



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Basic Assessment Report And Environmental Management Programme

FOR LISTED ACTIVITIES ASSOCIATED WITH PROSPECTING ACTIVITIES

Environmental Authorisation in support of the Prospecting Right Application for Portion 53 of the Farm Waterval 306 JQ

SUBMITTED FOR ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) (NEMA) AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 (ACT NO. 59 OF 2008) (NEM:WA) IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (ACT NO. 28 OF 2002) (MPRDA) (AS AMENDED).

NAME OF APPLICANT:	Rustenburg Platinum Mines Limited (RPM)
TEL NO:	011 373 6111
FAX NO:	011 373 5111
PHYSICAL ADDRESS:	55 Marshal Street Johannesburg 2107
FILE REFERENCE NUMBER SAMRAD:	NW 30/5/1/1/3/2/11682 PR



This document has been prepared by Digby Wells Environmental.

Report Type:	Basic Assessment Report and Environmental Management Programme
Project Name:	Environmental Authorisation for the Prospecting Right Application for Portion 53 of the Farm Waterval 306 JQ
Project Code:	AMP3249

Name	Responsibility	Signature	Date
Elschen Solomi	Report Writer		June 2015
Duncan Pettit	Project Manager		June 2015
Mellerson Pillay	Project Sponsor		June 2015
Michael Hennessy	Senior Review		June 2015

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IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the prospecting or mining “*will not result in unacceptable pollution, ecological degradation or damage to the environment*”.

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.



OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process—

- determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- identify the alternatives considered, including the activity, location, and technology alternatives;
- describe the need and desirability of the proposed alternatives,
- through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - the degree to which these impacts—
 - can be reversed;
 - may cause irreplaceable loss of resources; and
 - can be managed, avoided or mitigated;
- through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - identify and motivate a preferred site, activity and technology alternative;
 - identify suitable measures to manage, avoid or mitigate identified impacts; and
 - identify residual risks that need to be managed and monitored.



EXECUTIVE SUMMARY

Introduction

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), with Reference Number [NW 30/5/1/1/3/2/11682 PR], for portion 53 of the Farm Waterval 306 JQ.

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey which are nonintrusive and do not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance of the area will also be undertaken to aid in the determination of the potential extent of the ore body. Invasive methods will include the diamond core drilling to ascertain the stratigraphic sequence and reef horizons of the ore body. The core drilling will utilise a BQ size (outside diameter core of 36.4 mm). It is anticipated that a maximum of four boreholes will be drilled over a 5 year period.

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The sumps, access roads/tracks and prospecting site will be rehabilitated following the prospecting activities. The prospecting sites will be an area of approximately 10m by 10m. Cleared topsoil will be stockpiled on site to a maximum height of 1m.

Digby Wells Environmental (Digby Wells) has been appointed by RPM as the independent Environmental Assessment Practitioner (EAP) to conduct the Basic Assessment Process for the proposed prospecting activities.

Project Applicant

The particulars for RPM are detailed in the table below.

Table A: Particulars of the Applicant

Applicant Name:	Rustenburg Platinum Mines Limited (RPM)
Contact Person:	Xolisa Teti
Telephone No:	011 373 6111
Fax No:	011 683 4608
Email Address:	xolisa.teti@angloamerican.com
Physical Address:	55 Marshal Street Johannesburg
Postal Address:	P. O. Box 62179 Marshalltown, 2107

Project Overview

RPM has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), with Reference Number [NW 30/5/1/1/3/2/11682 PR], for portion 53 of the Farm Waterval 306 JQ. The Prospecting Right Application is for the prospecting of Platinum Group Metals (PGM) and associated minerals, including:

- Palladium (Pd);
- Rhodium (Rh);
- Iridium (Ir);
- Osmium (Os);
- Platinum (Pt);
- Ruthenium (Ru);
- Gold (Au);
- Copper (Cu);
- Nickel (Ni);
- Cobalt (Co);
- Silver (Ag); and
- Chrome O (Cr).

Purpose of this Report

The overarching objectives of this Basic Assessment Report are to:

- Identify and assess potential environmental impacts associated with the proposed Project; and
- Recommend mitigation and management measures to ensure that the development is undertaken in such a way as to minimise negative impacts.

This report also describes the status quo of the biophysical and socio-economic environment of the Project area through specialist studies undertaken. Furthermore, an Environmental Management Plan Report (EMPr) has been developed to mitigate and manage environmental impacts associated with each Project activity.

This Basic Assessment Report will be submitted to the public for input and comments which will then be addressed and incorporated into the Final Basic Assessment Report to be submitted to the Department of Mineral Resources (DMR) for consideration. The details of the listed and specified activities for the Project are included below.

Table 1: List and Specified Activities for the Project

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Site clearance and vegetation removal.	100 m ² per borehole 400 m ² in total	Not Listed	N/A
Establishment of access roads/tracks.	Dependant on Prospecting site location.	Not Listed	N/A
Topsoil stockpiling.	3 m ³	Not Listed	N/A
Development of three sumps (oil-sludge-water separation).	3 m ³	Not Listed	N/A
Drilling of prospecting boreholes.	100 m ² per borehole 400 m ² in total	X – Activity 20	GNR 983
Rehabilitation (topsoil cover, ripping and vegetation establishment).	100 m ² per borehole 400 m ² in total	Not Listed	N/A



Public Participation Process

A Public Participation Process (PPP) has been designed not only to comply with the regulatory requirements set out in Regulation 44 and 45 of the EIA Regulations¹, and as required in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), but is also designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate all aspects of the proposed Project. The aim is to maximise the Project benefits while minimising its adverse effects. This Basic Assessment Report will be available for public review for 30 days from 17 June 2015 to 16 July 2015 and will be available at publically accessible places, and on the Digby Wells website (www.digbywells.com).

Project Alternatives

The Project area is limited in extent (6.5 ha), with the proposed prospecting sites expected to have minimal impacts on the environment due to the expected extent of the disturbed sites (100 m²). The locations of the prospecting sites will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive environments or receptors will be avoided with the stipulated buffer zones implemented.

Project Environment

Several specialist studies were conducted to assess the baseline environment, including: groundwater, surface water, biodiversity, wetlands, heritage, and soil. The Project area is located 1.5 km east of Rustenburg, in the North West Province and has a Land Type classified as Land Type Ea3. The land capability from the land type database shows that the dominate land capability for the prospecting area is Class III (Moderate cultivation). The dominant land use based on the land type data is natural. Fauna occurring on the site include assemblages within the terrestrial ecosystem: mammals, birds, invertebrates, reptiles and amphibians. There are no National Freshwater Ecosystem Priority Areas (NFEPA) wetland types present within 500m of the boundary of the project area. The regional geology comprises of the Rustenburg Layered Suite, of the Bushveld Igneous Complex (BIC). The Waterval study area is located near a main road, secondary road and railway line that ran from the old 'Native Locations to the north and east of Rustenburg.

Summary of the Potential Environmental Impacts

The predominant impacts associated with the Establishment Phase are as a result of site clearing, which may impact on the Marikana Thornveld and habitats for faunal species. Site clearing activities will remove vegetation and expose soil surfaces. The exposed soils may

¹ Published in GN R 982 of 4 December 2014.



become eroded, compacted and contaminated during the Establishment Phase. The erosion of soils may result in additional impacts on the wetlands and surface water resources, such as the Hex River as sediment finds its way into the watercourses, inhibiting wetland function and deteriorating water quality. The construction activities are limited in footprint and hence the potential impacts are of a minor significance.

The predominant risk during the Operational Phase is due to the presence of drill fluid circulating throughout the drilling process which is utilised to cool the drill. The fluid could spill into the environment and cause soil, surface water and groundwater pollution, if not managed correctly. Although contingency provisions are in place to address the risk of spillages, it is not an anticipated impact.

The impacts associated with decommissioning are similar to the impacts during the Establishment Phase, with soil erosion and the resultant sedimentation of surface water resources being the predominant impacts.

Conclusions and recommendations

The impacts identified are expected to be confined to site specific impacts and the significance of such impacts is greatly reduced with the implementation of mitigation and management measures. With the implementation of the mitigation and management measures, it is recommended that the proposed Project be granted Environmental Authorisation.

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Plan 9: Wetland Delineation

Plan 10: Identified Heritage Resources

Plan 11: Composite Map



Part A: Scope of Assessment and Basic Assessment Report



1 Introduction

Rustenburg Platinum Mines Limited (RPM), a subsidiary of Anglo American Platinum Limited (Anglo American Platinum), has applied for a Prospecting Right in terms of Section 16 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), with Reference Number [NW 30/5/1/1/3/2/11682 PR], and an Environmental Authorisation on Portion 53 of the Farm Waterval 306 JQ, located near Rustenburg, North West province. The regional and local settings for the Project are displayed in Plan 1 and Plan 2, Appendix A. The Prospecting Right Application is for the prospecting of Platinum Group Metals (PGM) and associated minerals, including:

- Palladium (Pd);
- Rhodium (Rh);
- Iridium (Ir);
- Osmium (Os);
- Platinum (Pt);
- Ruthenium (Ru);
- Gold (Au);
- Copper (Cu);
- Nickel (Ni);
- Cobalt (Co);
- Silver (Ag); and
- Chrome O (Cr).

Digby Wells Environmental (Digby Wells) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) process in support of a Prospecting Right Application for the Project.

2 Project Applicant

As noted above, RPM has applied for a Prospecting Right in terms of Section 16 of the MPRDA. The particulars for RPM are detailed in Table 2-1.

Table 2-1: Particulars of the Application

Applicant Name:	Rustenburg Platinum Mines Limited (RPM)
Contact Person:	Xolisa Teti
Telephone No:	011 373 6111
Fax No:	011 638 4608
Email Address:	xolisa.teti@angloamerican.com
Physical Address:	55 Marshal Street Johannesburg
Postal Address:	P. O. Box 62179 Marshalltown, 2107

2.1 Details of the Environmental Assessment Practitioner

Digby Wells has been appointed by RPM as the independent EAP to conduct the Basic Assessment according to the NEMA, as well as the required Public Participation Process (PPP). Digby Wells is a South African company with international expertise in delivering comprehensive environmental and social solutions, with specific focus on the mining and energy industries. The particulars of the EAP undertaking the EIA process is supplied in Table 2-2.

Table 2-2: Contact details of the EAP

EAP Company Name:	Digby Wells Environmental
EAP:	Duncan Pettit
Telephone No:	011 789 9495
Fax No:	011 789 9498
Email Address:	duncan.pettit@digbywells.com
Physical Address:	Fern Isle, 359 Pretoria Avenue, Randburg
Postal Address:	Private Bag X10046, Randburg, 2125

2.2 Item 3(a)(ii): Expertise of the EAP

2.2.1 The Qualifications of the EAP

Duncan Pettit is an Environmental Consultant in the Environmental and Legal Services Department at Digby Wells. Duncan obtained a BSc (Bachelor of Science) degree in Environmental Management: Zoology Stream from the University of South Africa. Proof of Duncan's qualification is included in Appendix B.

2.2.2 Summary of the EAP's Past Experience

The CV of Duncan Pettit, including the relevant project experience, is included in Appendix B.



3 Location of the Overall Activity

The prospecting site area is located 1.5 km east of Rustenburg, in the North West Province.

The farm associated with the proposed prospecting activities is detailed in Table 3-1.

Table 3-1: Description of the Directly Affected Farm Portion

Farm Name:	Portion 53 of the Farm Waterval 306 JQ
Application Area (Ha):	6.5 ha
Magisterial District:	Rustenburg Magisterial District Rustenburg Local Municipality Bojanala Platinum District Municipality
Distance and direction from nearest town:	1.5 km northeast of Rustenburg
21 Digit Surveyor General Code for the Directly Affected Farm Portion:	T0JQ00000000030600053



4 Locality Map

The regional and local setting of the Project area is displayed in Plan 1 and Plan 2, Appendix A.



5 Description of the Scope of the Proposed Overall Activity

RPM intends to prospect for PGMs and associated minerals, including:

- Palladium (Pd);
- Rhodium (Rh);
- Iridium (Ir);
- Osmium (Os);
- Platinum (Pt);
- Ruthenium (Ru);
- Gold (Au);
- Copper (Cu);
- Nickel (Ni);
- Cobalt (Co);
- Silver (Ag); and
- Chrome O (Cr).

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey and do not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance of the area will also be undertaken to aid in the determination of the potential extent of the ore body. Invasive methods will include the diamond core drilling to ascertain the stratigraphy sequence and reef horizons of the ore body. The core drilling will utilise a BQ size (outside diameter core of 36.4 mm). It is anticipated that a maximum of four boreholes will be drilled over a 5 year period.

No permanent infrastructure will be constructed as part of the prospecting activities. Activities associated with the prospecting operations include the establishment of temporary access roads/tracks where existing roads cannot be used, the clearing of vegetation for the drill rig and the establishment of three sumps to separate and store oil, sludge and water. The sumps, access roads/tracks and prospecting site will be rehabilitated following the prospecting activities. Cleared topsoil will be stockpiled on site to a maximum height of 1 m. The prospecting sites will be an area of approximately 10 m by 10m.



5.1 Listed and Specified Activities

New EIA Regulations², repealing and replacing the previous 2010 Regulations came into effect on 08 December 2014 (the EIA Regulations, 2014). Together with the EIA Regulations, 2014, the Minister published the following Regulations in terms of Sections 24 and 24D of the NEMA:

- Regulation GN R. 983 – Listing Notice 1: This listing notice provides a list of various activities which require environmental authorisation and must follow the Basic Assessment process as described in Regulation 19 and Regulation 20 of the NEMA EIA Regulations;
- Regulation GN R. 984 – Listing Notice 2: This listing notice provides a list of various activities which require environmental authorisation and must follow an EIA process as described in Regulation 21 to Regulation 24 of the NEMA EIA Regulations; and
- Regulation GN R. 985 – Listing Notice 3: This notice provides a list of various environmental activities which have been identified by provincial governmental bodies. The undertaking of such activities within the stipulated provincial boundaries will require environmental authorisation and the Basic Assessment process as described in Regulation 19 and Regulation 20 of the NEMA EIA Regulations will need to be followed.

The Listed Activities applicable to the proposed prospecting activities, as defined in the EIA Regulations, 2014, are outlined in Table 5-1.

Table 5-1: Listed and Specified Activities for the Project

Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
Site clearance and vegetation removal.	100 m ² per borehole 400 m ² in total	Not Listed	N/A
Establishment of access roads/tracks.	Dependant on Prospecting site location.	Not Listed	N/A
Topsoil stockpiling.	3 m ³	Not Listed	N/A
Development of three sumps (oil-sludge-water separation).	3 m ³	Not Listed	N/A
Drilling of prospecting boreholes.	100 m ² per borehole	X – Activity 20	GNR 983

² Published in GN R982 of 4 December 2014.



Name of Activity	Aerial extent of the activity	Listed Activity	Applicable Listing Notice
	400 m ² in total		
Rehabilitation (topsoil cover, ripping and vegetation establishment).	100 m ² per borehole 400 m ² in total	Not Listed	N/A

5.2 Description of the Activities to be undertaken

Prospecting activities will include both invasive and non-invasive methods. Non-invasive methods include a ground magnetic survey and do not have an impact on the receiving environment. The ground magnetic survey will aid in the identification of areas to be drilled to obtain the required data for the mapping of the ore body. Datasets supplied by the Council of Geoscience, remote sensing methods such as satellite and aerial imagery, airborne geophysical surveys and field reconnaissance of the area will also be undertaken to aid in the determination of the potential extent of the ore body.

Once the prospecting sites have been identified, invasive prospecting activities will be undertaken. The identified site will be cleared of vegetation and the topsoil will be stripped and stockpiled, with a maximum stockpile height of 1 m. The site cleared of vegetation will be a maximum size of 10 m by 10 m. Three sumps will be developed for the separation of oil, sludge and water and a drill rig will be transported to site. The prospecting site will utilise existing roads where possible, with tracks being used if necessary to access the specific site. The drill rig will utilise diamond core drilling to ascertain the stratigraphy sequence and reef horizons of the ore body. The core drilling will utilise a BQ size (outside diameter core of 36.4 mm). It is anticipated that a maximum of four boreholes will be drilled over a 5 year period.

Following the completion of the drilling activities, the core will be transported for laboratory analysis and the borehole will either be backfilled, or cased and sealed, dependent on the land owners request. The topsoil will be spread over the prospecting site and the area will be ripped to ensure that the land is not compacted. Due to the short timeframes associated with the drilling (less than three months), vegetation should establish itself from the seed bank remaining in the topsoil resources. The rehabilitation of the site will be monitored by RPM and the site will be vegetated with indigenous vegetation, if necessary.

5.2.1.1 Project Activities

The activities associated with the proposed substation and power line route are described in Table 5-2.



Table 5-2: Project Activities

Activity No.	Activity
Establishment Phase	
1	Site clearance and topsoil removal prior to the commencement of physical construction activities. Topsoil will be stored in stockpiles not greater than 1m in height.
Operational Phase	
2	Drilling of prospecting boreholes.
Decommissioning Phase	
3	Rehabilitation of topsoil cover, ripping and vegetation establishment.

6 Policy and Legislative Context

From an environmental and social perspective, the proposed Project needs to comply with all requirements in terms of the provisions of the NEMA and MPRDA. The legislative guidelines directing the Project are outlined in further detail below.

Table 6-1: Applicable Legislation and Guidelines Applicable to the Proposed Project

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p><u>Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)</u></p> <p>Section 24 of the Constitution provides that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures, that –</p> <ul style="list-style-type: none"> i. Prevent pollution and ecological degradation; ii. Promote conservation; and iii. Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. 	<p>The implementation of the mitigation and management measures to minimise and prevent negative impacts associated with the Project, while promoting justifiable socio-economic development, have been included in Part B, Section 5.</p>	<p>The environmental management objectives of the project will be to protect ecologically sensitive areas and to support sustainable development and the use of natural resources, whilst promoting justifiable socio-economic development.</p>
<p><u>Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)</u></p> <p>In terms of the provisions of Section 16 and 17 of the MPRDA, a Prospecting Right Application must be accepted provided the operation does not result in unacceptable pollution or damage to the environment. The applicant must submit an EMP to the DMR and consult with I&APs for comment regarding the Project.</p>	<p>In terms of Section 16 (3)(b) of the EIA Regulation (2014), any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority. This Report has been compiled as per the requirements of the DMR.</p>	<p>This Basic Assessment Report has been compiled in accordance with the requirements of the NEMA EIA Regulations, 2014, with the environmental management objective to protect ecologically sensitive areas.</p>
<p><u>National Environmental Management Act, 1998 (Act No. 107 of 1998)</u></p>	<p>Environmental authorisation is required for listed activities in terms of the EIA</p>	<p>This Basic Assessment Report has been compiled in accordance with the</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p>The National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA), as amended was set in place in accordance with section 24 of the Constitution of the Republic of South Africa. Certain environmental principles under NEMA have to be adhered to, to inform decision making for issues affecting the environment. Section 24 (1)(a) and (b) of NEMA state that:</p> <p><i>The potential impact on the environment and socio-economic conditions of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.</i></p> <p>The Environmental Impact Assessment (EIA) Regulations, Government Notice Regulation (GN) R.982 were published on 04 December 2014 and promulgated on 08 December 2014. Together with the EIA Regulations, the Minister also published GN R.983 (Listing Notice No. 1), GN R.984 (Listing Notice No. 2) and GN R.985 (Listing Notice No. 3) in terms of sections 24(2) and 24D of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended.</p>	<p>Regulations (2014) of the NEMA. The Listed Activities are set out in Table 5-1.</p>	<p>requirements of the NEMA EIA Regulations (2014).</p>
<p><u>National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)</u></p>	<p>A Notification of Intent to Develop (NID) has been compiled and will be submitted to the SAHRA and PHRA of North West. The</p>	<p>An NID has been undertaken in support of an approval in terms of the NHRA. The NID will be attached to the Final Basic</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p>The National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) is the overarching legislation that protects and regulates the management of heritage resources in South Africa. The Act requires that Heritage Resources Agency's in this case the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Resources Authority (PHRA), be notified as early as possible of any developments that may exceed certain minimum thresholds.</p>	<p>heritage baseline is provided in Section 12.1.9.</p>	<p>Assessment as an Appendix.</p>
<p><u>National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA)</u></p> <p>According to the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM: AQA) the Department of Environmental Affairs (DEA), the provincial environmental departments and local authorities (district and local municipalities) are separately and jointly responsible for the implementation and enforcement of various aspects of NEM: AQA. A fundamental aspect of the new approach to the air quality regulation, as reflected in the NEM: AQA is the establishment of National Ambient Air Quality Standards (NAAQS). These standards provide the goals for air quality management plans and also provide the benchmark by which the effectiveness of these management plans is measured.</p>	<p>Mitigation measures have been included for the potential impacts on the air quality. The mitigation measures will be in compliance with the NEM:AQA, as referred to in Part B, Section 5.</p>	<p>The mitigation and management measures to be implemented as part of the Project aim to manage and prevent potential impacts to air quality.</p>
<p><u>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</u></p>	<p>Mitigation measures have been included for the potential impacts on flora and fauna and</p>	<p>The mitigation and management measures to be implemented as part of</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
<p>The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species. This Act works in accordance to the framework set under NEMA. The following regulations which have been promulgated in terms of the NEM:BA are also of relevance:</p> <ul style="list-style-type: none"> ■ Alien and Invasive Species Lists, 2014 published (GN R.599 in GG 37886 of 1 August 2014) ; ■ National Environmental Management: Biodiversity Act, 2004: Threatened and Protected Species Regulations; ■ National list of Ecosystems Threatened and in need of Protection under Section 52(1) (a) of the Biodiversity Act (GG 34809, GN R.1002, 9 December 2011). 	<p>the biodiversity of the Project site. The mitigation measures will be in compliance with the NEM:BA, as referred to in Part B, Section 5.</p>	<p>the Project aim to manage and conserve biological diversity, as well as to minimise alien invasive species.</p>
<p><u>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA)</u></p> <p>CARA aims to provide for the conservation of the natural agricultural resources of the country through the maintenance of the production potential of land, by combatting and preventing erosion and the weakening of water sources. In addition, this Act aims to protect vegetation, while combatting weeds and invader</p>	<p>Mitigation measures have been included for the potential impacts on soils and land capability. The mitigation measures will be in compliance with the CARA, as referred to in Part B, Section 5.</p>	<p>Section 12 of the CARA details the maintenance of soil conservation in which every land user will be responsible for the maintenance and conservation of soil. The mitigation measures recommended as part of this Basic Assessment Report aim to prevent the compaction, erosion</p>

Applicable Legislation and Guidelines used to Compile the Report	Reference where Applied	How does this Development Comply with and Respond to the Policy and Legislative Context
plants		and degradation of the soil resources.
<p><u>Environmental Conservation Act, 1989 (Act No. 73 of 1989) (ECA)</u></p> <p>ECA makes provision for guidelines pertaining to noise control and measurements. The regulations make reference to the use of the South African National Standards 10103:2008 (SANS) guidelines for the Measurement and Rating of Environmental Noise with Respect to Land Use, Health, and Annoyance and to Speech Communication.</p>	<p>Mitigation measures have been included for the potential impacts due to the generation of noise. The mitigation measures will be in compliance with the ECA, as referred to in Part B, Section 5.</p>	<p>The proposed Project will not exceed the SANS 10103: 2008 limits for baseline noise measurements, thus conforming to the requirements of the ECA.</p>



7 Need and Desirability of the Proposed Activities

It is an established fact that mining activities are essential to the economic development of South Africa. The establishment of a mine would result in significant tax contributions towards the country, as well as potential royalties paid which will benefit receiving communities. In addition, employment opportunities are likely to be provided should a new mine be established which will improve the socio-economic profile of the region.

Before any mining activities can take place and in terms of designated legislation, prospecting activities are undertaken to inquire about the geology and grade of an area. Once the relative resource becomes known during this process, feasibility of a prospective mine will be undertaken. Several auxiliary benefits such as employment, tax benefits and royalties may come about as a result of future mining activities. Sustainable development serves the interests of the public whilst maintaining the integrity of national policies and legislation.

Allowing RPM the opportunity to prospect the area and to determine the geology would in turn allow progress with further with potential mining activities.



8 Motivation for the Overall Preferred Site, Activities and Technology Alternative

The Project area is limited in extent (6.5 ha), with the proposed prospecting sites expected to have minimal impacts on the environment due to the expected extent of the disturbed sites (100 m²). The locations of the prospecting sites will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive environments have been identified as part of the baseline description and mitigation measures have been provided for potential nuisance impacts to surrounding receptors. The prospecting sites will be determined based on non-invasive methods and will avoid all wetlands and water courses, as there are no wetlands within 500 m of the Project boundary.



9 Full Description of the Process followed to reach the Proposed Preferred Alternatives within the Site

9.1 Details of the Development Footprint Alternatives Considered

Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives aid in identifying the most appropriate method of developing the Project, taking into account location or site alternatives, activity alternatives, technology alternatives, as well as the no-project alternative. Alternatives also aid in determining the activity with the least environmental impact.

Some of the potential alternatives that have been identified to date are provided below.

9.1.1 Property Alternatives

The location of the prospecting activities is determined by the location of the resource. The prospecting area is limited to 100m² and prospecting activities will avoid sensitive environments, such as watercourses and wetlands.

9.1.2 Technology Alternatives

The possible technology alternatives include drill rig types, as well as alternative methods for prospecting. Trenching is a prospecting alternative; however, quite apart from the depth of the ore body, such activities result in significant environmental impacts and permanent scars on the topography. As a result, trenching is not a desired option. Drilling is the only way to reach the depth of ore without having significant residual impacts on the surrounding environment.

9.1.3 No-Go option

The No-go option would result in the resources remaining un-investigated and therefore unknown. Not proceeding with the Project may result in a lack of development in the mining industry.



10 Details of the Public Participation Process Followed

A Public Participation Process (PPP) has been designed not only to comply with the regulatory requirements set out in Regulation 44 and 45 of the EIA Regulations, 2014 and as required in terms of Chapter 5 of NEMA and the MPRDA but is also designed to provide Interested and Affected Parties (I&APs) with an opportunity to evaluate all aspects of the proposed Project.

The PPP will enable the project team to incorporate stakeholder comments as far as possible into the proposed Project and will provide stakeholders with sufficient opportunity to partake meaningfully in the environmental regulatory process. The comments of stakeholders will be included in the Comment and Response Report (CRR).

The PPP has been broken down into three phases as follows:

- Announcement Phase;
- Basic Assessment Phase; and
- Decision Making Phase.

10.1.1 Announcement Phase

The Project was announced prior to the availability of this report for public comment. The announcement phase included the following activities:

10.1.1.1 Identification of Stakeholders

To ensure a proper representation of stakeholders interested in or affected by the proposed project, the following stakeholder identification methods were used to develop a stakeholder database:

- Conducting Windeed and related desktop searches in and around the project to verify landownership and obtain contact details;
- Responses to be received from newspaper advertisement and site notices;
- Responses on the distribution of the Background Information Letter (BIL); and
- Telephonic consultations with landowners to identify additional I&APs.

Stakeholders for the proposed project are grouped into the following categories:

- **Government:** National, Provincial, District and Local authorities;
- **Landowners:** Directly affected and indirectly affected landowners;
- **Land occupiers:** Directly affected and indirectly affected land occupiers;
- **Communities:** Surrounding communities;



- **Non-Governmental Organisations (NGOs):** Environmental and social organisations;
- **Agriculture:** associations or organisations focussed on agricultural activities; and
- **Business:** small medium enterprises and formal organisations.

A stakeholder database has been compiled which will be updated throughout the environmental regulatory process with new stakeholders (**refer to Appendix C**). Directly affected landowners for the proposed project are included in Table 10-1.

Table 10-1: Directly Affected Landowners

Farm	Portion	Owner
Waterval 306 JQ	53	John Michealis

Table 10-2: Indirectly affected Landowners

Farm	Portion	Owner
Town and Townlands of Rustenburg 272 JQ	272	Rustenburg Local Municipality
Waterval 306 JQ	2	Rustenburg Platinum Mines Ltd

10.1.1.2 Public participation documentation

The following documents were developed for the project announcement:

- **Background Information Letter (BIL):** a BIL which included a project description, information about the required legislation, the competent authorities and details of the appointed EAP and the registration process as an I&AP was prepared. The BIL also included a registration and comment form.
- **Newspaper advertisement:** a newspaper advert was placed in one local newspaper. The advert included a brief project description, information about the required legislation, the competent authorities and details of the appointed EAP.
- **Site notices:** site notices were put up at various places as indicated in Table 10-3. The site notices contained a brief project description, information about the required legislation, the competent authorities and details of the EAP.

10.1.1.3 Basic Assessment Phase

This Draft BAR has been made available for a public comment period of thirty (30) days. Following the public comment period, the Draft BAR will be finalised with issues and comments made by the public, as well as the responses provided by Digby Wells and RPM. The Final BAR will then also be submitted to the DMR for consideration. The Final BAR will



also be placed on the Digby Wells website so that I&APs can verify that their comments have been considered. The following activities have been undertaken:

- The Draft BAR has been made available for public comment at publically accessible places, and on the Digby Wells website (www.digbywells.com); and
- Engagement with I&APs has taken place by means of telephonic consultations to obtain comments which will be captured in the CRR.
- The Final BAR will be placed on the Digby Wells website and will enable I&APs to verify that their comments have been captured and responded to.

10.2 Summary of Public participation activities undertaken to date

Table 10-3 provides a summary of the PPP activities undertaken thus far, together with referencing materials included as annexures in Appendix C.

Table 10-3: Public Participation Activities

Activity	Details	Reference in Report
Identification of stakeholders	Stakeholder database which represent various sectors of society, including directly affected and adjacent landowners, in and around the proposed project area.	Appendix C Stakeholder database
Land Claims Enquiry	An enquiry to identify land claims within the proposed project area was submitted to the Department of Rural Development, Land Claims Commission on Tuesday, 9 June 2015. Still awaiting feedback.	Appendix C Public Participation Materials
Distribution of BIL announcement letter	BIL with Registration and Comment Form was emailed and posted to stakeholders on Thursday, 11 June 2015.	Appendix C Public Participation Materials
Placing of newspaper advertisement	An advert was placed in the Rustenburg Herald on Thursday, 18 June 2015	Appendix C Public Participation Materials
Putting up of site notices	Site notices were put up at the proposed project site, local libraries, municipal offices and frequently visited shops or recreational venues on Tuesday, 16 June 2015: <ul style="list-style-type: none"> ■ Rustenburg Local Municipality Public Library ■ Bonajala District Municipality Public Library 	Appendix C Public Participation Materials
Announcement of Draft Basic Assessment Report	Announcement of availability of the Draft BAR was emailed and posted to stakeholders together with the formal project announcement on Thursday, 11 June 2015. Copies of the Draft BAR are available at: <ul style="list-style-type: none"> ■ Rustenburg Local Municipality Public Library ■ Bonajala District Municipality Public Library The Draft BAR was also made available on www.digbywells.com (under Public Documents). (Comment period: Wednesday, 17 June to	Appendix C Progress Letters



Activity	Details	Reference in Report
	<i>Thursday, 16 July 2015)</i>	
Obtaining comments from stakeholders	Comments, issues of concern and suggestions received from stakeholders are captured in the Comment and Response Report (CRR).	Appendix C Comment and Response Report
Announcement of Final Basic Assessment Report	The final report will be made available on www.digbywells.com (under Public Documents)	

10.3 Decision Making Phase

Once the competent authority has taken a decision regarding the application all registered I&APs will be notified of the environmental authorisation decision by email, letter or fax and as required by legislation an advert will be placed in a local newspaper.



11 Summary of Issues Raised by I&APs

Table 11-1, Table 11-2 and Table 11-3 provides the format that will present the feedback from I&APs on the Project, as well as the EAP's and RPM's responses to the queries, comments and/or suggestions raised by stakeholders. At the time of submission for public comment of this Draft BAR, no stakeholder consultation had commenced. Feedback, comments and issues raised by stakeholders will be included in the Final BAR and submitted to the DMR and to the public to verify that their comments have been captured and responded to. The Final BAR will be available on the Digby Wells website for a period of 21 days.

Table 11-1: Interested and Affected Parties

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and/or responses were incorporated
Name of Individual	Consulted				
Landowners					
No comments received to date.					
Lawful occupier/s of the land					
No comments received to date.					
Landowners or lawful occupiers on adjacent properties					
No comments received to date.					
Municipal councillor					
No comments received to date.					
Municipality					
No comments received to date.					
Organisations of state (Responsible for Infrastructure that may be affected Roads Department, Eskom, Telkom, DWA etc.)					
No comments received to date.					
Communities					
No comments received to date.					
Traditional Leaders					
No comments received to date.					
Department of Land Affairs					
No comments received to date.					

Interested and Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and/or responses were incorporated
Name of Individual	Consulted				
<i>Department of Environmental Affairs</i>					
<i>No comments received to date.</i>					
<i>Other Competent Authorities Affected</i>					
<i>No comments received to date.</i>					

Table 11-2: Other Affected Parties

Other Affected Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and/or responses were incorporated
Name of Individual	Consulted				
<i>No comments received to date.</i>					

Table 11-3: Interested Parties

Interested Parties		Date of comments received	Issues raised	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and/or responses were incorporated
Name of Individual	Consulted				
<i>No comments received to date.</i>					

12 The Environmental Attributes Associated with the Alternatives

12.1 Baseline Environment

A summary of the baseline environment in the proposed Project area is provided in the sections below. With the exception of the heritage study, no site visits were conducted by the remaining specialists.

12.1.1 Climate

12.1.1.1 Rainfall

The Mean Annual Precipitation (MAP) obtained from the WR2005 manual for quaternary catchment A22H amounts to 658 mm as indicated in Table 12-1 below and is the adopted MAP for the project area.

Table 12-1: Summary of rainfall data extracted from the WR2005

Month	MAP
January	121.4
February	93.7
March	83.5
April	40.9
May	17.3
June	6.8
July	5.1
August	5.5
September	18.6
October	62.2
November	99.4
December	103.6
MAP	658

12.1.1.2 Evaporation

Monthly evaporation data was obtained from the WR2005 manual, (WR2005, 2009). The project area lies predominantly within quaternary catchments A22H, which has a MAE of 1700 mm. The area has a negative climatic water balance, as evaporation exceeds rainfall levels. The evaporation obtained is based on Symons pan evaporation measurements and needs to be converted to lake evaporation. This is due to the Symons pan being located below the ground surface, and painted black which results in the temperature in the water



being higher than that of a natural open water body. The Symons pan is then multiplied by a lake evaporation factor³ to obtain the adopted lake evaporation. Below in Table 12-2 is a summary of the adopted evaporation for the project site.

Table 12-2: Summary of evaporation data

Months	Symons Pan Evaporation (mm)	Lake Evaporation Factor	Lake Evaporation (mm)
January	181.9	0.84	152.8
February	151.8	0.88	133.6
March	147.2	0.88	129.6
April	116.1	0.88	102.2
May	98.8	0.87	85.9
June	81.3	0.85	69.1
July	90.1	0.83	74.8
August	119.3	0.81	96.7
September	159.8	0.81	129.4
October	185.6	0.81	150.4
November	176.3	0.82	144.6
December	191.8	0.83	159.2
Total	1700	N/A	1428

³ Evaporation factor obtained from WR2005



12.1.2 Topography and Visual Environment

The topography of the Project area and its surrounds is located 1.5 km northeast of Rustenburg, in the North West Province. Although the prospecting activities may have a visual impact on these receptors, the state of place will not be impacted upon as an industrial area is located directly west of the Project area.

12.1.3 Soil, Land Capability and Land Use

Existing Land Type data was used to obtain generalised soil patterns and terrain types for the Project site. Land Type data exists in the form of published 1:250 000 maps. These maps indicate delineated areas of similar terrain types, pedosystems (uniform terrain and soil pattern) and climate (Land Type Survey Staff, 1989).

These maps are general guidelines of what soils can be expected in the area.

12.1.3.1 Land Type

According to the Land Type data, the study site is classified as Land Type Ea3. The dominant soil form expected within this land type is the Acadia soil form which comprises approximately 70% of the study site, with 15.9% of the site comprising of shallow rocky or the Mispah soil form and the remainder comprising of a diversity of soils. These soils are described in more detail below. The Land Type for the Project area is illustrated in Plan 3, Appendix A.

12.1.3.2 Arcadia Soil Form

The Acadia soil form (70% of the study site) consist of deep Vertic A horizons overlying unspecified subsoil. These soils are have a texture that is high in clay (>55%). The interpretation of Land Type data of the study site suggests that the Acadia soil form occurs on level to gently sloping areas (1-4% slope gradients), with soil depths greater than 800mm, suggesting that these soils have a low potential to erode.

Arcadia soils are extremely physically active. They shrink when dry and swell when wet (Fey *et al.*, 2010). Heave can exceed 100 mm and the movement can lift buried pipes and poles to the surface. With the dry season, Arcadia soils are dry and cracked and water infiltration rate is high. Loose soil particles on the surface fall into the cracks towards deeper profiles of the soil body. When it rains, the soil swells and the cracks close and infiltration rate slows (Fey *et al.*, 2010). Arcadias have typically inverted profiles and lack horizons due to the random mixing when wet, therefore are not sensitive to disturbance (Soil Classification Working Group, 1991). In addition, Arcadia soils store large amounts of organic carbon (Smith, 2006).

The active nature of Arcadia soil forms often results in the shearing and tearing of plant roots. Additionally, in wet conditions these soils are prone to absorb and hold water rather than make it available for plants. It is for these reasons that these soils are often inferior for irrigated crop production. Despite this, Arcadia soils can accommodate a selected composition of vegetation such as grazing vegetation with monitored cultivation.



12.1.3.3 Mispah soil form

The Mispah soil form (15.9% of the study site) consists of an Orthic A horizon overlying impermeable rock. These soils are generally shallow with depths ranging from 100-400mm. From the interpretation of Land Type data these soils occur on steep gradients (2%). The Mispah soil form is sensitive to erosion and varies in clay percentages and water-holding capacity depending on the rock type from which they are derived.

Despite their shallow nature, Mispah soils can accommodate a wide variety of short shrub vegetation (Smith, 2006).

12.1.3.4 Land Capability

Land capability is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long term sustainable use of land under rain-fed conditions. From the Land Type data the generalised land capability of a particular area can be defined.

The land capability from the land type database shows that the dominate land capability for the prospecting area (Plan 4, Appendix A) is Class III (Moderate cultivation).

12.1.3.5 Land Use

The dominant land use based on the land type data for Waterval (Plan 5, Appendix A) is natural. This is high level information and the current state might indicate something different.

12.1.4 Fauna and Flora

The diversity and concentrations of the flora component in conjunction with geomorphological factors such as hills, valleys, rocky outcrops, streams and anthropogenic activities were used as the basis for delineating vegetation types or communities. A desktop study of the expected plant and animal species present within the study area has been conducted to determine the baseline environment of the Project area. The flora study component consisted of the delineation of different communities at a desktop level. Additional specialist study components associated with the identified vegetation communities included the identification of the following:

- Red data species;
- Medicinal species;
- Endemic species; and
- Alien invasive species.

The fauna study component consisted of the identification of various faunal species as an indicator of the delineated vegetation communities and habitat features. These faunal species consisted of endemic, endangered and protect species. The special faunal components which were assessed for this study include:



- Mammals;
- Avifauna;
- Invertebrates; and,
- Herpetofauna (Reptiles and Amphibians).

12.1.4.1 Regional Vegetation

According to Mucina and Rutherford (2006) the regional vegetation is the Marikana Thornveld (SVcb6) (Plan 6, Appendix A) that falls within the Savanna Biome and the greater Central Bushveld Bioregion Group. The Marikana Bushveld vegetation unit is distributed in the Gauteng and North-West provinces, with altitudes ranging between 1050 – 1450m.

The landscape is characterised by open *Acacia karroo* woodland in valleys and slightly undulating plains. Shrubbery is denser along drainage lines, rocky outcrops and other areas protected from fire. Table 12-3 shows flora taxa that are important within the vegetation unit and Appendix D shows plants species that are likely to occur within the site.

This vegetation unit is considered endangered as of 2006 (Mucina and Rutherford, 2006) and poorly conserved as less than 1% officially protected within the Magaliesburg Nature Area. In 2006, 48% of the unit had been transformed by agricultural and urban developments. The areas of the unit towards the east were under threat due to larger industrial developments.

Table 12-3: Flora of the Marikana Thornveld

Marikana Thornveld	
Tall Trees	<i>Acacia burkei</i>
Small Trees	<i>Acacia caffra</i> , <i>A. gerrardii</i> , <i>A. karroo</i> , <i>Combretum molle</i> , <i>Rhus lancea</i> , <i>Ziziphus mucronata</i> , <i>A. nilotica</i> , <i>A. tortilis subsp. heteracantha</i> , <i>Celtis africana</i> , <i>Dombeya rotundifolia</i> , <i>Pappea capensis</i> , <i>Peltophorum africanum</i> , <i>Terminalia sericea</i>
Tall Shrubs	<i>Euclea crispa subsp. crispa</i> , <i>Olea europaeae subsp. africana</i> , <i>Rhus pyroides subsp. pyroides</i> , <i>Diospyros lycoides subsp. geurkei</i> , <i>Ehretia rigida subsp. rigida</i> , <i>Euclea undulata</i> , <i>Grewia flava</i> , <i>Pavetta gardeniifolia</i>
Low Shrubs	<i>Asparagus cooperi</i> , <i>Rhynchosia nitens</i> , <i>Indigofera zeyherri</i> , <i>Justicia flava</i>
Woody Climbers	<i>Clematis brachiata</i> , <i>Helinus integrifolius</i>
Herbaceous Climbers	<i>Pentarrhinum insipidum</i> , <i>Cyphostemma cirrhosum</i>
Gramnoids	<i>Elionarus muticus</i> , <i>Eragrostis lehmanniana</i> , <i>Seterai sphacelata</i> , <i>Themeda triandra</i> , <i>Aristida scabrilalis subsp. scabralis</i> , <i>Fingerhathia africana</i> , <i>Heteropogon contortus</i> , <i>Hyperthelia dissoluta</i> , <i>Melinis nerriglumis</i> , <i>Pogonarthria squarrosa</i>



Marikana Thornveld	
Herbs	<i>Hermannia depressa, Ipomoea obseura, Barleria macrostrgia, Dianthus mooiensis, Ipomoea oblongata, Vernonia oligocephala</i>
Geophytic Herbs	<i>Ledebouria revoluta, Ornithogalum tennifolium, Sansevieria aethiopica</i>

12.1.4.2 Regional Fauna

Fauna occurring on the site include assemblages within the terrestrial ecosystem: mammals, birds, invertebrates, reptiles and amphibians. Each of these assemblages occurs within unique habitats and ecological state of these habitats directly relates to the number of species found within them.

As the region is used primarily for farming and mining (with associated nature reserves or natural areas), there will be a large number of mammals, both naturally occurring and possibly introduced. The majority of these make use of the Bushveld habitat for grazing, browsing and hunting. Small mammals will also be quite common in the area.

The Marikana Bushveld consists of a dominant woody layer and a grass layer that provides sufficient cover for both herbivorous and predatory species. The vegetation unit supports a diverse range of ungulate species such as represented in Table 12-4. The grass cover also provides habitat for smaller mammal species such as the Scrub Hare (*Lepus saxatilis*) and Common Dwarf Mongoose (*Helogale parvula*). Big predatory species such as the Leopard (*Panthera pardus*) would be well supported by the dominant woody layer and tall grass cover, although due to the Project's proximity to the town of Rustenburg, it is unlikely to encounter such species. Reptile species would survive well in the hot summers and habitat provided by the rocky outcrops and drainage channels flowing throughout the vegetation unit.

Table 12-4: Possible Mammal Species

Family	Species	Common name	Red list category
Bovidae	<i>Damaliscus pygargus phillipsi</i>	Blesbok	Least Concern
Bovidae	<i>Raphicerus campestris</i>	Steenbok	Least Concern
Bovidae	<i>Sylvicapra grimmia</i>	Bush Duiker	Least Concern
Canidae	<i>Canis mesomelas</i>	Black-backed Jackal	Least Concern
Cercopithecidae	<i>Papio ursinus</i>	Chacma Baboon	Least Concern
Felidae	<i>Panthera pardus</i>	Leopard	Vulnerable



Family	Species	Common name	Red list category
Herpestidae	<i>Atilax paludinosus</i>	Marsh Mongoose	Least Concern
Herpestidae	<i>Cynictis penicillata</i>	Yellow Mongoose	Least Concern
Herpestidae	<i>Helogale parvula</i>	Common Dwarf Mongoose	Least Concern
Hystricidae	<i>Hystrix africaeaustralis</i>	Cape Porcupine	Least Concern
Leporidae	<i>Lepus saxatilis</i>	Scrub Hare	Least Concern
Leporidae	<i>Pronolagus randensis</i>	Jameson's Red Rock Hare	Least Concern
Macroscelididae	<i>Elephantulus myurus</i>	Eastern Rock Elephant Shrew	Least Concern
Muridae	<i>Acomys</i>	Spiny Mice	Not listed
Muridae	<i>Aethomys ineptus</i>	Tete Veld Aethomys	Least Concern
Muridae	<i>Aethomys namaquensis</i>	Namaqua Rock Mouse	Least Concern
Muridae	<i>Lemniscomys rosalia</i>	Single-Striped Lemniscomys	Data Deficient
Muridae	<i>Mastomys</i>	Multimammate Mice	Not listed
Muridae	<i>Rhabdomys pumilio</i>	Xeric Four-striped Grass Rat	Least Concern
Mustelidae	<i>Ictonyx striatus</i>	Striped Polecat	Least Concern
Nesomyidae	<i>Dendromus melanotis</i>	Gray African Climbing Mouse	Least Concern
Procaviidae	<i>Procavia capensis</i>	Rock Hyrax	Least Concern



Family	Species	Common name	Red list category
Soricidae	<i>Crocidura cyanea</i>	Reddish-gray Musk Shrew	Data Deficient
Soricidae	<i>Myosorex varius</i>	Forest Shrew	Data Deficient
Thryonomyidae	<i>Thryonomys swinderianus</i>	Greater Cane Rat	Least Concern
Vespertilionidae	<i>Neoromicia capensis</i>	Cape Serotine	Least Concern
Viverridae	<i>Genetta genetta</i>	Common Genet	Least Concern

12.1.4.3 Reptiles

Southern African endemic reptiles that are found in the Magaliesberg Mountain region include the Kalahari Tent Tortoise *Psammobates oculiferus*, Duerden's burrowing asp *Atractaspis duerdeni*, Distant's Thread snake *Leptotyphlops distanti*, two-striped shovel-snout *Prosymna bivittata*, shield-nose snake *Aspidelaps scutatus* and thin-tailed legless skink *Acontias gracilicauda*. Threatened reptiles present include southern African python *Python sebae natalensis*. Table 12-5 shows the reptile species likely to be found on the site.

Table 12-5: Possible Reptile Species

Family	Species	Common name	Red list category
Agamidae	<i>Agama atra</i>	Southern Rock Agama	Least Concern (SARCA 2014)
Colubridae	<i>Psammophis brevirostris</i>	Short-snouted Grass Snake	Least Concern (SARCA 2014)
Gerrhosauridae	<i>Gerrhosaurus flavigularis</i>	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)
Lacertidae	<i>Meroles squamulosus</i>	Common Rough-scaled Lizard	Least Concern (SARCA 2014)
Scincidae	<i>Trachylepis punctatissima</i>	Speckled Rock Skink	Least Concern (SARCA 2014)
Scincidae	<i>Trachylepis varia</i>	Variable Skink	Least Concern (SARCA 2014)

Amphibious species are found mainly in wet or moist areas within the landscape such as drainage channels and wetland areas where the aquatic and terrestrial systems merge. The study area is likely to support amphibian species along the wetlands and drainage channels; with the denser shrubbery providing sufficient shade cover to keep it cool and moist. Table 12-6 represents amphibious species that are likely to occur on the site.

**Table 12-6: Possible Amphibian Species**

Family	Species	Common name	Red list category
Bufo	<i>Amietophrynus garmani</i>	Olive Toad	Least Concern
Bufo	<i>Amietophrynus gutturalis</i>	Guttural Toad	Least Concern
Bufo	<i>Amietophrynus poweri</i>	Power's Toad	Least Concern
Hyperoliidae	<i>Kassina senegalensis</i>	Bubbling Kassina	Least Concern
Microhylidae	<i>Phrynomantis bifasciatus</i>	Banded Rubber Frog	Least Concern
Phrynobatrachidae	<i>Phrynobatrachus natalensis</i>	Snoring Puddle Frog	Least Concern
Pipidae	<i>Xenopus laevis</i>	Common Platanna	Least Concern
Ptychadenidae	<i>Ptychadena anchietae</i>	Plain Grass Frog	Least Concern
Ptychadenidae	<i>Ptychadena mossambica</i>	Broadbanded Grass Frog	Least Concern
Pyxicephalidae	<i>Amietia queckettii</i>	Queckett's River Frog	Least Concern
Pyxicephalidae	<i>Cacosternum boettgeri</i>	Common Caco	Least Concern
Pyxicephalidae	<i>Strongylopus fasciatus</i>	Striped Stream Frog	Least Concern
Pyxicephalidae	<i>Tomopterna cryptotis</i>	Tremelo Sand Frog	Least Concern
Pyxicephalidae	<i>Tomopterna natalensis</i>	Natal Sand Frog	Least Concern

12.1.4.4 Avifauna

The South African Important Bird Area (IBA) Programme is coordinated by BirdLife South Africa. The purpose of the IBA Programme is to identify and protect a network of sites, at a biogeographical scale, critical for the long-term viability of naturally-occurring bird populations. The nearest Important Bird Area (IBA) is the Magaliesberg Bird Area situated less than 100 km south-west of the proposed project area (Plan 7, Appendix A). This IBA consists of the Magaliesberg Nature Conservation. Several large rivers have their headwaters in the Magaliesberg Mountains; these include the Crocodile, Sterkstroom, Magalies and Skeerpoort Rivers. Three major impoundments have been built along the



Magaliesberg: the massive Hartbeespoort Dam in the east, Buffelspoort Dam in the centre and Olifantsnek Dam about 7 km south of Rustenburg.

Many raptor species occur in area due to the close proximity of the Magaliesberg Mountains, including Cape Vulture *Gyps coprotheres*, White-backed Vulture *Gyps africanus* and Lappet-faced Vulture *Torgos tracheliotus*. Verreaux's Eagle *Aquila verreauxii* breeds in the Magaliesberg, and African Grass Owl *Tyto capensis* and Secretarybird *Sagittarius serpentarius* are regularly recorded. The likely avifauna of the study area, identified to fall within the Quarter Degree Square (QDS) 2527CB, was determined using the South African Bird Atlasing Project (SABAP2) website (Appendix D).

Nine species of conservation concern have a high probability of occurring due to the presence of suitable habitat; these include: Kori Bustard (*Ardeotis kori*), White-backed Vulture (*Gyps africanus*), Tawny Eagle (*Aquila rapax*), Martial Eagle (*Polemaetus bellicosus*), Secretarybird (*Sagittarius serpentarius*), Lanner Falcon (*Falco biarmicus*), Marabou Stork (*Leptoptilos crumeniferus*), Red-billed Oxpecker (*Buphagus erythrorhynchus*), and Short-clawed Lark (*Certhilauda chuana*). The desktop study identified 6 bird species of special concern as shown in Table 12-7 below.

Table 12-7: Possible Bird Species of Special Concern

Common Name	Species Name	Conservation Status
Cape Vulture	<i>Gyps coprotheres</i>	VU
Greater Flamingo	<i>Phoenicopterus ruber</i>	NT
Lesser Flamingo	<i>Phoenicopterus minor</i>	NT
Lesser Kestrel	<i>Falco naumanni</i>	VU
Red-billed Oxpecker	<i>Buphagus erythrorhynchus</i>	NT
Yellow-billed Stork	<i>Mycteria ibis</i>	NT

12.1.4.5 Current Biodiversity Status

The study site(s) is located in close proximity to urban developments and within agricultural fields. It is expected that natural environment has been impacted upon and is currently moderately modified. The anthropogenic pressures placed upon the natural environment in most instances lead to the establishment of alien invasive plant species and the alteration of the natural vegetation. Commercial agricultural practices alter vegetation structures and water regimes of the area and have an adverse effect on the environment which in turn may lead to habitat fragmentation which may cause the loss of faunal species due to migration or decline in numbers. The area in which the sites of interest are situated is extra-urban to rural and it is expected that the biodiversity will be low as a result of industrial, agricultural and anthropogenic impacts

12.1.5 Wetlands

No NFEPA wetlands are within the project area nor 500m around. There are however some wetlands in the greater area as shown on the map below and these are of Rank 6 (of no importance).

The desktop delineation revealed significantly more wetlands that are associated with the Hex River again, which is found ~250 east of the project area. These are delineated as channelled valley bottom wetlands and are part of the Hex River drainage system. The Hex River and the unnamed tributary are part of a large channelled valley bottom system, as shown in Plan 8, Appendix A. A desktop delineation of the wetland areas is included in Plan 9, Appendix A.

12.1.6 Surface Water

12.1.6.1 Regional Hydrology

The Project area is located within the Hex River catchment which forms part of quaternary catchment A22H, this falls within the Crocodile West and Marico Water Management Area (WMA 3) in the mid to southern section of quaternary catchment A22H.

The surface water attributes of the affected catchments namely Mean Annual Runoff (MAR), MAP and Mean Annual Evaporation (MAE) were obtained from the water research commission of South Africa (WRC, 2005) and are summarised below in Table 12-8 below.

Table 12-8: Summary of the surface water attributes of the B20D quaternary catchment

Quaternary Catchment	Total Area (km ²)	MAP (mm)	MAR m ³ *10 ⁶	MAE (mm)
A22H	579	658	9.11	1700

The A22H quaternary catchment area is 579 km² in extent and has an MAR of 9.11 million cubic metres (Mm³). Runoff emanating from this quaternary catchment drains in a northerly direction via the Hex River.

Elevations in the A22H quaternary range from 1711 metres above mean sea level (mamsl) at the highest point within the catchment, and drop to 1073 mamsl at the outlet of the catchment.

12.1.6.1.1 Rivers and Drainage

The four rivers making up the primary drainage for the A22H quaternary catchment are the Hex River, the Dorpspruit River, Waterkloofspruit River and the Sandspruit. All runoff within quaternary catchment A22H eventually reports to the Hex River at the outlet just below the Bospoort Dam. The Dorpspruit River, Waterkloofspruit River and the Sandspruit form tributaries of the Hex River which drain a large portion of the upper southern section of the catchment.



12.1.6.2 Storm Rainfall Depths

The Design Rainfall Estimation programme (DRE) (Smithers and Schulze, 2003), was used to extract storm rainfall depth information for the six nearest rainfall stations relative to the project site. A summary of these stations are presented in Table 12-9 below.

Table 12-9: Summary of six closest rainfall stations

Station Name	SAWS Number	Distance km	Record Length (years)	Lat (°) (')	Lon (°)	MAP (mm)	Altitude (m)
Rustenburg (POL)	0511400 W	7.6	87	25° 40'	27° 14'	665	1155
Bospoortdam	0511573 W	10.2	54	25° 33'	27° 21'	609	1070
Klipfontein	051162 W	10.2	71	25° 41'	27° 21'	633	1173
Rustenburg-AGR	0511523 A	10.9	41	25° 43'	27° 18'	639	1141
Kroondal	0511523 W	10.9	33	25° 43'	27° 18'	639	1141
Kroondal	0511554 W	10.9	40	25° 43'	27° 18'	639	1141

The adopted storm rainfall depths for the 1 day storm event are based on the Rustenburg (POL) station (0511400 W). Below in Table 12-10 is a summary of the rainfall depths for the 1 day storm event for various recurrence intervals (years).

Table 12-10: Summary of adopted storm rainfall depths

Design rainfall return period (yrs)	1:2	1:5	1:10	1:20	1:50	1:100	1:200
1 day design peak rainfall (mm)	59.9	81.3	96.8	112.5	134.5	152.3	171.1

12.1.7 Groundwater

12.1.7.1 Geology

The regional geology comprises the Rustenburg Layered Suite, of the Bushveld Igneous Complex (BIC). The rocks of the Rustenburg Layered Suite (RLS) range from ultrabasic pyroxenite and anorthosite in the lower parts to norite, gabbro and magnetite-gabbro in the upper parts. The RLS is subdivided into the Marginal, Lower, Critical, Main and Upper zones.

The surface area is predominantly underlain by the Mathlagame norite-anorthosite formation of the Critical Zone and the Pyramid gabbro-norite of the Main Zone. Rocks of the Critical



Zone comprise of alternating layers of norite, anorthosite pyroxenite and chromitite while the Main Zone consists predominantly of norite.

The Merensky Reef and UG2 Chromitite Layer seams occur in the Upper Critical Zone and the seams run parallel to each other approximately 600 m apart at outcrop. A black turf of almost 2 m thickness covers most of the prospecting area, formed due to the in-situ weathering of the gabbro/norite rocks. Various dolerite dykes (up to 40 m thick) and lamprophyre dykes (0.2 m to 2 m thick) occur in the area. The dykes occur in the form of swarms and generally trend south-easterly to north-westerly.

12.1.7.2 Hydrogeological Environment

Crystalline material, such as the norites and pyroxenites of the Bushveld Complex, comprise of an unweathered and intact rock matrix with negligible matrix porosity and permeability, as well as planes of discontinuity in the rock matrix, including both faults and joint planes (collectively referred to as fractures). The infiltration and flow of groundwater in such systems is controlled by the prevailing complex fracture network and can vary in space and time. Such conditions relate to structurally controlled flow systems. However, these fractures are often in-filled by precipitates from late-phase fluids (i.e. vein infill).

The following two layer aquifer model is proposed to conceptualise the Bushveld Complex aquifers at a regional scale:

- A shallow weathered aquifer system (i.e. intergranular water table aquifer) that may be laterally connected to alluvial aquifers associated with river systems; and
- A deeper, fractured bedrock aquifer system.

The shallow unconfined, phreatic (or water table) aquifer comprises of the saprolite (that formed as a result of intensive and in-situ weathering processes) to saprock (differentially weathered and fractured upper bedrock underlying the saprolite) zones. The soil and saprolite are collectively termed the regolith. The saprolite and saprock (classified as part of the bedrock) are generally treated as a single weathered aquifer unit, referred to as the weathered overburden, which varies in thickness from 12 to 50 m and is derived from the in-situ decomposition of the underlying noritic rocks. The degree/intensity of chemical weathering or more specifically the spatial and depth variations thereof, control the geometry of the shallow weathered aquifer profile. The weathered overburden is considered to have low to moderate transmissivity, but high storativity. Generally, crystalline/basement aquifers have very low transmissivity (T) values (i.e. geometric mean) ranging from 1 to 5 m²/day, with an order of magnitude lower and/or higher than these values, calculated in relation to a saturated thickness of the regolith varying from 12 m to 22 m (Chilton and Foster, 1995). Crystalline/basement aquifers are further characterized by poor connectivity of bedrock fractures and regions of low permeability resulting in significant local variations in yield and response to abstraction.

The unweathered and fractured, semi-confined bedrock aquifer consists of fractured norite, anorthosite and pyroxenite, underlying the upper weathered aquifer. The intact bedrock



matrix has a very low matrix hydraulic conductivity and its effective hydraulic conductivity is determined by fractures and mine voids. Water is generally stored and transmitted in fractures and fissures within a relatively impermeable matrix.

Groundwater occurrence of the RLS of the BIC is associated mainly with deeply weathered and fractured mafic rocks. The groundwater yield potential is classified as poor since most of the boreholes produce less than 2 L/s. Mafic rocks of the BIC tend to weather to clay rich soil, which has low permeability and considered to reduce the recharge to underlying aquifers. The aquifer system underlying the area is described as an intergranular and fractured aquifer with borehole yields varying between 0.5 to 2 L/s.

12.1.7.3 Groundwater flow

The infiltration of water from the shallow weathered aquifer system to the deeper fractured bedrock aquifer system is strongly heterogeneous and requires permeable soils, or permeable horizons (i.e. 'infiltration routes'), as well as open and interconnected fracture systems in the bedrock. Hydraulic continuity must exist between groundwater reservoirs in the overlying horizons (or weathered overburden) and the underlying bedrock. The fracture zones act as conduits for deeper flow from groundwater reservoirs located in upper permeable soils or the weathered overburden. Groundwater flows through interconnected fracture systems with the potential of rapid vertical groundwater flow from the weathered overburden (and surface water bodies) to greater depths along interconnected conductive zones. However, the generally low transmissivity values for the upper weathered aquifer inhibit both lateral flow (within the shallow weathered aquifer) and vertical flow (between the shallow and deeper aquifer systems).

As a result, the impacts on the shallow, weathered aquifer system may be negligible away from the immediate vicinity of the mining areas, given the hydrogeological characteristics of the weathered aquifer and the spatial heterogeneity in hydraulic connectivity between the shallow, weathered aquifer and the deeper fractured aquifer. The weathered and alluvial aquifers along the river courses support most irrigation and domestic water supply boreholes, despite being undermined. This indicates limited interaction between the shallow and deep aquifer systems.

Within the surface use areas and immediately above undermined zones, the shallow weathered aquifer may be drained due to slow vertical leakage to the dewatered, deeper fractured aquifer. However, the shallow aquifer has the potential to be replenished relatively quickly during sustained rainfall periods.

Lateral groundwater flow in the shallow aquifer is driven by topographic gradients and/or localised recharge mounds due to e.g. irrigation, leakage from tailings storage facilities. Due to mine dewatering in the Rustenburg area the local groundwater flow directions in the deeper fractured aquifer are generally re-directed towards the underground and open pit mines. This results in spatially different groundwater flow directions for the shallow and deeper aquifer systems.

Few boreholes close to the prospecting sites were located based on the data accessed from the National Groundwater Archive (NGA). The NGA database has few water levels reported in the area, and the water level range from 5-18 metres below ground level (mbgl).

12.1.7.4 Groundwater Users

Portion 53 of the farm Waterval 306 is located within a 1 km distance from the Rustenburg industrial site. Rustenburg town is located west of the proposed prospecting area. A large number of the Rustenburg occupants rely on municipal water for domestic water needs.



12.1.8 Socio-Economic and Political Structure

The Project area falls within the Rustenburg Local Municipality (RLM).

Data on the socio-economic environment was predominantly obtained from the Rustenburg Integrated Development Plan (RIDP) 2012-2017. An overview of the socio-economic structure is provided below.

12.1.8.1 Regional and District Overview

12.1.8.1.1 Demographic Profile

The RLM consists of various racial groups and the population has been on the increase over the past few years. The bulk of the district's population is African (86.4% in 2010).

12.1.8.1.2 Regional Employment

Notably, a stable increase in the labour force participation rate is identified in the RIDP between 1996 and 2010. Similarly, the unemployment rate has gradually declined during the same period.

12.1.8.2 Household Income

According to the RIDP, majority of African individuals earn between R18 000 and R360 000 per year. The White population earn between R96 000 and R1 200 000 per year and Asian individuals between R132 000 and R600 000 annually. The gap income for the Coloured population ranges from R6 000 and R12 000 annually.

12.1.8.3 Age and Gender Distribution

From 2001 to 2010 the RLM population has grown. A significant contributor to the rise in population is the increase in mining activities found in the area. The gender distribution consists of 55% male in 2001 and 54% in 2010 which can be attributed to labour migration in the mining industry.

12.1.8.4 Language

The prominent language in the RLM is Traditional African or Setswana. Secondary languages in the area include Xhosa and Afrikaans.

12.1.9 Heritage

The cultural baseline is based on information sources such as previous Heritage Impact Assessments (HIA) conducted in the area and several databases.



12.1.9.1 Regional and Local Study Area

12.1.9.1.1 *Geology and Palaeontological Sensitivity*

The local underlying geology is part of the Bushveld Complex as shown in Table 12-11 below. The study area lies within the Western Limb of the Rustenburg Layered Suite which is a mafic formation (magma flows) which does not contain any sedimentary layers and therefore no fossils (Johnson, et al., 2006).

Table 12-11: Lithographic units and fossil sensitivity (adapted from Johnson et al 2006 and SAHRIS⁴)

Ma	eon	Era	Lithostratigraphic units			Lithology	Sensitivity	Fossils						
2000-2050	Proterozoic	Eoproterozoic	Vaalian	Bushveld Complex	Rustenburg Layered (Vdt)	Critical Zone	Winterveld Norite-Anorthosite	Zero	None					
							Mooihoek Pyroxenite	Zero	None					
							Undetermined Quaternary	Zero	None					
2500						Proterozoic	Eoproterozoic	Vaalian	Bushveld Complex	Rustenburg Layered (Vdt)	Lower Zone	Tweelaagte Bronzitite	Zero	None
												Groenfontein Harzburgite	Zero	None
												Makope Bronzitite	Zero	None
												Eerlyk Bronzitite	Zero	None

12.1.9.1.2 *The Stone Age*

Surface accumulations of Middle and Later Stone Age (MSA and LSA) lithics have been recorded throughout the region, however, these finds are not commonly found *in situ* and provide limited contextual information.

A total of eight Stone Age surface scatter sites were identified as a result of previous HIAs within 14 km of the study area (Higgitt, 2015; Huffman & Schoeman, 2002; Magoma, 2014; Van Schalkwyk & Pelsler, 1997; van Vollenhoven & de Bruyn, 2014). These surface scatters included Early Stone Age Artefacts cores and flakes, MSA flakes, points and cores, and LSA flakes.

12.1.9.1.3 *Farming Communities*

The Farming Community Period marks the arrival of Bantu-speakers who brought with them agriculture and metal working skills. Archaeologically, common identifiers of this period in the region include ceramics and stone walled settlements (associated with the Late Farming Communities (LFC)).

A total of 46 LFC sites have been identified as a result of previous HIAs within 20 km of the study areas (Coetzee, 2008; Magoma, 2014; Higgitt, 2015; Huffman & Schoeman, 2002;

⁴ <http://www.sahra.org.za/sahris/fossil-heritage-layer-browser> accessed 23/04/2015



Van Schalkwyk, 2003; Van Schalkwyk & Pelsler, 1997; van Vollenhoven & de Bruyn, 2014). The majority of these sites are well preserved stone walled settlements with cattle kraals, terraces, pottery (mostly Uitkomst/Rooiberg/Olifantspoort ceramic facies), and grinding stones. Additionally, an Iron Age engraving site was recorded 13 or 14 km from the study areas depicting a settlement layout of a stone-walled settlement (See Appendix B for site list).

12.1.9.1.4 Historical period

The historical period is commonly associated with contact between white Europeans with LFC, and consequent written records. The closest large town is Rustenburg which was established in 1850 (Raper, 1987). The town was involved in the South African War, when British troops arrived on the 14 June 1900. Three battles occurred in the vicinity i.e. Buffelspoort, Nooitgedacht and Vlakfontein (Bergh, 1999).

Five historic sites were identified between 4 and 15 km from the proposed study areas as a result of previous HIAs in the area. These include burial grounds, stonewalls and historic pottery surface scatters (van Vollenhoven & de Bruyn, 2014).

12.1.9.2 Site Specific Study Area

The literature review did not identify any Stone Age or Farming Community heritage resources within the site specific areas and these heritage resources are not discussed further in this section.

12.1.9.2.1 Geology and Palaeontological Potential of the Study Area

According to the SAHRIS PalaeoSensitivity Map, the Waterval study area (depicted as a white circle in Figure 12-1) is situated in an area of insignificant palaeontological sensitivity (grey area) depicted in below (SAHRIS, 2014).

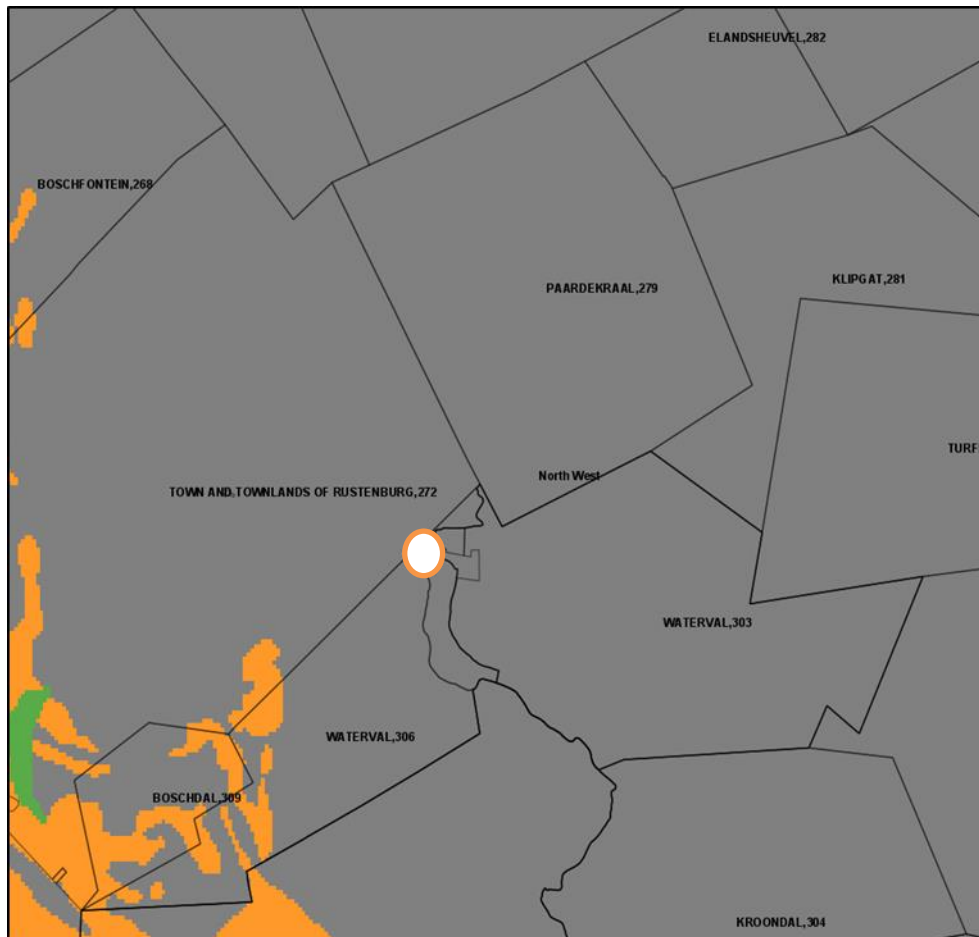


Figure 12-1: PalaeoSensitivity of the study area

12.1.9.3 Historical period

The 1902-1909 Rustenburg topographical map shows the Waterval study area is located near a main road, secondary road and railway line that ran from the old 'Native Locations' to the north and east of Rustenburg (Figure 12-2).

The Waterval site specific study area has remained mostly unchanged since 1955 based on reviewed aerial photographs. (Plan 10, Appendix A).

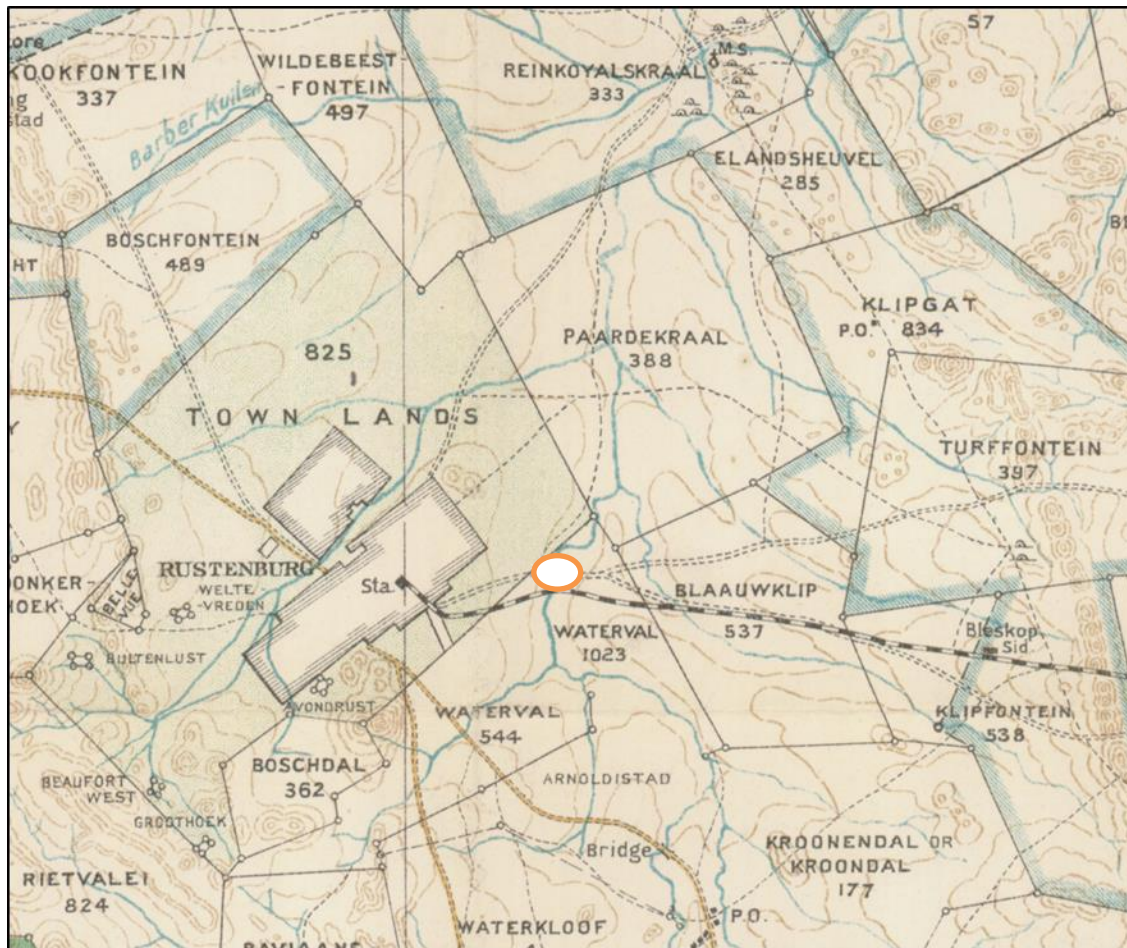


Figure 12-2: 1902-1909 map of the Waterval study areas

12.2 Description of the Current Land Uses

The current land use is described in Section 12.1.3. The land use within the area is dominated by natural areas with a water treatment plant in the area. Land Type for the Project area is detailed in Plan 3, Appendix A.

Land capability is determined by a combination of soil, terrain and climate features. Land capability is defined by the most intensive long term sustainable use of land under rain-fed conditions. From the Land Type data the generalised land capability of a particular area can be defined.

The land capability from the land type database shows that the dominate land capability for the prospecting area (Plan 4, Appendix A) is Class III (Moderate cultivation).

12.3 Environmental and Current Land Use Map

The Plans indicating the environmental features of the Project site are summarised in Table 12-12.



Table 12-12: Summary of the Plans indicating the Environmental Features of the Project Site

Environmental Feature	Plan Number (Appendix A)
Land Type	Plan 3
Land Capability	Plan 4
Land Use	Plan 5
Regional Vegetation	Plan 6
Important Bird Area	Plan 7
Wetlands	Plan 8 and Plan 9
Heritage Resources	Plan 10 - 12



13 Impacts and Risks Identified including the Nature, Significance, Consequence, Extent, Duration and Probability of the Impacts, including the Degree to which these Impacts can be Mitigated

The potential impacts are discussed according to each Phase of the proposed Project: the Establishment, Operational and Decommissioning Phases. The Project activities are summarised in Table 13-1.

This section also rates the significance of the potential impacts pre-mitigation and post-mitigation. The impacts below are a result of both the environment in which the activity takes place, as well activity itself. The impacts associated with the Project include the NEMA EIA Regulations Listed Activities, as well as the prospecting activities to take place at the Property. The methodology utilised to assess the significance of the potential impacts is described in Section 14.

Table 13-1: Project Activities Summary

Activity No.	Activity
Establishment Phase	
1	Site clearance and topsoil removal prior to the commencement of physical construction activities. Topsoil will be stored in stockpiles not greater than 1m in height.
Operational Phase	
2	Drilling of prospecting boreholes.
Decommissioning Phase	
3	Rehabilitation of topsoil cover, ripping and vegetation establishment.



13.1 Establishment Phase

No physical construction will take place as no permanent infrastructure will be established. Activities will relate to the possible establishment of a temporary access road, as well as the clearing of vegetation for the establishment of the prospecting drill site.

Potential access roads will be constructed from existing road infrastructure with the shortest possible route to the prospecting drill site being utilised, ensuring that there are minimal environmental impacts related to this activity. The temporary access roads will only be utilised by personnel vehicles for site inspections and the pick-up of drill core during the Operational Phase.

Three sumps will be constructed within the boundary of each prospecting drill site footprint to separate oil, sludge and water. Topsoil will be stockpiled and stored for future rehabilitation of the prospecting drill site once drilling has concluded. Topsoil stockpiles will be covered during windy and rainy months to prevent soil erosion. The wet season occurs between October and March.

13.1.1 Social Nuisance Impacts

The impacts associated with social nuisance to the neighbouring communities during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-2.

Table 13-2: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisance Impacts during the Establishments Phase

Activity No 1: Site Clearance	
Criteria	Details / Discussion
Description of impact	<ul style="list-style-type: none"> ■ Increased dust levels due to site clearing, use of access roads and vehicular activity; and ■ Ambient noise levels will increase due to vehicles and site clearing machinery.
Mitigation required	<ul style="list-style-type: none"> ■ Keep soils moist to suppress possibility of dust; ■ Site clearing to take place during daylight hours only; ■ Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; ■ Vehicles and machinery will be properly maintained to minimise operating noise; ■ Vehicles will obey speed limits; and ■ Bulk Delivery of materials should be maximised to reduce the frequency of deliveries.



<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	1	3	5	- 25
Post-Mitigation	1	1	1	4	- 12



13.1.2 Soil, Land Use and Land Capability

The impacts associated with soil and land capability during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-3.

Table 13-3: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Establishment Phase

Activity No. 1: Site Clearance					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ Soil compaction due to machinery and increased personnel activity; ■ Soil erosion due to site clearance and stockpile of topsoil exposure to wind and water; and ■ Loss of topsoil due to erosion. 				
Mitigation required	<ul style="list-style-type: none"> ■ Only clear vegetation when and where necessary; ■ Only remove topsoil when and where necessary; ■ Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and ■ Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (October to March). 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	2	3	6	- 42
Post-Mitigation	1	2	2	5	- 25



13.1.3 Fauna and Flora

The impacts associated with fauna and flora during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-4.

Table 13-4: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Establishment Phase

Activity No. 1: Site Clearance					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ Loss of vegetation communities; ■ Loss of biodiversity and habitat fragmentation; and ■ Direct impact on Threatened Ecosystems of the Marikana Thornveld. 				
Mitigation required	<ul style="list-style-type: none"> ■ Only remove vegetation when and where necessary; ■ Minimise the size of the prospecting drill sites as far as possible; ■ Indigenous trees will not be removed; ■ Drainage lines, and indigenous vegetation will be avoided; and ■ Use existing access roads. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	3	5	- 35
Post-Mitigation	1	2	2	4	- 20



13.1.4 Wetlands

There are no wetlands within 500 m of the Project site and, therefore, there are no impacts on wetlands associated with the Project.

13.1.5 Surface Water

The impacts associated with surface water during the Establishment Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-5.

Table 13-5: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Establishment Phase

Activity No. 1: Site Clearing.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Site clearing activities will expose soils and increase the risk of erosion. Soil erosion may cause siltation of the surface water resources. Contaminated water will reduce the available volume of water for downstream uses. The Project site is located approximate 300 m to the west of the Hex River. 				
Mitigation required	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; and All watercourses will be avoided and the stipulated buffer will be implemented. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	2	3	3	3	-24
Post-Mitigation	1	3	2	2	-12



13.1.6 Groundwater

There are no anticipated impacts associated with groundwater resources for the site establishment phase.



13.2 Operational Phase

13.2.1 Social Nuisance Impacts

The impacts associated with social nuisance to the neighbouring communities during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-6.

Table 13-6: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Social Nuisances during the Operations Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ Drilling could increase the ambient noise levels in the area. The noise levels should be below 45 dB from the nearest farmstead according to the SANS 10103: 2008 guidelines for daylight, rural areas; ■ Dust generation from vehicular activity; and ■ Increased dust due to erosion of soil stockpiles. 				
Mitigation required	<ul style="list-style-type: none"> ■ Maintain drilling equipment and, if possible, fit silencing equipment; ■ Drilling will only take place during daylight hours; ■ Use a dust suppressant and keep access roads moist; and ■ Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding. 				
<i>Parameters</i>	Spatial	Duration	Intensity	Probability	Significant rating
Pre-Mitigation	2	2	3	5	- 35
Post-Mitigation	1	2	2	4	- 20



13.2.2 Soils, Land Use and Land Capability

The impacts associated with soil and land capability during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-7.

Table 13-7: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ The risk of spills and leaks of hydrocarbons from the drill rig and vehicles will contaminate the soil; ■ Compaction of soil due to machinery and personnel on site; and ■ Stockpiles of topsoil could erode during windy and rainy days (October to March). 				
Mitigation required	<ul style="list-style-type: none"> ■ Immediately cease drilling and contain and clean-up any hydrocarbon spillages as they occur; ■ Ensure the spill clean-up kits are readily available in the event of a spillage; ■ Machinery and vehicles must be serviced and maintained off site at a workshop and drip trays must be in place to capture the spillage and avoid soils from being contaminated; and ■ Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	3	3	6	-54
Post-Mitigation	2	2	3	4	- 28



13.2.3 Fauna and Flora

The impacts associated with fauna and flora during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-8.

Table 13-8: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ Faunal species may disperse from the area due to loss of habitats, as well as due to the generation of noise from the drilling activities; and ■ Risk of increase and encroachment of alien invasive species. 				
Mitigation required	<ul style="list-style-type: none"> ■ Remove alien invasive species as and when they occur; ■ Maintain drilling equipment and, if possible, fit silencing equipment; and ■ All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	3	5	- 35
Post-Mitigation	1	2	2	4	- 20



13.2.4 Wetlands

All wetlands, pans and dams will be avoided with a 100 m buffer and therefore no impacts are expected. A berm will be constructed around the periphery of the prospecting site to ensure that no runoff falling within the prospecting site reports to the catchment, preventing potential sedimentation of the wetlands

13.2.5 Surface Water

The impacts associated with surface water during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-9.

Table 13-9: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Increased turbidity and sedimentation as a result of dust and soil erosion. 				
Mitigation required	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; and Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	2	2	4	- 28
Post-Mitigation	2	1	2	3	-15



13.2.6 Groundwater

The impacts associated with groundwater during the Operational Phase, as well as the significance ratings and potential mitigation measures, are detailed below.

Table 13-10: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Groundwater during the Operational Phase

Activity No. 2: Drilling of prospecting boreholes					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ The circulation of drill fluid through the drill rig is likely to come into contact with the aquifers. The drill fluid may impact on groundwater quality as it is dispersed. The quantities of drill fluid to disperse and impact on the aquifers is expected to be negligible, provided the drill rig does not break down; and ■ Use of water from boreholes for the prospecting operations may impact on groundwater quantity. 				
Mitigation required	<ul style="list-style-type: none"> ■ Emergency spill response plan required to handle any unplanned spillages; ■ Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns; ■ An agreement with the landowner must be established for the use of water from the boreholes; and ■ Source water from external resources should the groundwater supply not be sufficient for prospecting activities. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	2	3	3	- 24
Post-Mitigation	2	2	3	2	-14

13.3 Decommissioning Phase

Each Prospecting site will be rehabilitated immediately following the cessation of the drilling activities for that individual site. All Prospecting sites will be rehabilitated fully prior to the cessation of the Prospecting Right.

13.3.1 Soils, Land Use and Land Capability

The impacts associated with soil and land capability during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-11.

Table 13-11: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Soils during the Decommissioning Phase

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ Soil could wash away into drainage and water systems should backfilling and levelling not take place; ■ The site will be compacted due to heavy machinery and personnel movement on site, affecting land capability. 				
Mitigation required	<ul style="list-style-type: none"> ■ Sumps will be backfilled and the site levelled immediately after drilling has concluded; and ■ All compacted areas will be ripped to loosen the soils during rehabilitation. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	3	2	6	- 48
Post-Mitigation	1	1	2	2	- 8



13.3.2 Fauna and Flora

The impacts associated with fauna and flora during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-12.

Table 13-12: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Fauna and Flora during the Decommissioning Phase

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> ■ Rehabilitation will attempt to restore the land to the pre-prospecting condition. Indigenous vegetation will be established and monitored for 1 year following the conclusion of the drilling. This is a positive impact should it be implemented correctly; ■ Increase and encroachment of alien invasive species due to the presence of disturbed areas; and ■ Direct impact on Marikana Thornveld should alien invasive species encroach onto the site. 				
Mitigation required	<ul style="list-style-type: none"> ■ Remove alien invasive species as and when they occur; ■ An alien invasive management plan must be established; ■ All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and ■ Rehabilitation. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	1	3	3	5	-35
Post-Mitigation	1	2	2	3	15

13.3.3 Wetlands

All wetlands, pans and dams will be avoided with the stipulated buffer and therefore no impacts are expected.

13.3.4 Surface Water

The impacts associated with surface water during the Decommissioning Phase, as well as the significance ratings and potential mitigation measures, are detailed in Table 13-13.

Table 13-13: Pre-Mitigation and Post-Mitigation Significance Ratings for Impacts on Surface Water during the Decommissioning Phase

Activity 3: Rehabilitation of topsoil cover, ripping and vegetation establishment.					
Criteria	Details / Discussion				
Description of impact	<ul style="list-style-type: none"> Increased dust and soil erosion during the removal of equipment could lead to sedimentation of the surface water resources; and The decommissioning of sumps. 				
Mitigation required	<ul style="list-style-type: none"> The site and access roads will be kept moist to avoid the creation and disturbance of dust; The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on site must be cleaned up immediately. 				
<i>Parameters</i>	<i>Spatial</i>	<i>Duration</i>	<i>Intensity</i>	<i>Probability</i>	<i>Significant rating</i>
Pre-Mitigation	3	2	3	5	-40
Post-Mitigation	1	1	2	3	-12



14 Methodology used in Determining and Ranking the Nature, Significance, Consequence, Extent, Duration and Probability of Potential Environmental Impacts and Risks

The methodology utilised to assess the significance of potential social and heritage impacts is discussed in detail below. The significance rating formula is as follows:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

Where

$$\text{Consequence} = \text{Type of Impact} \times (\text{Intensity} + \text{Spatial Scale} + \text{Duration})$$

And

$$\text{Probability} = \text{Likelihood of an Impact Occurring}$$

In addition, the formula for calculating consequence:

$$\text{Type of Impact (Nature)} = +1 \text{ (Positive Impact) or } -1 \text{ (Negative Impact)}$$

The weight assigned to the various parameters for positive and negative social and heritage impacts is provided for in the formula and is presented in Table 14-1. The probability consequence matrix for social and heritage impacts is displayed in Table 14-2, with the impact significance rating described in Table 14-3.

Table 14-1: Impact Assessment Parameter Ratings

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	<i>Positive Impacts</i> (Type of Impact = +1)			
7	<p>Very significant impact on the environment. Irreparable and irreplaceable damage to highly valued species, habitat or ecosystem. Persistent severe damage.</p> <p>Irreparable and irreplaceable damage to highly valued items of great cultural significance or complete breakdown of social order.</p>	<p>Noticeable, on-going social and environmental benefits which have improved the livelihoods and living standards of the local community in general and the environmental features.</p>	<p><u>International</u></p> <p>The effect will occur across international borders.</p>	<p><u>Permanent:</u> No <u>Mitigation</u></p> <p>The impact will remain long after the life of the Project. The impacts are irreversible.</p>	<p><u>Certain/ Definite.</u></p> <p>There are sound scientific reasons to expect that the impact will definitely occur.</p>
6	<p>Significant impact on highly valued species, habitat or ecosystem. Significant management and rehabilitation measures required to prevent irreplaceable impacts.</p> <p>Irreparable damage to highly valued items of cultural significance or breakdown of social order.</p>	<p>Great improvement to livelihoods and living standards of a large percentage of population, as well as significant increase in the quality of the receiving environment.</p>	<p><u>National</u></p> <p>Will affect the entire country.</p>	<p><u>Beyond Project Life</u></p> <p>The impact will remain for some time after the life of a Project.</p>	<p><u>Almost certain/Highly probable</u></p> <p>It is most likely that the impact will occur.</p>

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	<i>Positive Impacts</i> (Type of Impact = +1)			
5	<p>Very serious, long-term environmental impairment of ecosystem function that may take several years to rehabilitate.</p> <p>Very serious widespread social impacts. Irreparable damage to highly valued items.</p>	<p>On-going and widespread positive benefits to local communities which improves livelihoods, as well as a positive improvement to the receiving environment.</p>	<p><u>Province/ Region</u></p> <p>Will affect the entire province or region.</p>	<p><u>Project Life</u></p> <p>The impact will cease after the operational life span of the Project.</p>	<p><u>Likely</u></p> <p>The impact may occur.</p>
4	<p>Serious medium term environmental effects. Environmental damage can be reversed in less than a year.</p> <p>On-going serious social issues. Significant damage to structures / items of cultural significance.</p>	<p>Average to intense social benefits to some people. Average to intense environmental enhancements.</p>	<p><u>Municipal Area</u></p> <p>Will affect the whole municipal area.</p>	<p><u>Long term</u></p> <p>6-15 years to reverse impacts.</p>	<p><u>Probable</u></p> <p>Has occurred here or elsewhere and could therefore occur.</p>
3	<p>Moderate, short-term effects but not affecting ecosystem functions. Rehabilitation requires intervention of external specialists and can be done in less than a month.</p> <p>On-going social issues. Damage to items of cultural significance.</p>	<p>Average, on-going positive benefits, not widespread but felt by some.</p>	<p><u>Local</u></p> <p>Extending across the site and to nearby settlements.</p>	<p><u>Medium term</u></p> <p>1-5 years to reverse impacts.</p>	<p><u>Unlikely</u></p> <p>Has not happened yet but could happen once in the lifetime of the Project, therefore there is a possibility that the impact will occur.</p>

Rating	Intensity		Spatial scale	Duration	Probability
	<i>Negative Impacts</i> (Type of Impact = -1)	<i>Positive Impacts</i> (Type of Impact = +1)			
2	<p>Minor effects on biological or physical environment. Environmental damage can be rehabilitated internally with/ without help of external consultants.</p> <p>Minor medium-term social impacts on local population. Mostly repairable. Cultural functions and processes not affected.</p>	<p>Low positive impacts experience by very few of population.</p>	<p><u>Limited</u> Limited to the site and its immediate surroundings.</p>	<p><u>Short term</u> Less than 1 year to completely reverse the impact.</p>	<p><u>Rare/ improbable</u> Conceivable, but only in extreme circumstances and/ or has not happened during lifetime of the Project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures.</p>
1	<p>Limited damage to minimal area of low significance that will have no impact on the environment. No irreplaceable loss of a significant aspect to the environment.</p> <p>Minimal social impacts, low-level repairable damage to commonplace structures.</p>	<p>Some low-level social and environmental benefits felt by very few of the population.</p>	<p><u>Very limited</u> Limited to specific isolated parts of the site.</p>	<p><u>Immediate</u> Less than 1 month to completely reverse the impact.</p>	<p><u>Highly unlikely/None</u> Expected never to happen.</p>



Table 14-2: Probability Consequence Matrix for Impacts

		Significance																																										
		7	6	5	4	3	2	1	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21															
Probability	7	147	140	133	126	119	112	105	98	91	84	77	70	63	56	49	42	35	28	21	14	7	0	-7	-14	-21	-28	-35	-42	-49	-56	-63	-70	-77	-84	-91	-98	-105	-112	-119	-126	-133	-140	-147
	6	126	120	114	108	102	96	90	84	78	72	66	60	54	48	42	36	30	24	18	12	6	0	-6	-12	-18	-24	-30	-36	-42	-48	-54	-60	-66	-72	-78	-84	-90	-96	-102	-108	-114	-120	-126
	5	105	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	-60	-65	-70	-75	-80	-85	-90	-95	-100	-105
	4	84	80	76	72	68	64	60	56	52	48	44	40	36	32	28	24	20	16	12	8	4	0	-4	-8	-12	-16	-20	-24	-28	-32	-36	-40	-44	-48	-52	-56	-60	-64	-68	-72	-76	-80	-84
	3	63	60	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	3	0	-3	-6	-9	-12	-15	-18	-21	-24	-27	-30	-33	-36	-39	-42	-45	-48	-51	-54	-57	-60	-63
	2	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38	-40	-42
	1	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21
			-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21				
		Consequence																																										

Table 14-3: Significance Threshold Limits

Score	Description	Rating
109 to 147	A very beneficial impact which may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change.	Major (positive)
73 to 108	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	Moderate (positive)
36 to 72	An important positive impact. The impact is insufficient by itself to justify the implementation of the Project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	Minor (positive)
3 to 35	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	Negligible (positive)
-3 to -35	An acceptable negative impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.	Negligible (negative)
-36 to -72	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	Minor (negative)



Score	Description	Rating
-73 to -108	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.	Moderate (negative)
-109 to -147	A very serious negative impact which may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts will be irreplaceable and irreversible should adequate mitigation and management measures not be successfully implemented.	Major (negative)

14.1 The Positive and Negative Impacts that the Proposed Activity (in Terms of the Initial Site Layout) and Alternatives will have on the Environment and the Community that may be Affected

Considering the limited extent of the Project area, the likely impacts associated with such activities are also expected to be limited.

As noted above, the PPP has been designed not only to comply with the regulatory requirements set out in Regulation 44 and 45 of the EIA Regulations (December 2014), and as required in terms of Chapter 5 of NEMA, but is also designed to provide I&APs with an opportunity to evaluate all aspects of the proposed Project. The aim is to maximise the Project benefits while minimising its adverse effects. All comments, concerns and issues raised by I&APs regarding the proposed prospecting activities will be taken into consideration.

14.2 The Possible Mitigation Measures that could be Applied and the Level of Risk

The most significant potential impacts identified for the proposed Project includes loss of vegetation and soil erosion during the Establishment Phase, possible spillage of drill fluid during the Operational Phase and soil erosion as a result of sedimentation of surface water during Decommissioning of the Project. The mitigation measures provided aim to prevent or reduce the impacts from occurring. Dust suppression must be used on exposed surfaces and the establishment of vegetation is crucial to manage and prevent soil erosion, leading to a loss of soil resources and containing the source for dust generation. The clearance of natural vegetation will be limited to the prospecting site footprints.



14.3 Motivation where no Alternatives sites were Considered

The Project area is limited in extent (6.5 ha), with the proposed prospecting sites expected to have minimal impacts on the environment due to the expected extent of the disturbed sites (100 m²). Only one prospecting site will be drilled at a time, ensuring that several disturbed areas are not in operation concurrently. The locations of the prospecting sites will be determined through non-invasive prospecting methods. As a result of the above, there will be limited alternatives available for consideration. Sensitive areas, such as watercourse and wetlands, will be avoided and a 100 m buffer zone implemented.

The use of trenching as a prospecting activity was discarded due to the permanent scars and environmental impacts associated with the activity, as well as the trenching not suitable for the depths that are required to prospect for PGMs.

14.4 Statement Motivating the Alternative Development Location within the Overall Site

As noted above, the prospecting sites are small and exact locations will be determined based on non-invasive prospecting methods. All watercourses and wetlands will be avoided with buffers. The project site will also not require any infrastructure to be constructed, with only temporary access routes being utilised.



15 Full Description of the Process undertaken to Identify, Assess and Rank the Impacts and Risks the Activity will impose on the Preferred Site (In Respect of the Final Site Layout Plan) through the Life of the Activity

As the determination for the location of the prospecting boreholes will be based on non-invasive methods, very few impacts are anticipated. All impacts identified will be mitigated against to reduce the significance of such impacts.

16 Assessment of each Identified Potentially Significant Impact and Risk

The potential impacts per activity are detailed in Table 16-1 below. The impacts per phase of the Project are outlined in Section 13, Item 3 (g)(v) above and indicate the mitigation measures proposed, as well as the impact significance pre-mitigation and post mitigation.

Table 16-1: Assessment of Each Identified Impact

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Type	Significance
Establishment Phase						
Site Clearance	Fugitive dust generation.	Air Quality	LoM	Minor Negative	Control through: <ul style="list-style-type: none"> ▪ Dust Management Plan. ▪ Vegetation Establishment. 	Negligible Negative
	Loss of topsoil resources and land capability.	Soils	Establishment Phase	Minor Negative	Control through: <ul style="list-style-type: none"> ▪ Soil stripping procedure. 	Negligible Negative
	Loss of fauna and flora species.	Fauna and Flora	Establishment Phase	Minor Negative	Avoid through: <ul style="list-style-type: none"> ▪ Limitation of infrastructure footprint. 	Negligible Negative
	Sedimentation of wetlands	Wetlands	Establishment Phase Operational Phase	Negligible Negative	Prevent through: <ul style="list-style-type: none"> ▪ Storm Water Management Plan. Avoid through: <ul style="list-style-type: none"> ▪ Implementation of buffer zones. 	Negligible Negative
	Sedimentation and contamination of surface water resources.	Surface water	Establishment Phase Operational Phase	Minor Negative	Avoid through: <ul style="list-style-type: none"> ▪ Limitation of infrastructure footprint. 	Negligible Negative
	Groundwater contamination	Groundwater	Establishment Phase	Negligible Negative	Remedy and avoid through: <ul style="list-style-type: none"> ▪ Spill Response Plan. 	
	Noise generation	Noise	Establishment Phase Decommissioning Phase	Negligible Negative	Control through: <ul style="list-style-type: none"> ▪ Operating hours; ▪ Use of silencers; and ▪ Routine maintenance and services. 	Negligible Negative
Operational Phase						
	Alteration of visual environment	Topography and Visual Environment	Operational Phase	Minor Negative	Remedy through: <ul style="list-style-type: none"> ▪ Vegetation Establishment. 	Minor Negative

Activity	Potential Impact	Aspects Affected	Phase	Pre-Significance	Mitigation Type	Significance
Drilling of Prospecting Boreholes	Soil compaction and erosion	Soils	Operational Phase Decommissioning Phase	Minor Negative	Avoid and control through: <ul style="list-style-type: none"> Vegetation establishment. Restrict access. 	Negligible Negative
	Sedimentation of wetlands	Wetlands	Operational Phase	Minor Negative	Avoid through: <ul style="list-style-type: none"> Implementation of buffer zones. 	Negligible Negative
	Sedimentation of surface water resources	Surface Water	Operation Phase	Minor Negative	Avoid through: <ul style="list-style-type: none"> Implementation of buffer zones; and Erosion management. 	Negligible Negative
	Contamination of groundwater and reduction in groundwater quantity	Groundwater	Operation Phase	Negligible Negative	Prevent through: <ul style="list-style-type: none"> Routine maintenance of drill rig Manage through: <ul style="list-style-type: none"> Landowner agreements for water use. 	Negligible Negative
Decommissioning Phase						
Rehabilitation	Fugitive dust generation.	Air Quality	Decommissioning Phase	Minor Negative	Control through: <ul style="list-style-type: none"> Dust Management Plan. Vegetation establishment. 	Negligible Negative
	Soil compaction and erosion	Soils	Operational Phase Decommissioning Phase	Minor Negative	Avoid and control through: <ul style="list-style-type: none"> Vegetation establishment. Restrict access. 	Negligible Negative
	Sedimentation and contamination of surface water resources	Surface Water	Decommissioning Phase	Minor Negative	Control through: <ul style="list-style-type: none"> Vegetation establishment Manage through: <ul style="list-style-type: none"> Prevent through rehabilitation of sumps. 	Negligible Negative

17 Summary of Specialist Reports

Numerous specialist impact assessments were undertaken for the Project. Table 17-1 details the specialist studies undertaken for the Project, with the specialist input provided directly into this BAR. No individual specialist reports were compiled. The specialist input included the baseline environment, potential impacts and the recommended mitigation measures.

Table 17-1: Specialist Studies undertaken for the Project

List of Studies undertaken	Recommendations of Specialist Reports (Inputs of the Specialist Studies)	Specialist Recommendations that have been included in the EIA Report	Reference to Applicable Section of Report where Specialist Recommendations have been Included
Soils Impact Assessment	<ul style="list-style-type: none"> ▪ Significance of impacts ▪ Mitigation measures 	X	All mitigation and management measures included in this report were recommended by the Soil Specialist.
Fauna and Flora Impact Assessment	<ul style="list-style-type: none"> ▪ Significance of impacts ▪ Mitigation measures 	X	All mitigation and management measures included in this report were recommended by the Fauna and Flora Specialist.
Wetlands Impact Assessment	<ul style="list-style-type: none"> ▪ Significance of impacts ▪ Mitigation measures 	X	All mitigation and management measures included in this report were recommended by the Wetlands Specialist.
Surface Water Impact Assessment	<ul style="list-style-type: none"> ▪ Significance of impacts ▪ Mitigation measures 	X	All mitigation and management measures included in this report were recommended by the Surface Water Specialist.
Groundwater Impact Assessment	<ul style="list-style-type: none"> ▪ Significance of impacts ▪ Mitigation measures 	X	All mitigation and management measures included in this report were recommended by the Groundwater Specialist.
Heritage Impact Assessment	<ul style="list-style-type: none"> ▪ Significance of heritage resources. ▪ Recommendations. 	X	All mitigation and management measures included in this report were recommended by the Heritage Specialist.



18 Environmental Impact Statement

18.1 Summary of the Key Findings of the Environmental Impact Assessment

The Environmental Impact Statement is utilised to summarise all of the potential environmental impacts identified during each phase of the proposed Project. The significance of the impacts associated with the biophysical environment, pre-mitigation and post-mitigation, is summarised in Table 18-1.

Table 18-1: Summary of the Potential Impacts on the Biophysical Environment

Project Phase	Receiving Environment	Impact Description	Pre-Mitigation Significance	Post-Mitigation Significance
Establishment Phase	Social	Nuisance impacts due to dust and noise	Negligible Negative	Negligible Negative
	Soil, Land Use and Land Capability	Loss of topsoil resources and land capability.	Minor Negative	Negligible Negative
		Soil erosion and degradation.	Minor Negative	Negligible Negative
	Fauna and Flora	Loss of fauna and flora species.	Minor Negative	Negligible Negative
		Destruction of suitable habitats	Minor Negative	Negligible Negative
	Surface water	Sedimentation and contamination of surface water	Minor Negative	Negligible Negative
	Groundwater	Groundwater contamination	Negligible Negative	Negligible Negative
Operational Phase	Social	Nuisance impacts due to dust and noise	Negligible Negative	Negligible Negative
	Soil, Land Use and Land Capability	Soil compaction	Minor Negative	Negligible Negative
	Wetlands	Contaminations of wetlands	Minor Negative	Negligible Negative



Project Phase	Receiving Environment	Impact Description	Pre-Mitigation Significance	Post-Mitigation Significance
	Surface Water	Contaminations of surface water resources	Minor Negative	Negligible Negative
Decommissioning Phase	Air Quality	Fugitive dust generation.	Minor Negative	Negligible Negative
	Soil, Land Use and Land Capability	Soil contamination	Minor Negative	Negligible Negative
		Restoration of land capability	Minor Negative	Minor Negative
	Fauna and Flora	Destruction of suitable habitats	Negligible Negative	Negligible Negative
	Surface Water	Contaminations and sedimentation of surface water	Minor Negative	Negligible Negative

18.2 Final Site Map

The site specific locations of the prospecting sites have not been determined as the locations will be based on non-invasive prospecting methods. The prospecting sites will be 100m² in extent. The Project area is displayed in Plan 2, Appendix A.

18.3 Summary of the Positive and Negative Implications and Risks of the Proposed Activity and Identified Alternatives

The predominant impacts associated with the Establishment Phase are as a result of site clearing. Site clearing activities will remove vegetation and expose soil surfaces. The exposed soils may become eroded, compacted and contaminated during the Establishment Phase. The erosion of soils may result in additional impacts on the wetlands and surface water resources as sediment finds its way into the watercourses, inhibiting wetland function and deteriorating water quality. The construction activities are limited in footprint and, hence, the potential impacts are expected to be of a minor significance.

The predominant impact during the Operational Phase is due to the presence of drill fluid circulating throughout the drilling process and is utilised to cool the drill. Negligible quantities of drill fluid may spill into the environment and cause soil, surface water and groundwater pollution, if not managed correctly. Another significant impact during the Operational Phase is the use of hydrocarbons:

The impacts associated with decommissioning are similar to the impacts during the Establishment Phase, with soil erosion and the resultant sedimentation of surface water resources the predominant impacts.

19 Proposed Impact Management Objectives and the Impact Management Outcomes for inclusion in the EMPR

The EMP seeks to achieve a required end state and describes how activities that have, or could have, an adverse impact on the environment will be mitigated, controlled and monitored.

This EMP addresses the environmental impacts during the Establishment, Operational, Decommissioning and Post-Closure Phases of the Project. Due regard must be given to environmental protection during the entire Project; a number of environmental recommendations are made to achieve environmental protection. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- Minimise the extent of an impact during the life of the Project;
- Ensure appropriate restoration of areas affected by the Project; and
- Prevent long term environmental degradation.

20 Aspects for Inclusion as Conditions of Authorisation

The implementation of the mitigation measures provided in this Report must be a condition of authorisation. Additional conditions include the implementation of a 100 m buffer zone from all watercourses and wetland areas.

21 Description of any Assumptions, Uncertainties and Gaps in Knowledge

A high-level desktop baseline environment was undertaken for this Project and no site investigations were undertaken. The baseline environment has, therefore has been confirmed based on the desktop data. In addition, the exact borehole locations were unknown at the time of drafting this report.

22 Reasoned Opinion as to Whether the Proposed Activity should or should not be Authorised

22.1 Reasons why the Activity should be Authorised or not

Digby Wells recommends that the proposed prospecting activities be provided authorisation, provided the stipulated mitigation and management measures are implemented for the Project. The limited extent of the prospecting sites (100 m²) will have minimal impacts on the environment and the activity will not result in the loss of critical habitat. In addition, wetlands and water courses will be avoided and a 100 m buffer zone implemented, ensuring that habitat function and river integrity is not compromised by the Project.

Furthermore, the site specific locations of the prospecting sites will aim to avoid the site specific sensitivities, such as indigenous vegetation.

22.2 Conditions that must be Included in the Authorisation

The implementation of the mitigation measures provided in this Report must be a condition of authorisation. Additional conditions include the implementation of a 100 m buffer zone from all watercourses and wetland areas.



23 Period for which the Environmental Authorisation is Required

The environmental authorisation is required for a period of 5 years.

24 Undertaking

An undertaking is provided in Part B, Section 13 of the EMPr and is applicable to the EIA and EMPr sections of this Report.

25 Financial Provision

As part of the requirements of the MPRDA, Digby Wells calculated the environmental closure liability for the Project according to the DMR guidelines. The financial provision will be made available to the DMR by RPM in the form of a guarantee from a financial institution to ensure that adequate rehabilitation will be undertaken. The closure cost is estimated per borehole is **R 9 649.70** amounting to a total of **R 38 598.80** for 4 boreholes.

25.1 Explain how the aforesaid Amount was Derived

The environmental closure liability for the Project was calculated according to the DMR's "Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision Provided by a Mine".

The DMR Guideline format makes use of a set template for which defined rates and multiplication factors are utilised.

The 2005 DMR Master Rates were updated and published by the DMR in 2012 however, due to inflation, these are no longer accurate. During this assessment, the 2012 Master Rates, as published by the DMR, were increased by an average inflation rate of 5.7% (Statistics SA, 2013). An average rate of inflation of 5.9% (Statistics SA, 2014⁵) was added to the 2013 Master Rates to reflect 2014 costs.

The DMR Guideline Document classifies a mine according to a number of factors which allows one to determine the appropriate weighting factors to be used during the quantum calculation. The following factors are considered:

- The mineral mined;
- The risk class of the mine;
- Environmental sensitivity of the mining area;
- Type of mining operation; and
- Geographic location.

Table 25-1 provides a summary of the estimate calculated for each component for the proposed Project.

⁵ Inflation rate as released by Statistics South Africa (StatsSA): April 2014 (latest)

Table 25-1: Environmental Liability for the Project according to the DMR Methodology

<u>Financial Revision Calculation - Rehabilitation</u>					
Item		Unit	Quantity	Rate	Cost
1	<u>Sump (4 m³)</u>				
	Topsoil	m ³	6	R 59.80	R 358.80
	Fill Sump	Labour	1	R 168.00	R 168.00
2	<u>Drill Area (20 m by 20 m)</u>				
	Re-vegetate	ha	0.04	R 24 775.38	R 991.02
	Rip area ⁶	m ²	400	R 6.68	R 2 672.00
	Shape	ha	0.04	R 1 533.00	R 61.32
3	<u>Borehole</u>				
	Fill Borehole (100 m)	m ³	7	R 19.11	R 133.77

⁶ A mobilisation fee for the equipment hire will need to be included.



	Concrete	m ³	0.7	R 30.28	R 21.19
4	<u>General Clean-up</u>	Labour	1	R 168.00	R 168.00
5	<u>Hydrocarbon clean-up</u>	m ³	5	R 89.12	R 445.60
6	<u>Inspection</u>	Hours	1	R 870.00	R 870.00
7	<u>Audit</u>				
	Site Inspection	Hours	4	R 470.00	R 1 880.00
	Report Writing	Hours	4	R 470.00	R 1 880.00
				Total	R 9 649.70
	Grand Total (Total multiplied by 4 Boreholes)		5	Grand Total	R 38 598.80

25.2 Confirm that this Amount can be Provided for from Operating Expenditure

RPM confirms that the amount determined in Section 25 can be provided in the form of a bank guarantee.

26 Specific Information Required by the Competent Authority

26.1 Impact on the Socio-Economic Conditions of any Directly Affected Person

Very few impacts on socio-economic conditions of any directly affected person have been identified. A potential impact is dust and noise nuisances which will be mitigated against. The prospecting area will also be rehabilitated to reduce any further impacts which may affect the surrounding areas.

No heritage resources will be directly impacted upon by the prospecting activities.

27 Other Matters Required in terms of Sections 24(4)(a) and (b) of the Act

Section 24(4)(b)(i) of the NEMA (as amended), provides that an investigation must be undertaken of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. The outcome of the investigation has been provided in Section 7 to Section 19 of this Basic Assessment Report.



Part B: Environmental Management Programme Report



1 Details of the EAP

The details of the EAP have been provided in Section 2.1, Part A of this Report.



2 Description of the Aspects of the Activity

The aspects of the activity as described in Section 5: Item 3(h) are covered by the draft EMP.

3 Composite Map

The composite plan for the Project area, indicating sensitive areas, heritage resources watercourse buffers, is included as Plan 14, Appendix A.



4 Description of Impact Management Objectives including Management Statements

4.1 Determination of Closure Objectives

The closure objectives have been formulated for the Project. The closure objectives for the Project are as follows:

- Rehabilitate the prospecting sites to their natural or predetermined state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation;
- Rehabilitate all disturbed land to a condition that facilitates compliance with applicable environmental quality objectives, such as air and water quality objectives as an example;
- Reduce the visual impact of the prospecting sites through rehabilitation of all disturbed land and residue deposits;
- Develop a retrenchment programme in a timely manner;
- Keep authorities informed of the progress of the activities during the Decommissioning Phase;
- Submit monitoring results to the relevant authorities; and
- Maintain the required pollution control facilities and the condition of the rehabilitated land following closure.

4.2 Volumes and Rate of Water Use Required for the Operation

Water will be required during the drilling activities to be passed over the drill bits to ensure that the drill does not overheat. Water will also be utilised for dust suppression, when required. The water will be sourced either through an agreement with the landowner, or transported in through a water truck. The volumes will be determined once a contractor has been appointed.

4.3 Has a Water Use Licence has been Applied for

A water use licence has not been applied for as the site specific borehole locations have not yet been determined. A water use licence will be applied for any water uses triggered in terms of Section 21 of the NWA.

5 Impacts to be Mitigated in their Respective Phases

The proposed mitigation measures and its compliance with the relevant standards are presented in Table 5-1.

Table 5-1: Impacts to be Mitigated

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
Establishment Phase						
Site Clearance	Social Nuisance	Establishment Phase	Limited to the prospecting site	<ul style="list-style-type: none"> ▪ Keep soils moist to suppress possibility of dust; ▪ Site clearing to take place during daylight hours only; ▪ Ensure that dust suppressants are applied to gravel or unpaved roads that are in use; ▪ Vehicles and machinery will be properly maintained to minimise operating noise; ▪ Vehicles will obey speed limits; and ▪ Bulk Delivery of materials should be maximised to reduce the frequency of deliveries. 	<ul style="list-style-type: none"> ▪ Dust Management Plan 	<ul style="list-style-type: none"> ▪ Ongoing and Daily during: ▪ Establishment Phase
	Soils	Establishment Phase	100 m ²	<ul style="list-style-type: none"> ▪ Only clear vegetation when and where necessary; ▪ Only remove topsoil when and where necessary; ▪ Ensure topsoil is stored in one dedicated stockpile, less than 1 m high, and within the demarcated prospecting site; and ▪ Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions so as to prevent erosion (October to March). 	<ul style="list-style-type: none"> ▪ Soil Rehabilitation Plan; and ▪ Storm Water Management Plan in accordance with: ▪ MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and ▪ CARA. 	<ul style="list-style-type: none"> ▪ Ongoing and Weekly during: ▪ Establishment Phase
	Fauna and Flora	Establishment Phase	100 m ²	<ul style="list-style-type: none"> ▪ Only remove vegetation when and where necessary; ▪ Minimise the size of the prospecting drill sites as far as possible; ▪ Indigenous trees will not be removed; ▪ Drainage lines, and indigenous vegetation will be avoided; and ▪ Use existing access roads. 	<ul style="list-style-type: none"> ▪ NEM:BA; and ▪ ECA. 	<ul style="list-style-type: none"> ▪ Ongoing during: ▪ Establishment Phase
	Wetlands	Establishment Phase Operational Phase	Local	<ul style="list-style-type: none"> ▪ Ensure site clearing is limited to the designated areas; and ▪ All watercourses will be avoided and the stipulated buffer will be implemented. All vehicles and machinery to be serviced in a hard 	<ul style="list-style-type: none"> ▪ Buffer zones; and ▪ Spill Response Plan in accordance with: 	<ul style="list-style-type: none"> ▪ Ongoing and as required

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
				park area or at an off-site location.	<ul style="list-style-type: none"> NWA; Best Practice Guidelines; MPRDA. 	
	Surface water	Establishment Phase	Local	<ul style="list-style-type: none"> Ensure site clearing is limited to the designated areas; Berms must be constructed around the periphery of the prospecting site to separate clean and dirty water. Water within the prospecting site must be diverted to the water sump; and All watercourses will be avoided and the stipulated buffer will be implemented. 	<ul style="list-style-type: none"> ECA. 	As required and throughout: <ul style="list-style-type: none"> Establishment Phase
	Groundwater	Establishment Phase	Local	<ul style="list-style-type: none"> All potential hydrocarbon spillages and leaks must be cleaned up immediately and the soils remediated; Spillage control kits will be readily available on site to contain the mobilisation of contaminants and clean up spills; All vehicles and machinery to be serviced in a hard park area or at an off-site location; and Vehicles with leaks must have drip trays in place. 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: <ul style="list-style-type: none"> NWA; Best Practice Guidelines 	<ul style="list-style-type: none"> As required
	Noise	Establishment Phase Decommissioning Phase	Site Specific	<ul style="list-style-type: none"> Site clearing to take place during daylight hours only; Vehicles and machinery will be properly maintained to minimise operating noise; Vehicles will obey speed limits; and Bulk Delivery of materials should be maximised to reduce the frequency of deliveries. 	<ul style="list-style-type: none"> Regular Vehicle Inspections in accordance with: <ul style="list-style-type: none"> NEM:AQA; and ECA. 	<ul style="list-style-type: none"> Daily and according to Maintenance Plan during: <ul style="list-style-type: none"> Establishment Phase and Decommissioning Phase
Operational Phase						
Drilling of Prospecting Boreholes	Social Nuisance	Operational Phase	Limited	<ul style="list-style-type: none"> Maintain drilling equipment and, if possible, fit silencing equipment; Drilling will only take place during daylight hours; Use a dust suppressant and keep access roads moist; and Cover stockpiles with a plastic liner in windy and rain conditions so as to prevent topsoil from eroding. 	<ul style="list-style-type: none"> Dust Management Plan 	<ul style="list-style-type: none"> Ongoing and Daily during: <ul style="list-style-type: none"> Establishment Phase
	Noise	Operational Phase	Site Specific	<ul style="list-style-type: none"> Maintain drilling equipment and, if possible, fit silencing equipment; 	<ul style="list-style-type: none"> Regular Vehicle Inspections 	<ul style="list-style-type: none"> Daily and according to Maintenance Plan during:

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
				<ul style="list-style-type: none"> Drilling will only take place during daylight hours; 	in accordance with : <ul style="list-style-type: none"> NEM:AQA; and ECA. 	<ul style="list-style-type: none"> Operational Phase
	Fauna and Flora	Operational Phase	100 m ²	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; Maintain drilling equipment and, if possible, fit silencing equipment; and All personnel are to remain on the prospecting drill site only, to prevent the footprint of the site expanding and further vegetation loss. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Operational Phase
	Soil	Operational Phase Decommissioning Phase	Site Specific	<ul style="list-style-type: none"> Immediately cease drilling and contain and clean-up any hydrocarbon spillages as they occur; Ensure the spill clean-up kits are readily available in the event of a spillage; Machinery and vehicles must be serviced and maintained off site at a workshop and drip trays must be in place to capture the spillage and avoid soils from being contaminated; and Stockpiles must be covered with a plastic liner in windy and rain conditions (October to March) to prevent potential soil erosion. 	<ul style="list-style-type: none"> Spill Response Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; and CARA. 	As required and throughout: <ul style="list-style-type: none"> Operational Phase
	Surface Water	Operational Phase	Local	<ul style="list-style-type: none"> Only clear vegetation when and where necessary; Topsoil stockpiles will be covered with a plastic liner during windy and rain conditions (October to March) so as to prevent erosion; and Berms on the periphery of the prospecting site will be inspected daily and maintained to ensure runoff from within the prospecting site does not report to the catchment. 	<ul style="list-style-type: none"> Spill Response Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control. 	As required and throughout: <ul style="list-style-type: none"> Operational Phase
	Groundwater	Operational Phase	Local	<ul style="list-style-type: none"> Emergency spill response plan required to handle any unplanned spillages; Daily inspection of the drill rig must be undertaken prior to the commencement of drilling and routine maintenance must be undertaken to prevent the likelihood of fluid dispersing and breakdowns; An agreement with the landowner must be established for the use of water from the boreholes; and 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: NWA; Best Practice Guidelines 	As required

Activity	Aspects Affected	Phase	Size and Scale of Disturbance	Mitigation Measure	Compliance with Standards	Time Period for Implementation
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
				<ul style="list-style-type: none"> Source water from external resources should the groundwater supply not be sufficient for prospecting activities. 		
Decommissioning Phase						
Rehabilitation	Surface Water	LoM	Local	<ul style="list-style-type: none"> The site and access roads will be kept moist to avoid the creation and disturbance of dust; The sumps must be pumped empty and the oil and sludge must be disposed of at a registered waste facility, with the water treated at a water treatment plant. The liner used in the sumps must be removed from site for reuse elsewhere, or disposal at a registered waste facility, and any potential spillages from the liner on site must be cleaned up immediately. 	<ul style="list-style-type: none"> Spill Response Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; CARA 	<ul style="list-style-type: none"> As required during: Operational Phase and Decommissioning Phase.
	Soil	Operational Phase Decommissioning Phase	100 m ²	<ul style="list-style-type: none"> Sumps will be backfilled and the site levelled immediately after drilling has concluded; and All compacted areas will be ripped to loosen the soils during rehabilitation. 	<ul style="list-style-type: none"> Spill Response Plan; and Vehicle Maintenance Plan in accordance with: MPRDA Regulation 56 (1) to (8); soil pollution and erosion control; CARA. 	<ul style="list-style-type: none"> As required
	Fauna and Flora	Decommissioning Phase	100 m ²	<ul style="list-style-type: none"> Remove alien invasive species as and when they occur; An alien invasive management plan must be established; All compacted areas will be ripped to loosen the soils during rehabilitation and seeded with an appropriate seed mixture; and Rehabilitation. 	<ul style="list-style-type: none"> NEM:BA; and ECA. 	<ul style="list-style-type: none"> Ongoing during: Decommissioning Phase

6 Impact Management Outcomes

A description of the objectives and outcomes of the EMP is outlined in Table 6-1, taking into account the impact and mitigation type.

Table 6-1: Outcomes and Objectives of the EMP

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Establishment Phase					
Site Clearance	Fugitive dust generation.	Air Quality	Establishment Phase	Control through: <ul style="list-style-type: none"> ▪ Dust Management Plan. ▪ Vegetation Establishment. 	<ul style="list-style-type: none"> ▪ To minimise fugitive dust generation emanating from the Project.
	Loss of topsoil resources and land capability.	Soils	Establishment Phase	Control through: <ul style="list-style-type: none"> ▪ Soil stripping procedure. Remedy through.	<ul style="list-style-type: none"> ▪ To prevent soil contamination and degradation.
	Loss of fauna and flora species.	Fauna and Flora	Establishment Phase	Control through: <ul style="list-style-type: none"> ▪ Vegetation establishment. Avoid through: <ul style="list-style-type: none"> ▪ Limitation of infrastructure footprint. 	<ul style="list-style-type: none"> ▪ To prevent and minimise the loss of vegetation communities; and ▪ To minimise habitat destruction.
	Sedimentation of wetlands	Wetlands	Establishment Phase Operational Phase	Prevent through: <ul style="list-style-type: none"> ▪ Storm Water Management Plan. Avoid through: <ul style="list-style-type: none"> ▪ Implementation of buffer zones. 	<ul style="list-style-type: none"> ▪ To prevent sedimentation of wetlands.
	Sedimentation and contamination of surface water resources.	Surface water	Establishment Phase Operational Phase	Avoid through: <ul style="list-style-type: none"> ▪ Limitation of infrastructure footprint. 	<ul style="list-style-type: none"> ▪ To prevent the siltation of surface water resources.
	Groundwater contamination	Groundwater	Establishment Phase	Remedy and avoid through: <ul style="list-style-type: none"> ▪ Spill Response Plan. 	<ul style="list-style-type: none"> ▪ To prevent the contamination of groundwater resources
	Noise generation	Noise	Establishment Phase Decommissioning Phase	Control through: <ul style="list-style-type: none"> ▪ Operating hours; ▪ Use of Silencers; and ▪ Routine maintenance and services. 	<ul style="list-style-type: none"> ▪ To prevent the noise emanating from the construction machinery and vehicles impacting on surrounding sensitive receptors.
Operational Phase					
	Soil contamination and degradation	Soil	Operational Phase Decommissioning Phase	Remedy through: <ul style="list-style-type: none"> ▪ Spill Response Plan. 	<ul style="list-style-type: none"> ▪ To prevent soil contamination and

Activity	Potential Impact	Aspects Affected	Phase	Mitigation Type	Standards to be Achieved
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Drilling of Prospecting Boreholes				Avoid through: ▪ Maintenance Procedures.	degradation.
	Alternation of visual environment	Topography and Visual Environment	Operational Phase	Remedy through: ▪ Vegetation establishment.	▪ To prevent alteration of visual environment
	Soil compaction	Soils	Operational Phase	Avoid and control through: ▪ Vegetation establishment. ▪ Restrict access.	▪ To prevent the compaction of soil resources.
	Sedimentation of wetlands	Wetlands	Operational Phase	Avoid through: ▪ Implementation of buffer zones	▪ To prevent the sedimentation of the wetland systems.
	Sedimentation of surface water resources	Surface Water	Operational Phase	Remedy through: ▪ Implementation of buffer zones; and; ▪ Erosion management	▪ To prevent the sedimentation of surface water resources.
	Contamination of groundwater and reduction in groundwater quantity	Groundwater	Operational Phase	Prevent through: ▪ Routine maintenance of drill rig Manage through: ▪ Landowner agreement for water use.	▪ To prevent contamination of groundwater and reduction in groundwater quality.
Decommissioning Phase					
Rehabilitation	Fugitive dust generation.	Air Quality	Decommissioning Phase	Control through: ▪ Dust Management Plan. ▪ Vegetation establishment.	▪ To minimise fugitive dust generation emanating from the Project.
	Soil compaction and erosion	Soil	Operational Phase Decommissioning Phase	Void and control through: ▪ Vegetation establishment; ▪ Restrict access.	▪ To prevent soil contamination and degradation.
	Sedimentation and contamination of surface water resources	Surface Water	Decommissioning Phase	Control : ▪ Vegetation establishment Manage through: ▪ Prevent through rehabilitation of sumps.gh:	▪ To prevent sedimentation and contamination of surface water resources

7 Impact Management Actions

A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in referenced in Table 7-1.

Table 7-1: Impact Management Actions

Activities	Potential Impacts	Aspects Affected	Mitigation Type	Time Period for Implementation	Compliance with Standards
<p>The list of activities for the Project are displayed in Column 1 in Part B, Section 5, (Table 5-1) and in Column 1 in Part B, Section 6, (Table 6-1).</p>	<p>The potential impacts associated with each activity are outlined in Column 2 in Part B, Section 6, Item 1(2) (Table 6-1).</p>	<p>The aspects affected as a result of the potential impact are outlined in Column 2 in Part B, Section 5, (Table 5-1) and in Column 3 in Part B, Section 6, (Table 6-1).</p>	<p>The mitigation types of each of the potential impacts are outlined in Column 3 in Part B, Section 6, (Table 6-1).</p>	<p>The time periods for each of the potential impacts are outlined in Column 7 in Part B, Section 5, (Table 5-1).</p>	<p>The compliance with the standards for the potential impacts are outlined in Column 6 in Part B, Section 5, (Table 6-1).</p>



8 Financial Provision

8.1 Determination of the Amount of Financial Provision

8.1.1 Describe the Closure Objectives and the Extent to which they have been aligned to the Baseline Environment Described under the Regulation

The closure objectives have been formulated for the Project. The closure objectives take in to account the baseline environment of the Project site. The closure objectives for the Project are as follows:

- Rehabilitate the prospecting sites to their natural or predetermined state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation;
- Rehabilitate all disturbed land to a condition that facilitates compliance with applicable environmental quality objectives, such as air and water quality objectives as an example;
- Reduce the visual impact of the prospecting sites through rehabilitation of all disturbed land and residue deposits;
- Develop a retrenchment programme in a timely manner;
- Keep authorities informed of the progress of the activities during the Decommissioning Phase;
- Submit monitoring results to the relevant authorities; and
- Maintain the required pollution control facilities and the condition of the rehabilitated land following closure.

8.1.2 Confirm specifically that the Environmental Objectives in Relation to Closure have been Consulted with Landowner and Interested and Affected Parties

As part of the PPP, this Basic Assessment Report, along with the closure objectives, will be provided to I&APs for review and stakeholders will be able to provide comment.

8.1.3 Provide a Rehabilitation Plan that Describes and Shows the Scale and Aerial Extent of the Main Mining Activities, including the Anticipated Mining Area at the Time of Closure

The prospecting sites will be rehabilitated immediately following the commencement of the drilling activities. The rehabilitation process is summarised as follows:

- The drill rig and core will be removed from site;



- The sumps will be pumped empty and the oil and sludge disposed of at a registered disposal facility;
- The waste water will be removed from site and treated at a registered water treatment facility;
- All waste will be removed from site and disposed of accordingly;
- The sump liner will be removed and reused at another site, following the inspecting of the liner, or disposed of at a registered disposal facility;
- The sumps will be backfilled and levels;
- The site will be levelled and ripped to ensure there is no compaction;
- The topsoil will be spread over the site and the site vegetated with indigenous vegetation; and
- The site will be monitored for the success of the rehabilitation.

8.1.4 Explain why it can be confirmed that the Rehabilitation Plan is Compatible with the Closure Objectives

The rehabilitation plan has been compiled in support of the primary closure objective which is to rehabilitate the prospecting sites to their natural or predetermined state, or to land use that conforms to the generally accepted principles of sustainable development through restoration, remediation, rehabilitation and stabilisation remediation of the impact land to a post-mining land use capable of supporting grazing activities.

8.1.5 Calculate and State the Quantum of the Financial Provision required to manage and Rehabilitate the Environment in accordance with the Applicable Guideline

The environmental closure liability for the Project was calculated according to the DMR's "Guideline Document for the Evaluation of the Quantum of Closure-related Financial Provision Provided by a Mine".

The DMR Guideline format makes use of a set template for which defined rates and multiplication factors are utilised.

The 2005 DMR Master Rates were updated and published by the DMR in 2012 however, due to inflation, these are no longer accurate. During this assessment, the 2012 Master Rates, as published by the DMR, were increased by an average inflation rate of 5.7% (Statistics SA, 2013). An average rate of inflation of 5.9% (Statistics SA, 2014⁷) was added to the 2013 Master Rates to reflect 2014 costs.

⁷ Inflation rate as released by Statistics South Africa (StatsSA): April 2014 (latest)



The DMR Guideline Document classifies a mine according to a number of factors which allows one to determine the appropriate weighting factors to be used during the quantum calculation. The following factors are considered:

- The mineral mined;
- The risk class of the mine;
- Environmental sensitivity of the mining area;
- Type of mining operation; and
- Geographic location.

Table 8-1 provides a summary of the estimate calculated for each component for the proposed Project.

Table 8-1: Environmental Liability for the Project according to the DMR Methodology

Financial Revision Calculation - Rehabilitation				
Item	Unit	Quantity	Rate	Cost
1 <u>Sump (4 m³)</u>				
Topsoil	m ³	6	R 59.80	R 358.80
Fill Sump	Labour	1	R 168.00	R 168.00
2 <u>Drill Area (20 m by 20 m)</u>				
Re-vegetate	ha	0.04	R 24 775.38	R 991.02
Rip area ⁸	m ²	400	R 6.68	R 2 672.00
Shape	ha	0.04	R 1 533.00	R 61.32
3 <u>Borehole</u>				
Fill Borehole (100 m)	m ³	7	R 19.11	R 133.77

⁸ A mobilisation fee for the equipment hire will need to be included.

	Concrete	m ³	0.7	R 30.28	R 21.19
4	<u>General Clean-up</u>	Labour	1	R 168.00	R 168.00
5	<u>Hydrocarbon clean-up</u>	m ³	5	R 89.12	R 445.60
6	<u>Inspection</u>	Hours	1	R 870.00	R 870.00
7	<u>Audit</u>				
	Site Inspection	Hours	4	R 470.00	R 1 880.00
	Report Writing	Hours	4	R 470.00	R 1 880.00
				Total	R 9 649.70
	Grand Total (Total multiplied by 4 Boreholes)		4	Grand Total	R 38 598.80

8.1.6 Confirm that the Financial Provision will be Provided as Determined

The applicant, RPM, confirms that the financial provision will be provided for as determined is Section 8.1.5, Part B.



9 Monitoring Compliance with and Performance Assessment against the Environmental Management Programme and Reporting thereon

RPM will be responsible for the implementation of all of the monitoring of mitigation and management measures, as well as compliance with the EMP. The recommended monitoring for the identified impacts is detailed below. RPM will keep a record of all environmental monitoring taken on site. A summary of the environmental monitoring to be undertaken is included in Table 9-1.

9.1 Monitoring of Impact Management Actions

9.1.1 List of Identified Impacts Requiring Monitoring Programmes

The identified impacts that require monitoring programmes includes the following:

- Site clearing and establishment:
 - Removal of vegetation; and
 - Soil erosion.
- Drilling:
 - Soil erosion;
 - Dust and noise;
 - Water generated; and
 - Groundwater levels and quality.
- Heritage landscape;
- Hydrocarbon spillages;
- Domestic waste; and
- Fires.

Wetlands, pans and dams will be avoided during the prospecting activities.

9.1.2 Roles and Responsibilities for the Execution of the Monitoring Programmes

Supervisors must be appointed to monitor the potential impacts of the above mentioned activities and Project Managers will foresee that all of the management plans are implemented. Once the prospecting activities have been completed, RPM will appoint an

independent environmental officer to conduct a site visit to audit the rehabilitation and a report will be compiled and submitted to the DMR.

9.2 Monitoring and Reporting Frequency

Table 9-1 discusses the monitoring and reporting frequency.

9.3 Responsible Persons

Table 9-1 sets out roles and responsibilities with respecting to the monitoring programme.

9.4 Time Period for Implementing Impact Management Actions

Table 9-1 captures the time period for implementing impact management actions.

9.5 Mechanism for Monitoring Compliance

Table 9-1 sets out the method of monitoring the implementation of the impact management actions, the frequency of monitoring the implementation of the impact management actions, an indication of the persons who will be responsible for the implementation of the impact management actions, the time periods within which the impact management actions must be implemented and the mechanism for monitoring compliance with the identified impact management actions.

Table 9-1: Monitoring and Management of Environmental Impacts

Activities	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles And Responsibilities (For the Execution of the Monitoring Programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
All activities throughout the LoM.	Removal of vegetation	<ul style="list-style-type: none"> Vegetation cleared from the prospecting drill site will be stored adjacent to the prospecting drill site and removed from the area should it not be adequate to use for rehabilitation. Only the necessary vegetation required for the establishment of the prospecting drill site will be cleared and indigenous trees will be avoided 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Soil erosion	<ul style="list-style-type: none"> All topsoil removed will be stored in a stockpile and protected from erosion for use during rehabilitation. Daily site inspection will be undertaken by the site manager to ensure that all soil erosion mitigation measures are in place and implemented 	<ul style="list-style-type: none"> Environmental Manager Soil Specialist 	Daily
	Dust and Noise	<ul style="list-style-type: none"> Soil stockpiles must be covered with a plastic liner during windy conditions. The drill must be maintained and serviced regularly and, if possible, a silencing system should be fitted. Drilling must only take place during daylight hours, which are to be communicated to directly affected persons 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Water generated	<ul style="list-style-type: none"> Water generated from the drilling must be captured and treated as waste water, since drill fluids will be present in the water 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Access roads	<ul style="list-style-type: none"> Machinery operators and drivers must be made aware of the possible safety hazards that they could pose 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Heritage landscape	<ul style="list-style-type: none"> A Watching Brief must be implemented during site establishment in the event that heritage resources are discovered. Identified heritage resources (historical structures, graves and Iron Age sites) must be avoided and a 50 m buffer implemented 	<ul style="list-style-type: none"> Environmental Manager 	Daily during site establishment
	Use of hydrocarbons	<ul style="list-style-type: none"> During drilling, a spill tray will be placed under the machinery to collect any hydrocarbon leaks and spillages. Should spillages occur, the soil must be cleared and treated utilising bioremediation techniques. Should the soil not be adequately treated on site, the soil must be removed from the prospecting drill site and disposed of at a waste handling facility 	<ul style="list-style-type: none"> Environmental Manager 	Daily
	Ablution facilities	<ul style="list-style-type: none"> The contents of the chemical toilets must be emptied on a 	<ul style="list-style-type: none"> Environmental Manager 	Weekly

Activities	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles And Responsibilities (For the Execution of the Monitoring Programmes)	Monitoring and Reporting Frequency and Time Periods for Implementing Impact Management Actions
		regular basis, at least weekly, to prevent spillages		
	Domestic waste	<ul style="list-style-type: none"> ▪ Bins will be placed at each prospecting drill site to collect the domestic waste and will be disposed of at a registered waste handling facility. The waste in the rubbish bins will be removed as required by the contractor 	<ul style="list-style-type: none"> ▪ Environmental Manager 	Weekly
	Rehabilitation	<ul style="list-style-type: none"> ▪ Review of rehabilitation after each prospecting activity 	<ul style="list-style-type: none"> ▪ Environmental Manager 	After the completion of each prospecting activity



10 Indicate the Frequency of the Submission of the Performance Assessment/ Environmental Audit Report

A performance assessment report for the Project will be submitted on an annual basis to the DMR during construction and on a two yearly basis during operation.

11 Environmental Awareness Plan

11.1 Manner in which the Applicant intends to Inform his or her Employees of any Environmental Risk which may result from their Work

RPM has developed Environmental, Health and Safety Policies. The Environmental Policy will be communicated to all personnel, whether they are contractors or permanent staff, and the policy will be erected at each active prospecting drill site.

Employees will receive general environmental awareness training on specific items contained in this EMP, as well as on Best Possible Environmental Practices (BPEP).

11.1.1 General Awareness Training

11.1.2 Specific Environmental Training

Environmental Awareness Training will be undertaken to make employees and contractors aware of the following:

- The importance of conforming with the environmental policy and procedures and with the requirements of the EMP;
- The significant social and environmental impacts of their work activities and the environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system;
- The potential consequences of departure from specified operating procedures; and
- Possible archaeological finds action steps for mitigation measures, surface collections, excavations and communication routes to follow in the case of a discovery.

The guidelines for training are summarized below, which are in line with the ISO 14001:2004 guidelines with regards to training and awareness creation.

Table 11-1: Training Guidelines

Types of Training	Audience	Purpose
Raising awareness of the strategic importance of environmental management.	Senior management	To gain commitment and alignment to the organisation's environmental policy.
Raising general environmental awareness.	All employees	To gain commitment to the environmental policy and objectives and to instil a sense of individual responsibility.



Types of Training	Audience	Purpose
Skill enhancement.	Employees with environmental responsibilities	To improve performance in specific tasks.
Compliance.	Employees whose actions can affect compliance	To ensure that regulatory and internal requirements for training are met.

The training programme will consist of the following elements:

- Identification of employee training needs;
- Development of a training plan to address defined needs;
- Verification of conformance of the training programme to regulatory or organisation requirements and standards;
- Training of target employee groups;
- Documentation of training received; and
- Evaluation of training received.

This training is undertaken on an annual basis for all personnel, together with the annual required induction programmes. The training material provided will be subject to annual review, based on issues such as incidents, accidents, new legislative requirements, modified processes and environmental and social aspects identified from time to time. This training is to be carried out and coordinated internally by RPM.

RPM will, therefore, develop the capabilities and support mechanisms necessary to achieve its environmental policy, objectives and targets.

In addition, an Emergency Preparedness Plan will be communicated and trained to all site personnel during the induction process.

11.2 Manner in which Risks will be Dealt with to avoid Pollution or the Degradation of the Environment

An Emergency Response Plan has been developed and is the approach used by RPM to respond to risks that may pollute or degrade the environment during the operational phase.

12 Specific Information Required by the Competent Authority

The financial provision for the environmental rehabilitation and closure requirements of mining operations is governed by National Environmental Management Act, 1998, Act 107 of 1998), as amended, (NEMA) which provides in Section 24P that the holder of a mining right must make financial provision for rehabilitation of negative environmental impacts. The financial provision will be reviewed annually.



13 Undertaking

The EAP herewith confirms:-

- The correctness of the information provided in the reports
- The inclusion of comments and inputs from stakeholders and I&APs ;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and
- The acceptability of the Project in relation to the finding of the assessment and level of mitigation proposed.

Signature of the Environmental Assessment Practitioner:	Duncan Pettit
Name of Company:	Digby Wells Environmental
Date:	

Basic Assessment Report and Environmental Management Programme

Environmental Authorisation for the Prospecting Right Application for Portion 53 of the Farm
Waterval 306 JQ

APM3249



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Appendix A: Plans

Basic Assessment Report and Environmental Management Programme

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Appendix B: Curriculum Vitae and Proof of Qualifications

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Appendix C: Public Participation Process

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Appendix D: Fauna and Flora List