45”; E 30°06'12"), located upstream of the proposed project area. The normal dry season flow is in the range of 0 m^3/s to 0.02 m^3/s. The stream flow recorded at the gauge for the period 2006 – 2012 is indicated in Figure 8.

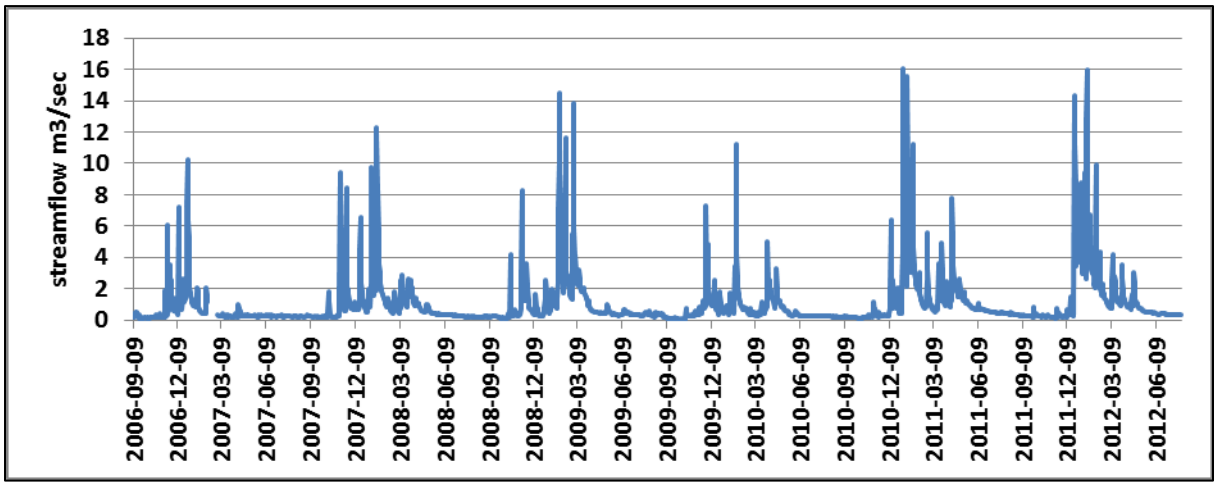

Figure 8: Stream flow record of DWA gauge B4H009 for the period 2006 to 2012

During the EIA phase, base flow will be calculated using the Recursive Digital Filter to further understand the baseline stream flow dynamics.

The peak flood flow volumes will be calculated for sub-catchments (to be delineated in the EIA Phase) using the Rational and Alternative Rational methods.

3.1.7.4 Surface water use

The predominant surface water use within the proposed project area seems to be domestic use by rural settlements, irrigated agriculture, agricultural livestock watering and mining. These uses will be confirmed during the EIA phase.

3.1.8 Aquatics

The main drainage feature within the proposed project area is the Steelpoort River. The Steelpoort River is a large system and as such shows considerable seasonal variability in flow and water clarity. The system alternates between areas of good rocky habitat and areas of uniform sandy substrate providing limited cover for aquatic biota (SAS, 2011).

The secondary drainage feature within the project area is the Dwars River which is a major tributary of the Steelpoort River. The Dwars River runs through the Dwars River valley further upstream. The Dwars River is also renowned for having excellent instream habitat conditions and supporting a high level of aquatic biodiversity with several sensitive aquatic taxa known to be occurring in the system.

Additional aquatic resources within the project area include several small natural drainage lines, which under natural conditions can be considered a non-perennial stream most likely only flowing after rainfall events.

The project area is located within a part of the B41H and B41J quaternary catchments. These drainage features are major tributaries of the Olifants River primary catchment. According to Kleynhans (2000) these quaternary catchments are in a largely natural state and should be managed in support of a natural state. According to the MBCP (Figure 9) the local river systems have been classified as “no protection required”.

Figure 9: Aquatic biodiversity sub catchments

This is obviously conflicting indications for the state of the systems. An aquatic survey was completed by Scientific Aquatic Services (SAS, 2011) and the study concluded that the local water resources are in a largely natural state.

The general (*in situ*) water quality of the Steelpoort and Dwars rivers is in an acceptable state. The integrity of the habitat associated with the systems has been affected by incisions, erosion as well as some riverbed modification is evident. In spite of these modifications, the general habitat integrity is considered to be largely natural for the systems. The macroinvertebrate community associated with the systems is likely to be in a modified state when compared to natural conditions. These modifications are not likely to be as a result of impaired water quality but rather varying flow conditions. The macroinvertebrate community supports the *in situ* water quality findings. The fish communities associated with the systems is in a modified state. A total of 12 fish species are expected to occur within the catchment area (SAS, 2011).

3.1.9 Wetlands

The project area is located on the gentle undulating plains of the Steepoort River valley as well as the Dwars River valley. The Steelpport River and the Dwars River flood zones are pronounced on either side of the two rivers with typical riparian zones. The riparian zone area is characterised by unconsolidated recent alluvial soils and typical riparian vegetation. According to the National Freshwater Protected Areas Programme (NFEPA) the study area is not associated with any wetland systems of ecological importance (Figure 10 and Figure 11).

Based on the findings of the desktop wetland assessment, a number of seepage and valley bottom wetland units were identified. According to Metago Environmental Engineers (2009), the wetland areas are dominated by hydromorphic and structured soils, and plant life that are associated with aquatic processes. The soils are generally dark grey to black in the topsoil horizons, and high in transported clays, and show pronounced mottling on gleyed backgrounds in the subsoils. These soils occur within the zone of groundwater influence.

3.1.10 Groundwater

3.1.10.1 Groundwater occurrence

Three aquifer types are present in the study area as described below. All three types are regarded as minor aquifers. Although the Steelpoort fault runs along the valley, there is no evidence (as far as is known) of high groundwater yields associated with the fault in this area, and it therefore cannot be classified as a major aquifer (Water Geosciences Consulting, 2007).

Figure 10: Wetlands overview

Figure 11: Wetlands - Zoomed in

3.1.10.1.1 Shallow alluvial aquifers (unconfined)

Alluvial aquifers are present in locally distributed unconsolidated sand, silt and clay sediments deposited along the lower reaches of the Steelpoort River. This aquifer is characterized by low to moderate permeability with boreholes typically intersecting seepage water. Recharge is primarily downward leakage from the overlying river and in direct response to rainfall events.

These aquifers provide groundwater storage and recharge to the underlying secondary weathered bedrock aquifers with which they are in hydraulic connection, as well as interacting and contributing to the baseflow of the main rivers. Due to their limited size and/or probable low transmissivity and connectivity to the river baseflow, the alluvial aquifers are not considered suitable groundwater production targets (Water Geosciences Consulting, 2007).

3.1.10.1.2 Shallow weathered bedrock aquifers (semi-unconfined)

Norite, anorthosite and pyroxenite rocks of the Bushveld Complex are characterized by a zone of weathering, which provides suitable porosity and permeability conditions to host an unconfined to locally semi-confined aquifer. The groundwater potential in weathered bedrock aquifers is generally poor to moderate with yields from 0.1ℓ/s up to 3ℓ/s. Recharge is mainly direct in response to seasonal rainfall and downward leakage from the alluvial aquifer (Water Geosciences Consulting, 2007).

3.1.10.1.3 Deep fractured bedrock aquifers (Confined)

The deeper regional confined fractured bedrock aquifer covers the greater part of the catchment and represents fresh and fractured bedrock below the weathered zone. The presence of un-weathered Bushveld mafic rocks with very low permeability, poorly connected joint/fractures and dolerite/diabase dykes acting as barriers to groundwater flow ensures that the aquifer system is confined and poorly connected with shallower bedrock and perched aquifers.

Aquifer testing on a range of boreholes indicates that the average upper aquifer yield is between 0.7 and 1.66 ℓ/s. Higher yielding boreholes have been identified in the area and can be associated with isolated structures within the bigger project area (Water Geosciences Consulting, 2007).

The average “background” yield for boreholes drilled into the Bushveld Complex in the greater Steelpoort valley area is between 0.5 and ℓ/s. Higher yields may be obtained close to surface drainages (proximity of alluvium), where the Bushveld rocks are fractured, and/or where weathering is deeper than normal. Bushveld Complex aquifers can vary considerably over short distances in terms of hydraulic properties. There is a poor correlation between borehole depth and borehole yield.

Most water strikes are shallow (6 to 22 m below surface) and is mostly associated with fractured, weathered norite or pyroxenite along no flow boundaries presented by dolerite dykes. The water levels are relatively shallow (4 and 7 meters below ground level (mbgl)). From previous groundwater investigations, most boreholes sited away from the river valley

deliver blow-out yields of less than 0.1 ℓ/s and are mostly dry (ERM, 2008). Groundwater flow is generally influenced by the topography in the project area (Digby Wells, 2012). The flow is likely to be from the higher ground in the east and west towards water courses, which occur in lower lying areas.

In order to provide a sustainable supply, the borehole efficiency depends not only on the hydraulic properties of the borehole and immediate surrounding aquifer, but must also be in continuity with a suitable resource of water which is recharged in some way. In Bushveld aquifers, this resource is likely to exist in more fractured areas, or areas of deeper weathering, rather than as a more uniform regional resource. The resource available to each borehole may therefore be limited in extent, and although a given borehole may be able to yield a relatively large amount of water initially, it may not be able to sustain this continuously. Only long-term testing (or usage) will help to determine true sustainable rates of supply.

The most sensitive, susceptible and vulnerable groundwater zone to groundwater contamination therefore represents those E-W and NE-SW trending fractures/intrusive structures cross-cutting the Dwars River and Steelpoort River valleys. These also represent the high yielding zones for groundwater resource development (ERM, 2008).

Boreholes in and around the project area are used for domestic and agricultural (livestock and irrigation) purposes.

3.1.10.2 Groundwater quality

Previous studies showed that the groundwater is generally very elevated in nitrate with certain boreholes reflecting elevated sulphate and iron, and to a lesser extent, magnesium. The class of the water was determined to be between 2 (marginal) and 4 (dangerous) in terms of suitability for domestic use. This is mainly due to the elevated nitrates (Digby Wells, 2012).

The dominant magnesium-carbonate character of the groundwater indicates a recently recharged and shallow groundwater with its natural chemical character attributed to silicate weathering processes in the weathered zone together with calcium (Ca) and magnesium (Mg) ion exchange (Water Geosciences Consulting, 2007).

It should be noted that the groundwater quality in certain areas is likely to be influenced by the old Vantech Vanadium project (Lion Plant), which is causing a pollution plume of which the extent is unknown. The plume was investigated by Jasper Muller Associates in 2009.

A number of the samples were collected in the vicinity of the plume emanating from the old Vantech vanadium site. The extent of the plume and the exact composition are not known with certainty (Jasper Muller report could not be sourced), but it is likely to have resulted in elevated levels of sulphate, as well as minor elements harmful to human health such as chromium and vanadium. The tailings dams in the area are likely to increase mineralization of the groundwater and may introduce further pollutants. The general direction of groundwater flow is towards the Steelpoort River, which is likely to be the ultimate receptor of poorer quality groundwater (Water Geosciences Consulting, 2007).

Locally groundwater quality is not good due to elevated levels of sulphate, nitrate, magnesium, total dissolved solids (TDS) and other constituents. This makes most of the borehole water unsuitable for domestic use (Water Geosciences Consulting, 2007).

Whilst much of the poorer water quality is natural (groundwater in the Bushveld Complex frequently has elevated dissolved ion concentrations), some of the analysis did suggest anthropogenic pollution. The median value for nitrate of the fifteen Metago samples is 59mg/l (as N), well above the upper limit for a Class 1 water of 10mg/l. Other indicators of anthropogenic pollution can be ammonia (found at REM-B2), chloride and boron (Water Geosciences Consulting, 2007).

The water appears to be well buffered, with pH values near to neutral or slightly alkaline.

3.1.10.2.1 The Lion Plant plume

A number of the samples were collected in the vicinity of a plume of groundwater pollution emanating from the Lion Plant smelter. The extent of the plume and the exact composition are not known with certainty, but it is likely to have resulted in elevated levels of sulphate, as well as minor elements harmful to human health such as chromium and vanadium (Water Geosciences Consulting, 2007). The tailings dam for the area is likely to increase mineralization of the groundwater, and may introduce further pollutants. The general direction of groundwater flow is towards the Steelpoort River, which is likely to be the ultimate receptor of poorer quality groundwater. It is possible that a trend towards increased SO_4-ion concentrations reflects this plume.

The conceptual groundwater model of the project area developed thus far can be summarised as follows:

- Groundwater is mainly found within an upper zone of weathered Bushveld material (shallow weathered aquifer), or material transported by rivers (shallow alluvial aquifers). This zone is likely to be a few tens of metres thick at most. The un-weathered Bushveld rock underlying the shallow aquifer zone is a fractured or secondary aquifer and has much lower transmissivity and storage values;
- The deep, un-weathered Bushveld Complex rocks contain relatively little groundwater, and the sub-surface mining operations are expected to be mostly dry. However, past work has shown the existence of deeper fracture systems associated with groundwater inflows into Bushveld Complex mines, although at present these are imperfectly understood;
- River alluvium is found close to the existing perennial rivers, but also appears to be associated with ephemeral river courses which are dry for most of the year;
- Groundwater flow in the area of investigation is driven mainly by topography and tends to flow from the higher ground on either side of the Steelpoort River towards the river. The river thus receives groundwater contributions to baseflow (gaining river) and it is this baseflow that sustains river flow during dry periods. Pumping of groundwater modifies these regional flow patterns locally. Boreholes close to the river are likely to intercept ambient flow towards the river and eventually to induce flow from the river to

the borehole intakes. The Steelpoort River is likely to be the ultimate receptor of any contaminants introduced into the shallow groundwater;

- Recharge of groundwater is from rainfall falling across the study area, and particularly on the higher ground on either side of the river due to topographic effects;
- Dykes, fractures and other linear anomalies modify aquifer properties locally and may provide zones of enhanced groundwater availability. Zones of deeper weathering are also regarded as promising groundwater targets. Intensive geophysical exploration is needed to characterise these zones in detail. The deep, un-weathered Bushveld rocks have very little groundwater in general; and
- Pumping of boreholes for water supply, dewatering, or other purposes will modify groundwater flow directions and may induce flow from the river.

3.1.10.3 Groundwater monitoring

Two water monitoring programmes are currently taking place in the project area:

- Groundwater Consulting Services was appointed by Eastern Platinum Limited to do the quarterly water monitoring at Eastern Platinum's Eastern Limb Operations, namely Kennedy's Vale, Spitzkop and Mareesburg. Water monitoring by GCS at Spitzkop and Kennedy's Vale began in March 2012 and is happening on a quarterly basis. Mareesburg will be included in the monitoring programme once the boreholes have been drilled; and
- SLR Consulting is also involved to monitor the water quality for the Eastplats, Spitzkop Operation. A hydrocensus was performed in April 2007 to identify the surrounding water uses and users. A water monitoring program was then established using this data. Limited activity occurred at the mine through 2008 and 2009, with no water monitoring occurring. Monitoring commenced again during 2010. The operation currently consists of a few mobile offices, a sewage plant and basic infrastructure. The environmental management plan (EMP) was approved in August 2011 and construction of the project has commenced. The first sampling run for surface and groundwater was performed in February 2012.

3.1.10.4 GCS Groundwater monitoring

The current water monitoring programme conducted by GCS includes quarterly groundwater and surface water monitoring (GCS, 2012). The water monitoring programme includes:

- Spitzkop:
  - 4 groundwater sites – SP GW M01, SP GW M02, SP GW M03 and SP GW M10; and
  - 3 surface water sites – SP SW M01, SP SW M02 and SP SW M03.
- Kennedy's Vale:
  - 5 groundwater sites – KV GW M01, KV GW M02, KV GW M03, KV GW MB33 and REM B1;

- 7 surface water sites – KV SW M04, KV SW M05, KV SW M06, KV SW M07, KV SW M010, KV SW M11 and KV SW M12; and
- 4 drinking water sites – FHW M01, GHW M01, STW M02 and MNW M03.

Results from the first quarter 2012 are presented below according to their level of compliance[1]. The South African Water Quality Guidelines (SAWQG) for Domestic Use (Department of Water Affair, 1996) was used. Water quality objectives for this area have not been defined to date.

3.1.10.4.1 Spitzkop Groundwater

- **SP GW M02 and SP GW MO3**: Elevated total dissolved solids, magnesium (SP GW M03), chloride, nitrate and iron (SP GW M02); and
- **SP GW M01**: Elevated TDS, conductivity, calcium and magnesium, possibly due to natural water-rock interactions. Chloride concentration high, but still compliant.

3.1.10.4.2 Kenndy's Vale Groundwater

- **KV GW M01, KV GW M02, KV GW M03 and KV GW MB33**: Very high dissolved salt content, with TDS, calcium, magnesium, sodium, chloride (KV GW M01 and KV GW M03), sulphate, nitrate (except KV GW M03), ammonia (KV GW MB33) and iron (KV GW M01); and
- **REM B1**: Elevated TDS, conductivity, calcium and magnesium, possibly due to natural water-rock interactions.

3.1.10.4.3 GCS Water monitoring recommendations

- Monthly rainfall data from Spitzkop and Kennedy's Vale are requested. This will assist in the interpretation of borehole water level trends;
- Borehole SP GS M01 had a blockage at approximately 9 m. It is recommended that this is cleared;
- The high nitrate and chloride concentrations in the Spitzkop groundwater should be investigated. A groundwater study of the groundwater flow directions should be done to assist in determining the source of the elevated concentrations;
- The sewage treatment process should be investigated. Bacterial contamination can lead to the spread of disease, and a high ammonia concentration can lead to elevated nitrate;

[1] **Red** areas require immediate attention due to levels exceeding the compliance objectives by a large margin or immediate management measures need to be implemented. Yellow is where constituents have exceeded the compliance objectives, or a trend is suspected. **Green** indicates an acceptable water quality. Process water is not expected to comply with domestic water standards, but the standards are used for comparative purposes. Process or waste water is therefore designated as purple. Samples that were not possible due to technical problems are as designated blue, and white represents monitoring points that were not tested for water quality.

- As treated sewage usually has different compliance standards from other water, it is requested that Eastplats provide the standards required by the plant to GCS;
- The Kennedy Vale borehole KV GW MB33 had very poor quality water. This borehole appears to be down gradient of a tailings dam, process water dams and other infrastructure. It is recommended that additional boreholes are drilled in order to assess the impact of the concentrator plant and associated activities. The stormwater management of the above infrastructure should also be investigated; and
- The Kennedy's Vale boreholes that lie between the sewage plant and the Steelpoort River had very poor quality water. It is unclear whether the contamination originates from the sewage plant or the up-gradient infrastructure. This should be investigated.

3.1.10.5 SLR Groundwater monitoring

SLR Consulting were monitoring 15 groundwater sites (SLR, 2012) and concluded the following:

- Groundwater from the three boreholes at the sewage plant at Kennedy's Vale continue to indicate elevated parameters to exceed the SANS Class 2 standard. Either the sewage plant and/or the upstream mining operations are contaminating the groundwater. The groundwater from the region where the temporary offices are located (area of the new plant) was elevated in various parameters to indicate contamination has or may still be occurring. Having access to the upstream mining operations water quality results will aid in understanding these polluting sources; and
- Iron is elevated in many of the borehole monitored. This is most likely due to the steel make-up of the borehole. New purposefully constructed water monitoring boreholes needs to be installed to prevent contamination from steel constructed boreholes.

3.1.10.5.1 SLR Water monitoring recommendations

The following recommendations were made:

- Investigate the source of groundwater contamination at the sewage plant to determine if it is indeed sewage or else another source. The sewage plant must be upgraded to prevent further seepages;
- Access to the upstream mining operations water quality results which will aid in understanding sources of high salts in certain of the groundwater; and
- Install monitoring boreholes at the prescribed locations now that construction is occurring.

3.1.11 Air Quality

The area within the proposed project site is surrounded by several residential areas, mining and agricultural activities. The main sources of pollution include emissions from ferrochrome smelters for Xstrata and Samancor, various open cast mining activities that emit dust and some hazardous gases. Vehicles emit hazardous gases and particulate matter as they travel

on unpaved roads. There is combustion of domestic fuels such as coal and firewood by the settlements adjacent to the proposed site. Agricultural activities also produce nuisance dust.

3.1.12 Noise

Current ambient noise levels in the area are already significantly impacted on by the prevailing platinum and chrome mining activities in the surrounding Steelpoort area. Existing noise sources will typically be the mining activities as well as vehicular activity on the R555 and secondary roads in the area.

3.2 Cultural Characteristics

3.2.1 Sites of Archaeological and Cultural Interest

As part of the Environmental Impact Assessment (EIA) and Environmental Management Programme Report (EMPR), a heritage assessment is required for the project area. The heritage assessment should include a detailed and comprehensive baseline study, characterising the cultural landscape. With the intention of providing the relevant heritage authority with sufficient information to evaluate the heritage assessment, it is necessary to present a baseline account or scoping report in the form of a Heritage Statement. Once the Heritage Statement has been compiled, the relevant heritage authority will be notified with a Notice of Intent to Develop (NID) which will be informed by the Heritage Statement.

From the desktop study several heritage resources were identified in and surrounding the project area. These are summarised in Table 4.

Table 4: Identified heritage resources

Site Name	Longitude	Latitude	Site Type	Description
2429DD1/Wits	-24.8025	29.9725	LIA	Stone Walled
2430CA1/Wits	-24.72944444	30.22583333		No description
2430CC1/Wits	-24.87777778	30.12055556	EIA	Archaeological Iron Age Site – S.35
2430CC2/Wits	-24.87777778	30.11527778	LIA	Archaeological Iron Age Site – S.35
2430CC3/Wits	-24.87777778	30.10833333	SA	Archaeological Stone Age Site – S.35
Spitskop333/GSSA	-24.7855	30.15377778	BG	Burial Ground - S.36
Grootboom336/GSSA	-24.74705556	30.17936111	BG	Burial Ground - S.36
Goudmyn337/GSSA	-24.74316667	30.18458333	BG	Burial Ground - S.36

Site Name	Longitude	Latitude	Site Type	Description
RHO1867/HS001	-24.83516667	30.08516667	BS	Built Structure visible on 1954 aerial image - S.34
RHO1867/HS002	-24.83772222	30.09416667	BS	Built Structure visible on 1954 aerial image - S.34
RHO1867/HS003	-24.82522222	30.09308333	BS	Built Structure visible on 1970 aerial image - S.34
RHO1867/HS004	-24.81080556	30.0955	BS	Built Structure visible on 1970 aerial image - S.34
RHO1867/HS005	-24.80333333	30.08791667	BS	Built Structure visible on 1954 aerial image - S.34
RHO1867/HS006	-24.869555	30.097506	BS	Rectangular structure visible on satellite imagery - S.34
RHO1867/HS007	-24.836218	30.1222	LIA	Stone walling visible on a koppie - S.35
2430CC/KVL 01	-24.844629	30.093298	BS	Historic water canal - S.34
2430CC/KVL 02	-24.84304	30.09288	LIA	LIA / Historic homestead - S.35
2430CC/KVL 03	-24.84266	30.09193	LIA	LIA / Historic stone walling - S.35
2430CC/KVL 04	-24.842919	30.091593	LIA	LIA / Historic walling, possible terracing and possible grain bin platforms - S.35
2430CC/KVL 05 and 06	-24.842909	30.091568	BS	Historic to recent ruins - S.34 / 35
2430CC/KVL 07	-24.84206	30.092421	BS	Historic to recent ruins - S.34 / 35
2430CC/KVL 08	-24.842063	30.09335	LIA	LIA / Historic walling - S.35
2430CC/KVL 09	-24.838528	30.093886	SA, IA	Early to late farmer ceramics, MSA and LSA debitage, Eiland and Icon ceramics - S.35
2430CC/KVL 10	-24.83958	30.091998	LIA	Late farmer circular walling and ceramics - S.35

The geology of the project area suggests that there is no intrinsic paleontological value and that the likelihood of identifying paleontological resources is low.

Artefacts associated with the Stone Age have been identified within and surrounding the project area. There is a high probability that Stone Age lithic scatters will be identified.

Heritage resources pertaining to the Iron Age have been recorded within the region, as well as within the project area. These span from the Middle – Late Iron Age and are associated with *Eiland* and *Icon facies.* Ceramic scatters as well as stone walled settlements are likely to be identified within the project area.

Historically, the Pedi have been active in the region. Artefacts from the historical period associated with the Pedi may be present within the project area. This could include artefacts associated with the Boer-Pedi War and Sekhukhune War. Additionally, artefacts associated with the Boers may also be present.

Homesteads associated with the farms have been identified through historical imagery from 1954. Built-up areas in this region may also include buildings associated with the establishment of townships for the evicted and displaced black groups. These townships were established in the 20th century and therefore any buildings in these areas may be older than 60 years, which in accordance with Section 34 of the NHRA, would make them heritage resources.

Burial grounds and graves associated with the original farm homesteads as well as the Ga-Mampuru and Ga-Matate communities may be identified in the project area. Desktop survey indicated that at least three burial grounds occur in close proximity to the project area.

3.2.2 Socio-economic Environment

3.2.2.1 Project location

The proposed project is situated in Wards 2 and 27 of the Greater Tubatse Local Municipality (LM), which is part of the Greater Sekhukhune District Municipality (DM). The project site is intersected from the southwest to the northeast by the R555 road (which runs past the new De Hoop Dam towards the town of Steelpoort) and by the Steelpoort River, which runs roughly parallel to the road. Ward 2 of the municipality is situated to the south of the river, and encompasses the portions of the farms Kennedy's Vale, Belvedere and Tweefontein that are included in the project area. Ward 27 is situated to the north of the river, and includes the portions of the farm Boschkloof that form part of the project area.

Ward 27 has a significantly denser population (when compared with Ward 2), with several villages situated in the area between the Steelpoort River and the Steelpoort Mountains (which occupy the northern part of the project area). These villages include Ga-Mampuru (in the southern part of the project area) and Ga-Matate (towards the north). Ward 2, to the south of the river, is mostly occupied by commercial farming and mining. The town of Steelpoort is situated about five kilometres to the east of the project site. It is a rapidly growing town that serves the surrounding mining community and is largely characterised by heavy engineering enterprises, suppliers to the mines, transport facilities, building material suppliers, distributors/wholesale, medium density housing and a small retail component.

3.2.2.2 Population

The project area occupies a total surface of about 7393 ha. Of this area, about 638 ha (or 9%) is occupied by settlements comprising the villages mentioned above. Visual inspection of available satellite imagery places the average density of these settlements at about 600 households per km^2. This implies that the estimated total population of the project area is approximately 3 600 households. These settlements are surrounded by about 850 ha of subsistence agricultural fields; these occupy roughly 12% of the project area.

Due to the large number of mines in the area, its population is somewhat more prosperous than many other rural communities in the surrounding area. Nevertheless, unemployment is high (estimated to be in the order of 50% of the economically active population) with a large proportion of the population being dependent on migrant remittances, social grants, subsistence farming and natural resources to sustain their livelihoods.

3.2.2.3 Political structures

The villages in the project area are situated on communal land within legally recognised traditional authorities governed by chiefs and their respective tribal councils. It should be noted, however, that the boundaries between traditional authorities' areas of jurisdiction are not always well-defined, as households paying allegiance to different traditional authorities are sometimes interspersed.

The traditional authorities listed below therefore include not only those authorities whose formal areas of jurisdiction overlap with the project area, but also those who are paid allegiance by some of the households resident in the project area. These traditional authorities are:[2]

- The Roka Phasha Phokwane Traditional Authority, led by Kgoshi Phasha. This traditional authority's formal area of jurisdiction includes portions of the farm De Goedverwachting 332KT in the northern part of the project area; it also extends to Eerstegeluk 327KT just to the north of the project area;
- The Ba Bina Noko ba Mampuru Traditional Authority, led by Kgoshi Mampuru. This traditional authority's area of jurisdiction includes portions of the farms Boschkloof 331KT in the western part of the project area and De Goedverwachting 332KT in the northern part of the project area;
- The Bahlakwana ba Malekane Traditional Authority, led by Kgoshi Malekane. This traditional authority's area of jurisdiction includes a portion of Steelpoort Park 366KT, directly to the south of the project area; however, as indicated above, some households in the project area regard themselves as under the authority of this chief;
- The Batlokwa Tribal Authority, led by Kgoshi Magolego. This traditional authority's area of jurisdiction also includes a portion of Steelpoort Park 366KT; it is included in this list for the same reason as that of Kgoshi Malekane; and
- The M J Nkosi beNgwenyama ya Maswati Traditional Authority, led by Kgoshi Nkosi. This traditional authority's area of jurisdiction includes portions of the farm Winterveld 293KT (to the north of the project area).

The population of the project area is therefore subject to two parallel systems of governance: the statutory system (consisting of ward committees, ward councillors, local municipality, etc.) and a customary system (consisting of chiefs, tribal councils, etc.). The ward

[2] MasterQ Research (2007). Proposed Steelpoort Integration Project: Social Impact Assessment Draft Scoping Report.

committees consists of elected members who function as the link between the community and the local municipality, with the latter being responsible for service delivery, development planning and other, related functions. The duties of tribal councils to some extent overlap with those of the ward councils; their responsibilities include dealing with conflicts in the community, presiding over customary court cases, allocating stands to community members, and coordinating development efforts in the community.

Other community-based structures present in the project area include farming committees, a home-based care committee; youth leagues for respective political organisations; church committees; traditional dance committees and governing bodies at the schools. Being in a relatively rural area, many people in the project area attach considerable importance to their cultural traditions, and tribal authorities are held in high regard. However, with a significant influx of people who have migrated into the area in search of employment at the nearby mines, this trend has begun to show some changes in recent years.

3.2.2.4 Land ownership and land claims

Land owners of the project area include:

- Rhodium Reefs Limited;
- The National Republic of South Africa;
- Hester Petronella Erasmus; and
- Impala Platinum Limited.

The farm portions belonging to the National Republic of South Africa are currently being administered by the Department of Rural Development and Land Reform, and are on the process of being allocated to the traditional authorities mentioned above.

A land claim has been lodged for the whole farm Belevedere 362KT by the Bakone ba gaMaimela community. This community is represented by Chairperson Joel Maimela and spokesperson Philemon Maimela (contact number 079 919 9170). The land claim has progressed to the point where it is only awaiting a signature from the Rural Development Director General and the Minister, after which the land will be handed over to the community. Land will be governed by a Communal Property Association. The claim is for surface rights; mines will retain mining rights.

3.2.3 Regional Socio-Economic Structure

This section provides socio-economic baseline information on the Greater Tubatse Local Municipal area, which forms the regional backdrop of the proposed project. The municipality was established on 5 December 2000 as part of the Sekhukhune District Municipality. It comprises part of the former Lebowakgomo homeland, and is mainly rural in nature. The surface area of the Greater Tubatse Local Municipality is approximately 229 000 ha.

The nearest urbanised settlements are Steelpoort (about five kilometres to the east of the project site), Burgersfort (about 20 km to the northeast) and Bothashoek (about 8 km to the north of Burgersfort).[3] The local municipality consists of 29 wards. There are currently 15 mines in the Greater Tubatse area, with several more being planned. Other economic activities include agriculture and a nascent tourism industry.

3.2.3.1 Demographics

There are approximately 270 000 people and 54 000 households living in the Greater Tubatse area. The population of Tubatse contributes about 28% of the total population of the Sekhukhune District Municipality. Ninety-nine per cent of the population is Black African, and 1% White. The average number of people living in one household (under one roof) is 4.72. An estimated 7% of the population, (19 000 people) stay in 11 traditional villages in Tubatse. In general people living in this area are very poor, with approximately 19 people financially dependent on one income earner.

The population growth rate is estimated to be approximately 3.4% per annum. Taking into consideration the impact of HIV AIDS on the population growth rates, however, it is expected that population rates are slowing, and that the population might start to decline in the near future.[4]

Of the population of the local municipality, 91% speak Sepedi, 4% Swazi and 2 % Tsonga. Overall, women represent 54% of the total Greater Tubatse population and men 46%. However, the gender distribution varies between age groups. In the pre- and school-going age group male and female representation is equal (50/50). In the “working-years” age group, however, there are more females (59%) and fewer males (41%). This can be attributed to the fact that men leave their homes to go and work in the cities.

3.2.3.2 Education and health

Twenty-two per cent of the population in Tubatse that is 20 years and older has had no form of education or schooling. There are 246 educational institutions in Tubatse, including 70 primary schools, 55 secondary schools, 115 combined primary and secondary schools, 4 farm schools and 2 higher education institutions.[5] There is approximately one educator for every 36 primary school learners in Tubatse and one educator for every 34 secondary school learners.

There are four hospitals in the Greater Tubatse Local Municpality. Together the four hospitals have 376 beds. There are approximately 416 people working in these facilities of which 45% (186) is medical personnel and 55% administrative. In 2005 there were 9 mobile clinics and 5 vehicles and 15 medical personnel who work in these mobile clinics in Tubatse.

[3] ITS Engineers (2007). Community Empowerment Impact Assessment Report for the Tubatse R37 Special Development Project.

[4] Mpumalanga Department of Agriculture and Land Administration (2006).

[5] Municipal Demarcation Board (2006).

3.2.3.3 Employment and income

Of the municipal population 66% is not economically active (does not work/does not look for work), 21% are unemployed while 13% have employment. Most of the people who are employed work within the Government sector (27%), where they mostly provide services within the health and social development sectors. Mining employs approximately 20% of the employed people, while agriculture accounts for about 12% of employment.

Only approximately 1 295 individuals in the Greater Tubatse Local Municipality earn more than R6400 per month, with the average income between R1-R2 400 per month. Economic indicators support the conclusion fact that Tubatse is a poor rural area.

3.2.3.4 Housing and basic services

Seventy-three per cent of the dwellings in Tubatse are formal. Traditional dwellings (huts) account for 18% of dwellings and informal structures for 9%. The traditional dwellings are mostly located in the 11 rural villages.

Tubatse residents depend mainly on communal stands and the river for water: 32% of households use natural water sources such as rivers and dams; 51% of households have basic access to water supplies such as the water vendor and communal taps; 13% of the households have intermediate access to water with water inside their premises; and only 4% of households have full access to water. The Integrated Development Plan of the local municipality stresses the issues around the dangers of inadequate water supplies and the necessity for the provision of clean water.[6]

Of the households in the local municipal area, 47% use electricity for lighting, 47% use candles and 5% use paraffin. Most households in Tubatse make use of a pit latrine; 25% of households have no sanitation. Only 5% of the households have flush toilets.

[6] Greater Tubatse Local Municipality Integrated Development Plan (2011/2012).

4 PREDICTED ENVIRONMENTAL IMPACTS

The potential impacts that could arise from the proposed project activities over the life of mine (LoM) are detailed below. The details of the exact activities of each phase will be used to rate the significance of the impacts associated with the project activities within each phase of the mining process and the applicable mitigation measures will also be prescribed. Based on the activities and potential impacts, a management plan will be developed as well as a monitoring programme.

4.1 Construction Phase

During the construction phase of the project, the general activities which have been considered for the associated activities are predominantly associated with preparation for the mining operation. These will include the clearing of the project area for infrastructure and internal routes, tarring the access road, as well as preparation for the actual shaft area.

4.1.1 Topography

It is envisaged that the project will have minimal disturbance to the surface topography as this is an underground operation with limited surface infrastructure, and most processing activities are taking place offsite. However, a basic topographic investigation should take place to thoroughly evaluate the project's impact on the surface topography. This study should focus on if the underground activities will cause any form of surface subsidence and also investigate how the surface infrastructure may cause erosion (due to the naturally steep slopes).

4.1.2 Geology

During the construction phase there will be a definite impact on the geology where the shaft will be sunk. This impact is unavoidable.

4.1.3 Soil and land Capability

This primary impact will be the loss of topsoil for the area where the infrastructure will be located but the area is small and is limited to less than 3 Ha. In spite of the fact that only a small portion of the area is being used for commercial agriculture (as the soils in this area should predominantly be shallow and non-arable), the current land use will change from agricultural to mining. In addition to this, the removal of topsoil will also alter the land capability for the project area and this will influence productivity for the area. The impacts will be negative, some may be permanent, but during construction will probably be site specific.

4.1.4 Flora

The main impact on vegetation will occur during this phase when existing vegetation will be intentionally removed. The area is small and the impact is not expected to be significant.

A total of eight conservation-important plants have been identified for the project area. All eight Red Data species were found in Euclea – Petalidium (Plains Shrubland), making it the

most important community for Red Data plants within the project area. This area should be avoided for development; alternatively authorities should be consulted on how to proceed in the event of potential impacts being incurred. In addition to this, 15 species endemic to the SCPE have been recorded for the project area as well as 11 species protected by legislation. The floral species will be considered for the impact assessment phase of the project.

4.1.5 Fauna

The destruction of natural vegetation and habitat for animal life will have an effect on any animal species present within the infrastructure area. As there are protected (Red Data) animal species that are known to inhabit the study area, the destruction of the vegetation will have a negative effect on species richness in the immediate area. The location and suitable habitat types which support the local Red Data faunal species should be identified in order to prescribe management for these areas.

4.1.6 Surface Water

4.1.6.1 Potential Impacts

The potential surface water impacts on quality and quantity that could arise from the proposed project activities over the life of mine (LoM) are detailed below. During the EIA Phase, precise details of the activities in each phase will be used to rate the significance of the impacts associated with the project activities within each phase of the mining process and the applicable mitigation measures will also be prescribed. Based on the activities and potential impacts, a management plan will be developed as well as a monitoring programme.

During the construction phase the clearing of the site and vehicle movement are the main activities anticipated and may have potential impacts on quality and quantity of surface water.

4.1.6.2 Surface Water Quality

Dust from vehicle movement may settle in the water resources resulting in siltation. Prolonged hydrocarbon leaks and spills may impact negatively on the surface water resources. The topsoil berms that will be erected to isolate the dirty area, if not vegetated, may be vulnerable to soil erosion during the rainy season. This may lead to siltation of the water resources.

4.1.6.3 Surface Water Quantity

The delineation and isolation of the dirty area by means of topsoil berms will result in loss of surface runoff to the surface water catchment.

4.1.7 Aquatic Environment

The Steelpoort and Dwars Rivers are in a largely natural state, in spite of the local activities and land-uses. The removal of topsoil may result in increased runoff velocity and potential

for the catchment due to the loss of surface roughness. This may result in the erosion of the area during rainfall periods, resulting in sediment deposition within the rivers. Excessive sedimentation of the streams will alter the water quality of these systems as well as impact on the quality of the available habitat structures. Changes to the water and habitat quality of these systems will impact on the aquatic biota community structures which are sensitive to impaired water quality and habitat changes.

4.1.8 Wetlands

The removal of topsoil and vegetation to initiate the mining operation and the placement of infrastructure for the proposed mining operation will result in the potential permanent removal of selected wetland areas and riparian zones. The wetlands and riparian zones within the project area are considered as biodiversity hotspots and provide important ecological services in support of the Steelpoort and Dwars Rivers. The potential loss or impacts to the wetland areas will have indirect impacts on the receiving river systems.

4.1.9 Groundwater

4.1.9.1 Impacts on groundwater quantity:

Site clearing and removal of topsoil, may lead to ponding of surface water in the cleared areas during the wet season and potentially lead to increased infiltration to the weathered and alluvial aquifers.

4.1.9.2 Impacts on groundwater quality

Oil or fuel spillages from site clearing and construction machinery may collect in the soils. During rainfall events, hydrocarbon compounds from oils and fuel in the soils may migrate to the subsurface water bodies with water infiltrating through these polluted areas.

4.1.10 Air Quality

The principle emissions from the construction phase of the project will be Total Suspended Solids (TSS), PM10, and PM2.5 arising from the following activities:

- Clearing of groundcover, and levelling of area;
- Establishment of the infrastructure such as roads and drainage system;
- Moving of heavy plant and machinery on site;
- Loading and unloading of topsoil for shaft construction; and
- Wind erosion from exposed surfaces and temporary stockpiles.

Vehicles movement on site will lead to tailpipe emissions from construction and haul vehicles at the construction sites emitting nitrogen dioxide (NO_2), carbon monoxide (CO), carbon dioxide (CO_2) and sulphur dioxide (SO_2).

4.1.11 Noise

During the construction phase the clearing of the site and vehicular movement are the main activities anticipated and may have potential impacts on the ambient noise levels at the surrounding communities. Increased activity of vehicles and heavy machinery, rock drilling in preparation of sinking the proposed sub vertical shaft will all contribute to the impact on local noise levels.

4.1.12 Visual

The Steelpoort River Valley is well known as a Platinum Group Metals mining area, thus from a visual perspective, it is envisaged that the proposed project will not have a major impact on the aesthetic value of the area as it is already largely disturbed. There will be some impacts and a brief visual impact assessment should be performed to assess this impact.

4.1.13 Heritage and Archaeology

Potential impacts and sources of threats and risk are limited to the very small impact footprint. These threats and risks will be greatest during the construction phase, where the potential to damage or destroy unidentified heritage resources is high.

4.1.14 Road network and Traffic

Vehicular traffic will increase during the construction phase. However, after this period additional impact on traffic is anticipated to be minimal, since conveyor systems will be used to transport ore from the mining area for processing.

4.1.15 Socio Economic

4.1.15.1 Economic benefits

The construction phase of the proposed project is expected to give rise to a number of positive economic impacts for the local and regional population. More specifically, the following positive impacts are anticipated:

- Local and regional employment opportunities; and
- Increased business opportunities for local entrepreneurs, as well as indirect economic benefits created through local spending by the construction workforce.

Clear policy guidelines and careful management of implementation will be required to ensure that benefits for the local population and economy are maximised. Without such measures, it is possible that the main benefits may be diverted elsewhere – either because of the majority of unskilled construction workers being sourced from outside the local area or because of corruption, bribery and nepotism amongst persons responsible for recruiting construction workers.

4.1.15.2 Physical and economic displacement

Physical displacement refers to the necessity to relocate entire households, while economic displacement refers to instances where households will lose access to agricultural land or other livelihood resources because of a project. As mentioned earlier, a relatively large proportion of the project area (about 21%) is occupied by rural villages and their subsistence agricultural fields. Thus, although the surface infrastructure associated with the proposed project will be fairly limited, the possibility cannot be ruled out that some households or agricultural fields will be displaced by the project. Such displacement impacts, if they occur, will commence prior to construction, but will continue into the operational phase of the project.

The extent of physical and/or economic displacement will be assessed as part of the ESIA, and recommendations will be made as to how such impacts could be avoided (either by modifying the design/layout of surface infrastructure designs or by reducing safety buffers around infrastructure or construction activities). It the event that displacement proves to be unavoidable, it will be necessary to develop a Resettlement Action Plan (RAP) to describe how impacts associated with such displacement would be managed and mitigated (either through relocation or compensation). However the preferred site is currently unoccupied therefore a RAP should not be necessary.

4.1.15.3 Community well-being and safety

The local community's well-being and safety may be affected by construction activities associated with the proposed project. In particular, the following impacts are anticipated:

- There is likely to be an influx of job-seekers into the area during the construction phase of the project. This may have a negative impact on the local community by engendering competition for limited job opportunities, placing pressure on local resources and services, and possibly giving rise to conflict and social pathologies (such as an increase in crime, etc.); and
- Construction activities could pose safety risks for local community members. Sources of such risk include construction traffic and the possibility that local persons (especially children) and livestock could wander into construction areas.

Likely mitigation measures to minimise the influx of job-seekers would include clear communication of the project proponent's intent to give preference to local employment, while awareness programmes on road and construction-related safety could reduce safety risks associated with construction activities.

4.1.15.4 Physical intrusion

Construction activities will constitute a physical intrusion that may affect local residents in various ways:

- Vibration, noise and air (dust) pollution during construction may have a detrimental effect on the local communities, both by damaging structures and by constituting a nuisance;

- Construction-related traffic and other activities may cause disruptions of the daily movement patterns of local communities; and
- Impacts associated with a construction camp (if such a camp will be required to house construction workers).

With regard to vibration, noise and air pollution, technical input is required from the relevant specialist studies (air quality, noise, etc.) to identify suitable mitigation measures. In order to mitigate impacts on daily movement patterns, it will be necessary to identify the roads, footpaths and other movement corridors frequently used by local communities, and then to determine whether the effect on these (if any) could be avoided or ameliorated through appropriate placement of infrastructure, through the establishment of crossing points or walkways, etc.

4.2 Operational Phase

The most notable activity during the operational phase will be sinking of the shaft to access the ore body. Secondary impacts will be associated with the activities in support of the shaft, these will include vehicular movement and increased infrastructure development such as offices.

4.2.1 Topography

The topographical impact during the operational phase is not expected to change.

4.2.2 Geology

There will be a definite impact on the geology of the region as the minerals are being mined. However this impact is unavoidable and should not relate to significant impacts on the environment and society.

4.2.3 Soil and Land Capability

Soil erosion and soil pollution may be encountered during the operational phase. Water runoff from roads and plant areas must be controlled in order to prevent soil erosion. Diesel and oil spills are common at mine sites due to the large volumes of diesel and oil consumed by construction vehicles. Pollution may however be localised. Small pockets of localised pollution may be cleared up easily using commercially available hydro carbon emergency clean-up kits.

Stockpiled soil must be clearly demarcated and protected against erosion by establishing vegetation on the stockpiles

4.2.4 Flora

During the operational phase of the project, additional impacts to the floral communities will be limited owing to the fact that the majority of the impacts will be incurred during the construction phase when topsoil is removed. After construction it is possible that areas which have not been permanently disturbed will re-vegetate.

4.2.5 Fauna

Owing to the increase in mining related activities, vehicular movement and human activity, it is likely that this will impact on the local faunal communities. The increase in activities in general will result in increased noise levels, air pollution and general disturbances which are expected to unsettle local fauna, resulting in the loss of more sensitive species.

4.2.6 Surface Water

During the operational phase the impacts on surface water quantity and quality are not expected to change from those of the construction phase but may increase as a result of additional activities undertaken during.

4.2.6.1 Surface Water Quality

Predominant quality impacts could result from accidental spillages and prolonged leaks of hazardous and hydrocarbon containing material. These materials may find their way to the surface water resources via runoff. The erosion of soil and dust deposition could also result in siltation, an impact on surface water quality.

4.2.6.2 Surface Water Quantity

Due to clean and dirty water contamination measures that will be put in place a portion of the catchment will be lost to the water resources. The minimization of this area will decrease the significance of such an impact. Siltation of surface water resources and infrastructure (dams and drainage channels) may also reduce their capacity to handle high flows.

4.2.7 Aquatic Environment

The general water quality associated with the Steelpoort and Dwars Rivers is in an acceptable state. These systems are considered to be largely natural with a diversity of aquatic biota. According to Kleynhans (2000) the catchment area should be managed in support of maintaining a largely natural state for these systems. The local systems are threatened due to development of the area. These systems support aquatic biota sensitive to water quality, flow and habitat changes. The development of the catchment may result in impacts to the overall water quality and habitat structures for these systems, impacting on the local aquatic communities.

4.2.8 Wetlands

The operation may alter the geohydrology of the area. The underlying hydrodynamics of the area could be altered. These changes and the potential loss of aquifers may result in the loss of wetland areas which are supported by perched aquifers.

The other activities associated with the operational phase are the changes in land use, from natural vegetation to hardened surfaces, which will result in an increase in the amount and energy of storm water generated from the project area. The terrestrial soils around the area are generally erodible and therefore pose a threat due to excessive deposition of sediment within the wetlands. Increased amounts of storm water and excessive storm water energy

will result in increased flood peaks within the low lying wetland areas which will also promote erosion.

The release of sediment free dewatered groundwater into the nearby river may result in excessive erosion at the water release point. Furthermore the release of sediment free water may result in the under-cutting of the macro-channel and erosion of sedimentation features such as sediment benches and instream islands.

4.2.9 Groundwater

4.2.9.1 Impacts on groundwater levels

Dewatering of underground mining areas will lead to a decline in the groundwater levels in the immediate surrounds of the mining area causing a cone of depression.

4.2.9.2 Impacts on Groundwater quality

Oil or fuel spillages from mining machinery and vehicles in the underground workings and on the surface, may collect in the soils. During rainfall events, and normal underground operation, hydrocarbon compounds from oils and fuel may migrate to the subsurface water bodies resulting in their contamination.

The storage of hazardous products and mine waste material may have a potential negative effect on groundwater quality should there be spillage/leaks as they could infiltrate through the soils to reach the groundwater table.

4.2.10 Air Quality

The ore body will be accessed via a vertical shaft in year 4 of operation and via a sub-vertical shaft in year 22. No opencast mining methods will be employed.

As the mine is envisaged as an underground operation, there will be ore extraction, processing, handling and transporting where hazardous pollutants are released. The only air quality impacts anticipated will be fugitive dust from waste dumps.

4.2.11 Noise

During the operational phase the impacts on the ambient noise levels at the surrounding communities are expected to be less significant. The noise will only be from the operation of the shaft and associated activities which are expected to attenuate significantly towards the surrounding communities. The reason for the significant attenuation is because of the nature of the noise and the landscape as well as the distance towards the surrounding communities.

4.2.12 Visual

The visual impact during the operational phase is not expected to change.

4.2.13 Heritage and Archaeology

Once the infrastructure footprint has been constructed, there is no further risk of impact on any heritage or archaeological resources.

4.2.14 Socio Economic

4.2.14.1 Economic benefits

Like its construction phase, the operational phase of the proposed project is expected to give rise to a number of positive economic impacts for the local and regional population. The following positive impacts are anticipated:

- Local and regional employment opportunities. Although smaller in number than employment creation during the construction phase, these will have a significantly longer duration;
- Increased business opportunities for local entrepreneurs through the supply of goods and services to the mine;
- A positive macro-economic impact at a local, region and provincial level due to operational expenditure, taxes and royalties; and
- Economic and social benefits associated with corporate social responsibility (CSR) and local economic development (LED) initiatives by the mine.

As with the construction phase, clear policy guidelines and careful management of implementation will be required to ensure that benefits for the local population and economy are maximised. CSR and LED initiatives to be undertaken by the mine have been identified in consultation with stakeholders (e.g. the local municipality) and formalised in the mine's Social and Labour Plan (SLP).

4.2.14.2 Physical and economic displacement

As mentioned above, displacement impacts (if they occur) will commence prior to construction, but will continue into the operational phase of the project. The potential relocation of households, in particular, is likely to be permanent in its effect.

4.2.14.3 Community well-being and safety

The local community's well-being and safety may be affected by operational activities in the following ways:

- The ***influx of job-seekers***, mentioned earlier in the context of construction-related impacts, may continue during the operational phase of the project. Negative impacts associated with such influx (competition for limited job opportunities, pressure on local resources and services, conflict, social pathologies, etc.) may also continue into the operational phase; and
- Operational activities, like construction, could pose ***safety risks*** for local community members. Particular sources of risk include damage to structures caused by

blasting, mine-related traffic, and the possibility that local persons (especially children) and livestock could wander into the mine site.

Mitigation measures mentioned under the discussion of construction impacts would also apply during the operational phase.

4.2.14.4 Physical intrusion

Impacts arising from physical intrusion associated with project activities will be similar to those discussed above under construction-related impacts; these include vibration, noise and air (dust) pollution and disruptions of the daily movement patterns of local communities. Due to the fact that surface infrastructure and above-ground activities will be limited during the project's operational phase, these impacts are expected to be less severe than during construction; however, their duration will be longer, continuing for the life of the mine.

Local communities may also be positively impacted upon if the mine brings about improvements in local infrastructure (e.g. roads).

4.3 Decommissioning and Post Closure Phase

4.3.1 Topography

The topographical impact during the decommissioning phase is not expected to change. The post-closure topographical impact will be positive or neutral, depending on the effectiveness of decommissioning and rehabilitation and if the area is returned to a free draining state.

4.3.2 Geology

There will be no further impacts on the geology once mining ceases.

4.3.3 Soil and Land Capability

Mining and rehabilitation should be developed together and maintained during all phases of mining. During mining operations the impact on the soil will mostly be the result of stripping and stockpiling of the topsoil and sub-soil. The natural sequence of the soil horizons is lost while stockpiling soil causes the organic carbon content and fertility to be reduced. Rehabilitation of the disturbed mined areas causes mechanical compaction and soil contamination.

The impacts will be negative and mostly of a permanent nature. The disturbance of the soil layers will be a problem, even after the area has been rehabilitated. Recovery of the soil quality is dependent on the quality of rehabilitation. Fertility may be improved through soil amelioration but soil depth and compaction are not easily alleviated.

4.3.4 Flora

The primary concern during this phase is the unnecessary destruction of vegetation communities, creating favourable habitat for fast growing invasive species. The removal of infrastructure will result in ground compaction for the respective areas, making the re-

establishment of vegetation communities difficult. Also of concern are the possible spillages from infrastructure holding hazardous material. These spillages and leaks may be considered for infrastructure such as sewerage and waste facilities, toxicant, pollutant and fuel storage infrastructure and general vehicle use. In the event that this infrastructure is not demolished properly and with caution, resulting spillages and leaks would impact on vegetation and soil quality.

Final replacement of overburden and topsoil and revegetation may be considered to be a positive impact if implemented properly. The replacement of overburden and topsoil throughout the life of mine as well as the final replacement during the decommissioning phase may result in the restoration of the natural vegetation.

4.3.5 Fauna

The removal of infrastructure and the increase in activities in general during the demolishing of the study area may incur further impacts to the local faunal communities. No sensitive or Red Data species are expected to be associated with the local infrastructure, the faunal community is expected to comprise predominantly of tolerant species. The increase in activities will result in excessive dust, noise and pollutant generation which is expected to further impact on the local faunal communities. These disturbances may result in the local faunal species moving away to areas with fewer disturbances.

4.3.6 Surface Water

4.3.6.1 Decommissioning Phase

The decommissioning phase will have both negative (during demolition) and positive (restoration of the site) impacts depending on the activities that will be undertaken. However, the resultant impact may be neutral as the alteration of the site may not return it to the pre-development phase.

4.3.6.1.1 Surface Water Quality

Soil erosion and dust deposition as a result of vehicle movement during the demolition process may pose a risk of contaminating surface water resources. Similarly the handling of hazardous materials such as chemicals, sewage and those containing hydrocarbons may result in the contamination of surface water resources as a result of accidental spillages and improper disposal.

4.3.6.1.2 Surface Water Quantity

The decommissioning process could impact on the surface water quantity in a positive/neutral manner as water will be returned to the catchment. This will only be possible if the management of the demolition process is carried out correctly and the area is cleaned, vegetated and the drainage lines restored (to prevent damming of water).

4.3.6.2 Post closure Phase

Water quality and quantity impacts may occur post closure, depending on the decommissioning and rehabilitation efforts that would have been implemented. These impacts will be detected by means of continuous monitoring for a minimum of three years after closure (as agreed to with the DWA).

4.3.6.2.1 Surface Water Quality

Post closure activities that could impact on water quality include on-going maintenance and rehabilitation, such as application of grass seeds to vegetate the rehabilitated area as this will prevent soil erosion and siltation of the surface water resources.

4.3.6.2.2 Surface Water Quantity

Ensuring that the drainage lines are restored and that the water is allowed to flow freely will result in positive/neutral water quantity impacts.

4.3.7 Aquatic Environment

The removal of infrastructure as well as the increase in vehicle activities may result in the increase in open area susceptible to erosion due to limited vegetation cover. These areas may be eroded during rainfall periods resulting in sedimentation of the local river systems. This will impact on the water quality and habitat structures of these systems. Changes to the system may result in the loss of aquatic biota sensitive to selected changes.

4.3.8 Wetlands

The demolition and removal of infrastructure may result in impacts to wetland water quality through spillages and leaks. These spillages and leaks may be considered for infrastructure such as sewerage and waste facilities, toxicant, pollutant and fuel storage infrastructure and general vehicle use. The replacement of soils in the correct soil profile formation would help to restore sub-surface flow dynamics for the system. The restoration of sub-surface flow dynamics may result in wetland areas being re-established and supported by surface and sub-surface flow. Profiling and contouring of the area is important to allow for surface flow dynamics to be rehabilitated according to the original drainage lines for the catchment.

4.3.9 Groundwater

4.3.9.1 Impacts on groundwater quantity

Groundwater will be recharged and return to near pre-mining water levels in time, after mining activities comes to a halt.

4.3.9.2 Impacts on Groundwater quality

Rehabilitation activities at mine closure should reduce the potential for pollution from mining activities and have a positive impact on the recovery of the groundwater quality.

4.3.10 Air Quality

During the decommissioning phase, nuisance dust will likely be emitted on access and haul roads as a result of infrastructure demolition and bringing site to its rehabilitated state. Impacts may also arise from vehicle emissions as the site is being deconstructed.

4.3.11 Noise

During the decommissioning phase the demolition of the shaft infrastructure and headgear are the main activities anticipated and may have potential impacts on the ambient noise levels at the surrounding communities. The duration of the decommissioning phase is expected to be of short term and will decrease the overall significance of the impact.

The post closure phase will have a neutral impact on the ambient noise levels on the surrounding communities because the noise levels will have decreased to the pre-construction baseline levels.

4.3.12 Visual

The visual impact during the decommissioning phase is not expected to change. The post-closure visual impact will be positive or neutral, depending on the effectiveness of decommissioning and rehabilitation.

4.3.13 Heritage and Archaeology

No impacts anticipated.

4.3.14 Socio Economic

Socio-economic impacts associated with decommissioning and closure will be both positive and negative. Negative impacts include:

- Job losses at the mine;
- Associated negative impacts on the local economy; and
- Discontinuation of the mine's CSR and LED programmes.

Positive impacts could include social or economic benefits through the post-closure donation of mine infrastructure (e.g. staff housing) to the local community or municipality.

Mitigation measures to ameliorate negative impacts and enhance positive ones would include:

- Implementation of the mine's commitments to manage downscaling and retrenchment (which would be formalised in the SLP, and could include re-training, transfer to other operations, etc.);
- Effective design and implementation of the mine's CSR and LED programmes to ensure post-closure sustainability; and
- Adequate rehabilitation of land affected by the project to enable alternative post-closure uses (e.g. for agriculture).

5 Public Participation Process

5.1 EIA Application Form and Landowner Notifications

The EIA application for the proposed project was submitted to the LEDET on 20 September 2012. Prior to the submission of the application form a letter notifying directly affected land owners and occupiers were sent via registered mail on 19 September 2012. Proof of the notification letters were attached to the application form submitted to the LEDET. A copy of the letter is attached as part of the PPP Appendix A.

5.2 Scoping Report and Plan of Study for EIA

The Plan of Study (PoS) for the EIA will take into consideration comments received from the key commenting authorities and Interested and Affected Parties (I&APs) during the Draft Scoping Report (DSR) public review period. The DSR was available for public review from 4 December 2012 to 30 January 2013. The report has been finalised and the Final Scoping Report (FSR) will be submitted to the LEDET for acceptance and approval to proceed with the EIA phase of this project.

5.3 The Public Consultation Process

Public participation is an essential and legislative requirement for environmental authorisation in a number of the major Acts applicable to this activity. The principles that demand communication with sectors of society are best embodied in the principles of the National Environmental Management Act (Act 107 of 1998, Chapter 1), South Africa's overarching environmental law. In addition, Section 24 (5), Regulation 54-57 of GNR 543 under the NEMA, guides the PPP that is required for an environmental authorisation process.

The PPP for the proposed development has been designed to satisfy the requirements laid down in the above legislation and guidelines and are also compliant for the other applicable Acts such as the MPRDA and NWA. This section of the report highlights the key elements of the public participation process to date.

5.3.1 Objectives of public participation in an EIA

The key objective of public participation is to ensure transparency throughout the EIA process and to promote informed decision making. Supporting this objective public participation during the EIA process will provide sufficient and accessible information to I&APs in an objective manner so as to:

- During Scoping phase:
  - Assist I&APs to identify issues of concern, and provide suggestions for enhanced benefits and alternatives
  - Contribute to local knowledge and experience

- Verify that comments have been considered and to help define the scope of the technical studies to be undertaken during the Impact Assessment phase

- During Impact Assessment phase:
  - Verify that I&AP comments have been considered either by the EIA Specialist Studies, or elsewhere
  - Comment on the findings of the EIA report, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

5.3.2 Identification of interested and affected parties

To ensure proper representation of all I&APs, the following identification methods were used for the updating of the I&AP database:

- Conducting Windeed searches around the project footprint within a radius of between 100 m and 2 km to verify landownership and obtain contact details of the directly affected and surrounding landowners;
- Face-to-face discussions with the local Chiefs through Eastplats' quarterly engagement sessions;
- I&AP responses received from the publication of newspaper advertisements in the local newspapers, namely the Capricon Voice and Steelburger on 19 September 2012;
- I&AP responses on the placement of site notices within the proposed project area and other, strategic public areas; and
- I&AP responses on the distribution of the announcement letter and Background Information Document (BID) with Registration and Comment Sheet.

The identification of I&APs will be on-going and refined throughout the EIA process. As the on-the-ground understanding of affected parties improves through interaction with various stakeholders in the area, the database will be updated.

All I&AP details have been captured on Maximiser 12, an electronic database management software programme that automatically categorises engagement with stakeholders, thus providing an on-going record of communications - an important requirement by the authorities for public participation. In addition, comments and contributions received from I&APs are recorded, linking each comment to the name of the person who made it.

According to the NEMA EIA Regulations under Section 24(5) of NEMA, a register of I&APs (Regulation 55 of GNR 543) must be kept by the public participation practitioner. Such a register has been compiled and is being kept updated with the details of involved I&APs throughout the process (see Appendix A).

Two main I&AP groups were identified:

5.3.2.1 Authorities

Relevant authorities were identified as these departments and divisions form part of the project decision-making process and need to be appropriately informed.

- Department of Mineral Resources (DMR);
- Department of Water Affairs (DWA);
- Department of Public Works, Roads and Transport (DPWRT); and
- Department of Agriculture, Forestry and Fisheries – Sekhukune District
- Department of Rural Development and Land Reform – (DRDLA);
- Limpopo Department of Economic Development, Environment and Tourism (LEDET);
- Traditional authorities; and
- Greater Tubatse Local Municipality - managers, environmental and social departments.

5.3.2.2 Public

- Adjacent land owners;
- Directly affected land owners;
- Agricultural organisations;
- Environmental groups;
- Communities;
- Potentially displaced communities; and
- Land claimants.

Landownership details for relevant I&APs are provided in Table 5 below.

Table 5: Landownership details

Farm Name	Farm Portion	Ownership
De Goedeverwachting 332KT	RE	National Republic of South Africa
De Goedeverwachting 332KT	Ptn 1	National Republic of South Africa
Boschkloof 331KT	Ptn RE	National Republic of South Africa
Boschkloof 331KT	Ptn of Ptn 1	National Republic of South Africa
Boschkloof 331KT	Ptn of Ptn 2	National Republic of South Africa

Farm Name	Farm Portion	Ownership
Kennedy's Vale 361KT	Ptn 9	Rhodium Reefs Ltd
Kennedy's Vale 361KT	Ptn 12	Petronella Erasmus Hester
Kennedy's Vale 361KT	Ptn 15	Rhodium Reefs Ltd
Kennedy's Vale 361KT	Ptn 19	Rhodium Reefs Ltd
Kennedy's Vale 361KT	Ptn 22	Rhodium Reefs Ltd
Kennedy's Vale 361KT	Ptn 25	Xstrata South Africa Pty Ltd
Kennedy's Vale 361KT	Ptn 27	Rhodium Reefs Ltd
Kennedy's Vale 361KT	Ptn 28	Rhodium Reefs Ltd
Kennedy's Vale 361KT	Ptn 29	Rhodium Reefs Ltd
Tweefontein 360KT	RE	Rhodium Reefs Ltd
Tweefontein 360KT	Ptn 6	Samancor Chrome Ltd
Tweefontein 360KT	Ptn 8	Rhodium Reefs Ltd
Belvedere 362KT	RE	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 1	Impala Platinum Ltd
Belvedere 362KT	Ptn 2	Impala Platinum Ltd
Belvedere 362KT	Ptn 3	Impala Platinum Ltd
Belvedere 362KT	Ptn 6	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 7	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 9	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 10	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 11	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 12	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 13	Impala Platinum Ltd
Belvedere 362KT	Ptn 14	Impala Platinum Ltd
Belvedere 362KT	Ptn 14	Impala Platinum Ltd

Farm Name	Farm Portion	Ownership
Belvedere 362KT	Ptn 15	Impala Platinum Ltd
Belvedere 362KT	Ptn 16	Impala Platinum Ltd
Belvedere 362KT	Ptn 17	Impala Platinum Ltd
Belvedere 362KT	Ptn 18	Impala Platinum Ltd
Belvedere 362KT	Ptn 19	Impala Platinum Ltd
Belvedere 362KT	Ptn 20	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 22	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 24	Impala Platinum Ltd
Belvedere 362KT	Ptn 25	Rhodium Reefs Ltd
Belvedere 362KT	Ptn 26	Impala Platinum Ltd
Belvedere 362KT	Ptn 27	Impala Platinum Ltd
Belvedere 362KT	Ptn 29	Rhodium Reefs Ltd

Table 6: Adjacent landownership details

Farm Name	Farm Portion	Ownership
Spitskop 333 KT	Ptn 1	Samancor Chrome Ltd
Spitskop 333 KT	Ptn 29	Dithamaga Trust
Spitskop 333 KT	Ptn 28	Dithamaga Trust
Spitskop 333 KT	Ptn 20	Boabab supplies Pty Ltd
Spitskop 333 KT	Ptn 21	Dithamaga Trust
Spitskop 333 KT	Ptn 22	Dithamaga Trust
Spitskop 333 KT	Ptn 23	Dithamaga Trust
Spitskop 333 KT	Ptn 24	Dithamaga Trust
Spitskop 333 KT	Ptn 25	Dithamaga Trust

Farm Name	Farm Portion	Ownership
Spitskop 333 KT	Ptn 26	Dithamaga Trust
Tweefontein 630 KT	Ptn 5	Samancor Chrome Ltd
Tweefontein 630 KT	Ptn 7	Rhodium Reefs Ltd
Tweefontein 630 KT	Ptn 4	Samancor Chrome Ltd
Tweefontein 630 KT	Ptn 9	Samancor Chrome Ltd
Tweefontein 630 KT	Ptn 6	Samancor Chrome Ltd
Tweefontein 630 KT	Ptn 2	Jan Joubert Trust
Tweefontein 630 KT	Ptn 1	Samancor Chrome Ltd
Kalkfontein 367 KT	Ptn 11	Bakomu Ba Masha- Makopole Communal Property Association
Steelpoortpark 366 KT	Ptn 1	National Republic of South Africa
Belvedere 362 KT	Ptn 34	National Republic of South Africa
Mooimeisjesfontein 363 KT	Ptn 1	National Republic of South Africa
Het Fort 329 KT	Ptn 1	National Republic of South Africa
Nooitverwacht 324 KT	Ptn 2	National Republic of South Africa
Nooitverwacht 324 KT	Ptn 1	National Republic of South Africa
Eerstegeluk 327 KT	Ptn 2	Greater Tubatse Municipality
Annex Grootboom 335 KT	Ptn 1	Samancor Chrome Ltd

5.3.3 Authority consultation

As part of the process to inform and receive guidance from authorities with regards to the public participation process, a meeting was held on 7 September 2012 with the affected and surrounding traditional authorities.

In addition, a consultative meeting was held with the Department of Rural Development and Land Reform on 2 October 2012 to establish if a land claim has been lodged on the affected farm properties. The minutes of the meetings are attached in Appendix A. Comments and issues from authorities are part of the Comments and Response Report (CRR).

5.3.4 Announcement of opportunity to become involved

The opportunity to participate in the EIA process was announced in September 2012 as follows:

- Distribution of a letter of invitation to become involved, addressed to individuals and organisations, accompanied by a BID containing details of the proposed project, including a locality map of the project area, and a registration sheet (Appendix A); and
- Advertisements were placed in the following newspapers as seen in Table 7.

Table 7: Advertisements placed during the announcement phase

Newspaper	Date
Capricon Voice	19 September 2012
Steelburger	19 September 2012

Site Notices were placed on-site and at various public places at Kennedy's Vale and Burgersfort on 20 and 21 September 2012 to invite I&APs to participate in the project. These site notices were placed at conspicuous places and at various public places (PPP - Appendix A).

5.3.5 Obtaining comment and contributions

The following opportunities were available during the Scoping phase for contribution from I&APs:

- Completing and returning the registration/comment sheets on which space was provided for comment;
- Providing comments telephonically or by email to the public participation office; and
- Commenting directly to the LEDET.

5.3.6 Comments and Response Report and acknowledgements

The comments raised during the scoping phase of the project, will be captured in a Comments and Response Report (CRR) (Appendix A). The CRR was updated to include additional I&AP contributions during the Scoping phase, and will be updated as the findings of the EIA report become available. The issues and comments which will be raised during the public review period of the Final Scoping Report will be included in the CRR and appended to the Draft Environmental Impact Assessment Report. The contributions made by IA&Ps were and will be acknowledged in writing and responses provided accordingly.

5.3.7 Availability of the Draft Scoping Report

The purpose of the PPP in scoping is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted, and to raise further comments. Comments provided by I&APs will be used to assist with amendment of the Terms of Reference for the Specialist Studies that will be conducted during the Impact Assessment Phase of the EIA process. A period of sixty (60) calendar days instead of 40 days was provided for public review of the DSR (from 4 December 2012 to 30 January 2012), due to the review period overlapping the December holiday period.

The availability of the DSR was announced in a letter (post and email) and addressed personally to all individuals and organisations on the stakeholder database.

The DSR, including the updated Comments and Response Report, was distributed for comment as follows:

- Placed at in public venues within the vicinity of the project area;
- Mailed to key stakeholders;
- Mailed to Interested and Affected Parties who requested a copy of the report; and
- CD copies of the DSR were made available at the stakeholder meetings and mailed to individuals who requested copies.

The comments received during the public review period have been incorporated into the Final Scoping Report, which will be made available as indicate in Table 8.

Table 8: List of public places where the Scoping Reports are available

Person	Location	Contact
Printed Copies		
Ms M P Sello	Ga-Malekane Traditional Council	072 5255 341
Ms M C Fenyane	Ga-MampuruTraditional Council	072 879 5918
M B Makofane	Roka Phasha Traditional Council	073 763 0841
Mr Aaron Phetla	Ga- Masha Traditional Council	082 635 0511
Mr Pule Nkosi	Bengwenya Traditional Council	078 655 7130
Councillor Makina	Greater Tubatse Municipality – Mapodile Satellite office	0728248802
Ms Rebecca	Greater Tubatse Municipality – Public library	013 231 7296

Person	Location	Contact
Ms Emily	Eerstegeluk Public Library	013 237 0039
Electronic Copies		
Sibongile Bambisa	www.digbywells.com	011 789 9495
	Request a CD copy	011 789 9495

5.3.8 Final Scoping Report

The Final Scoping Report (FSR) has been updated with comments received to date. The FSR has been submitted to the relevant authorities (LEDET, and DMR), key stakeholders, and to those individuals who specifically requested a copy of the FSR.

5.3.9 Notification of the availability of the Final Scoping Report

The FSR has been made available at the same public places where the DSR was made available, as well as a few additional locations (based onn feedback received during the public meetings). Stakeholders are again invited to visit the Digby Wells website to download the report or to request a CD copy of the report from the public participation office.

In the Impact Assessment Phase of the EIA, Specialist Studies will be conducted to determine/confirm baseline conditions, assess the potential positive and negative impacts of the proposed project, and to recommend appropriate measures to enhance positive impacts and avoid or reduce negative ones. I&APs will be kept informed of progress with these studies and the opportunity to comments on study results. I&APs are requested to submit their comments on the FSR to LEDET and Digby Wells.

5.3.10 Public participation during the Impact Assessment phase

Public participation during the impact assessment phase of the EIA will mainly involve a review of the findings of the EIA report, presented in a Draft Environmental Impact Report (EIR), the Draft EMP and the volumes of Specialist Studies. I&APs will be advised in good time of availability of these reports, how to access them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

5.4 Summary of Comments and Responses

The majority of the comments raised during the announcement phase, public review periods and public meetings were regarding rightful land ownership, job opportunities, training and share ownership in the company. These issues do not have direct relevance to the EIA process and cannot be investigated herein, however, Eastplats have responded to all of these comments, which are included in the CRR (Appendix A).

Non-governmental Organisations raised concerns regarding the water availability and quality in the proposed project's catchment. Surface and groundwater specialist working on the project were given a copy of these comments and asked to investigate these concerns during the EIA phase.

6 PLAN OF STUDY FOR EIA

The section below describes the terms of reference for the studies to be conducted during the EIA phase of this project, should the scoping report be approved by the LDEDET.

6.1 Topography

The topography will be evaluated by using a Digital Terrain Model (DTM), which is a digital model or 3D representation of the earth's terrain surface. A DTM will be created using existing 5 m contours that have already been sourced for the project area. Additional relief data in the form of spot heights and trig beacons are available for the proposed project and surrounding area and will be included in the model. The DTM will be used to visualise the current landscape of the project area and the immediate surrounds. Further impacts which the development may pose on the landscape and topography will be investigated and quantified. The DTM will further be used in various specialist studies including surface water and groundwater assessments of the proposed development. Recommendations will be made regarding erosion management where applicable.

6.2 Soil

A semi detailed survey of the soils occupying the project area will be conducted during field visits. Due to the size of the project area, areas with steep slopes and visible rock outcrops will be done on a reconnaissance scale whereas areas where the soil could have some significant value a more detailed survey will be done. A hand soil auger will be used to survey the soil properties present and to obtain soil samples. Survey positions will be recorded as waypoints using a handheld GPS. Other features such as existing open trenches and animal burrows will also be helpful to determine the soil depth.

The soil forms (types of soil) found in the study area will be identified using the South African soil classification system namely; Soil Classification: A Taxonomic System for South Africa (Soil Classification working group, 1991). Several digital photographs will be recorded as reference information.

The topsoil (0-30 cm) and subsoil (30-60 cm) of dominant soils will be sampled. Samples will be analysed at a reputable soil laboratory for soil acidity, fertility and textural indicators.

6.3 Land Use and Capability

The existing land use will be simultaneously recorded at each chosen soil survey point. Agricultural potential and land capability depends on soil capability which will also be determined and recorded at chosen soil survey positions. The dominant land capability will be classified according to the method described by Schoeman *et al* (2000).

6.4 Flora and Fauna

The desktop study encompasses the research of published documents relating directly and indirectly to the proposed site. This gathered information will help identify habitats, species

and ecosystems that could possibly occur on site. The study will provide a baseline to guide the detailed studies.

The site will be visited twice to gather the required information for the study. A wet and dry season will be surveyed to ensure species variation is addressed between seasons. To assess the biodiversity pattern of the site, numerous methodologies will be utilised, each relating to certain features of the environment.

Vegetation will be identified through a PRECIS list which will be ordered from the relevant authority. This will provide general species diversity and species composition for the study area. To identify species specific to the study area the Braun Blanquet method for field survey will be utilised. This method involves delineating a specific area (a plot 20 m x 20 m), identifying all species in that area, and then assigning a Braun Blanquet code to each species based on its contribution to the total area. With the aid of the Braun Blanquet method the vegetation study encompasses the following:

- Vegetation classification, mapping of plant communities identified and the description thereof;
- Species list for each plant community;
- Dominant species for each plant community;
- Invasive species (if present) for each plant community;
- Exotic species (if present) for each plant community; and
- Rare or endangered species, as well as all protected plants (if present) for each plant community.

In order to identify communities, vegetation species and sampling plots are captured into TURBOVEG (Hannekens, 1996b) which stores and manages vegetation data. This data is then exported to Juice (Tichy, 2007) for vegetation classification. Juice is a data analysing programme which classifies vegetation into communities following the TWINSPAN procedure. The TWINSPAN method describes the vegetation in terms of cover abundance, diagnostic species, dominant species and species composition.

Fauna found within these communities and habitats will be identified, firstly, through lists of potential species that might occur on the site. These lists are established through literature research which includes analysis of field guides relating to specific fauna, contact with relevant Government Departments, conservationists, specialists and knowledge from local inhabitants further quantifies the lists.

6.5 Surface Water

The terms of Reference for the EIA are:

- A desktop assessment of the surface water environment including the hydrological calculations of base flow, flood peaks (1:50 and 1:100 over 24 hrs), selection of strategic water quality monitoring sites;
- A field survey and sample collection site visit;

- Data interpretation to determine the baseline;
- Impact assessment and development of mitigation measures; and
- Development of a water management and water quality monitoring plans.

6.6 Wetlands

Maps will be generated from 1:50 000 topographic maps and aerial photographs, onto which the wetland boundaries were delineated. Each of the identified wetlands will be classified according to their hydro-geomorphic (HGM) determinants based on modification of the system proposed by Brinson (1993), and modified for use by Marneweck and Batchelor (2002) and subsequently revised by Kotze *et al*. (2004). Estimates of wetland boundaries will be made from aerial photos making use of topography, the presence of water and typical wetland vegetation communities as indicators.

The approach for the delineation and identification of riparian zone boundaries was developed by J. MacKenzie and M. Rountree (2007). This approach takes into consideration the following attributes:

- Typical riparian zone vegetation taking into account the species composition and physical structure;
- Presence of unconsolidated recent alluvial deposits; and
- Shape of the macro-channel bank.

The methodology for the delineation of riparian zones is described by MacKenzie and Rountree (2007). Draft riparian delineation methods prepared for the Department of Water Affairs and Forestry, Version 1.0 (unpublished field notes).

The actual wetland delineation and identification process will include a site visit where a wetland delineation procedure prescribed by the DWA will be employed. The above mentioned wetland delineation procedure takes into account (according to DWAF guidelines for wetland delineations, 2005) the following attributes to determine the limitations of the wetland:

- Terrain Unit Indicator – helps to identify those parts of the landscape where wetlands are more likely to occur;
- Soil Form Indicator – identifies the soil forms, which are associated with prolonged and frequent saturation;
- Soil Wetness Indicator – identifies the morphological “signatures” developed in the soil profile as a result of prolonged and frequent saturation; and
- Vegetation Indicator – identifies hydrophilic vegetation associated with frequently saturated soils.

In accordance with the method described by Kotze *et al*. (2007) a Level II ecological functional assessment of the wetland areas will be undertaken. This methodology provides for a scoring system to establish the services of the wetland ecosystem. The onsite wetlands

will be grouped according to homogeneity and assessed utilizing the functional assessment technique, WET-EcoServices, developed by Kotze *et al*, (2007) to provide an indication of the benefits and services.

A present ecological status analysis will be conducted in order to establish baseline integrity (health) for the delineated wetlands. In order to determine the integrity (health) of the characterized hydrogeomorphic (HGM) units for the project area, the WET-Health tool will be applied. According to Macfarlane *et al*. (2007) the health of a wetland can be defined as a measure of the deviation of wetland structure and function from the wetland's natural reference condition. The wetland health assessment attempts to assess hydrological, geomorphological and vegetation health, in 3 separate modules. This is conducted in order to estimate similarity to or deviation from natural conditions. The tool is structured such that a low score (close to 0) provides an indication of good health, while a high score (close to 10) provides an indication of poor health.

6.7 Groundwater

The methodology utilised to obtain quantitative and qualitative information will be site specific. The methodology will entail the acquisition of all relevant hydrogeological background information and data. This will be a phased approach due to the order in which the data and results become available when physical field studies are completed. This normally comprises a desktop study, field visit, site specific surveys, possible intrusive studies (drilling and aquifer testing), data interpretation, numerical flow and contamination modelling and reporting. Once completed, a specialist report will be compiled from all relevant data and will feed into the EIA.

6.7.1 Phase I – Desktop Study

Phase I has been partially completed with preliminary results presented within this report.

6.7.2 Phase II – Field Surveys and Intrusive work

This phase comprises detailed investigations to a definitive level to enable accurate mine and project planning and to comply with regulatory requirements.

6.7.2.1 Geophysics

Various recommendations were made in the recent water monitoring programmes to install additional groundwater monitoring boreholes. A ground geophysical survey will be conducted to delineate weathered zones and vertical to sub-vertical features within these areas to ensure effective monitoring of the groundwater behaviour.

Magnetic and electro-magnetic surveys will assist in locating preferential groundwater flow paths and in positioning of drilling targets.

6.7.2.2 Drilling

Drilling will be conducted to gain general aquifer characteristics for the site area and to assess gaps identified during previous groundwater studies and the recent monitoring

programmes. The boreholes will be placed across the area in order to gain a representative understanding of the project area. At least six characterisation boreholes around the site and infrastructure areas are proposed. The number and depths of boreholes may change depending on the infrastructure planned for the mine and will have to be negotiated with the client on an ad hoc basis. A preliminary depth of 60m per borehole is suggested.

6.7.2.3 Aquifer testing

It is imperative that the most strategic and successful boreholes drilled during this investigation be aquifer tested to determine aquifer responses and to calculate the parameters presenting the aquifer hydro dynamics underlying the investigation area. Each borehole will be step-tested, followed by a 24 hour constant drawdown test and recovery test.

Water quality samples will be collected following each aquifer test for chemical analysis and these samples will be sent to a SANAS accredited laboratory in Pretoria.

6.7.3 Phase III

6.7.3.1 Hydrogeological modelling

6.7.3.1.1 Conceptual modelling

This is a vital step in the impact assessment process, and the development of a good conceptual model will ensure reasonable results. The conceptual model aims to describe the groundwater environment in terms of the following:

- Aquifers - these are rock units or open faults and fractures within rock units that are sufficiently permeable (effectively porous) to allow water flow;
- Runoff, groundwater head data which yields groundwater flow;
- Hydraulic parameters;
- Recharge and discharge areas, exchange of groundwater and surface water (if any); and
- Geochemical data.

6.7.3.2 Monitoring Network Design and/or Dewatering

Recommendations and a possible update of the current monitoring and possible dewatering will be provided based on the results of the groundwater study, latest mine plan and the model results. Frequency of sampling and reporting will be a function of the EIA and the life of mine and its effect on the receiving environment.

6.7.3.3 Reporting

All information, data, maps and interpretations will be compiled into a detailed technical report that is the final deliverable of the hydrogeological specialist investigation of the project EIA, with conclusions and recommendations on risks, and mitigation and monitoring requirements as stipulated by the regulators.

The site specific Groundwater Impact Assessment methodology and risk rating that will be used is the same as described in the EIA and is in accordance with the corresponding authorities.

The groundwater monitoring plan will be updated based on the conditions and activities on site and will include the location of the monitoring boreholes, frequency of monitoring, list of chemical parameters to be monitored, sampling methodology, description of data capturing and reporting requirements.

6.8 Air Quality

The EIA terms of reference are:

- Legislative and policy framework – National Environmental Management: Air Quality Act (39 of 2004) and National Framework for Air Quality Management in the Republic of South Africa (2007);
- Preliminary risk assessment to identify risks;
- Qualitative Impact Assessment - Analysis and Interpretation; and
- Development of Air Quality monitoring programme.

6.8.1 Methodology

A desktop study will be conducted to review the available meteorological and climate data.

The climatic information obtained during scoping phase will be used to determine seasonal trends and extremes to ensure climate is taken into consideration. These aspects include precipitation, evaporation, temperature and wind velocity and direction and will be directly compared to one another to ensure a comprehensive understanding of the local and regional climatic conditions.

The following activities will be carried out to determine the regional climate and to assess the baseline conditions, as well as the local (site-specific) prevailing weather conditions, and its influence on the climatic and atmospheric dispersion and dilution potential of pollutants released into the atmosphere (if available).

Site-specific meteorological data will be obtained and evaluated to determine local prevailing weather conditions:

- The PSU/NCAR mesoscale model (known as MM5) is a limited-area, non-hydrostatic, terrain-following sigma-coordinate model designed to simulate or predict meso-scale atmospheric circulation. MM5 modelled meteorological data sets for full three calendar years for three project locations will be obtained from Lakes Environmental in Canada. This dataset consists of surface data, as well as upper air meteorological data that is required to run the dispersion model. It is required if site specific surface and upper air meteorological data is not available;
- Identification of existing sources of emissions and characterisation of ambient air quality within the airshed using available monitoring data (Client to provide any existing ambient monitoring data);
- Review of the current South African legislative and regulatory requirements;
- Detailed literature review of emissions from all activities on sites. Where information is not available on emission rates, US EPA AP42 emission factors or Australian NPI emission factors will be used. Other emission sources in the area will also be included in the emission inventory (Client to assist in the provision of this information);
- Review of potential health effects associated with these activities; and
- Define the potential sensitive receptors, such as local communities, as well as environmental constraints relative to air quality.

Sources associated with the construction, operation and decommissioning and closure phases of the proposed underground platinum group metals mine project will be discussed and their emissions qualitatively assessed.

6.9 Noise

The scope of work is to provide a specialist environmental noise impact assessment, including noise dispersion models indicating the expected noise propagation from the activities. The study will assess, via predictive noise modelling, the potential impact of the noise emissions from the proposed activities on the surrounding environment. The study will include baseline noise measurements and also provide recommendations in terms of the mitigation and monitoring measures.

In order to assess ambient noise levels, baseline noise monitoring will be conducted at various noise sensitive receptors surrounding the proposed location of the sub vertical shaft, especially in the communities of Ga-Mapodila and Ga-Matate.

All measurements will be taken in accordance with the guidelines of the SANS 10103:2008. Measurements will be for a period of 24 hours per location. That measurement will include spectral analysis.

The baseline information will be included in an environmental noise impact assessment report, along with the quantification of the potential noise sources. The impacts of the proposed construction, operational and decommissioning activities of the shaft on the ambient noise levels of the area will be assessed by comparing the baseline information with the propagated noise levels. The propagated noise levels will be calculated by means of the dispersion modelling software 'Soundplan'. The report will also include recommended mitigation measures as well as recommended action plans.

6.10 Visual

The visual impact assessment is a specialist study performed to establish the visual effects of the infrastructure on the surrounding environment. This study intends to assess the extent of the visual intrusion of the infrastructure on the surrounding landscape. The scope of the assessment is that of a qualitative investigation determining the visual character of the area. It involves assessing the visual impacts on the environment and will addressing the following aspects:

- Visual Absorption Potential (ability of the landscape to accommodate the project from a visual perspective);
- Identification of visual elements that would be effected and description/evaluation of specific visual impacts;
- Recommendations with reference to mitigation measures; and
- Provision of graphic representations of the above points.

6.11 Heritage and Archaeology

Rhodium Reefs has requested Digby Wells to undertake an EIA / EMPR in support of environmental authorisation in accordance with the MPRDA and the NEMA. As part of the EIA, a Heritage Statement is required as part of the Scoping Process. This report serves to inform the notify Notice of Intent to Develop (NID) that was submitted to the relevant Heritage Resources Authority (HRA) for comment.

6.11.1 Heritage Statement

The current heritage landscape of the Rhodium Reefs project area was characterised to include existing and potential heritage resources. The following methods were used in compiling the Heritage Statement:

6.11.2 A literature review

- A literature review of relevant and available published research such as academic journals and academic books;
- Archival and background research; and
- A review of existing heritage impact assessment reports.

6.11.3 Historical layering

- A desktop-based survey of existing historical to current aerial photography to complement historical research and identify potential heritage resources;
- A desktop-based survey of historical to current topographical maps where relevant to determine the existence of potential heritage resources; and
- A desktop-based survey of historical to current geological maps where relevant to determine the potential existence of palaeontology resources.

6.11.4 Site naming

6.11.4.1 Previously identified sites

Sites may be identified based on previous relevant reports. The site names and/or numbering that were used in the original reports will be used, but prefixed with the relevant 1:50 000 topographical map number if available, for example an identified site in De Kamper and Nel (2008), described as a historic walling and numbered KVL01 in that report will be:

2430CC/KVL01

6.11.4.2 Unconfirmed sites identified during desktop study

Potential sites not previously identified, but noted as a result of historical layering, desktop studies or through indicators such as vegetation will be named using the Digby Wells project number and site number prefixed with HS (Heritage Statement) and suffixed with a short description, for example RHO1867/HS001-grave.

6.12 Socio Economic

This section outlines a plan of study for undertaking a more detailed socio-economic specialist study during the impact assessment phase of the EIA. It considers additional data to be collected, the assessment and rating of impacts, the design of mitigation measures, as well as the formulation of socio-economic specialist input into the Environmental Management Plan (EMP).

The objectives of the specialist study will be:

- To gather detailed information on current baseline socio-economic conditions of project-affected communities, households and businesses;
- To identify and assess the potential social and economic impacts of the proposed project on these communities, households and businesses; and
- To design appropriate mitigation measures to reduce and, where possible, avoid negative impacts, as well as to enhance positive impacts.

6.12.1 Additional data collection

The information required in order to accurately predict and assess the potential socio-economic impacts of the proposed project will include:

- The layout of surface infrastructure, including construction exclusion zones and safety buffers;
- The required workforce for each of the project phases (disaggregated according to skill level required), and the project proponent's policy in terms of the employment of locals;
- The mine's existing or planned CSR and LED programme;
- The anticipated duration of the construction period;
- The likelihood that construction workers will be housed in a construction camp, and details regarding such a camp (if relevant), such as its anticipated location and size;
- The perceptions and attitudes of nearby farmers and business owners regarding the project, including possible concerns of how the project will influence their operations and the subsequent impact this will have on their workforce;
- The local municipality's ability to meet additional demand for basic services;
- The current extent of social problems in the municipal area, and the initiatives being undertaken to combat them, whether initiated by the municipality, NGOs or other parties;
- Other existing and planned future projects in the area. Of particular relevance in this regard would be:
  - Construction of the water pipeline for the Olifants River Water Resources Development Project Phase 2C, which is currently underway; and
  - Spatial development planning by the local and district municipalities;

In order to obtain this information, the following data collection activities will be undertaken:

- Formulation of an information request to the project proponent, in order to obtain details on the planned project layout, required workforce, etc.;
- Visual inspection of available aerial or satellite imagery to determine the possible extent of overlap between the planned project footprint and settlements or subsistence agricultural fields;
- A series or focus group discussions or individual interviews with key informants, including:
  - Residents of nearby communities;
  - Landowners and business owners in the project area;
  - Representatives of neighbouring mines;
  - Local ward councillors and representatives of traditional authorities;
  - Local and district municipal officers; and
  - Non-governmental organisations (NGOs) and/or community-based organisations (CBOs) active in the area;

- A review of the results of other specialist studies undertaken as part of the EIA, in order to identify biophysical impacts of the project that may have indirect social effects.

7 CONCLUSION

The Rhodium Reefs project will have a limited footprint on the surface (vertical shaft with associated infrastructure), by making use of the existing Spitzkop operation and its infrastructure. It is not anticipated that the Rhodium Reefs project will have significant environmental impacts on the surface. The main environmental aspect of concern will be the impacts on groundwater. Although the entire array of specialist studies will be conducted (where necessary), the core focus will be on groundwater as these impacts are expected to be the most significant. The impacts that are anticipated relate to:

- A groundwater cone forming resulting in a loss of yield in the aquifer;
- Groundwater quality impacts as a result if the underground activities;
- Impacts of the groundwater make on Rhodium Reef's water balance; and
- Impacts on surrounding rivers, streams and wetlands which are groundwater fed.

In addition to this, the area also has a very large community structure that needs to be taken into consideration. The PPP has already been initiated with a kick-off meeting as well as one-on-one meetings with the directly affected land owners and three public meetings. Rhodium Reefs is fully committed to running an open and transparent process with input from all the Interested and Affected Parties.

At the time of submitting this report there were no significant uncertainties. All knowledge gaps identified during the scoping phase will be addressed during the EIA phase, as per the plan of study (Section 6).

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Appendix A: Public Participation Information