ENVIRONMENTAL & ENGINEERING

REPORT

SALDOMATE (PTY) LTD – WELTEVREDEN COAL MINE

INTEGRATED ENVIRONMENTAL AUTHORISATIONS – DRAFT SCOPING REPORT

REPORT REF: 19-725 AUTH DRAFT SCOPING REPORT (WELTEVREDEN COAL MINE EA)

VERSION 00

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Approved for Distribution:				
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Quality Control BY:

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DECLARATION OF INDEPENDENCE/

I, Vernon Siemelink, declare that;

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing:
    - any decision to be taken with respect to the application by the competent authority; and
    - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

17/05/2019

Signature **Date**

Mr. Vernon Siemelink
BSSc Honn GeoScience (UP)
M (EnvMan) Environmental Management
ISO 14001:2004 Lead Auditor

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT ACTIVITIES

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: Saldomate (Pty) Ltd

TEL NO: +27 (11) 783-9810

FAX NO: +27 (86) 625-4121

POSTAL ADDRESS: P O Box 3001, Zimbali, 4418

PHYSICAL ADDRESS: 5 Sulawezi, 17 Fish Eagle Drive, Hilltop Estate, 4420

FILE REFERENCE NUMBER SAMRAD: MP 30/5/1/2/3/2/1 (10234) EM

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 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 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 SCOPING PROCESS

1) The objective of the scoping process is to, through a consultative process—

   (a) identify the relevant policies and legislation relevant to the activity;

   (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

   (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;

   (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;

   (e) identify the key issues to be addressed in the assessment phase;

   (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

   (g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

CONTENTS

Annexures -

No table of contents entries found.

List of Figures -

List of Tables

SCOPING REPORT

2. CONTACT PERSON AND CORRESPONDENCE ADDRESS

2.a DETAILS OF:

2.a.i The EAP who prepared the report

Name of the practitioner	Vernon Siemelink & Riana Panaino
Tel Number	012 807 0383
Fax Number	086 714 5397
Email Address	vernon@ecoe.co.za / riana@ecoe.co.za

2.a.ii Expertise of the EAP

The qualification of the EAP

The EAP's have Honours degrees in Environmental Management, is SACNASP Registered, and has more than 20 years' experience in Environmental Consulting.

Refer to Annexure 2 for a CV of the EAP.

Summary of the EAP's past experience

Refer to Annexure 2 for a CV of the EAP.

2.b DESCRIPTION OF THE PROPERTY

Farm Name:	A portion of portion 2 and Portion 6 of the farm Weltevreden 324 JS
Application area (Ha)	231.5 Hectares
Magisterial district:	eMalahleni Local Municipality Nkangala District Municipality
Distance and direction from nearest town	13 km South-west from Witbank, situated between Witbank and Phola Village, East of Clewer community
21 digit Surveyor General Code for each farm portion	T0JS00000000032400002 T0JS00000000032400006

2.c LOCALITY MAP

(show nearest town, scale not smaller than 1:250000 attached as Appendix 3).

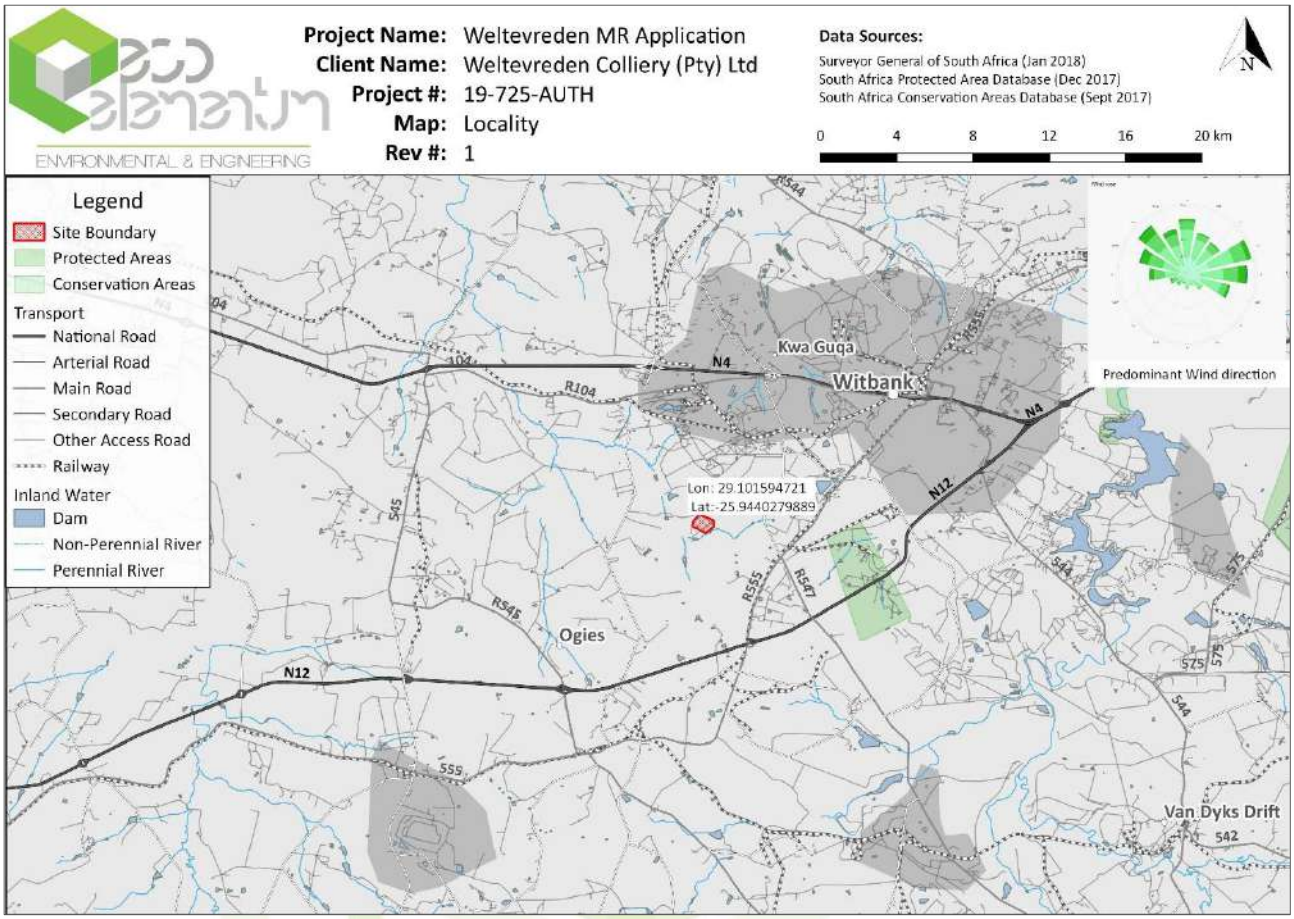


Figure 1: Weltevreden Coal Mine Locality

2.d DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

2.d.i Listed and specified activities

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix 4

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
Clearing in preparation for Mining Operation including all ancillary infrastructure		X	GNR984, Activity 15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
Mining of Coal and subsequent Crushing and Screening	36ha	X	GNR984, Activity 17 Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including- (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.
			GNR984, Activity 19 The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including-

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
			(a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.
Overburden (Hards and Softs) dump	5.8ha	X	Category B, Activity 11 The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
Hard Park	1.2ha		*Contributes to clearance of 20ha or more*
Haul Road	>1000m Access Road is 326m	X	GNR983, Activity 24 The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road- (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter.
Topsoil Stockpile	0.67ha		*Contributes to clearance of 20ha or more*

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
Opencast Mining	36ha	X	GNR983, Activity 19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
Offices, Changehouse, Ablution Facilities and Workshops			*Contributes to clearance of 20ha or more*
Pipelines and Stormwater infrastructure.		X	GNR983, Activity 9 The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
Dirty water diversion infrastructure		X	GNR983, Activity 10 The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes- (i) with an internal diameter of 0,36 metres or more; or ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.
Pollution Control Dam		X	GNR983, Activity 12 The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;-X
			GNR983, Activity 13

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
			The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.
			GNR984, Activity 6 The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding- (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.
Diesel Storage		X	GNR983, Activity 14 The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.

2.d.ii Description of the activities to be undertaken

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity

MINING METHOD

The mining method that will be used to exploit the different coal seams will be Roll-over Strip mining concurrently with rehabilitation. The roll over mining will make use of dozer and truck and shovel teams to remove the waste material to expose the No. 2 seam. Once the coal seam is exposed, it will be mined by truck and shovel operation and placed on the ROM stockpiles for transport to Elandsfontein Colliery where beneficiation will be done.

The initial boxcut waste mining material will be placed on dumps to create space for the next cut material to be rolled into. This will form a continuous roll over method where the waste material will be placed in the previous mined out cut. The placement of material on the low wall side as part of the rehabilitation strategy will be in the same sequence as the material mined from bottom to top, i.e. hards at the bottom, then subsoil on top of the hards and finally topsoil on top of the soft subsoils.

Drilling and blasting operations will occur on the hard overburden and interburdens during the critical part of mining the hards as well as the coal seams. All hard material horizons will be drilled at specific patterns and blasted with the use of emulsion and pyrotechnics (shocktube).

ROM PRODUCTION

The plant feed will be from the Weltevreden Operation. The discard will be discarded in the current Elandsfontein discard handling facility (off site). This will have the effect that the Weltevreden Opencast facility will not be used for any discard from the plant, and therefore the rehabilitation can commence immediately when the operation reaches a steady state scenario.

A truck and shovel mining method will be used to transport the ROM coal to a ROM pad on Weltevreden from where it will be loaded on roadworthy road- hauler trucks, which will transport the coal to the Elandsfontein Facility (off site).

BASIC CRUSHING & SCREENING PLANT DESIGN

ROM coal from the Weltevreden project will be processed and beneficiated on site via a crushing and screening process, mainly for the local & regional Eskom market.

This plant will consist of a Primary breaker in the form of a Jaw Crusher, which will crush the ROM coal to a -150mm product feed. This feed will be fed onto a single deck screen that will remove the already 0-50mm product before the oversize (+50mm) will be fed to a secondary crusher in the form of an Impact crusher.

The secondary crusher will re-circulate its product back to the screen to ensure that coal within the 0-50mm spectrum does not get crushed for a third time.

The coal gets circulated through the Impact crusher until it is removed through the screen and produced as a 0-50mm Eskom product.

The crush and screen plant yield will be 100% as no coal is discarded.

The impact crusher creates more fines than some other conventional crushers although its throughput is substantially higher.

It is therefore envisaged that the split will be 30% +30mm, and 70% -30mm.

COAL PROCESSING

Saldomate (Pty) Ltd has an agreement that all coal mined from the Weltevreden coal reserve, will be transported to Elandsfontein Colliery for beneficiation. The coal will be transported by trucks via a public road that runs the Mine properties.

The agreement entails that all coal will be run from the Weltevreden Coal Mine as ROM to Elandsfontein where the No. 2 coal seam will be crushed and screened to a 0-50mm product.

For this reason, no further beneficiation infrastructure need to be build.

POTABLE WATER

Potable water is for the use in the mine offices, workshops and change house facilities.

DIESEL STORAGE

Storage facility consist of 2 x 23000l storage tanks. Total storage capacity is 46000 litres.

GENERAL WASTE STORAGE

For general waste, no authorisation is required as the waste site is kept to less than 100m^3. The removal of waste will be managed on a daily basis to ensure that the limit is not exceeded.

HAZARDOUS INDUSTRIAL WASTE

The site is maintained to less than 35m^3. This is a relatively small waste site and the mine will have a waste removal contract with a reputable company to remove this waste on a regular basis.

SEWERAGE

Sewerage is removed on a need basis.

DIRTY WATER

Dirty water on site will be diverted to the PCD. Dust suppression for the operations will be done my means of a water cart. Water from the dirty water storage facility will be used for dust allying at a rate of 50000-80000 l/day dependant on distance of haulage.

2.e POLICY AND LEGISLATIVE CONTEXT

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);		**REFERENCE WHERE APPLIED**
National Environmental Management Act (107 of 1998) The NEMA provides the overarching legislation for environmental governance in South Africa, giving effect to Section 24 of the Constitution of the Republic of South Africa. NEMA sets out the fundamental principles of Integrated Environmental Management that must be adhered to in order to ensure sustainable development	Section 28 of the NEMA includes a far-reaching general "Duty of Care" which stipulates the need to protect the environment from degradation and pollution, In terms of the listed activities, a S&EIR process is required.	An Application for Environmental Authorisation and Mining Right has been made to the DMR.
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) To make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith.	Section 22- The project requires a mining right authorisation from the DMR	A section 22 Mining Right Application was lodged with the DMR

NEMA Environmental Impact Assessment (EIA) Regulations, 2014 (as amended)	In terms of the listed activities, a S&EIR process is required. The process will be followed in terms of the "one environmental system"	An Application for Environmental Authorisation and Mining Right has been made to the DMR.
The South African Constitution In terms of Section 24, of the Constitution of the Republic of South Africa (108 of 1996), 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 legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while prompting justifiable economic and social development.	Applied at potential impacts identification as well as mitigation measures and public participation	An open and participatory public participation process will be followed. An EMP and awareness plan will be designed according to the issues raised during this process
National Environmental Management: Biodiversity Act, 2004 The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA) provides for listing of threatened or protected species	The fauna and flora prevailing in the proposed project site will be handled in terms of this Act and relevant ecological studies have already been initiated.	The mining footprint will be guided by the results of the ecological studies where possible. Permits will be applied for where and when necessary should any red data species be relocated.
National Environmental Management: Waste Act The objectives of NEM:WA involve the protection of health, wellbeing and the environment by providing reasonable measures for the minimization of natural resource consumption, avoiding and minimizing the generation of waste, reducing, recycling and recovering waste, and treating and safely disposal of waste as a last resort. In terms of the NEMWA, all waste management activities must be licensed A distinction is made between Category A waste management activities, which require a basic assessment, and Category B activities, which require a full EIA, and Category C waste management activities which do not require a waste management licence but compliance with relevant requirements or standards. According to Section 44 of the Act, the licensing procedure must be integrated with an EIA process in accordance with the Regulations GNR 982.	In terms of the list of Section 19 waste management activities, a S&EIR process is required. The process is part of the "one environmental system" GNR 633 includes the establishment or reclamation of a residue stockpile or residue deposit resulting from prospecting or mining activities as a listed activity	In terms of GN718 of 2009, under NEMWA, various Category A and B waste management activities are applicable to the proposed mining operation. The impacts and associated management and/or mitigation measures will be included in the EIA phase of the project.
National Heritage Resources Act (Act No. 25 of 1999) The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA).	An Heritage and Paleontological study has been initiated to identify and assess the project in terms of heritage and paleontological resources. This is mandatory in terms of Section 38 of the NHRA	The Heritage Report will be uploaded on the SAHRIS website for comment and the development guided by any findings of the Report.
National Water Act (Act No. 36 of 1998) The NWA is the primary regulatory legislation, controlling and managing the use of water resources as well as the	An IWULA will be submitted to DWS for consideration for the	The DWS will provide comment and an application will be lodged for their review prior to the

pollution thereof. This act provides for fundamental reformation of legislation relating to water resource use. GN 704- Regulations on use of water for mining and related activities aimed at the protection of water resources	following Section 21 water uses including: (a) abstraction from a borehole (c) and (i) mining activities within 500m from a wetland (g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams	undertaking of any water use activities on site Management Principles will be applied to the mining operations as per GN704
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004); and applicable Regulations, Standards and Notices published in terms of NEMAQA The promulgation of this Act marked a turning point in the approach to air pollution control and governance in South Africa, introducing the philosophy of Air Quality Management, in line with international policy developments and the environmental right, i.e. Section 24 of the Constitution (Act No. 108 of 1996).	Dust monitoring on site during operations	As part of the EMP dust suppression methods will be used.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996); The Mine Health and Safety Act (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa	Health and Safety Policy of mine to be guided by this Act	Risk Impact Assessment to be conducted
Mpumalanga Spatial Development Framework (SDF)	Used to identify the municipality's long term spatial development plans. SDF to be considered in terms of the need and desirability	The SDF should be consulted as part of the Socio-Economic Study's Scope of Work.
National Development Plan (2012) The National Development Plan outlines what we should do to eradicate poverty, increase employment and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety	Used to identify project Need and Desirability and alignment with National Policy	To form part of the project background and socio-economic evaluation
Promotion of Access to Information Act, 2000 **(Act No. 2 of 2000) (PAIA)** PAIA recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right	The S&EIR process is aligned with the PAIA and therefore fair and open public participation is undertaken.	NEMA Public Participation Process will be followed as per the 2014 EIA Guidelines.
Conservation of Agricultural Resources Act (act no. 43 of 1983) (CARA) CARA provides for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.	Principles of the Act to be included in the relevant specialist's Scope of Work.	Mine Closure and Rehabilitation strategy to be informed by CARA and stakeholder engagement process.

2.f NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

- The project is in line with the 2012 National Development Plans' Nine Point Plan which is aimed at reigniting the economy to be able to create much-needed jobs include industrialisation, mining and beneficiation, agriculture and agro-processing, energy, small, medium and micro enterprises (SMMEs), managing workplace conflict, attracting investments, growing the oceans economy and tourism. Cross-cutting areas such as science and technology, water and sanitation infrastructure, transport infrastructure and broadband roll-out have also been added.
- The mining sector generates mass employment opportunities which are mainly situated within the rural areas of the municipality. Although some key sectors of the municipality are slowly declining (due to international and national factors), the mining sector continues to grow
- The activity of mining has numerous social and economic benefits in local, regional and national context. These include: 1. Job creation 2. Skills development 3. SMME development 4. Local economic development 5. Contribution to local and national tax income (royalties, companies tax etc.) 6. Contribution to the national gross domestic product, and 7. Future business opportunities.

2.g PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

A 10 year authorisation is requested.

2.h DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED SITE.

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

- GIS and spatial analysis will be used to determine the location of the mining infrastructure by considering environmental sensitivities.
- The site layout will take into account the resource location, watercourse location, and location of built structures and graves.
- The infrastructure layout will be presented during the EIA phase.

2.h.i Details of all alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which or location where it is proposed to undertake the activity;

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses and residential areas. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative properties were considered.

(b) the type of activity to be undertaken;

Opencast or underground mining are the alternatives for the activity to be undertaken. Due to the shallow nature of the Coal seam the preferred alternative is Opencast Rollover mining

(c) the design or layout of the activity;

The infrastructure and mining layout is constrained by the prospecting right boundary, the location of other mining houses and residential areas. The resource location and the presence of a watercourse on the site boundary further restrict the layout options. The final layout will be determined based on the results from the specialist assessments.

(d) the technology to be used in the activity;

Opencast Rollover mining is the preferred alternative for mining.

The other alternatives would be beneficiation on site or off site. Due to the limited space available on site, the preferred alternative will be to transport crushed and screened ROM to the Elandsfontein Colliery for further beneficiation. Therefore, no beneficiation plant will be required on site.

(e) the operational aspects of the activity; and

as per (d) above

(f) the option of not implementing the activity.

The option of not approving the activities will result in a significant loss of revenue and job creation to, and within the municipality. The surrounding properties also consist of mining activities, and including this portion into the mining section will profit the local economy.

2.h.ii Details of the Public Participation Process Followed

(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.))

Section 41 of NEMA Regulation 982 (specifically Chapter 6) set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process will/has been followed at all times and is based on reciprocal dissemination of information. The following was/will be undertaken during the PPP:

- Identification of Interested and Affected Parties (IAPs);
- Consultation with selected landowners;
- Notification of IAPs regarding the proposed project via newspaper advert (in the Witbank News); the placing of 4 x site notices at conspicuous places, the sending of notices to affected parties via email (in the form of Background Information Documents) and sms'.
- A public information meeting (open day) with IAPs will be held on 31 May 2019 at the eMalahleni Main Library;
- Gathering comments, issues and concerns from IAPs;
- Responding to IAP comments, issues and concerns;
- Compilation and submission of results of consultation report to the DMR; and
- Providing IAPs with the opportunity to review and comment on the Draft Scoping and EIA Reports

2.h.iii Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

This will be included in the final Scoping Report and going forward into the EIA phase, as the Public consultation will kick off with the public review period of this document.

2.h.iv The Environmental attributes associated with the sites

2.h.iv.1 Baseline Environment

2.h.iv.1.a Type of environment affected by the proposed activity.

(its current geographical, physical, biological, socio- economic, and cultural character).

GEOLOGY

The project is located in the Witbank Coalfield, one of the most important in South Africa, supplying more than 50% of the country's saleable coal (Hancox, 2016). Coal in the Witbank Coalfield is hosted in rocks of the Vryheid Formation of the Ecca Group. The Vryheid Formation comprises a predominantly arenaceous sequence of sandstones with subordinate siltstone and mudstone in a series of upward coarsening sequences. Each genetic sequence represents a major cycle of deltaic outbuilding and is usually capped by a coal seam (The Mineral Corporation, July 2014). The coal seams are mainly flat lying to gently undulating, with a very gentle regional dip (1-3°) to the south. Five individual seams are usually recognised associated with various depositional sequences (see Figure 2). Of these, the No 2, 4 and 5 seams are considered the most economically important.

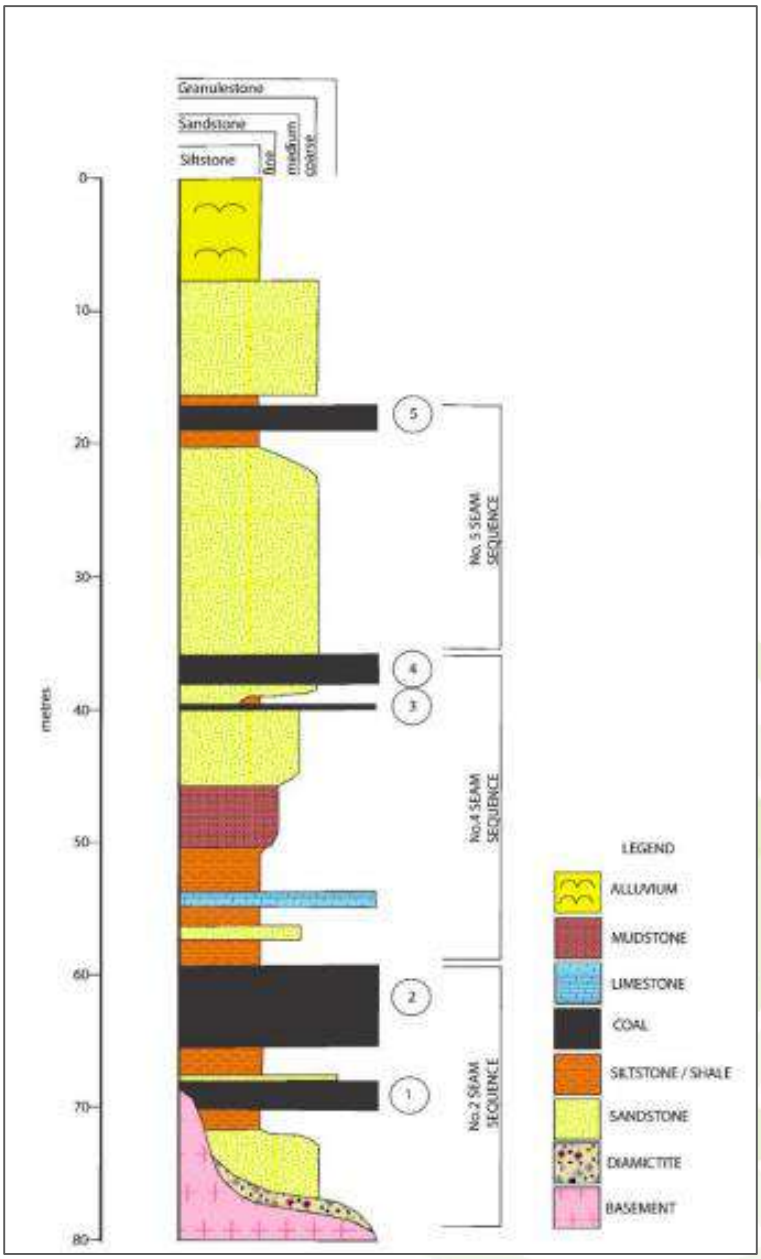


Figure 2: Geology of the project area

TOPOGRAPHY

Eastern Highveld Grassland is characterised by slightly to moderately undulating plains, including some low hills and pan depressions with an altitude 1 520–1 780 m.

Rand Highveld Grassland is characterised by areas between rocky ridges from Pretoria to Witbank, extending onto ridges in the Stoffberg and Roossenekal regions as well as west of Krugersdorp centred in the vicinity of Derby and Potchefstroom, extending southwards and northeastwards from there. The altitude ranges from 1 300–1 635 m

CLIMATE

Strongly seasonal summer rainfall, with very dry winters. MAP 650–900 mm (overall average: 726 mm), MAP relatively uniform across most of this unit, but increases significantly in the extreme southeast. The coefficient of variation in MAP is 25% across most of the unit, but drops to 21% in the east and southeast. Incidence of frost from 13–42 days, but higher at higher elevations.

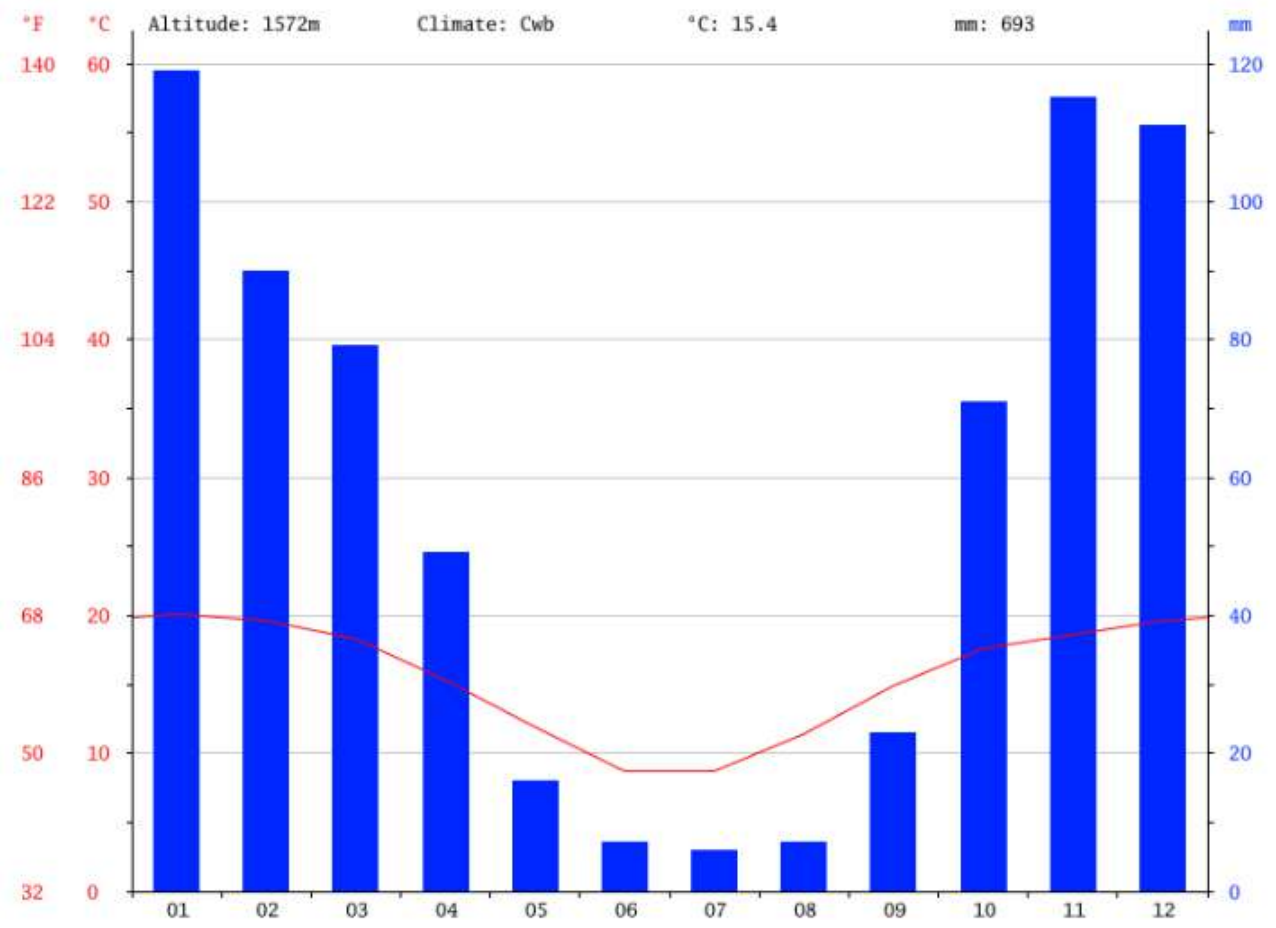


Figure 3: Average Climate Graph by month for eMalahleni

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	20.1	19.6	18.3	15.3	11.9	8.7	8.7	11.4	14.9	17.6	18.6	19.6
Min. Temperature (°C)	13.6	13.2	11.5	7.8	3.4	-0.3	-0.4	2.1	6.2	10	11.8	13.1
Max. Temperature (°C)	26.6	26.1	25.2	22.9	20.4	17.8	17.8	20.7	23.7	25.3	25.4	26.2
Avg. Temperature (°F)	68.2	67.3	64.9	59.5	53.4	47.7	47.7	52.5	58.8	63.7	65.5	67.3
Min. Temperature (°F)	56.5	55.8	52.7	46.0	38.1	31.5	31.3	35.8	43.2	50.0	53.2	55.6
Max. Temperature (°F)	79.9	79.0	77.4	73.2	68.7	64.0	64.0	69.3	74.7	77.5	77.7	79.2
Precipitation / Rainfall (mm)	119	90	79	49	16	7	6	7	23	71	115	111

Figure 4: eMalahleni weather by month

WETLAND ECOLOGY

Wetlands are sensitive ecosystems that perform many complex functions including the maintenance of water quality, carbon storage, stream-flow regulation, flood attenuation, various social benefits as well as the maintenance of biodiversity (Kotze et al.,2007). The Ramsar Convention on Wetlands refers to wetlands as one of the most important life support systems on earth owing to the services provided. Wetlands are defined according to the National Water Act, 1998 (Act 36 of 1998) (NWA) as: "*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.*"

In accordance with the definition of a wetland in the NWA, vegetation is the primary indicator of a wetland, which must be present under normal circumstances. However, the soil wetness indicator tends to be the most important in practice and the remaining three indicators are then used in a confirmatory role. The reason for this is that the response of vegetation to changes in the soil moisture regime or management is relatively quick and may be transformed whereas the morphological indicators in the soil are significantly more longlasting and will hold the indications of frequent and prolonged saturation long after a wetland has been drained (perhaps several centuries) (DWAF, 2005).

Figure 5 shows the wetlands within the larger catchment as identified by by the National Freshwater Ecosystem Priority Areas (NFEPA) Data.

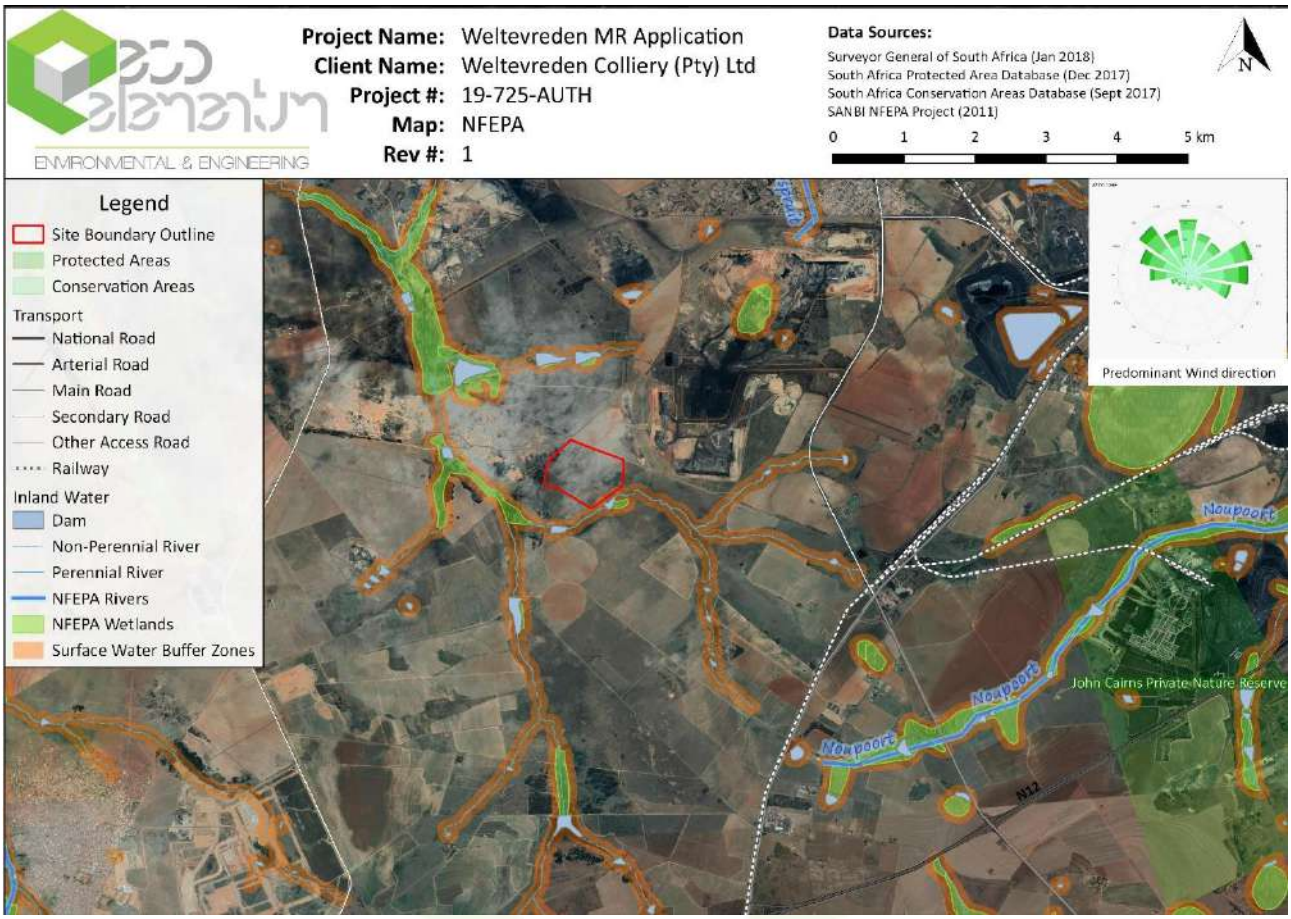


Figure 5: NFEPA for the larger project area

A Wetland Impact Assessment will be conducted and included in the EIA.

AQUATIC ECOLOGY

Figure 6: Aquatic Biodiversity combined sensitivity

From the desktop assessment it was found that the combined aquatic biodiversity of the site was of a low sensitivity.

National Freshwater Ecological Priority Areas (NFEPA)

Catchment B20G fall outside of the defined NFEPA categories which imply that they are not currently priority areas in terms of the NFEPA guidelines (Nel *et al.* 2011).

Potential fish species within the affected rivers

Quaternary catchment B20H was selected as a reference site for B20G (B20G does not have expected fish data) as they both report to the Wilge River. B20H is affected by open cast mining within their catchments and as such may contain more sensitive species than B20G.

Table 1: Species potentially occurring in the project area

Scientific Name	Common Name	IUCN Red data status (Ver 3)
Barbus anoplus	Chubby head barb	Least concern
Barbus neefi	Sidespot barb	Least concern
Barbus paludinosus	Straightfin barb	Least concern
Labeobarbus polylepis	Smallscale yellowfish	Least concern
Barbus trimaculatus	Theespot barb	Least concern
Cyprinus carpio	Carp (exotic)	Least
Clarias gariepinus	Sharptooth catfish	Least concern

Gabusia affinus	Mosquito fish (exotic)	Least concern
Labeo umbratus	Moggel	Least concern
Microterus salmoides	Largemouth bass (exotic)	Least concern
Pseudocrenulabus philander	Southern Mouthbrooder	Not Assessed
Tilapia sparrmanii	Banded tilapia	Least concern
Labeobarbus marequensis	Largescale yellowfish	Least concern
Labeo cylindricus	Redeye labeo	Least concern

Adapted from Kleynhans (2007)

An Aquatic Impact Assessment will be conducted and included in the EIA.

TERRESTRIAL ECOLOGY

A Terrestrial Impact Assessment will be conducted and included in the EIA.

Eastern Highveld Grassland

This vegetation type corresponds partially with Bankenveld and North-eastern Sandy Highveld according to the Acocks (1975) and also Moist Sandy Highveld Grassland as described by Low and Rebelo (1996).

This vegetation type occurs within the Gauteng and Mpumalanga Provinces on the plains in the areas between Belfast in the East and the eastern side of Johannesburg in the West and southwards to Bethal, Ermelo and West of Piet Retief.

The conservation status of this vegetation type is Endangered and the conservation target is 24%. By 2006 some 44% was already transformed primarily by cultivation, plantations, mining, urbanisation and building of dams. No serious invasions are reported, although *Acacia mearnsii* can become dominant in disturbed sites. Erosion is generally low. Only a small part of this vegetation type is conserved in the statutory nature reserves Nooitgedacht dam - and Jericho dam Nature Reserve of the Mpumalanga Tourism and Parks Agency and in Private Nature Reserves such as Holkranse, Kransbank and Morgenstond (Mucina and Rutherford, 2006).

Important plant species of this vegetation type are given in Table 2.

Table 2: Important plant species of the Eastern Highveld Grassland

FAMILY	SPECIES	STATUS
POACEA	*Aristida aequiglumis*	D
POACEA	*A. congesta*	D
POACEA	*A. junciformis* subsp. *galpinii*	D
POACEA	*Brachiaria serrata*	D
POACEA	*Cynodon dactylon*	D
POACEA	*Digitaria monodactyla*	D
POACEA	*D. tricholaenoides*	D
POACEA	*Elionurus muticus*	D
POACEA	*Eragrostis chloromelas*	D
POACEA	*E. curvula*	D
POACEA	*E. racemosa*	D
POACEA	*E. sclerantha*	D
POACEA	*Heteropogon contortus*	D
POACEA	*Loudetia simplex*	D
POACEA	*Microchloa caffra*	D
POACEA	*Monocymbium ceresiiforme*	D
POACEA	*Setaria sphacelata*	D
POACEA	*Sporobolus africanus*	D
POACEA	*S. pectinatus*	D
POACEA	*Themeda triandra*	D
POACEA	*Trachypogon spicatus*	D
POACEA	*Tristachya leucothrix*	D
POACEA	*T. rehmannii*	D
POACEA	*Alloteropsis semialata* subsp. *eckloniana*	
POACEA	*Andropogon appendiculatus*	
POACEA	*A. schirensis*	
POACEA	*Bewsia biflora*	
POACEA	*Ctenium concinnum*	
POACEA	*Diheteropogon amplectens*	
POACEA	*Eragrostis capensis*	
POACEA	*E. gummiflua*	
POACEA	*E. patentissima*	
POACEA	*Harpochloa falx*	
POACEA	*Panicum natalense*	
POACEA	*Rendlia altera*	
POACEA	*Schizachyrium sanguineum*	
POACEA	*Setaria nigrirostris*	
POACEA	*Urelytrum agropyroides*	
ASTERACEAE	*Berkheya setifera*	D
ASTERACEAE	*Haplocarpha scaposa*	D
ACANTHACEAE	*Justicia anagalloides*	D
GERANIACEAE	*Pelargonium luridum*	D
EUPHORBIACEAE	*Acalypha angustata*	
FABACEAE	*Chamaecrista mimosoides*	
ASTERACEAE	*Euryops gilfillanii*	
ASTERACEAE	*E. transvaalensis* subsp. *setilobus*	
ASTERACEAE	*Helichrysum aureonitens*	
ASTERACEAE	*H. caespititium*	
ASTERACEAE	*H. callicomum*	
ASTERACEAE	*H. oreophilum*	
ASTERACEAE	*H. rugulosum*	
CONVOLVULACEAE	*Ipomoea crassipes*	
RUBIACEAE	*Pentanisia prunelloides* subsp. *latifolia*	
SCROPHULARIACEAE	*Selago densiflora*	
ASTERACEAE	*Senecio coronatus*	
ASTERACEAE	*Vernonia oligocephala*	
CAMPANULACEAE	*Wahlenbergia undulata*	
IRIDACEAE	*Gladiolus crassifolius*	
AMARYLLIDACEAE	*Haemanthus humilis* subsp. *hirsutus*	
HYPOXIDACEAE	*Hypoxis rigidula* var. *pilosissima*	
HYACINTHACEAE	*Ledebouria ovatifolia*	
ASPHODELACEAE	*Aloe ecklonis*	
RUBIACEAE	*Anthospermum rigidum* subsp. *pumilum*	
ASTERACEAE	*Stoebe plumosa*	

Rand Highveld Grassland

This vegetation type corresponds partially with the Bankenveld (64%) of Acocks (1953) and with the Rocky Highveld Grassland (45%) and Moist Sandy Highveld Grassland (21%) of Low & Rebelo (1996).

Rand Highveld Grassland is distributed in parts of Gauteng, North-West, Free State and Mpumalanga Provinces in areas between rocky ridges from Pretoria to Witbank (eMalahleni), extending onto ridges in the Stoffberg and Roossenekal regions as well as west of Krugersdorp centred in the vicinity of Derby and Potchefstroom, extending southwards and northeast wards from there. Altitude 1 300-1 635 m, but reaches 1 760 m in places.

Vegetation & landscape features display a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. Most common grasses on the plains belong to the genera *Themeda, Eragrostis, Heteropogon* and *Elionurus.* High diversity of herbs, many of which belong to the Asteraceae, is also a typical feature. Rocky hills and ridges carry sparse (savannoid) woodlands with *Protea caffra* subsp. *caffra, P. welwitschii, Acacia caffra* and *Celtis africana,* accompanied by a rich suite of shrubs among which the genus *Rhus* (especially *R. magalismontana)* is most prominent.

Biogeographically Important Taxa (all Northern sourveld endemics) Geophytic Herbs: *Agapanthus inapertus* subsp. *pendulus, Eucomis vandermerwei.* Succulent Herb: *Huernia insigniflora.* Low Shrub: *Melhania randii.* Endemic Taxa Herbs: *Melanospermum rudolfii, Polygala spicata*. Succulent Herbs: *Anacampseros subnuda* subsp. *lubbersii, Frithia humilis.* Succulent Shrubs: *Crassula arborescens* subsp. *undulatifolia, Delosperma purpureum.* Small Trees: *Encephalartos lanatus, E. middelburgensis.*

The Conservation status is Endangered and the conservation target is 24%. It is currently poorly conserved (only 1 %). Small patches are protected in statutory reserves such as Kwaggavoetpad, Van Riebeeck Park, Bronkhorstspruit and Boskop Dam Nature Reserves as well as in private conservation areas such as Doornkop, Ezemvelo, Rhenosterpoort and Mpopomeni. Almost half of the vegetation type has been transformed mostly by cultivation, plantations, urbanisation or dam-building. Cultivation may also have had an impact on an additional portion of the surface area of the unit where old lands are currently classified as grasslands in landcover classifications and poor land management has led to degradation of significant portions of the remainder of this unit. Scattered aliens (most prominently *Acacia mearnsii)* occur in about 7% of this unit. Only about 7% has been subjected to moderate to high erosion levels.

Important plant species of this vegetation type are given in Table 3.

Table 3: Important plant species of the Rand Highveld Grassland

FAMILY	SPECIES	STATUS
POACEAE	*Ctenium concinnum*	D
POACEAE	*Cynodon dactylon*	D
POACEAE	*Digitaria monodactyla*	D
POACEAE	*Diheteropogon amplectens*	D
POACEAE	*Eragrostis chloromelas*	D
POACEAE	*Heteropogon contortus*	D
POACEAE	*Loudetia simplex*	D
POACEAE	*Monocymbium ceresiiforme*	D
POACEAE	*Panicum natalense*	D
POACEAE	*Schizachyrium sanguineum*	D
POACEAE	*Setaria sphacelata*	D
POACEAE	*Themeda triandra*	D
POACEAE	*Trachypogon spicatus*	D
POACEAE	*Tristachya biseriata*	D
POACEAE	*T. rehmannii*	D
POACEAE	*Andropogon schirensis*	
POACEAE	*Aristida aequiglumis*	
POACEAE	*A. congesta*	
POACEAE	*A. junciformis* subsp. *galpinii*	
POACEAE	*Bewsia biflora*	
POACEAE	*Brachiaria nigropedata*	
POACEAE	*B. serrata*	
POACEAE	*Cymbopogon caesius*	
POACEAE	*Digitaria tricholaenoides*	
POACEAE	*Elionurus muticus*	
POACEAE	*Eragrostis capensis*	
POACEAE	*E. curvula*	
POACEAE	*E. gummiflua*	
POACEAE	*E. plana*	
POACEAE	*E. racemosa*	
POACEAE	*Hyparrhenia hirta*	
POACEAE	*Melinis nerviglumis*	
POACEAE	*M. repens* subsp. *repens*	
POACEAE	*Microchloa caffra*	
POACEAE	*Setaria nigrirostris*	
POACEAE	*Sporobolus pectinatus*	
POACEAE	*Trichoneura grandiglumis*	
POACEAE	*Urelytrum agropyroides*	
CYPERACEAE	*Bulbostylis burchellii*	
ASTERACEAE	*Acanthospermum australe*	D
ACANTHACEAE	*Justicia anagalloides*	D
ILLECEBRACEAE	*Pollichia campestris*	D
EUPHORBIACEAE	*Acalypha angustata*	
FABACEAE	*Chamaecrista mimosoides*	
ASTERACEAE	*Dicoma anomala*	
ASTERACEAE	*Helichrysum caespititium*	
ASTERACEAE	*H. nudifolium* var. *nudifolium*	
ASTERACEAE	*H. rugulosum*	
CONVOLVULACEAE	*Ipomoea crassipes*	
RUBIACEAE	*Kohautia amatymbica*	
ASTERACEAE	*Lactuca inermis*	
ASTERACEAE	*Macledium zeyheri* subsp. *argyrophyllum*	
ASTERACEAE	*Nidorella hottentotica*	
RUBIACEAE	*Oldenlandia herbacea*	
LAMIACEAE	*Rotheca hirsuta*	
SELAGINACEAE	*Selago densiflora*	
ASTERACEAE	*Senecio coronatus*	

Plant species previously recorded in the grid square 2529CC, according to the PRECIS database are listed in Table 4

Table 4: Species previously recorded in the grid square 2529CC

SPECIES	RDL
Blepharis innocua C.B.Clarke	LC
Chaetacanthus costatus Nees	LC
Tulbaghia leucantha Baker	LC
Cyrtanthus breviflorus Harv.	LC
Cyrtanthus tuckii Baker var. transvaalensis I.Verd.	LC
Nerine rehmannii (Baker) L.Bolus	LC
Ozoroa paniculosa (Sond.) R.& A.Fern. var. paniculosa	LC
Searsia zeyheri (Sond.) Moffett	LC
Chlorophytum calyptrocarpum (Baker) Kativu	LC
Chlorophytum fasciculatum (Baker) Kativu	LC
Afrosciadium magalismontanum (Sond.) P.J.D.Winter	
Alepidea setifera N.E.Br.	LC
Asclepias albens (E.Mey.) Schltr.	LC
Asclepias brevipes (Schltr.) Schltr.	LC
Asclepias crispa P.J.Bergius var. crispa	LC
Asclepias eminens (Harv.) Schltr.	LC
Asclepias fallax (Schltr.) Schltr.	LC
Aspidoglossum biflorum E.Mey.	LC
Aspidoglossum glabrescens (Schltr.) Kupicha	LC
Aspidoglossum interruptum (E.Mey.) Bullock	LC
Aspidoglossum validum Kupicha	Thr*
Brachystelma rubellum (E.Mey.) Peckover	LC
Cordylogyne globosa E.Mey.	LC
Gomphocarpus glaucophyllus Schltr.	LC
Pentarrhinum insipidum E.Mey.	LC
Periglossum angustifolium Decne.	LC
Raphionacme hirsuta (E.Mey.) R.A.Dyer	LC
Disyranthus randii S.Moore	LC
Xysmalobium asperum N.E.Br.	LC
Asparagus flavicaulis (Oberm.) Fellingham & N.L.Mey. subsp. flavicaulis	LC
Aloe eckloniis Salm-Dyck	LC
Bulbine favosa (Thunb.) Schult. & Schult.f	LC
Chortolirion angolense (Baker) A.Berger	LC
Kniphofia ensifolia Baker subsp. ensifolia	LC
Kniphofia porphyrantha Baker	LC
Trachyandra asperata Kunth var. natalgencensis (Kuntze) Oberm.	LC
Trachyandra saltii (Baker) Oberm. var. saltii	LC
Aster harveyanus Kuntze	LC
Callilepis leptophylla Harv.	Declining
Dimorphotheca caulescens Harv.	LC
Dimorphotheca spectabilis Schltr.	LC
Euryops gilfillanii Bolus	LC
Gazania krebsiana Less. subsp. serrulata (DC.) Roessler	LC
Geigeria aspera Harv. var. aspera	LC
Helichrysum acutatum DC.	LC
Helichrysum aureonitens Sch.Bip.	LC
Helichrysum cephaloideum DC.	LC
Helichrysum nudifolium (L.) Less. var. nudifolium	LC
Helichrysum subglomeratum Less.	LC
Lasiospermum pedunculare Lag.	LC
Nidorella anomala Steetz	LC
Nidorella hottentotica DC.	LC
Osteospermum stratum Burtt Davy	LC
Schistostephium heptalobum (DC.) Oliv. & Hiern	LC
Senecio coronatus (Thunb.) Harv.	LC
Senecio glandulosо-pilosus Volkens & Muschl.	LC
Senecio gregatus Hilliard	LC
Senecio harveianus MacOwan	LC
Sonchus dregeanus DC.	LC
Ursinia nana DC. subsp. leptophylla Prassler	LC
Xanthium strumarium L.	
Asterella wilmsii (Steph.) S.W.Arnell	
Heliophila rigidiuscula Sond.	LC
Dianthus mooiensis F.N.Williams subsp. mooiensis var. mooiensis	
Camptorrhiza strumosa (Baker) Oberm.	LC
Commelina africana L. var. africana	LC
Commelina modesta Oberm.	LC
Cyanotis speciosa (L.f.) Hassk.	LC
Convolvulus sagittatus Thunb.	LC
Falkia oblonga Bernh. ex C.Krauss	LC
Ipomoea bathycolpos Hallier f.	LC
Ipomoea crassipes Hook. var. crassipes	LC
Ipomoea ommanneyi Rendle	LC
Merremia verecunda Rendle	LC
Bulbostylis contexta (Nees) M.Bodard	LC
Bulbostylis ortrephes (Rdl.) C.B.Clarke	LC
Bulbostylis schlechteri C.B.Clarke	LC
Bulbostylis scleropus C.B.Clarke	LC
Carex glomerabilis Krecz.	LC
Cyperus denudatus L.f. var. denudatus	LC
Cyperus difformis L.	LC
Cyperus indecorus Kunth var. decurvatus (C.B.Clarke) Kük.	LC
Cyperus margaritaceus Vahl var. margaritaceus	LC
Cyperus marginatus Thunb.	LC
Cyperus obtusiflorus Vahl var. obtusiflorus	LC
Eleocharis dregeana Steud.	LC
Eleocharis limosa (Schrad.) Schult.	LC
Fimbristylis complanata (Retz.) Link	LC
Fuirena pubescens (Poir.) Kunth var. pubescens	LC
Kyllinga alba Nees	LC
Kyllinga erecta Schumach. var. erecta	LC
Pycreus macranthus (Boeck.) C.B.Clarke	LC
Schoenoplectus corymbosus (Roth ex Roem. & Schult.) J.Raynal	LC
Schoenoplectus decipiens (Nees) J.Raynal	LC
Schoenoplectus scirpoides (Schrad.) Browning	LC
Scirpoides dioecus (Kunth) Browning	LC
Scleria sterrima (Rdl.) Napper	LC
Dioscorea dregeana (Kunth) T.Durand & Schinz	LC
Drosera madagascariensis DC.	LC
Diospyros lycioides Desf. subsp. guerkei (Kuntze) De Winter	LC
Erica drakensbergensis Guthrie & Bolus	LC
Eriospermum porphyrovalve Baker	LC
Jatropha lagarinthoides Sond.	LC
Acacia caffra (Thunb.) Willd.	LC
Chamaecrista comosa E.Mey. var. capricornia (Steyaert) Lock	LC
Elephantorrhiza elephantina (Burch.) Skeels	LC
Eriosema burkei Benth. ex Harv. var. burkei	LC
Eriosema cordatum E.Mey.	LC
Eriosema gunniae C.H.Stirt.	LC
Eriosema psoraleoides (Lam.) G.Don	LC
Eriosema salignum E.Mey.	LC
Indigofera atrata N.E.Br.	LC
Indigofera egens N.E.Br.	LC
Indigofera monocoma N.E.Br.	LC
Indigofera oxalidea Welw. ex Baker	LC
Indigofera oxytropis Benth. ex Harv.	LC
Lotononis foliosa Bolus	LC
Lotononis solitudinis Dummer	LC
Melolobium alpinum Eckl. & Zeyh.	LC
Melolobium wilmsii Harms	LC
Pearsonia cajanifolia (Harv.) Polhill subsp. cajanifolia	LC
Rhynchosia monophylla Schltr.	LC
Rhynchosia nervosa Benth. ex Harv. var. nervosa	LC
Rhynchosia totta (Thunb.) DC. var. totta	LC
Smithia erubescens (E.Mey.) Baker f.	LC
Tephrosia capensis (Jacq.) Pers. var. capensis	LC
Tephrosia longipes Meisn. subsp. longipes var. longipes	LC
Vigna vexillata (L.) A.Rich. var. vexillata	LC
Zornia linearis E.Mey.	LC
Fossombronia crispa Nees	
Fossombronia gemmifera Perold	
Chironia krebsii Griseb.	LC
Chironia purpurascens (E.Mey.) Benth. & Hook.f. subsp. humilis (Gilg) I.Verd.	LC
Pelargonium luridum (Andrews) Sweet	LC
Pelargonium pseudofumarioides R.Knuth	LC
Albuca shawii Baker	LC
Dipcadi gracillimum Baker	LC
Dipcadi marlothii Engl.	LC
Dipcadi rigidifolium Baker	LC
Dipcadi viride (L.) Moench	LC
Ledebouria cooperi (Hook.f.) Jessop	LC
Ledebouria marginata (Baker) Jessop	LC
Ornithogalum tenuifolium F.Delaroche subsp. tenuifolium	LC
Schizocarphus nervosus (Burch.) Van der Merwe	LC
Hypericum lalandii Choisy	LC
Hypoxis rigidula Baker var. rigidula	LC
Dierama mossii (N.E.Br.) Hilliard	LC
Gladiolus antholyzoides Baker	LC
Gladiolus elliotii Baker	LC
Gladiolus papilio Hook.f.	LC
Gladiolus vinosomaculatus Klies	LC
Lapeirousia sandersonii Baker	LC
Watsonia bella N.E.Br. ex Goldblatt	LC
Juncus dregeanus Kunth subsp. dregeanus	LC
Juncus exsertus Buchenau	LC
Juncus lomatophyllus Spreng.	LC
Juncus oxycarpus E.Mey. ex Kunth	LC
Acrotome hispida Benth.	LC
Ocimum obovatum E.Mey. ex Benth. subsp. obovatum var. obovatum	LC
Rotheca hirsuta (Hochst.) R.Fern.	LC
Syncolostemon pretoriae (Gürke) D.F.Otieno	LC
Teucrium trifidum Retz.	LC
Lobelia erinus L.	LC
Nesaea sagittifolia (Sond.) Koehne var. sagittifolia	LC
Nesaea schinzii Koehne	LC
Hermannia depressa N.E.Br.	LC
Hermannia lancifolia Szyszyl.	LC
Hermannia transvaalensis Schinz	LC
Hibiscus aethiopicus L. var. ovatus Harv.	LC
Nymphoides thunbergiana (Griseb.) Kuntze	LC
Frithia humilis Burgoyne	VU
Moraea inclinata (L.Bolus) N.E.Br.	LC
Disa rhodantha Schltr.	LC
Disa versicolor Rchb.f.	LC
Eulophia hians Spreng. var. hians	LC
Eulophia milnei Rchb.f.	LC
Eulophia ovalis Lindl. var. ovalis	LC
Satyrium hallackii Bolus subsp. ocellatum (Bolus) A.V.Hall	LC
Satyrium longicauda Lindl. var. longicauda	LC
Satyrium parviflorum Sw.	LC
Satyrium trinerve Lindl.	LC
Schizochilus zeyheri Sond.	LC
Alectra sessiliflora (Vahl) Kuntze var. sessiliflora	LC
Cycnium tubulosum (L.f.) Engl. subsp. tubulosum	LC
Sopubia cana Harv. var. cana	LC
Striga bilabiata (Thunb.) Kuntze subsp. bilabiata	LC
Oxalis obliquifolia Steud. ex A.Rich.	LC
Symphyogyna brasiliensis Nees & Mont.	
Calicostella trisis (Mitt.Hal.) Broth.	
Cyclodictyon vallis-gratiae (Hampe ex Mitt.Hal.) Kuntze	
Pittosporum viridiflorum Sims	LC
Cenchrus ciliaris L.	LC
Chloris gayana Kunth	LC
Cynodon dactylon (L.) Pers.	LC
Eragrostis curvula (Schrad.) Nees	LC
Eragrostis inamoena K.Schum.	LC
Eragrostis plana Nees	LC
Hyparrhenia hirta (L.) Stapf	LC
Ischaemum fasciculatum Brongn.	LC
Koeleria capensis (Steud.) Nees	LC
Leersia hexandra Sw.	LC
Leptochloa fusca (L.) Kunth	LC
Panicum repentelium Napper	LC
Phalaris arundinacea L.	
Phalaris canariensis L.	
Sporobolus africanus (Poir.) Robyns & Tournay	LC
Sporobolus albicans (Nees ex Trin.) Nees	LC
Stiburus conrathii Hack.	LC
Polygala houtboshiana Chodat	LC
Polygala producta N.E.Br.	LC
Polygala spicata Chodat	LC
Polygala transvaalensis Chodat subsp. transvaalensis	LC
Oxygonum dregeanum Meisn. subsp. canescens (Sond.) Germish. var. linearifolium Germish.	LC
Persicaria lapathifolia (L.) Gray	
Portulaca hereroensis Schinz	LC
Potamogeton octandrus Poir.	LC
Potamogeton pectinatus L.	LC
Potamogeton trichoides Cham. & Schltdl.	LC
Helinus integrifolius (Lam.) Kuntze	LC
Riccia atropurpurea Sim	
Riccia natalensis Sim	
Riccia volkii S.W.Arnell	
Canthium inerme (L.f.) Kuntze	LC
Fadogia homblei De Wild.	LC
Kohautia amatymbica Eckl. & Zeyh.	LC
Pachystigma thamnus Robyns	LC
Pentanisia angustifolia (Hochst.) Hochst.	LC
Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp. subsp. prunelloides	LC
Pygmaeothamnus zeyheri (Sond.) Robyns var. rogersii Robyns	LC
Zanthoxylum thorncroftii (I.Verd.) P.G.Waterman	LC
Thesium procerum N.E.Br.	LC
Thesium spartioides A.W.Hill	LC
Englerophytum magalismontanum (Sond.) T.D.Penn.	LC
Chaenostoma floribundum Benth.	LC
Jamesbrittenia aurantiaca (Burch.) Hilliard	LC
Manulea parviflora Benth. var. parviflora	LC
Melanospermum transvaalense (Hiern) Hilliard	LC
Zaluzianskya spathacea (Benth.) Walp.	LC
Solanum giganteum Jacq.	LC
Solanum nigrum L.	
Solanum retroflexum Dunal	LC
Solanum sisymbriifolium Lam.	
Withania somnifera (L.) Dunal	LC
Thelypteris confluens (Thunb.) C.V.Morton	LC
Gnidia capitata L.f.	LC
Gnidia kraussiana Meisn. var. kraussiana	LC
Xerophyta retinervis Baker	LC
Chascanum adenostachyum (Schauer) Moldenke	LC
Chascanum hederaceum (Sond.) Moldenke var. hederaceum	LC
Verbena brasiliensis Vell.	
Xyris gerrardii N.E.Br.	LC

HERITAGE AND PALAEONTOLOGY

The following figures show the relative sensitivity of the area for Archaeological finds and Cultural Heritage (Figure 7).

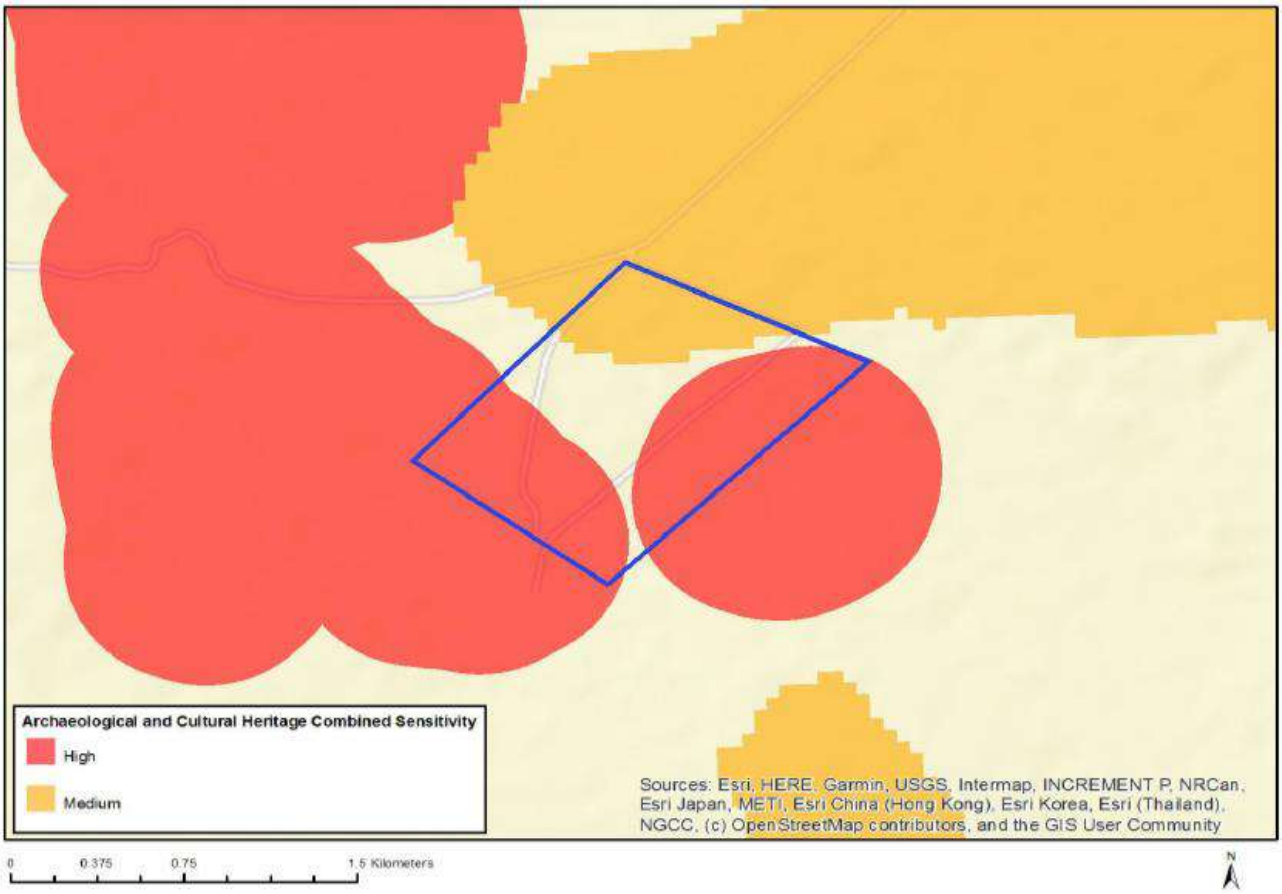


Figure 7: Relative Archaeological and Cultural Heritage Theme Sensitivity

Paleontological Record

The stratigraphic composition of the local geology contains diamictite deposits. The diamictite deposits are overlain by rocks from the Vryheid Formation consisting mainly of shales alternating with coal seams. These coal seams developed through the deposition of plant materials over a long period of time. Palaeontologically, the deposition of organic material increases the likelihood of fossil remains and therefore this coal rich formation has a high sensitivity rating. Vertebrates that occurred at this time are seldom preserved with the plants, (Bamford, 2012; SAHRIS, 2014), and none have been recorded in the Vryheid Formation. Plant fossils described by Bamford (2011) include; *Azanniodendron fertile. Cyclodendron leslii, sphenophyllum hammanskraalensis, Annularia* sp., *Raniganjia* sp., *Asterotheca* spp, *Liknopetalon enigmata, Glossopteris* > 20 species, *Hirsutum* 4 spp., *Scutm* 4 spp, *Ottokaria* 3 spp., *Estcourtia* sp., *Arberia* 4 spp., *Lidgetonnia* sp., *Noeggerathiopsis* sp. and *Podocarpidites* sp.

The Archaeological Record

The archaeological record begins with the Stone Age. Artefacts associated with the Middle Stone Age (MSA) and Late Stone Age (LSA) have been identified in the vicinity of the study area (Fourie, Steyn, Birkholtz, & Salomon, 2000). Briefly, this period is associated with the manipulation of stone to create tools, from both cores and flakes, which through time became more specialised and varied. The Stone Age dates from as early as 2.5 million years ago through to less than 150 years ago (Goodwin & Van Riet Lowe, 1929; Deacon & Deacon, 1999; Lombard, et al., 2012). During the MSA, commonly produced tools included long parallel-sided and triangular flakes. Delius and Cope (2007) notes that the MSA has not been extensively studied in the region. The LSA is marked by a series of technological changes from approximately 20 000 years ago. These include the bow and link-shaft arrow, bored stones and small stone tools for cutting meat and scraping hides (Delius & Cope, 2007). Early Iron Age sites are underrepresented in the Mpumalanga Province.

These groups moved into the eastern lowlands by the 5th century AD. Found in similar areas, most are located within close proximity to water courses to utilise nutrient rich alluvial soils for agriculture (Esterhuysen & Smith, 2007). Late Iron Age (LIA) stonewalling was also identified along the Olifants River (Fourie, Steyn, Birkholtz, & Salomon, 2000). As discussed in Delius & Cope (2007) and reproduced in De Jong (2009), the LIA in Mpumalanga dates to the 15th century onwards. These are commonly associated with the Sotho, Swazi and Ndebele in this region of Mpumalanga, however the Eastern Highveld has not been extensively researched (Maggs, 1974). Characteristic of settlements of this time period are extensive stone walling. Current understanding of the natural environment of the project area suggest that the identification of archaeological remains associated with the Stone Age and Iron Age periods are exceptions rather than the rule. This is consistent with findings contained in heritage studies previously conducted in the region, where Stone Age and Iron Age finds only constitute 4.42% of the identified heritage resources.

A Heritage Impact Assessment will be conducted and included in the EIA.

SURFACE WATER

The Weltevreden Coal Mine is located at the headwaters of the B20G quaternary catchment which is in the Wilge River catchment of the Olifants Water Management Area (WMA).

The project is located in the Upper Olifants River catchment and there are a large number of defunct mines scattered over the Wilge, Middelburg Dam and Witbank Dam catchments. The DWS report (DWAF, 2009) has reiterated on the deteriorating water quality, where Total Dissolved Solids (TDS) and sulfate concentrations in the Witbank, Middelburg and Loskop Dams have been increasing since 1970. Owing to the impacts, it is imperative that the DWS developed water management strategies. Hence the development of the Integrated Water Resource Management Plan for the Upper and Middle Olifants Catchment in 2009 (DWAF, 2009) which was responsible for setting up the Resource Water Quality Objectives (RWQO) used in this assessment. The project area lies in the greater Wilge River Catchment, which is upstream of the Loskop Dam Catchment. The confluences of the Klein Olifants, Spookspruit, Klipspruit and Wilge Rivers with the Olifants River are between Witbank and Loskop Dams.

Water Use

According to the Department of Water and Sanitation (DWS) water use database (WARMS), the main use of water in the catchment area is for agricultural irrigation and mining. Other uses identified in the area include:

- Domestic use, mainly limited to informal communities that use water for bathing and laundry, but the potential exist that the water could be used for drinking;
- Livestock watering for cattle and game.; and
- Irrigation of land. There are 36 registered users of which 98% is for irrigation use and the remaining 2% is used for mining purposes.

Water Quality

Baseline Water Quality data taken in 2015 for the Anglo Coal Umlalazi South Block Extension EIA (Shangoni, 2015) is shown in Table 5. The Umlalazi extension is located directly upstream of the proposed Weltevreden Coal Mine and also borders the Weltevreden Mining Right Application Area.

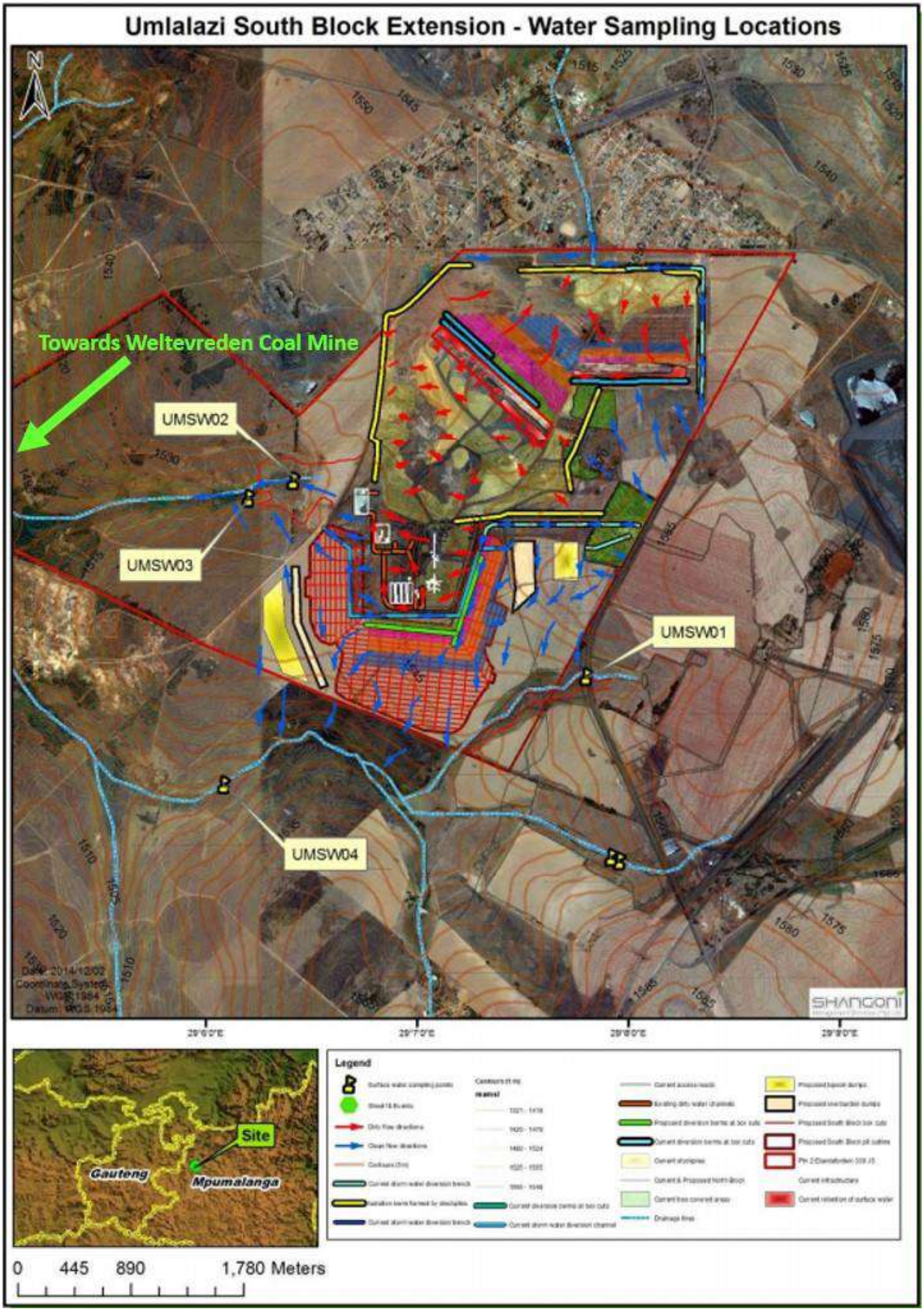


Figure 8: Umlalazi Surface Water Monitoring Points (Umlalazi South Block Extension EIA, Shangoni, 2015)

Table 5: Baseline surface water quality results (extracted from Shangoni, 2015)

Site Name	SANS 241: 2011	Livestock Watering (DWAF, 1996)	UMSW01	UMSW04	UMSW02	UMSW03
pH	≥5 to ≤9.7	-	7.45	6.84	6.96	**4.06**
EC (mS/m)	≤170	-	56.9	29.1	113	108
TDS (mg/l)	≤1200	≤2000	401	195	915	871
Ca (mg/l)		≤1000	67.4	24.8	149	125
Mg (mg/l)		≤500	32.9	14.2	75.1	67.4
Na (mg/l)	≤200	≤2000	10.6	12.8	21.9	17
K (mg/l)		-	5.99	4.78	8.34	6.18
MALK (mg/l)		-	67.8	23.3	22.5	5.22
Cl (mg/l)	≤300	≤3000	10.7	8.4	8.44	7.81
SO_4 (mg/l)	≤500 ≤250*	≤1500	**231**	114	**618**	**640**
NO_3-N (mg/l)	≤11	≤22	0.278	0.319	4.47	1.04
PO_4 (mg/l)	-	-	0.021	0.012	0.012	0.011
N_Ammonia (mg/l)	≤1.5*	-	0.054	0.028	0.078	0.073
F (mg/l)	≤1.5	-	0.251	0.263	0.254	<0.055
Al (mg/l)	≤0.3#	≤5	0.138	**1.49**	<0.003	**14.3**
Fe (mg/l)	≤2 ≤0.3*	-	0.039	0.885	<0.003	<0.003
Mn (mg/l)	≤0.5 ≤0.1*	≤10	<0.001	<0.001	**2.57**	**9.82**
Cr (mg/l)	≤0.05	≤2	<0.001	<0.001	<0.001	<0.001
Cu (mg/l)	≤2.0	≤2	<0.001	<0.001	<0.001	<0.001
Ni (mg/l)	≤0.07	≤1	<0.001	<0.001	<0.001	0.024
Zn (mg/l)	≤5	≤20	<0.002	<0.002	<0.002	<0.002
Co (mg/l)	≤0.5	≤1	<0.001	<0.001	<0.001	0.122
Cd (mg/l)	≤0.003	≤0.01	<0.001	<0.001	<0.001	<0.001
Pb (mg/l)	≤0.010	≤0.1	<0.004	<0.004	<0.004	<0.004
Tot Hardness (mg/l)		-	304	120	682	589
SAR	-	-	0.3	0.5	0.4	0.3
DWA Classification			*Good, class 1*	*Marginal, class 2*	*Marginal Class 2*	*Poor, class 3*

A detailed surface water Impact Assessment will be conducted and included in the EIA.

GROUNDWATER

Aquifer types

Hodgson and Krantz (1998) identified three distinct groundwater systems for the Olifants Catchment, namely:

- Upper weathered aquifer;
- Fractured aquifer; and
- Pre-Karoo fractured aquifer.

The weathering profile of the Ecca Group sediments on average varies between 5 m to 12 m in thickness. The upper weathered aquifer occurs within this zone, usually as a perched aquifer overlying impermeable shale or clay layers. This aquifer is generally low yielding, but of good quality as a result of dynamic groundwater flow washing away leachable salts (Hodgson and Krantz, 1998). The fractured aquifer occurs beneath the weathered aquifer, within fresh sediments. These sediments are typically well cemented, limiting significant permeation of water through, with the presence of secondary structures (fractures) providing the only pathway for groundwater movement. However, not all secondary structures are water bearing. The yields for this aquifer system are typically low with the coal seams frequently having the highest hydraulic conductivities. The water quality associated with this aquifer system contains higher salt loads as a result of longer residence times in the aquifer. The Dwyka tillite which underlay the Ecca Group sediments form a hydraulic barrier limiting the impact of mining activities (in the Ecca Group sediments) to the underlying aquifer systems (Hodgson and Krantz, 1998). Pre-Karoo aquifers have only been intersected on a few occasions, as a result of great depths required to reach the aquifer. Boreholes which have intersected this aquifer are generally low yielding with inferior water quality and low recharge capabilities due to the overlying impermeable Dwyka tillite (Hodgson and Krantz, 1998). Where dolomites of the Transvaal Supergroup underlay the Karoo Supergroup, boreholes may obtain high yields with good water quality.

Aquifer Classification

The aquifers of South Africa are defined according to their water supply potential, water quality and local importance for strategic purposes within an aquifer classification scheme and map. The aquifer classification map (Parsons, 1993) identifies the Karoo aquifers as minor systems with relatively good water quality (TDS <300mg/L), moderate vulnerability and medium susceptibility to contamination, where:

- Vulnerability is defined as the tendency or likelihood for contamination to reach a specified position in the aquifer; and
- Susceptibility is defined as a qualitative measure of the relative ease with which contamination can reach a groundwater aquifer.

Groundwater quality

Baseline Water Quality data taken in 2014 for the Anglo Coal Umlalazi South Block Extension EIA (Shangoni, 2015, AquiScience, 2014) is shown in Table 6. The Umlalazi extension is located directly upstream of the proposed Weltevreden Coal Mine and also borders the Weltevreden Mining Right Application Area.

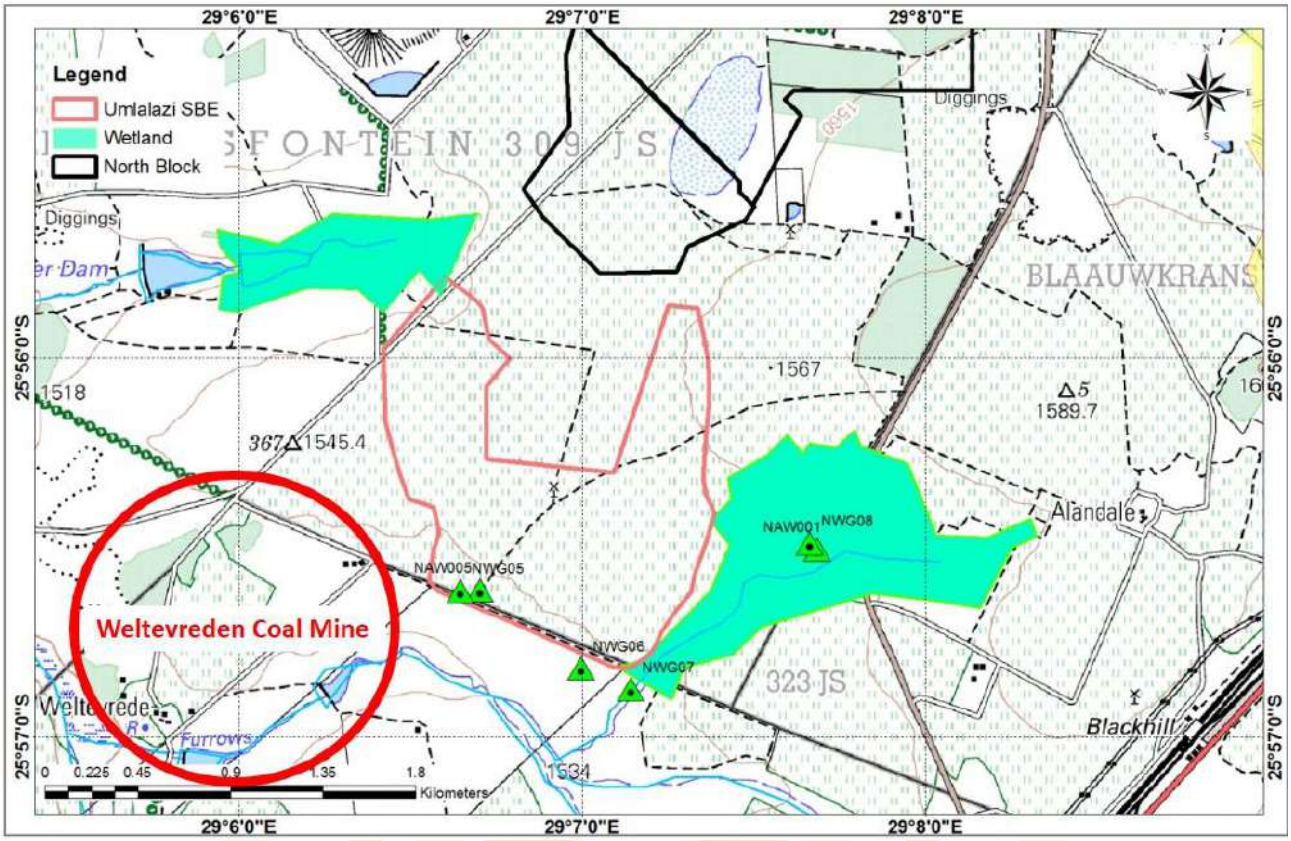


Figure 9: Position of the boreholes included in the baseline hydrocensus (extracted from AquiScience, 2014)

Table 6: Baseline hydrocensus boreholes - hydrochemical analysis results (extracted from AquiScience, 2014)

Site Name	SANS 241: 2011	NAW001	NAW005	NWG05	NWG06	NWG07	NWG08
pH	≥5 to ≤9.7	8.0	6.6	8.0	6.3	6.4	7.2
EC (mS/m)	≤170	39.1	8.9	17.8	10.4	15.5	13.4
TDS (mg/l)	≤1200	237.0	51.0	101.0	59.0	78.0	86.0
Ca (mg/l)	-	28.5	6.7	15.9	7.3	9.9	5.0
Mg (mg/l)	-	12.2	2.9	8.4	3.2	3.8	3.4
Na (mg/l)	≤200	46.7	2.8	4.2	4.7	13.9	22.3
K (mg/l)	-	3.1	2.0	2.7	3.1	1.2	1.2
MALK (mg/l)	-	211.0	8.6	85.9	18.4	42.5	70.1
Cl (mg/l)	≤300	7.2	6.7	9.7	6.3	13.4	5.4
SO_4 (mg/l)	≤500 ≤250*	7.6	1.0	1.9	3.3	8.4	4.0
NO_3-N (mg/l)	≤11	0.4	5.2	0.3	4.5	0.3	0.3
PO_4 (mg/l)	-	0.014	<0.008	<0.008	<0.008	<0.008	<0.008
N_Ammonia (mg/l)	≤1.5*	0.665	0.033	**2.82**	0.027	0.126	0.037
F (mg/l)	≤1.5	0.3	0.1	0.7	0.1	0.3	0.2
Al (mg/l)	≤0.3#	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fe (mg/l)	≤2	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Site Name	SANS 241: 2011	NAW001	NAW005	NWG05	NWG06	NWG07	NWG08
	≤0.3*						
Mn (mg/l)	≤0.5 ≤0.1*	<0.001	0.171	<0.001	0.076	0.634	0.009
Cr (mg/l)	≤0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu (mg/l)	≤2.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni (mg/l)	≤0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tot Hardness (mg/l)	-	122	29	74	32	40	26
SAR	-	1.18	0.2	0.2	0.4	1	1.9
DWS Classification		*Ideal* Class 0		Marginal, class 2	*Ideal* Class 0	Marginal, class 2	*Ideal* Class 0

A detailed Groundwater Impact Assessment will be undertaken for the EIA

Blasting and Vibration

A detailed Blasting and Vibration Impact Assessment will be undertaken for the EIA once more detail about the blasting methods have become available.

Air Quality

The following baseline information was sourced from the ***Baseline Assessment, Problem Analysis and the Air Quality Management Plan for the Highveld Priority Area (2011).***

The Highveld area in South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occur due to the concentration of industrial and nonindustrial sources (Held et al, 1996; DEAT, 2006). The Minister of Environmental Affairs and Tourism, Martinus van Schalkwyk, therefore, declared the Highveld Priority Area (HPA) on 23 November 2007. The priority area covers 31 106 km2 , including parts of Gauteng and Mpumalanga Provinces, with a single metropolitan municipality, three district municipalities, and nine local municipalities (Figure 10)

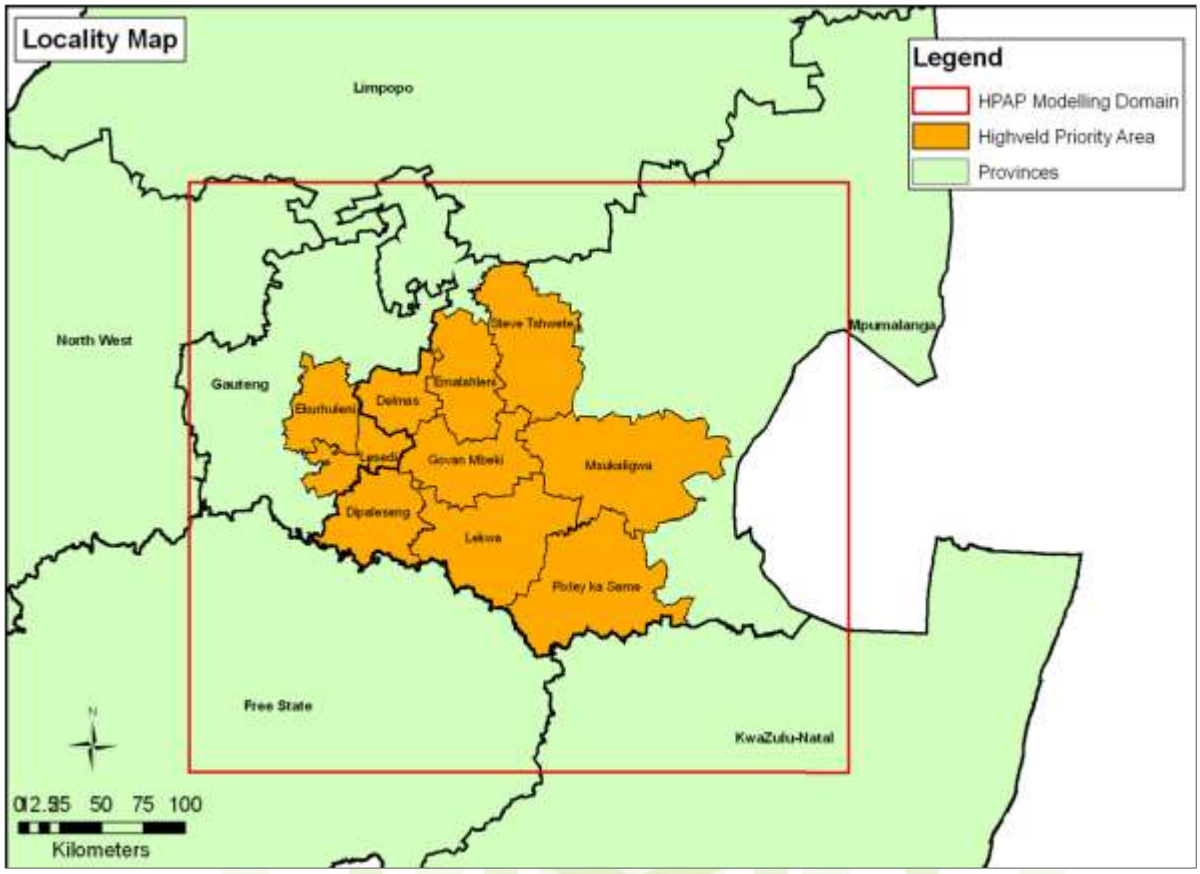


Figure 10: Highveld Priority Areas (HPA)

The total estimated annual emissions of fine particulate matter (PM_{10}) on the HPA is 279 630 tons, of which approximately half is attributed to particulate entrainment on opencast mine haul roads. The emission of PM_{10} from the primary metallurgical industry accounts for 17% of the total emission, with 12% of the total from power generation. By contrast, power generation contributes 73% of the total estimated oxides of nitrogen (NO_x) emission of 978 781 tons per annum and 82% of the total estimated sulphur dioxide (SO_2) emission of 1 633 655 tons per annum. The emission inventory for industrial sources was relatively complete and included all industries on the HPA with scheduled processes in terms of the APPA. Industrial sources in total are by far the largest contributor of emissions in the HPA, accounting for 89% of PM_{10}, 90% of NO_x and 99% of SO_2. Major industrial source contributors were grouped into the following categories:

- Power Generation
- Coal Mining
- Primary Metallurgical Operations
- Secondary Metallurgical Operations
- Brick Manufacturers
- Petrochemical Industry
- Ekurhuleni Industrial Sources
- Mpumalanga Industrial Sources

Table 7: Total emission of PM_{10}, NO_x and SO_2 from the different source types on the HPA (in tons per annum), and the percentage contribution for each source category

Source Category	PM_{10} t/a	%	NO_x t/a	%	SO_2 t/a	%
Ekurhuleni MM Industrial (incl Kelvin)	8909	3,00	15 636	2	25 772	2
Mpumalanga Industrial	684	0,00	590	0	5 941	0
Clay Brick Manufacturing	9708	3,00	-		9 963	1
Power Generation	34373	12,00	716 719	73	1 337 521	82
Primary Metallurgical	46805	17,00	4 416	0	39 582	2
Secondary Metallurgical	3060	1,00	229	0	3 223	0
Petrochemical	8246	3,00	148 434	15	190 172	12
Mine Haul Roads	135766	49,00	-		-	-
Motor vehicles	5402	2,00	83 607	9	10 059	1
Household Fuel Burning	17239	6,00	5 600	1	11 422	1
Biomass Burning	9438	3,00	3 550	0	-	-
TOTAL HPA	**279630**	**99***	**978781**	**100**	**1633655**	**101***

* *Total Percentage does not count to 100% due to rounding of figures.*

Ambient air quality

Most of the HPA experiences relatively good air quality, but ambient air quality standards for SO_2, PM_{10} and ozone (O_3) concentrations are exceeded in nine extensive areas. These "hot spots" are illustrated in Figure 10 by the number of modelled exceedances of the 24-hour SO_2 and PM_{10} standards, and are confirmed by ambient monitoring data (Table 8). The air quality hot spots result mostly from a combination of emissions from the different industrial sectors and residential fuel burning, with motor vehicle emissions, **mining** and crossboundary transport of pollutants into the HPA adding to the base loading.

Available monitoring confirms that the areas of concern are in the vicinity of **Witbank 2**, Middelburg, Secunda, Ermelo, Standerton, Balfour, and Komati where exceedances of ambient SO_2 and PM_{10} air quality standards occur (Table 8).

Table 8: Exceedances at HPA sites based on historic and new monitoring data

Municipality	Area	NO_2 *1-hr (88)*	O_3 *8-hr (11)*	PM_{10} *24-hr (4)*	SO_2 *24-hr (4); 1-hr (88)*
Emalahleni LM	Kendal 2	1	**58**		**34; 343**
	Phola	0		3	7; 27
	Witbank	37	9	**9**	**4**; 51
	Witbank 2		**17**	**25**	1; 11
Steve Tshwete LM	Columbus				
	Komati 2			**26**	1; 14

	Hendrina	1	**22**	3	1; 2
	Middelburg	71	**60**	**7**	1; 4
	Middelburg 2		1	**7**	0; 1
Govan Mbeki LM	Sasol Club	1		0	0; 25
	Langverwacht	1		0	2; 78
	Bosjesspruit				2; 27
	Elandsfontein	0	**73**	3	4; 33
	Leandra				6; 114
	eMbalenhle	2	4	**39**	0; 1
Msukaligwa LM	Camden	0	**24**	1	0; 4
	Ermelo	1	**73**	**22**	**21**; 10
Pixley Ka Seme LM	Amersfoort				
	Majuba 1				4; 87
	Majuba 2				
	Verkykkop	0	**46**	0	1; 7
Lekwa	Standerton	4	10	**29**	1; 6
Dipaleseng	Balfour		**29**	**8**	0; 4

NB. - Row 1: The averaging period for the relevant pollutant's standard is represented below the pollutant and following the allowed frequency of exceedance in brackets - Exceedances in bold are greater than the permitted frequency in the standard for the monitoring period. The permitted frequency of exceedance varies according to period for which data is presented at each monitoring site, and for Eskom and Sasol stations must be assessed against a cumulative permitted frequency of exceedance for 3 years of data

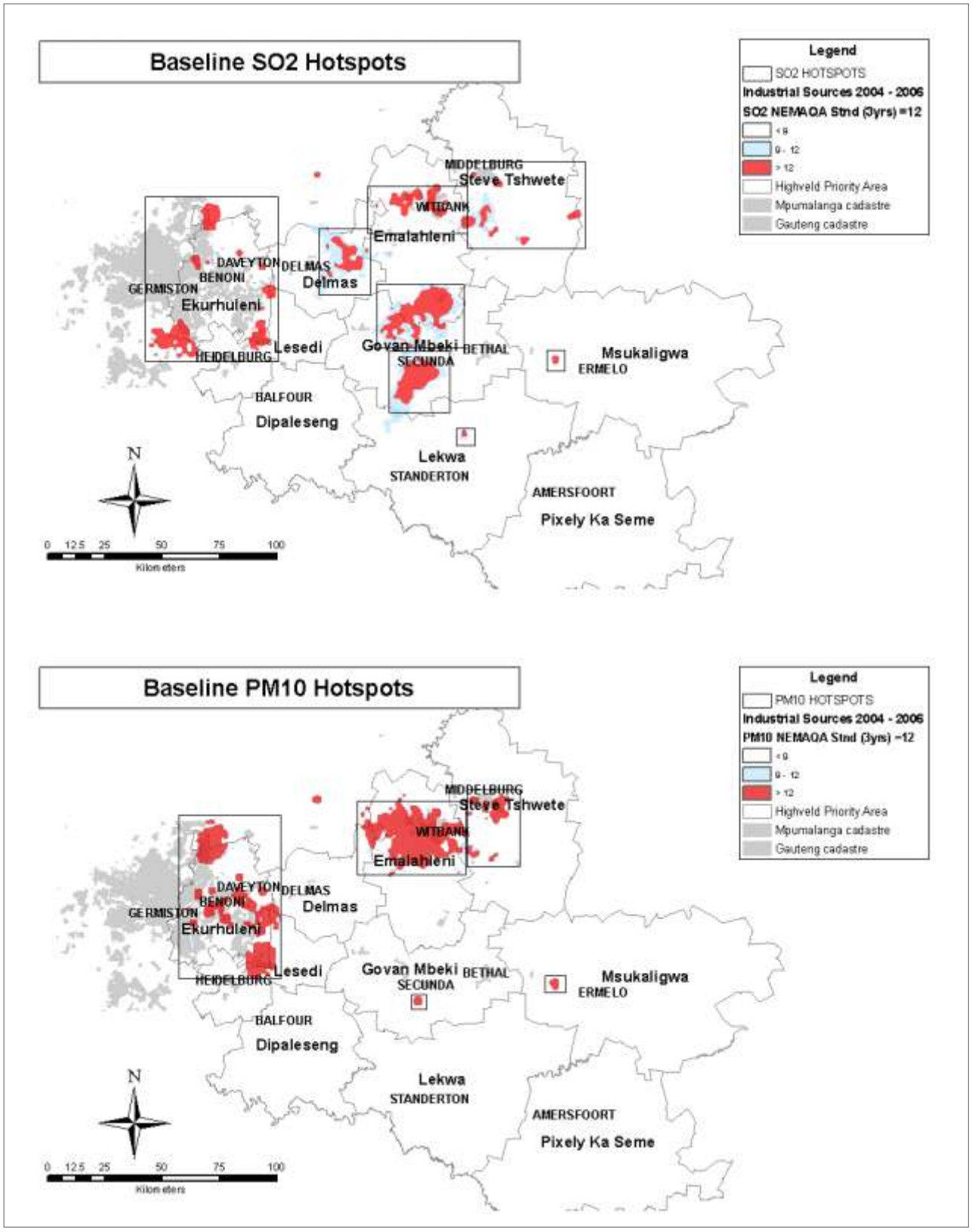


Figure 11: Modelled frequency of exceedance of 24-hour ambient SO_2 and PM_{10} standards in the HPA, indicating the modelled air quality Hot Spot areas

Detailed Air Quality Impact assessment will be undertaken for inclusion in the EIA report

NOISE

Table 9 depicts acceptable noise levels within districts according to the SANS 10103 guideline.

Table 9: Acceptable rating levels for noise in districts (SANS 10103, 2008)

Type of District	Equivalent continuous rating level ($L_{Reg.T}$) for noise (dBA)					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
	$L_{R,dna}$	$L_{Req,db}$	$L_{Req,nb}$	$L_{R,dna}$	$L_{Req,db}$	$L_{Req,nb}$
RESIDENTIAL DISTRICTS						
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
NON-RESIDENTIAL DISTRICTS						
d) Urban districts with some workshops, with business premises, and with main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50
NOTE 1 If the measurement or calculation time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table might result.						
NOTE 2 If the spectrum of the sound contains significant low frequency components, or when an unbalanced spectrum towards the low frequencies is suspected, special precautions should be taken and specialist advice should be obtained. In this case the indoor sound levels might significantly differ from the values given in columns 5 to 7						
NOTE 3 In districts where outdoor $L_{R,dn}$ exceeds 55 dBA, residential buildings (e.g. dormitories, hotel accommodation and residences) should preferably be treated acoustically to obtain indoor $L_{Req,T}$ values in line with those given in table 1.						
NOTE 4 For industrial districts, the $L_{R,dn}$ concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n =70 dBA can be considered as typical and normal.						
NOTE 5 The values given in columns 2 and 5 in this table are equivalent continuous rating levels and include corrections for tonal character, impulsiveness of the noise and the time of day.						
NOTE 6 The noise from individual noise sources produced, or caused to be produced, by humans within natural quiet spaces such as national parks, wilderness areas and bird sanctuaries, should not exceed a maximum Weighted sound pressure level of 50 dBA at a distance of 15 m from each individual source.						
a The values given in columns 2 and 5 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness of the noise and the time of day.						
b The values given in columns 3, 4, 6 and 7 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness.						

The probable community/group response to levels in excess of the acceptable rating levels are presented in Table 10, where LReq,T is the equivalent continuous A-weighted sound pressure level, in decibels (dBA), determined over a specific time period. 'A-weighted' is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

Table 10: Categories of community/group response (SANS 10103, 2008)

Excess ($\Delta L_{Req,T}$)[a]dBA	Estimated community/group response	
	Category	Description
0 – 10	Little	Sporadic complaints
5 – 15	Medium	Widespread complaints
10 - 20	Strong	Threats of action
>15	Very strong	Vigorous action
NOTE Overlapping ranges for the excess values are given because a spread in the community reaction might be anticipated.		
a $\Delta L_{Req,T}$ should be calculated from the appropriate of the following:		
1) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS LReq,T of the residual noise (determined in the absence of the specific noise under investigation);		
2) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the maximum rating level for the ambient noise given in table 1;		
3) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the typical rating level for the applicable district as determined from table 2; or		
4) $\Delta L_{Req,T}$ = Expected increase in $L_{Req,T}$ of ambient noise in an area because of a proposed development under investigation.		

A baseline assessment will be undertaken to determine the current ambient noise level at the nearest noise sensitive receptor to the proposed project.

SOILS

The land type occupying the project area is Bb 13 land type of the 2528 and 2628 Pretoria and East Rand Land Type maps (Land Type Survey Staff, 1989). The presence of a plinthic catena dominates this land type. A very large area of Mpumalanga Province is occupied by plinthic catena that in its perfect sequence is represented by (in order from highest to lowest in the upland landscape crest, midslope and foot slope positions). Red well drained soils for example Hutton soil types, yellow Clovelly soils in the midslope landscape position and less well drained soil in foot slope and valley bottom positions such as the Fernwood and Longlands soil forms. In addition, shallow Glencoe and Dresden soils, underlain by hard plinthite, occur in some places within the landscape.

The underlying geology of land type Bb 13 consists of sandstone, grit, shaly sandstone and shale of the Ecca Group, Karoo Sequence. The area occupied by the Bb 13 land type is 40 316 ha. The Bb 13 land type is, is dominated by 40 % crest and 45 % midslope positions, the remainder (15 %) is occupied by valley bottom landscape positions.

The Bb13 Land type is dominated by deep well drained yellow-brown apedal soils, with about 70% of the land type having these soils; they have an average slope of around 3 %. The following list of soil types occurs within the crest (40%) in this land type:

- Clovelly (Cv) – 45%
- Avalon (Av) – 15%
- Other shallow soil types such as the Glencoe (Gc) soil – 40%

The following list of soil types occurs within the midslope (45%) in this land type:

- Clovelly (Cv) – 35%
- Avalon (Av) – 35%

- Other shallow soil types such as the Glencoe (Gc) soil – 30%

A detailed soils, land use, and land capability assessment will be undertaken for inclusion in the EIA

SOCIAL ECONOMIC

The proposed Project is located in eMalahleni Local Municipality (ELM), within the Nkangala District Municipality (NDM) in Mpumalanga Province. The socio-economic characteristics of the population within each of the aforementioned areas are listed below.

Population and Demographics

According to the ELM 2013-2014 IDP, this municipality is the largest economic contributor to the NDM of the six local municipalities, contributing 45% to the districts economy. Dominant economic contributors include utilities (74.1%), mining (52.8%) and construction (52.5%). Emalahleni's population size, as recorded by Stats SA 2011, was 395 466 people which makes up 30% Nkangala District's population. The population lives in 119 874 households with an average household size of 3.3 people. This is a relatively low family size, which may reflect the young age of the urban centres in the district, in which large family structures have not had time to develop. More established towns generally have average family sizes in excess of 4.5 people, while rural areas often average 5.5 people or more per household. The ELM's population grew by 43.1% between 2001 and 2011 while annualised population growth rate was measured at 3.6%.

Educational Status

Educational achievement is a key development indicator of a population. The majority of the population (ages over twenty) in the local study area as well as district municipality have not completed matric, however, there is a large percentage of learners who complete primary level education.

Employment and Labour

According to Statistics South Africa, (2011) the employment rate for Mpumalanga Province and Nkangala District Municipality was 24% and 27% respectively (Stats SA, 2011). There has been a drop in unemployment rate in the ELM from 38.4% to 27% between 2001 and 2011. A large portion of those employed are absorbed into the mining, construction, power generation and agricultural sectors.

Annual Household Income

Over 40% of people in Mpumalanga Province have no annual income at all. Average income figures for the local study area, the ELM and the NDM are all very much in line with the provincial average; however, the income earning figures are slightly higher for the local study area, with more people earning between R3 201 and R12 800 (Stats SA, 2011). It can be gathered that the ELM has a higher income production than the provincial figures. This is attributed to the concentration of mining and power generation activities, and construction industry in this area (Stats SA, 2011).

Social Infrastructure and Services

All the urban areas within ELM (with the exception of informal settlements and townships) are fully reticulated in terms of potable water supply. A large percentage of households in the local study area have access to piped water either inside their house or within a communal yard, with an average of 77% having access to municipal water, whilst 8% have access to water through a borehole. In terms of sanitation, data from the 2011 census, show that an estimated 57% of households in the local study area have access to waterborne sewer services (flush toilets, with or without septic tanks); the majority (33%) of the remaining households use pit latrines (Stats SA, 2011). An estimated 69% of waste generated within the ELM is collected weekly by the local municipality. In contrast to the ELM, the most common means of waste disposal for populations in Ward 30 is through utilisation of their own refuse dumps (39%), 36% make use of municipal services and a significant amount of the population has no means of waste disposal at all. Of the households in local study area, 53% use electricity for cooking, heating and lighting. In contrast 69% of the households in the ELM use electricity. The bulk electricity provider throughout the municipality is Eskom (ELM IDP, 2012 - 2013). The ELM is strategically located in terms of the provincial context and transport network. It is situated in close proximity to the City of Johannesburg, City of Tshwane and Ekurhuleni Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. Although roads in the ELM are

sufficiently connected with district, provincial and national roads, many secondary road systems are in a state of disrepair, being insufficient to handle the increased traffic created by mining and other industrial developments. Crime and community safety is generally a cause of concern for communities in the local study area. There has been a history of substance abuse and widespread criminal activity in the area, with several instances of community conflict, industrial action and opposition towards the local municipality and surrounding mining companies.

Health Services

It was found in an interview with the head nurses at the Phola Community Health Centre and the Ogies Clinic that prostitution has become an increased problem within the region as a result of the mining operations; this then in turn leads to an increase in HIV/AIDS rates. The mining operations also have resulted in an influx of inhabitants into the area which has put tremendous strain on health facilities.

2.h.iv.1.b Description of the current land uses.

The current land use for the project area is agriculture (planted pastures and/or grazing with Mining activities the project area.

2.h.iv.1.c Description of specific environmental features and infrastructure on the site.

The site is traversed by a watercourse on its southern and western boundary, with built structures and farm steads located on site.

2.h.iv.1.d Environmental and current land use map.

(Show all environmental, and current land use features)

Refer to Annexure 3

2.h.v Impacts identified

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability and duration of the impacts

The anticipated impacts associated with the project is as follows:

Table 11: List of Preliminary Issues

PRELIMINARY IMPACTTO BE ASSESSED	CONSTRUCTION PHASE	OPERATIONAL PHASE	DECOMMISSIONING PHASE	POSTIVE/ NEGATIVE
POTENTIAL TO ALTER THE TOPOGRAPHY	✓	✓	✓	-
LOSS OF SOIL CHARACTERISTICS - EROSION AND COMPACTION	✓	✓	✓	-
CHANGE IN LAND USE FROM FARMING TO MINING	✓	✓	✓	-
LOSS OF BIODIVERSITY – VEGETATION CLEARANCE, HABITAT DESTRUCTION AND FAUNAL DISPLACEMENT	✓	✓	✓	-
POTENTIAL FOR ALIEN INVASIVE ESTABLISHMENT	✓	✓	✓	-

REDUCED FLOW TO DOWNSTREAM WATER CATCHMENT	✓	✓	✓	-
POTENTIAL POLLUTION TO WATER RESOURCES (SURFACE AND GROUNDWATER)	✓	✓	✓	-
DRAWDOWN CONE FROM DEWATERING ACTIVITIES (GROUNDWATER QUANTITY)	✓	✓	✓	-
INCREASED DUST AND EMISSIONS	✓	✓	✓	-
INCREASED NOISE LEVELS	✓	✓	✓	-
VISUAL AESTHETICS AND SENSE OF PLACE WILL BE ALTERED	✓	✓	✓	-
DAMAGE TO PROPERTY/INFRASTRUCTURE FROM BLAST EVENTS	✓	✓	✓	-
POTENTIAL DAMAGE TO HERITAGE SITES (GRAVE AND/OR ARCHAEOLOGICAL ARTEFACTS)	✓	✓	✓	-
INFLUX OF JOB SEEKERS TO THE AREA	✓	✓	✓	-
INCREASED TRAFFIC – COAL HAULAGE	✓	✓	✓	-
EMPLOYMENT OPPORTUNITIES	✓	✓	✓	+
ECONOMIC STIMULATION	✓	✓	✓	+

2.h.vi Methodology used in determining the significance of environmental impacts

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The assessment and evaluation of environmental impacts is often complicated by the subjective nature of these impacts. Ideally, the degree of severity or significance of a particular impact should be expressed in quantitative terms, against a quantitative assessment of the conditions that pertained before a particular activity started. There must also be some expression as to whether a particular impact is desirable or not, as the desirability of an impact will depend largely on the attitude and experience of the assessment team, subjectivity is unavoidable.

In order to address these issues and to provide a basis for comparison of the different impacts associated with the activities, a number of standard definitions and approaches will be used.

CATEGORY	DESCRIPTION OR DEFINITION
Statement	A brief written statement, stating which environmental aspect is impacted by a particular project activity or sequence of project activities.
Type of Impact	This defines what type of impact takes place. No value is allocated for a type of impact. Cumulative impacts will be dealt with in a separate table.
Direct	Direct result (impact) of an action (aspect).
Indirect	Impacts that are not a direct result (impact) of the strategic action (aspect) but occur away from the original source of impact or as a result of a complex pathway. Indirect impacts are often called secondary, tertiary etc. impacts, depending on how many steps there are between the original source and its impact

Cumulative	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

CATEGORY	VALUE	DESCRIPTION OR DEFINITION
Extent		Extent to which the impact will occur
Site	1	Only as far as the activity
Local	2	Site and immediate surroundings
Regional	3	Impact on a regional scale
National / International	4	National or International
Duration		The term or time period during which the impact is expressed, not the time until the impact is expressed. Where necessary, the latter is separately specified.
Temporary	1	This is very short term, usually a construction impact
Short term	2	During the operational activities
Long term	3	During closure / decommissioning of the operation
Permanent	4	Post-closure phase
Severity		The magnitude of the potential impact
Very Low	1	Natural, cultural and social functions are not affected
Low	2	Affected environment is altered but natural, cultural, and social functions and process continue both in a modified way
Moderate	3	Natural, cultural and social functions and processes are altered to the extent that it would temporarily cease
High	4	Natural, cultural and social functions and process are altered to the extent that it would permanently cease
Probability		The likelihood of the impact occurring
Improbable	1	Low possibility because of design or historic experience
Probable	2	Distinct probability to occur
Highly probable	3	Most likely to occur
Definitely	4	Will occur regardless of any prevention measures and/or there is a history of (an) incident/s and/or complaints
Significance		This is integration (i.e.an opinion) of the severity, type, extent, probability and duration of the impact. It is the best judgment of whether the impact is important or not within the broad context, once mitigation is taken into account. By adding the value of the extent, duration, severity and probability, a significance value will be obtained for each impact. A significance rating is assigned twice to the impact. Firstly, to indicate significance without mitigation or optimization and secondly, to indicate significance after mitigation or optimization. This is done to highlight the importance of mitigation or optimization of potential impacts.

No impact		A potential concern or impact, which, upon evaluation, is found to have no impact.
Very Low	1 - 4	Impacts will be of very low significance if the added values are between 1 and 4.
Low	5 - 8	Impacts will be of low significance if the added values are between 5 and 8.
Moderate	9 - 12	Impacts will be of moderate significance if the added values are between 9 and 12.
High	13 - 16	Impacts will be of high significance if the added values are between 13 and 16.
Very High	17 - 20	Impacts will be of very high significance if the added values are between 17 and 20.

Description of bio-physical assessment parameters with its respective weighting

Table 12: Rating Table

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

2.h.vii 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.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Refer to Table 11

2.h.viii The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

To be updated once the specialist has completed their studies and comment has been received from I&APs during the Draft EIA Phase. The following is proposed in the interim:

- Design the surface and storm water infrastructure to be within the footprint of the project area
- Separate clean from dirty water and allow discharge of water to designated areas.
- Vegetate disturbed areas to limit erosion
- Implement berms, trenches and storm water management measures in accordance with GN 704 Regulations
- Pollution Control Dams to be designed to cater for the required storage capacity

- Compacted soil areas in and around the periphery of the wetland will be ripped to break up compacted soil and vegetated with indigenous seed mix
- Comply with the National Air Quality Standards and Dust Control Regulations
- Comply with the SANS noise standard
- Avoid travelling past residences. Speed limit of 40km/h will be enforced. Liaise with landowner on areas sensitive to noise. Provide a buffer of 100m from households
- Prescribe to the DWS Catchment Water Quality Standards
- Restrict traveling speed of vehicles to reduce vehicle entrainment of dust. Wet gravel roads if dust is found to be excessive.
- No-go areas to be identified. Environmental awareness training of all employees
- Preference to be given to the use of local employment, contractors and local suppliers.
- Implement measures to protect soils from pollution.
- Reduce the visual impacts of mining activities, i.e. rehabilitation
- Site selection aimed at minimising disturbance to sensitive animal habitats and breeding areas.
- Utilise existing access roads as far as possible.
- Access roads to follow slope contours where possible. Vegetation to be left in place at the sides of the road to protect the soils.

2.h.ix The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

To be submitted with the Draft EIA Report once the specialist has given their input.

2.h.x Motivation where no alternative sites were considered.

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative sites were considered.

2.h.xi Statement motivating the preferred site.

(Provide a statement motivation the final site layout that is proposed)

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout.

Once specialist studies have been undertaken the most suitable layout will be finalised and presented in the EIA.

2.i PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

2.i.i Description of alternatives to be considered including the option of not going ahead with the activity.

Refer to Section 2.h.i

2.i.ii Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).

A team of specialist Scientists and Engineers have been appointed to undertake the following specialist studies. These studies will investigate the baseline environment, potential impacts and provide management measures where applicable.

- Socio-Economic Impact Study
- Air quality
- Traffic
- Aquatic Ecology
- Storm Water Management Plans
- Ecological
- Geo-hydrological
- Surface water
- Wetland
- Heritage, Archaeological, and Paleontology
- Soils, land use and land capability

Specialists' Scope of Work

Table 13: Specialist Scope of Work

Specialist Study	Scope of Work
Air quality	The purpose of this baseline study is to:
	- Study the available information relevant to the pre and post-development ambient air quality pollution concentrations in the environment;
	- Identify the major existing air emission sources in the environment;
	- Identify the existing sensitive air pollution areas in the environment;
	- Estimate by means of measurements and integration of the results with those of any relevant existing information the present ambient air quality climate;
	- Identify the processes and equipment that will cause the major contribution to the future air quality impact;
	- Consider, evaluate and rate the potential air quality impacts; and
	- Propose relevant management and mitigation measures to lessen the anticipated impacts.
	It is highly recommended that baseline dust monitoring be conducted for at least 3 months prior to the start of the project.
Aquatic Ecology	The assessment will be conducted as part of a three phase approach. The first phase consisted of a rapid desktop assessment. The second phase was conducted in field to gather data. The third phase consisted of an impact assessment and reporting by combining field data and desktop data.
	1. Rapid desktop assessment:
	Google Earth satellite imagery
	Aerial photographs
	GIS mapping software
	2. Field assessment by identifying the presence of one (at least) or more of the following attributes:
	Wetland/hydromorphic soils

Specialist Study	Scope of Work
	Hydrophytes
	High water table
	3. Combining desktop data, field data and calculating the Wetland Index of Habitat Integrity (DWA, 2007) by using the following indices:
	Present Ecological status
	Ecological Importance and Sensitivity
	Ecosystem Services supplied by wetland
	The following sections deal with the Wetland Index of Habitat Integrity as performed as part of the third phase of the study approach.
Social Impact Assessment	1) Identification of key stakeholders;
	2) Development of a social profile of the affected community;
	3) Identifying all applicable legislative and regulatory considerations;
	4) Undertaking stakeholder consultation;
	5) Assessment of possible social and economic impacts;
	6) Rating of impacts according to significance (severity, probability, duration, spatial extent and
	7) stakeholder sensitivity;
	8) Making a clear distinction between objective and subjective impacts;
	9) Provision of management guidelines for anticipated impacts; and
Ecological Assessment	The study will include two phases:
	10) Desktop study:
	- Review of existing information e.g. EIA, Specialist studies, Mining right, WULA etc.;
	- Analysis of recent Google maps;
	- Literature review of fauna and flora in the area;
	- Review of endangered species known to occur in the area;
	11) Detailed Terrestrial Ecology Report including a wetland delineation and functional assessment
Geo-hydrological	The scoping groundwater study will include, amongst others, the following information as required in terms of the MPRDA:
	- A description of the groundwater environment likely to be affected by the proposed mining activities;
	- An assessment of potential impacts on the groundwater environment.
	- A summary of the potential significance of identified impacts;
	- Proposed mitigation and management measures to minimise adverse impacts and to optimise benefits;
	- Planned monitoring and performance assessment of the EMP and Rehabilitation measures of areas disturbed during mining activities.
Surface water	The assessment will be conducted as part of a three-phase approach. The first phase consisted of a rapid desktop assessment. The second phase was conducted in field to gather data. The third phase consisted of an impact assessment and reporting by combining field data and desktop data
	1. Rapid desktop assessment:
	Google Earth satellite imagery
	Aerial photographs
	GIS mapping software
	2. Field assessment by identifying the presence of one (at least) or more of the following attributes:
	Wetland/hydromorphic soils
	Hydrophytes
	High water table
	3. Combining desktop data, field data and calculating the Wetland Index of Habitat Integrity (DWA, 2007) by using the following indices:
	Present Ecological status
	Ecological Importance and Sensitivity

Specialist Study	Scope of Work
	Ecosystem Services supplied by wetland
Wetland Impact Assessment	As above
Heritage, Archaeological, and Paleo	Phase 1 Archaeological Impact Assessments generally involve the identification of sites during a field survey with assessment of their significance, the possible impact development might have and relevant recommendations.
	All Archaeological Impact Assessment reports should include:
	a. Location of the sites that are found;
	b. Short descriptions of the characteristics of each site;
	c. Short assessments of how important each site is, indicating which should be conserved and which mitigated;
	d. Assessments of the potential impact of the development on the site(s);
	e. In some cases a shovel test, to establish the extent of a site, or collection of material, to identify the associations of the site, may be necessary (a pre-arranged SAHRA permit is required); and
	f. Recommendations for conservation or mitigation.
	This AIA report is intended to inform the client about the legislative protection of heritage resources and their significance and make appropriate recommendations. It is essential to also provide the heritage authority with sufficient information about the sites to enable the authority to assess with confidence:
	a. Whether or not it has objections to a development;
	b. What the conditions are upon which such development might proceed;
	c. Which sites require permits for mitigation or destruction;
	d. Which sites require mitigation and what this should comprise;
	e. Whether sites must be conserved and what alternatives can be proposed to relocate the development in such a way as to conserve other sites; and
	f. What measures should or could be put in place to protect the sites which should be conserved.
Visual	The scope of work for this Visual Impact Assessment will include:
	- Describe the existing visual characteristics of the proposed sites and its environs;
	- Viewshed and viewing distance;
	- Visual Exposure Analysis;
	- Viewer Sensitivity;
	- The overall objective of the Visual Impact Assessment (VIA) is to assess the significance of the visual impacts that will be caused by the mining activities.
Soils, land use and land capability	The following scope of work is proposed:
	· A study of the diagnostic soil horizons, soil forms and soil series for the area, including an assessment of effective profile depth and the classification of soils according to the South African Soil Classification System (Soil Working Group, 1991).
	· An assessment of the pedohydrological functioning of the area in order to shed light on the water storage capacity of the soils and occurrence of wetland or hydromorphic soils. Characteristics that will be noted include:
	- Fe(II)/Fe(III) layered double hydroxides (green rusts) that is indicative of moderate conditions of reductions and soils that are moist for prolonged periods;
	- The accumulation of ferrihydrate, lepridocrosite, goethite and hematite in vesicular nodules (mottling) owing to the reduction of Fe(III) to Fe(II), under conditions of a fluctuating water table;
	- The occurrence of grey colours, especially where mottling is not present, as a further indication of Fe mobilisation and semi-permanent or permanent conditions of water saturation;
	- The occurrence of bleached soil horizons that indicate lateral drainage of water;
	- The occurrence of uniform red and yellow colouration that is indicative of well drained areas;
	- Signs of Mn mobilisation and/or precipitation as indicating a fluctuating water table;
	- The occurrence of smectite clays that lead to swelling and shrinking characteristics in soil and that is conducive to water flow in the dry state but not in the wet state.
	- Texture of the soil horizons as a means to assess the water holding capacity, saturated water content and saturated hydraulic conductivity,
	- Textural changes, and other aspects, in the soil profile that will influence saturated and unsaturated flow of water.
	- Occurrence of layers, such as the rocks, ferricrete and/or calcrete, which impede water flow.

Specialist Study	Scope of Work
	- Occurrence of concretions, stones or pebbles in the soil horizons and the effect on water holding capacity, saturated water content and saturated hydraulic conductivity.
	· Representative soil samples will be collected and subjected to chemical and physical analyses. The following analyses will be conducted:
	- Water soluble cations and anions;
	- pH and EC (electrical conductivity);
	- Exchangeable/weakly complexed fraction of major cationic plant nutrients – calcium (Ca), sodium (Na), magnesium (Mg), potassium (K)
	- Cation exchange capacity
	- Plant available phosphorus (P), nitrogen content
	- Organic carbon content
	- Soil particle size distribution (texture including clay and silt content)
	- Soil salinity levels will be calculated.

2.i.iii Description of aspects to be assessed by specialists

Refer to previous section 2.i.ii, Table 13

2.i.iv Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

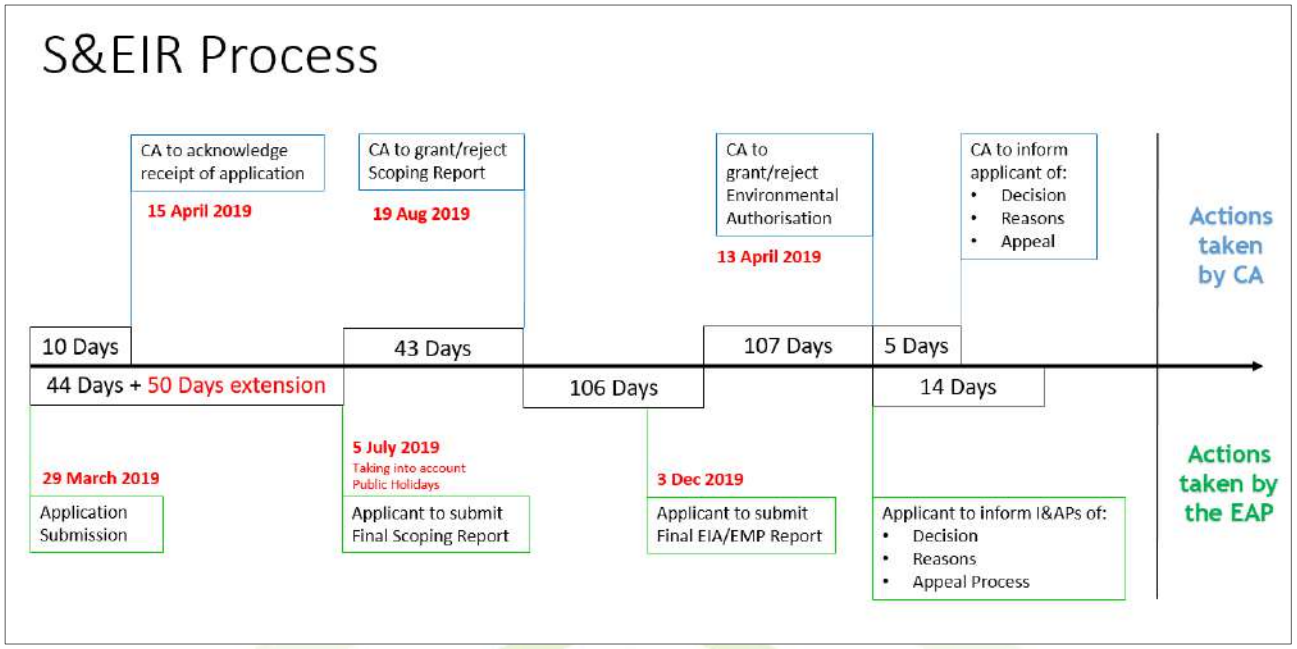
Refer to previous section 2.i.ii, Table 13

2.i.v The proposed method of assessing duration significance

Refer to previous section 2.i.ii, Table 13

2.i.vi The stages at which the competent authority will be consulted

- Application Stage (application form submitted on 29 March 2019)
- Copy of the Draft Scoping Report to be submitted for their records (17 May 2019)
- Submission of the Final Scoping Report for review and comment (5 July 2019, with granting of the extension request)
- Copy of the Draft EIA Report to be submitted for their records (TBC)
- Copy of the Final EIA Report to be submitted for review and decision making (TBC)



2.i.vii Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

2.i.vii.1 Steps to be taken to notify interested and affected parties.

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h) (ii) herein).

Section 41 of NEMA Regulation 982 (specifically Chapter 6) set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process will/has been followed at all times and is based on reciprocal dissemination of information. The following was undertaken during the PPP:

a. Identification of Interested and Affected Parties (IAPs);

b. Notification of IAPs regarding the proposed project via newspaper adverts (in the Witbank News); the placing of site notices at conspicuous places, the sending of notices to affected parties via email and sms (in the form of Background Information Documents) to adjacent landowners.

c. A public information meeting (open day) with IAPs held on 31 May 2019 at the eMalahleni Public Library;

d. Gathering comments, issues and concerns from IAPs;

e. Responding to IAP comments, issues and concerns;

f. Compilation and submission of results of consultation report to the DMR; and

g. Providing IAPs with the opportunity to review and comment on the Draft Scoping and EIA Reports

h. Further personal consultation with affected landowners

2.i.vii.2 Details of the engagement process to be followed.

(Describe the process to be undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings and records of such consultation will be required in the EIA at a later stage).

All persons registered as I&APs and organs of state identified through the scoping phase PPP will be sent invites to attend the Scoping and EIA Phase PPP meeting. The meeting will address specialist findings, focusing on sensitive issues, and provide information on the impact probability and significance. Proposed mitigation measures will also be discussed. The meeting will be recorded and minuted, and the minutes distributed to all attendees and I&APs for comment.

I&APs will be notified of the availability of the Scoping Report and EIA and EMP reports and associated Appendices for public review and comment, the location where the hard copy and electronic copies can be viewed and the timeframe (30 calendar days, which will be extended if significant public holidays occur within this period as per NEMA EIA regulations) for comment. All comments received from the review phase will be incorporated into the issues and response table and incorporated into the Final PPP Report and Final EIA and EMPr for submission to authorities. During the EIA and EMPr phase, if the need is identified to have one-on-one micro consultations, then these will be organised with the relevant I&AP. Upon receipt of an Environmental Authorisation, all registered I&APs will be notified of decision and the appeal process they can follow under NEMA.

2.i.vii.3 Description of the information to be provided to Interested and Affected Parties.

(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land).

I&APs will have access to any of the project information as per the NEMA and PAIA. They will also be given ample opportunity to comment and provide input on the relevant pieces of information during the S&EIR process.

2.i.viii Description of the tasks that will be undertaken during the environmental impact assessment process

- Public Review of the Draft Scoping Report (30 days)
- Public Engagement and gathering of issues and comments
- Finalising of the Scoping Report and submission to the DMR for consideration
- Undertaking of the specialist studies and risk assessment phase
- Drafting of the EIA Report, EMP and IWULA
- Public Review of the Draft EIA Report and EMP (30 days) including the IWULA
- Public Engagement and gathering of issues and comments
- Finalisation of the EIA Report and EMP, submission to the DMR for decision making

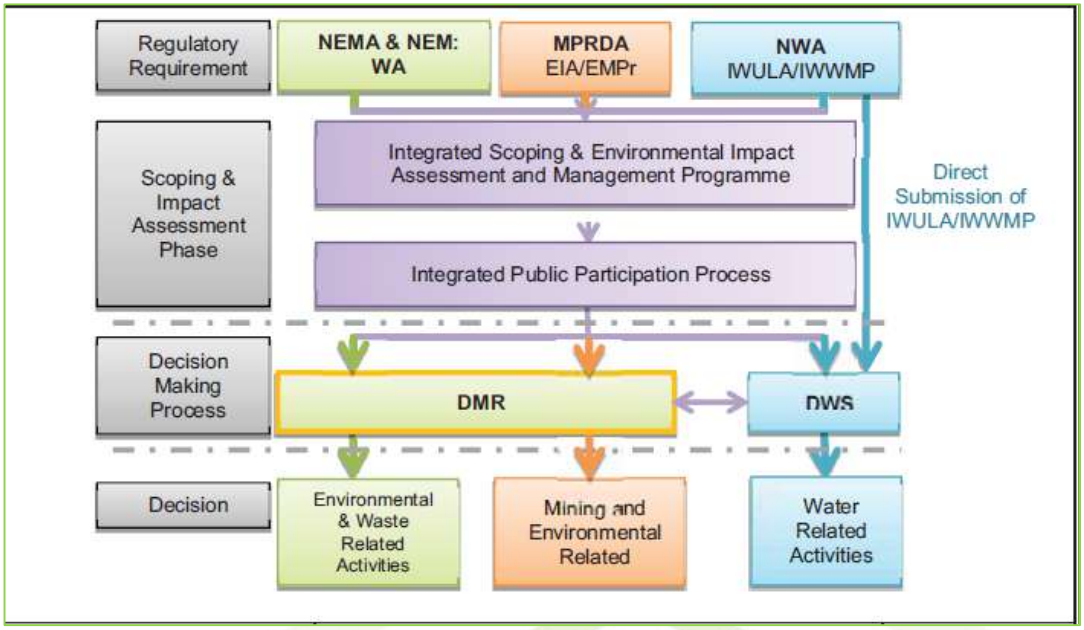


Figure 12: Authorisation Process Overview

2.i.ix Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

- Design the surface and storm water infrastructure to be within the footprint of the project area
- The water from the voids must be pumped out in order to facilitate and ensure safe and effective mining.
- The water from the voids must be contained in the PCDs because it is considered polluted. The water can therefore not be discharged into the nearest river, nor be used as potable or irrigation water. As a result, it can only be used on the dirty water areas of the mine, for dust suppression. The area has windy dry seasons and the mine will require dust suppression on site.
- The stockpiling of potentially acid-generating material (interburden material and ROM coal) is only a temporary measure. This material will be stockpiled on a compacted surface, with adequate surrounding drainage systems that will contain any polluted water arising off these stockpiles. This dirty water will be directed to the PCDs. There is no other option for the handling of this material other than stockpiling temporarily. The interburden material will be placed back into the progressively rehabilitated pits, and the ROM coal will be loaded and transported after it has been crushed.
- Separate clean from dirty water and allow discharge of water to designated areas.
- Vegetate disturbed areas to limit erosion
- Implement berms, trenches and storm water management measures in accordance with GN 704 Regulations
- Pollution Control Dams to be designed to cater for the required storage capacity
- Compacted soil areas in and around the periphery of the wetland will be ripped to break up compacted soil and vegetated with indigenous seed mix
- Comply with the National Air Quality Standards and Dust Control Regulations
- Comply with the SANS noise standard
- Avoid travelling past residences. Speed limit of 40km/h will be enforced. Liaise with landowner on areas sensitive to noise. Provide a buffer of 100m from households
- Prescribe to the DWS Catchment Water Quality Standards

- Restrict traveling speed of vehicles to reduce vehicle entrainment of dust. Wet gravel roads if dust is found to be excessive.
- No-go areas to be identified. Environmental awareness training of all employees
- Preference to be given to the use of local employment, contractors and local suppliers.
- Implement measures to protect soils from pollution.
- Reduce the visual impacts of mining activities, i.e. rehabilitation
- Site selection aimed at minimising disturbance to sensitive animal habitats and breeding areas.
- Utilise existing access roads as far as possible.
- Access roads to follow slope contours where possible. Vegetation to be left in place at the sides of the road to protect the soils.

2.l OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

2.l.i Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-

2.l.i.1 Impact on the socio-economic conditions of any directly affected person. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

Section to be populated once the public participation process of the Draft EIA Phase commences.

2.l.i.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

Section to be populated once the public participation process commences. Information to be uploaded on the SAHRIS website once received.

2.m OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4).

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative sites were considered.

2.j UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I _____herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

_____

Signature of the EAP

_____

DATE

2.k UNDERTAKING REGARDING LEVEL OF AGREEMENT

I _____herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

_____

Signature of the EAP

_____

DATE:

ANNEXURE 1: QUALIFICATIONS OF THE EAP

ANNEXURE 2: EAP CV

ANNEXURE 3: LOCALITY MAPS

ANNEXURE 4: SITE LAYOUT AND INFRASTRUCTURE

24296521

Universiteit van Pretoria

Die Raad en die Senaat verklaar hiermee dat die graad

Magister Artium

in

Omgewing en Samelewing

met al die regte en voorregte daaraan verbonde by geleentheid van 'n kongregasie van die Universiteit toegeken is aan

Vernon Siemelink

kragtens die Wet op Hoër Onderwys, 1997 en die Statuut van die Universiteit

Namens die Raad en die Senaat

C. de la Rey

Visekanselier en Rektor

Namens die Fakulteit Geesteswetenskappe

N Duncan

Dekaan

M. Smit

Registrateur

2014-04-23

2429652

University of Pretoria

The Council and Senate hereby declare that
at a congregation of the University the degree

Baccalaureus Societatis Scientiae Honores
with specialization in
Geography

with all the associated rights and privileges
was conferred on

VERNON SIEMELINK

in terms of the Higher Education Act, 1997 and the Statute of the University

On behalf of the Council and Senate

Vice-Chancellor and Principal

On behalf of the Faculty of
Humanities

Dean

Registrar

2008-04-24

VERNON SIEMELINK

2019

Director

ENVIRONMENTAL & ENGINEERING

ABOUT

Vernon is an ISO 14001 Lead Auditor and environmental professional with over 11 years' experience. His experience ranges from Environmental Auditing, Due Diligences, Technical Legal opinions, Impact Assessments, Stakeholder Engagement and technical specialist in the mining and manufacturing sectors. Vernon provided environmental consulting and auditing services in nearly every industry sector. He is a SGS IRCA Certified EMS Lead Auditor and a SETA accredited assessor. He also completed the CEM auditor conversion training for ISO 9001, ISO 14001 and OHSAS 18001 Integrated Management Systems.

CAREER HISTORY

Senior Environmental Consultant/EAP
Founder & Director
Eco Elementum (Pty) Ltd
Pretoria
2013- Current

Role:
Business, Project and Port-folio Management
Senior Environmental Consultant/EAP

Senior Environmental Consultant/Senior Manager
ENVASS -Environmental Assurance (Pty) Ltd & established ENVISO, sub company of ENVASS
Pretoria
2010

Role:
Senior Environmental Consultant/ ISO 14001 Lead Auditor
SETA Accredited Assessor, Facilitator and Moderator.

QUALIFICATIONS

Senior Certificate Matric
Afrikaanse Hoër Seunskool (Affies)
2001

BSSci: Urban, Rural and Social Development
University of Pretoria
2006

Honours in Geo-Science
University of Pretoria
2007

Masters in Environmental Management
University of Pretoria
2013

KEY ACHIEVEMENTS

Awards

- 06/2000 Represented RSA in Germany as exchange student - Inter Exchange
- 06/2000 Received 3rd Year tutor position - University of Pretoria
- 02/2007 Awarded Academic bursary - University of Pretoria
- 04/2007 Finished first in my Degree - University of Pretoria

Academic Papers & Publications

-
-

REGISTRATIONS

Professional Registrations

- 02/2008 - Geographical Counsel of South Africa, Member since 12/2008
- 2011 - AIAI- International Association of Impact Assessors, ELA – Environmental Law Association AND iema – Institute of Environmental Management & Assessment
- 2014 - NACA – National Association for Clean Air

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vernon@ecoelementum.co.za
072 196 9928
www.ecoelementum.co.za

Riana Panaino

ENVIRONMENTAL CONSULTANT

ABOUT

With more than 10 years' experience in the environmental consulting industry she has a firm understanding of Environmental Management. She can adapt to a wide range of working environments, has a strong problem-solving ability and work towards team and client satisfaction. Riana has a passion for Environmental Authorisation Processes (Basic Assessments, Environmental Impact Assessments, Monitoring, Environmental Management Plans, Waste Licence Applications, Closure Application and Integrated Water Use License Applications) in terms of the South African legislative regime.

CAREER HISTORY

Environmental Consultant
Eco Elementum (Pty) Ltd
Pretoria
April 2019 - Present

Role: Environmental Impact Assessments, Water Use Licenses, Waste Applications, Rectification Applications, Stakeholder Engagement, Project Mangement, Specialist Management.

Senior Environmental Consultant
GCS
Pretoria
March 2012 – March 2019

Role: Project Management, management and coordination of specialists, compilation of Environmental Impact Assessments, Environmental Waste Licence application, Public Participation, Environmental Management Programs.

QUALIFICATIONS

BSc Hons (Biodiversity & Conservation)
University of Johannesburg
2007

BSc (Botany and Zoology)
University of Johannesburg
2004 - 2006

Senior Certificate Matric
Hoërskool Westernaria
2003

EXPERTISE AND SKILLS

Skills include, but are not limited to:

- Specialist Co-ordination
- Project Management
- Moniting and Compliance
- Compilation of Environmental Management
- Compilation of Environmental Impact Assessment
- Government Department Liaison
- Assessment of Wetland Status and Functionality
- Determination of Wetland Boundaries

REGISTRATIONS

Professional Registrations

- Environmental Law Association (ELA)
- South African Council of Natural Science Professionals (SACNASP)

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riana@ecoe.co.za
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Riana Panaino

ENVIRONMENTAL CONSULTANT

ENVIRONMENTAL & ENGINEERING

PROJECT EXPERIENCE

ENVIRONMENTAL MANAGEMENT AND MONITORING

2008, 2009, 2010 — **Matla,Mpumalanga, South Africa**
Matla Wetland Monitoring and Management Plan for Matla coal mine. Responsibilities included: weekly site visits and reporting of findings during the construction of the Matla river diversion and assisted in compilation of the wetland management plan

BIOLOGICAL SCIENCES

2009 — **Eskom DPSS, Freestate/KwaZulu Natal, South Africa**
Assisted in the capture of fish for genetic sampling to map distribution patterns between two different catchment.

ENVIRONMENTAL IMPACT ASSESSMENT

2016 — **Exxaro NBC Project**
Project Consultant, coordination, BA and EMP report compilation as well as public consultation of the various aspects on this project.

2016 — **Exxaro Coal Central Eloff Project, Mpumalanga, South Africa**
Project Consultant, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2015 — **Exxaro Belfast Project, Mpumalanga, South Africa**
Environmental Control Officer

2015 — **Exxaro Matla Project, Mpumalanga, South Africa**
Project Consultant, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2015 — **Exxaro UCG Project, Limpopo, South Africa**
Project Management, coordination and public consultation of the various aspects on this project.

2014 — **Quantum Crushing and Screening, KwaZulu-Natal, South Africa**
Project Management, coordination and BA and EMP report compilation as well as public consultation of the various aspects on this project.

2013 — **Glencore Rietvly – Northwest, South Africa**
Project Management, coordination and BA and EMP report compilation as well as public consultation of the various aspects on this project.

2012 — **Jacomynspan, Northern Cape, South Africa**
Project Management, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2012 — **Bighorn Substation, Northwest, South Africa**
Project assistance, coordination and report compilation as well as public consultation of the various aspects on this project.

2012 — **Otjozondu, Namibia**
Environmental Impact Assessment Report Compilation

2012 — **Leeuwpan, Mpumalanga, South Africa**
Project Management, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2008 — **Lonmin Akanani, Limpopo, South Africa**
Project assistance, coordination and report compilation of the various studies done on this project.

ECOLOGY

2012 — **Schoongezicht, Mpumalanga South Africa**
Ecological studies with responsibilities that included wetland input for the IWULA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

2012 — **Mooiplaats, Mpumalanga South Africa**
Ecological studies with responsibilities that included wetland input for the IWULA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

2011 — **Kromdraai Pipeline, Mpumalanga, South Africa**
Ecological studies with responsibilities that included wetland input for the project EIA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

2010 — **New Vaal Life Expansion, Freestate, South Africa**
Ecological studies with responsibilities that included wetland input for the project EIA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

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ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Locality
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)

N

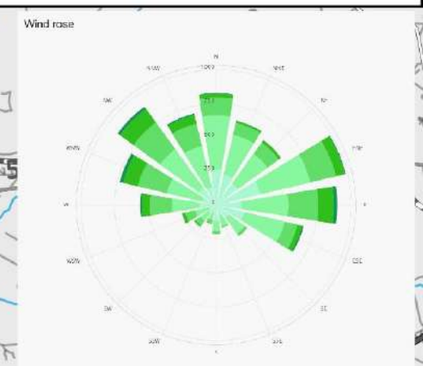
0 4 8 12 16 20 km

Legend

- Site Boundary
- Protected Areas
- Conservation Areas

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Inland Water
- Dam
- Non-Perennial River
- Perennial River



Predominant Wind direction

Lon: 29.101594721
Lat:-25.9440279889

Kwa Guqa
Witbank
Ogies
Van Dyks Drift

N4
N12
R104
R544
R555
R545
R547
545
555
544
575
542

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Topography
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)
Geo-i 5m Contours (2014)

0 2 4 6 8 10 km

N

Legend

- Site Boundary Outline
- Conservation Areas
- Protected Areas

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Contours
- 100m
- 20m
- 5m

Inland Water
- Dam
- Non-Perennial River
- Perennial River

Wind rose

Predominant Wind direction

N4
R104
Witbank
N12
R555
R547
544
545
John Cairns Private Nature Reserve
Ogies
1500
1600
olifantsrivier

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Landcover
Rev #: 1

Data Sources:
Surveyor General of South Africa (Jan 2018)
DEA Landcover (2013-2014)

N

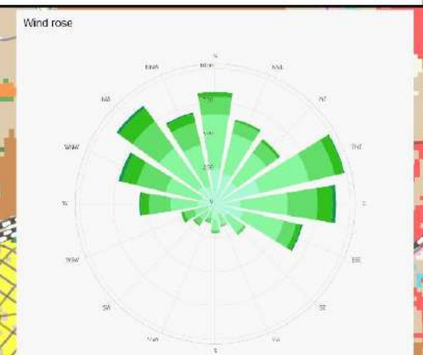
0 1 2 3 4 5 km

Legend

Site Boundary Outline
Boundary Farm Portions

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Landcover
- Indigenous Forest
- Thicket / Dense Bush
- Woodland / Open Bush
- Low Shrubland
- Plantations / Woodlots
- Cultivated Commercial Crop Non-Pivot
- Cultivated Commercial Crop Pivot
- Cultivated Commercial Orchards
- Cultivated Commercial Vines
- Cultivated Subsistence Crops
- Settlements
- Wetlands
- Grasslands
- Fynbos - Forest
- Fynbos - Thicket
- Fynbos - Open Bush
- Fynbos - Low Shrub
- Fynbos - Grassland
- Fynbos - Bare Ground
- Nama Karoo - Forest
- Nama Karoo - Thicket
- Nama Karoo - Open Bush
- Nama Karoo - Low Shrub
- Nama Karoo - Grassland
- Nama Karoo - Bare Ground
- Succulent Karoo - Forest
- Succulent Karoo - Thicket
- Succulent Karoo - Open Bush
- Succulent Karoo - Low Shrub
- Succulent Karoo - Grassland
- Succulent Karoo - Bare Ground
- Mines
- Waterbodies
- Bare Ground
- Degraded



Predominant Wind direction

RE/2/309
40/325
2/324
7/324
R555
R547

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Site Layout
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)
SANBI NFEPA Project (2011)

0 0.3 0.6 0.9 1.2 1.5 km

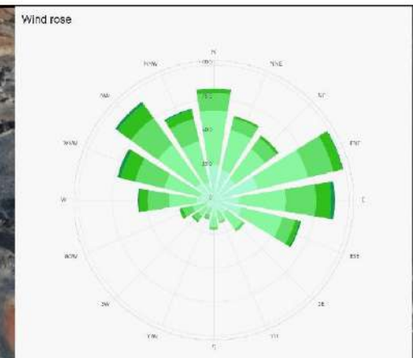
N

Legend

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Acces Road
- Railway

Inland Water
- Dam
- Non-Perennial River
- Perennial River

Infrastructure
- Dumps - Hards, Softs
- First Cuts Open
- Hard Park
- Haul Road
- Pit Area
- Topsoil Stockpile
- Haul Road



Predominant Wind direction

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: NFEPA
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)
SANBI NFEPA Project (2011)

0 1 2 3 4 5 km

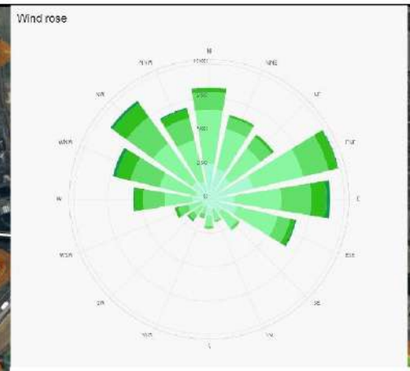
N

Legend

- Site Boundary Outline
- Protected Areas
- Conservation Areas

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Inland Water
- Dam
- Non-Perennial River
- Perennial River
- NFEPA Rivers
- NFEPA Wetlands
- Surface Water Buffer Zones



Predominant Wind direction

sprui

Noupoort

Noupoort

Noupoort

John Cairns Private Nature Reserve

N12

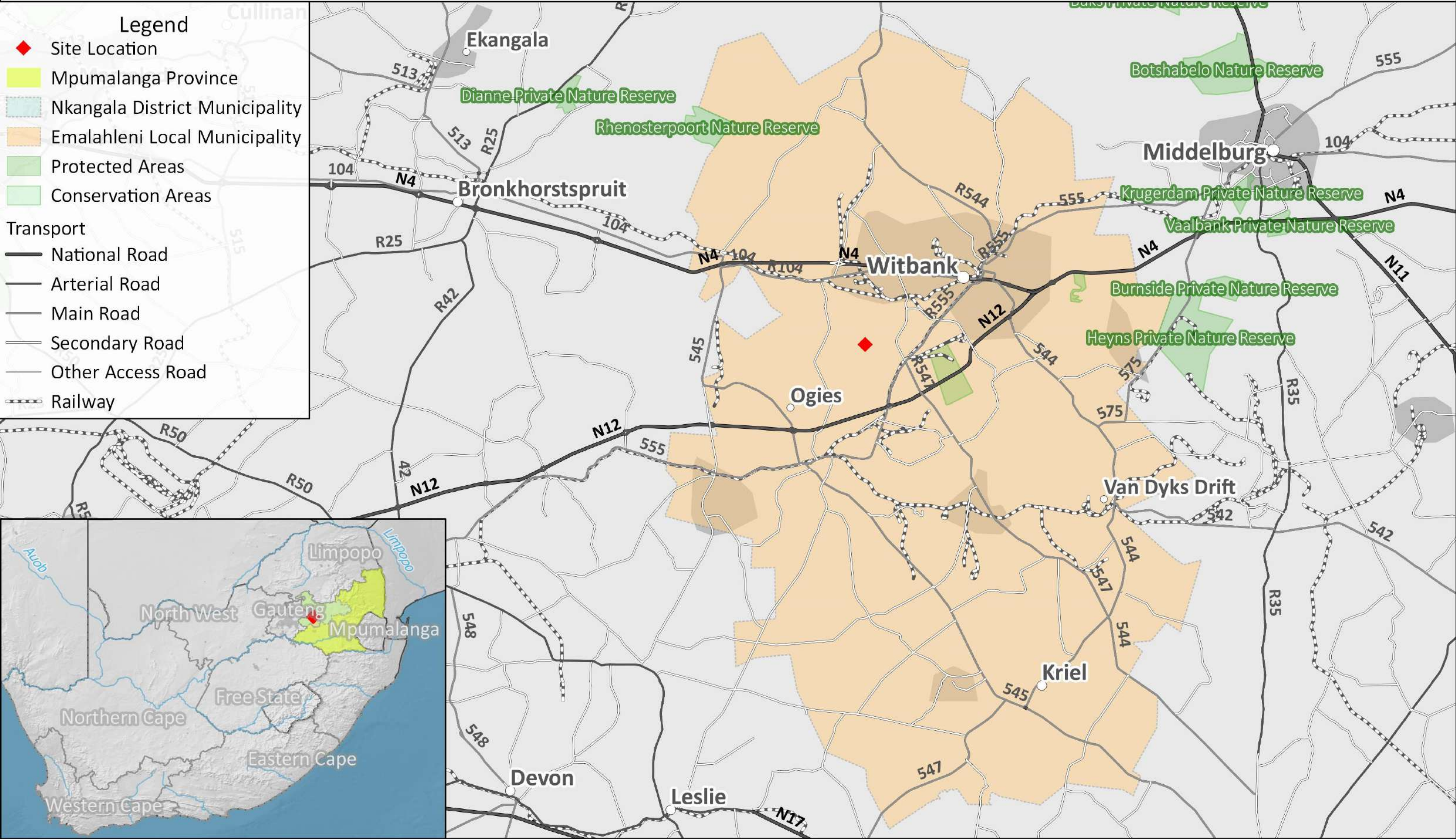
Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Regional Overview
Rev #: 1

ENVIRONMENTAL & ENGINEERING

Data Sources:
Surveyor General of South Africa (Jan 2018)

N

0 9 18 27 36 45 km



Legend
Site Location
Mpumalanga Province
Nkangala District Municipality
Emalahleni Local Municipality
Protected Areas
Conservation Areas
Transport
National Road
Arterial Road
Main Road
Secondary Road
Other Access Road
Railway
Ekangala
Dianne Private Nature Reserve
Rhenosterpoort Nature Reserve
Botshabelo Nature Reserve
Middelburg
Bronkhorstspruit
Krugerdam Private Nature Reserve
Vaalbank Private Nature Reserve
Witbank
Burnside Private Nature Reserve
Heyns Private Nature Reserve
Ogies
Van Dyks Drift
Kriel
Devon
Leslie
N4
N12
N11
N17
R25
R42
R50
R104
R544
R547
R555
R35
104
513
555
545
575
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547
542
548
Limpopo
North West
Gauteng
Mpumalanga
Free State
Northern Cape
Eastern Cape
Western Cape
Auob

ENVIRONMENTAL & ENGINEERING

REPORT

SALDOMATE (PTY) LTD – WELTEVREDEN COAL MINE

INTEGRATED ENVIRONMENTAL AUTHORISATIONS – DRAFT SCOPING REPORT

REPORT REF: 19-725 AUTH DRAFT SCOPING REPORT (WELTEVREDEN COAL MINE EA)

VERSION 00

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Approved for Distribution:				
0.0	Henno Engelbrecht	16/05/2019		Final report

Quality Control BY:

Nature of Signoff:	Responsible Person:	Role / Responsibility	Qualification
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Quality Reviewer			
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Client			

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DECLARATION OF INDEPENDENCE/

I, Vernon Siemelink, declare that;

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing:
    - any decision to be taken with respect to the application by the competent authority; and
    - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

17/05/2019

Signature **Date**

Mr. Vernon Siemelink
BSSc Honn GeoScience (UP)
M (EnvMan) Environmental Management
ISO 14001:2004 Lead Auditor

mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT ACTIVITIES

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

NAME OF APPLICANT: Saldomate (Pty) Ltd

TEL NO: +27 (11) 783-9810

FAX NO: +27 (86) 625-4121

POSTAL ADDRESS: P O Box 3001, Zimbali, 4418

PHYSICAL ADDRESS: 5 Sulawezi, 17 Fish Eagle Drive, Hilltop Estate, 4420

FILE REFERENCE NUMBER SAMRAD: MP 30/5/1/2/3/2/1 (10234) EM

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 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 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 SCOPING PROCESS

1) The objective of the scoping process is to, through a consultative process—

   (a) identify the relevant policies and legislation relevant to the activity;

   (b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

   (c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;

   (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;

   (e) identify the key issues to be addressed in the assessment phase;

   (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and

   (g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

CONTENTS

Annexures -

No table of contents entries found.

List of Figures -

List of Tables

SCOPING REPORT

2. CONTACT PERSON AND CORRESPONDENCE ADDRESS

2.a DETAILS OF:

2.a.i The EAP who prepared the report

Name of the practitioner	Vernon Siemelink & Riana Panaino
Tel Number	012 807 0383
Fax Number	086 714 5397
Email Address	vernon@ecoe.co.za / riana@ecoe.co.za

2.a.ii Expertise of the EAP

The qualification of the EAP

The EAP's have Honours degrees in Environmental Management, is SACNASP Registered, and has more than 20 years' experience in Environmental Consulting.

Refer to Annexure 2 for a CV of the EAP.

Summary of the EAP's past experience

Refer to Annexure 2 for a CV of the EAP.

2.b DESCRIPTION OF THE PROPERTY

Farm Name:	A portion of portion 2 and Portion 6 of the farm Weltevreden 324 JS
Application area (Ha)	231.5 Hectares
Magisterial district:	eMalahleni Local Municipality Nkangala District Municipality
Distance and direction from nearest town	13 km South-west from Witbank, situated between Witbank and Phola Village, East of Clewer community
21 digit Surveyor General Code for each farm portion	T0JS00000000032400002 T0JS00000000032400006

2.c LOCALITY MAP

(show nearest town, scale not smaller than 1:250000 attached as Appendix 3).

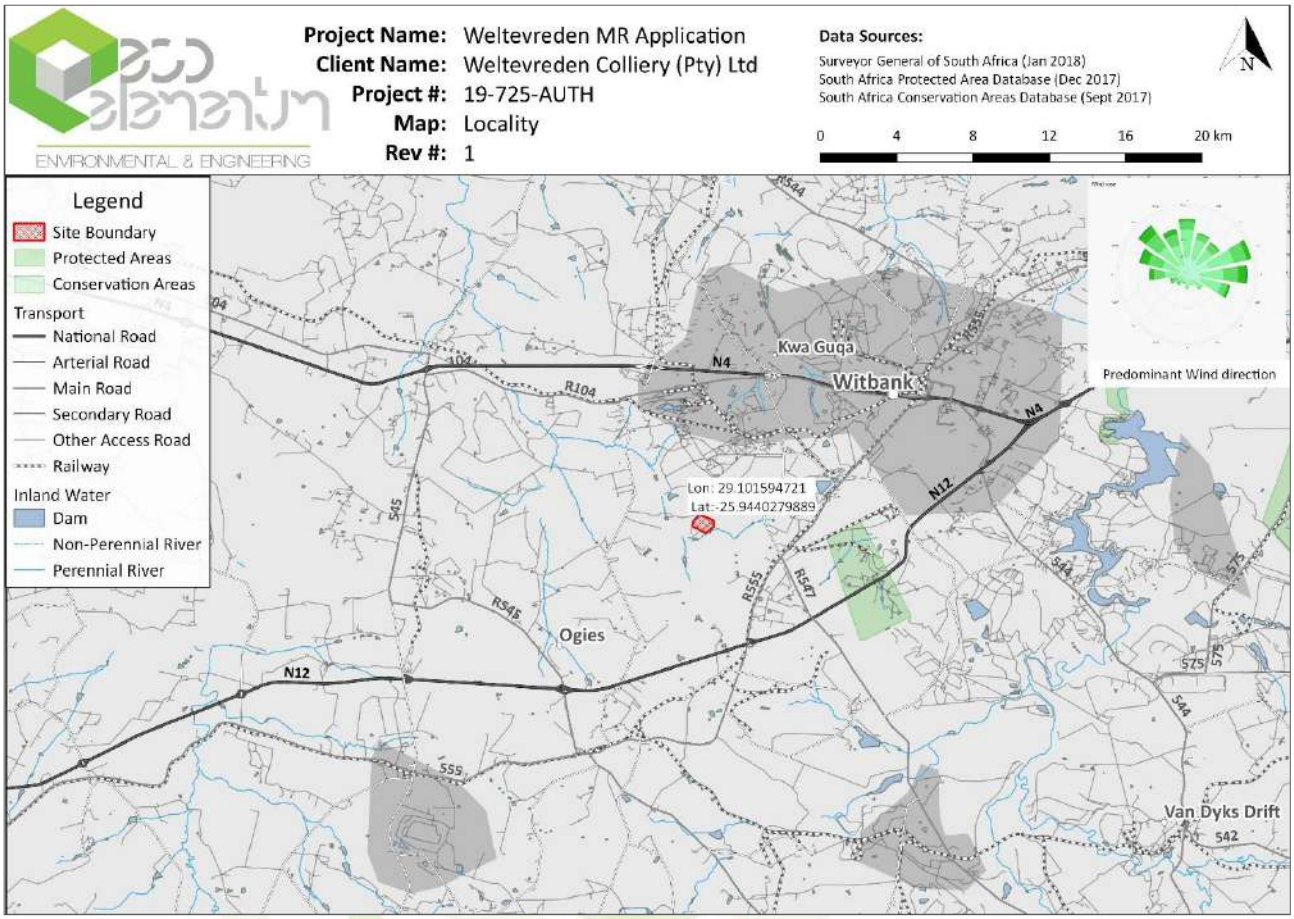


Figure 1: Weltevreden Coal Mine Locality

2.d DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY.

2.d.i Listed and specified activities

Provide a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site and attach as Appendix 4

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
Clearing in preparation for Mining Operation including all ancillary infrastructure		X	GNR984, Activity 15 The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for- (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
Mining of Coal and subsequent Crushing and Screening	36ha	X	GNR984, Activity 17 Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including- (a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.
			GNR984, Activity 19 The removal and disposal of minerals contemplated in terms of section 20 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including-

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
			(a) associated infrastructure, structures and earthworks, directly related to prospecting of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.
Overburden (Hards and Softs) dump	5.8ha	X	Category B, Activity 11 The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
Hard Park	1.2ha		*Contributes to clearance of 20ha or more*
Haul Road	>1000m Access Road is 326m	X	GNR983, Activity 24 The development of a road- (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road- (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter.
Topsoil Stockpile	0.67ha		*Contributes to clearance of 20ha or more*

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
Opencast Mining	36ha	X	GNR983, Activity 19 The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
Offices, Changehouse, Ablution Facilities and Workshops			*Contributes to clearance of 20ha or more*
Pipelines and Stormwater infrastructure.		X	GNR983, Activity 9 The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water- (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
Dirty water diversion infrastructure		X	GNR983, Activity 10 The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes- (i) with an internal diameter of 0,36 metres or more; or ii) with a peak throughput of 120 litres per second or more; excluding where- (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.
Pollution Control Dam		X	GNR983, Activity 12 The development of- (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;-X
			GNR983, Activity 13

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985 (as amended) / NOT LISTED / NEMWA GN 921
			The development of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of activity 16 in Listing Notice 2 of 2014.
			GNR984, Activity 6 The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding- (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.
Diesel Storage		X	GNR983, Activity 14 The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.

2.d.ii Description of the activities to be undertaken

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity

MINING METHOD

The mining method that will be used to exploit the different coal seams will be Roll-over Strip mining concurrently with rehabilitation. The roll over mining will make use of dozer and truck and shovel teams to remove the waste material to expose the No. 2 seam. Once the coal seam is exposed, it will be mined by truck and shovel operation and placed on the ROM stockpiles for transport to Elandsfontein Colliery where beneficiation will be done.

The initial boxcut waste mining material will be placed on dumps to create space for the next cut material to be rolled into. This will form a continuous roll over method where the waste material will be placed in the previous mined out cut. The placement of material on the low wall side as part of the rehabilitation strategy will be in the same sequence as the material mined from bottom to top, i.e. hards at the bottom, then subsoil on top of the hards and finally topsoil on top of the soft subsoils.

Drilling and blasting operations will occur on the hard overburden and interburdens during the critical part of mining the hards as well as the coal seams. All hard material horizons will be drilled at specific patterns and blasted with the use of emulsion and pyrotechnics (shocktube).

ROM PRODUCTION

The plant feed will be from the Weltevreden Operation. The discard will be discarded in the current Elandsfontein discard handling facility (off site). This will have the effect that the Weltevreden Opencast facility will not be used for any discard from the plant, and therefore the rehabilitation can commence immediately when the operation reaches a steady state scenario.

A truck and shovel mining method will be used to transport the ROM coal to a ROM pad on Weltevreden from where it will be loaded on roadworthy road- hauler trucks, which will transport the coal to the Elandsfontein Facility (off site).

BASIC CRUSHING & SCREENING PLANT DESIGN

ROM coal from the Weltevreden project will be processed and beneficiated on site via a crushing and screening process, mainly for the local & regional Eskom market.

This plant will consist of a Primary breaker in the form of a Jaw Crusher, which will crush the ROM coal to a -150mm product feed. This feed will be fed onto a single deck screen that will remove the already 0-50mm product before the oversize (+50mm) will be fed to a secondary crusher in the form of an Impact crusher.

The secondary crusher will re-circulate its product back to the screen to ensure that coal within the 0-50mm spectrum does not get crushed for a third time.

The coal gets circulated through the Impact crusher until it is removed through the screen and produced as a 0-50mm Eskom product.

The crush and screen plant yield will be 100% as no coal is discarded.

The impact crusher creates more fines than some other conventional crushers although its throughput is substantially higher.

It is therefore envisaged that the split will be 30% +30mm, and 70% -30mm.

COAL PROCESSING

Saldomate (Pty) Ltd has an agreement that all coal mined from the Weltevreden coal reserve, will be transported to Elandsfontein Colliery for beneficiation. The coal will be transported by trucks via a public road that runs the Mine properties.

The agreement entails that all coal will be run from the Weltevreden Coal Mine as ROM to Elandsfontein where the No. 2 coal seam will be crushed and screened to a 0-50mm product.

For this reason, no further beneficiation infrastructure need to be build.

POTABLE WATER

Potable water is for the use in the mine offices, workshops and change house facilities.

DIESEL STORAGE

Storage facility consist of 2 x 23000l storage tanks. Total storage capacity is 46000 litres.

GENERAL WASTE STORAGE

For general waste, no authorisation is required as the waste site is kept to less than 100m^3. The removal of waste will be managed on a daily basis to ensure that the limit is not exceeded.

HAZARDOUS INDUSTRIAL WASTE

The site is maintained to less than 35m^3. This is a relatively small waste site and the mine will have a waste removal contract with a reputable company to remove this waste on a regular basis.

SEWERAGE

Sewerage is removed on a need basis.

DIRTY WATER

Dirty water on site will be diverted to the PCD. Dust suppression for the operations will be done my means of a water cart. Water from the dirty water storage facility will be used for dust allying at a rate of 50000-80000 l/day dependant on distance of haulage.

2.e POLICY AND LEGISLATIVE CONTEXT

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process);		**REFERENCE WHERE APPLIED**
National Environmental Management Act (107 of 1998) The NEMA provides the overarching legislation for environmental governance in South Africa, giving effect to Section 24 of the Constitution of the Republic of South Africa. NEMA sets out the fundamental principles of Integrated Environmental Management that must be adhered to in order to ensure sustainable development	Section 28 of the NEMA includes a far-reaching general "Duty of Care" which stipulates the need to protect the environment from degradation and pollution, In terms of the listed activities, a S&EIR process is required.	An Application for Environmental Authorisation and Mining Right has been made to the DMR.
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) To make provision for equitable access to and sustainable development of the nation's mineral and petroleum resources; and to provide for matters connected therewith.	Section 22- The project requires a mining right authorisation from the DMR	A section 22 Mining Right Application was lodged with the DMR

NEMA Environmental Impact Assessment (EIA) Regulations, 2014 (as amended)	In terms of the listed activities, a S&EIR process is required. The process will be followed in terms of the "one environmental system"	An Application for Environmental Authorisation and Mining Right has been made to the DMR.
The South African Constitution In terms of Section 24, of the Constitution of the Republic of South Africa (108 of 1996), 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 legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while prompting justifiable economic and social development.	Applied at potential impacts identification as well as mitigation measures and public participation	An open and participatory public participation process will be followed. An EMP and awareness plan will be designed according to the issues raised during this process
National Environmental Management: Biodiversity Act, 2004 The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM:BA) provides for listing of threatened or protected species	The fauna and flora prevailing in the proposed project site will be handled in terms of this Act and relevant ecological studies have already been initiated.	The mining footprint will be guided by the results of the ecological studies where possible. Permits will be applied for where and when necessary should any red data species be relocated.
National Environmental Management: Waste Act The objectives of NEM:WA involve the protection of health, wellbeing and the environment by providing reasonable measures for the minimization of natural resource consumption, avoiding and minimizing the generation of waste, reducing, recycling and recovering waste, and treating and safely disposal of waste as a last resort. In terms of the NEMWA, all waste management activities must be licensed A distinction is made between Category A waste management activities, which require a basic assessment, and Category B activities, which require a full EIA, and Category C waste management activities which do not require a waste management licence but compliance with relevant requirements or standards. According to Section 44 of the Act, the licensing procedure must be integrated with an EIA process in accordance with the Regulations GNR 982.	In terms of the list of Section 19 waste management activities, a S&EIR process is required. The process is part of the "one environmental system" GNR 633 includes the establishment or reclamation of a residue stockpile or residue deposit resulting from prospecting or mining activities as a listed activity	In terms of GN718 of 2009, under NEMWA, various Category A and B waste management activities are applicable to the proposed mining operation. The impacts and associated management and/or mitigation measures will be included in the EIA phase of the project.
National Heritage Resources Act (Act No. 25 of 1999) The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999) (NHRA). The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA).	An Heritage and Paleontological study has been initiated to identify and assess the project in terms of heritage and paleontological resources. This is mandatory in terms of Section 38 of the NHRA	The Heritage Report will be uploaded on the SAHRIS website for comment and the development guided by any findings of the Report.
National Water Act (Act No. 36 of 1998) The NWA is the primary regulatory legislation, controlling and managing the use of water resources as well as the	An IWULA will be submitted to DWS for consideration for the	The DWS will provide comment and an application will be lodged for their review prior to the

pollution thereof. This act provides for fundamental reformation of legislation relating to water resource use. GN 704- Regulations on use of water for mining and related activities aimed at the protection of water resources	following Section 21 water uses including: (a) abstraction from a borehole (c) and (i) mining activities within 500m from a wetland (g) dust suppression, coal stockpiling, mine residue stockpiling and dirty water dams	undertaking of any water use activities on site Management Principles will be applied to the mining operations as per GN704
National Environmental Management: Air Quality Act, 2004 (Act no.39 of 2004); and applicable Regulations, Standards and Notices published in terms of NEMAQA The promulgation of this Act marked a turning point in the approach to air pollution control and governance in South Africa, introducing the philosophy of Air Quality Management, in line with international policy developments and the environmental right, i.e. Section 24 of the Constitution (Act No. 108 of 1996).	Dust monitoring on site during operations	As part of the EMP dust suppression methods will be used.
Mine Health and Safety Act, 1996 (Act No. 29 of 1996); The Mine Health and Safety Act (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa	Health and Safety Policy of mine to be guided by this Act	Risk Impact Assessment to be conducted
Mpumalanga Spatial Development Framework (SDF)	Used to identify the municipality's long term spatial development plans. SDF to be considered in terms of the need and desirability	The SDF should be consulted as part of the Socio-Economic Study's Scope of Work.
National Development Plan (2012) The National Development Plan outlines what we should do to eradicate poverty, increase employment and reduce inequality by 2030. The Plan has the target of developing people's capabilities to be to improve their lives through education and skills development, health care, better access to public transport, jobs, social protection, rising income, housing and basic services, and safety	Used to identify project Need and Desirability and alignment with National Policy	To form part of the project background and socio-economic evaluation
Promotion of Access to Information Act, 2000 **(Act No. 2 of 2000) (PAIA)** PAIA recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right	The S&EIR process is aligned with the PAIA and therefore fair and open public participation is undertaken.	NEMA Public Participation Process will be followed as per the 2014 EIA Guidelines.
Conservation of Agricultural Resources Act (act no. 43 of 1983) (CARA) CARA provides for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants.	Principles of the Act to be included in the relevant specialist's Scope of Work.	Mine Closure and Rehabilitation strategy to be informed by CARA and stakeholder engagement process.

2.f NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

- The project is in line with the 2012 National Development Plans' Nine Point Plan which is aimed at reigniting the economy to be able to create much-needed jobs include industrialisation, mining and beneficiation, agriculture and agro-processing, energy, small, medium and micro enterprises (SMMEs), managing workplace conflict, attracting investments, growing the oceans economy and tourism. Cross-cutting areas such as science and technology, water and sanitation infrastructure, transport infrastructure and broadband roll-out have also been added.
- The mining sector generates mass employment opportunities which are mainly situated within the rural areas of the municipality. Although some key sectors of the municipality are slowly declining (due to international and national factors), the mining sector continues to grow
- The activity of mining has numerous social and economic benefits in local, regional and national context. These include: 1. Job creation 2. Skills development 3. SMME development 4. Local economic development 5. Contribution to local and national tax income (royalties, companies tax etc.) 6. Contribution to the national gross domestic product, and 7. Future business opportunities.

2.g PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

A 10 year authorisation is requested.

2.h DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED SITE.

NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.

- GIS and spatial analysis will be used to determine the location of the mining infrastructure by considering environmental sensitivities.
- The site layout will take into account the resource location, watercourse location, and location of built structures and graves.
- The infrastructure layout will be presented during the EIA phase.

2.h.i Details of all alternatives considered.

With reference to the site plan provided as Appendix 4 and the location of the individual activities on site, provide details of the alternatives considered with respect to:

(a) the property on which or location where it is proposed to undertake the activity;

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses and residential areas. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative properties were considered.

(b) the type of activity to be undertaken;

Opencast or underground mining are the alternatives for the activity to be undertaken. Due to the shallow nature of the Coal seam the preferred alternative is Opencast Rollover mining

(c) the design or layout of the activity;

The infrastructure and mining layout is constrained by the prospecting right boundary, the location of other mining houses and residential areas. The resource location and the presence of a watercourse on the site boundary further restrict the layout options. The final layout will be determined based on the results from the specialist assessments.

(d) the technology to be used in the activity;

Opencast Rollover mining is the preferred alternative for mining.

The other alternatives would be beneficiation on site or off site. Due to the limited space available on site, the preferred alternative will be to transport crushed and screened ROM to the Elandsfontein Colliery for further beneficiation. Therefore, no beneficiation plant will be required on site.

(e) the operational aspects of the activity; and

as per (d) above

(f) the option of not implementing the activity.

The option of not approving the activities will result in a significant loss of revenue and job creation to, and within the municipality. The surrounding properties also consist of mining activities, and including this portion into the mining section will profit the local economy.

2.h.ii Details of the Public Participation Process Followed

(Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings. (Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.))

Section 41 of NEMA Regulation 982 (specifically Chapter 6) set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process will/has been followed at all times and is based on reciprocal dissemination of information. The following was/will be undertaken during the PPP:

- Identification of Interested and Affected Parties (IAPs);
- Consultation with selected landowners;
- Notification of IAPs regarding the proposed project via newspaper advert (in the Witbank News); the placing of 4 x site notices at conspicuous places, the sending of notices to affected parties via email (in the form of Background Information Documents) and sms'.
- A public information meeting (open day) with IAPs will be held on 31 May 2019 at the eMalahleni Main Library;
- Gathering comments, issues and concerns from IAPs;
- Responding to IAP comments, issues and concerns;
- Compilation and submission of results of consultation report to the DMR; and
- Providing IAPs with the opportunity to review and comment on the Draft Scoping and EIA Reports

2.h.iii Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

This will be included in the final Scoping Report and going forward into the EIA phase, as the Public consultation will kick off with the public review period of this document.

2.h.iv The Environmental attributes associated with the sites

2.h.iv.1 Baseline Environment

2.h.iv.1.a Type of environment affected by the proposed activity.

(its current geographical, physical, biological, socio- economic, and cultural character).

GEOLOGY

The project is located in the Witbank Coalfield, one of the most important in South Africa, supplying more than 50% of the country's saleable coal (Hancox, 2016). Coal in the Witbank Coalfield is hosted in rocks of the Vryheid Formation of the Ecca Group. The Vryheid Formation comprises a predominantly arenaceous sequence of sandstones with subordinate siltstone and mudstone in a series of upward coarsening sequences. Each genetic sequence represents a major cycle of deltaic outbuilding and is usually capped by a coal seam (The Mineral Corporation, July 2014). The coal seams are mainly flat lying to gently undulating, with a very gentle regional dip (1-3°) to the south. Five individual seams are usually recognised associated with various depositional sequences (see Figure 2). Of these, the No 2, 4 and 5 seams are considered the most economically important.

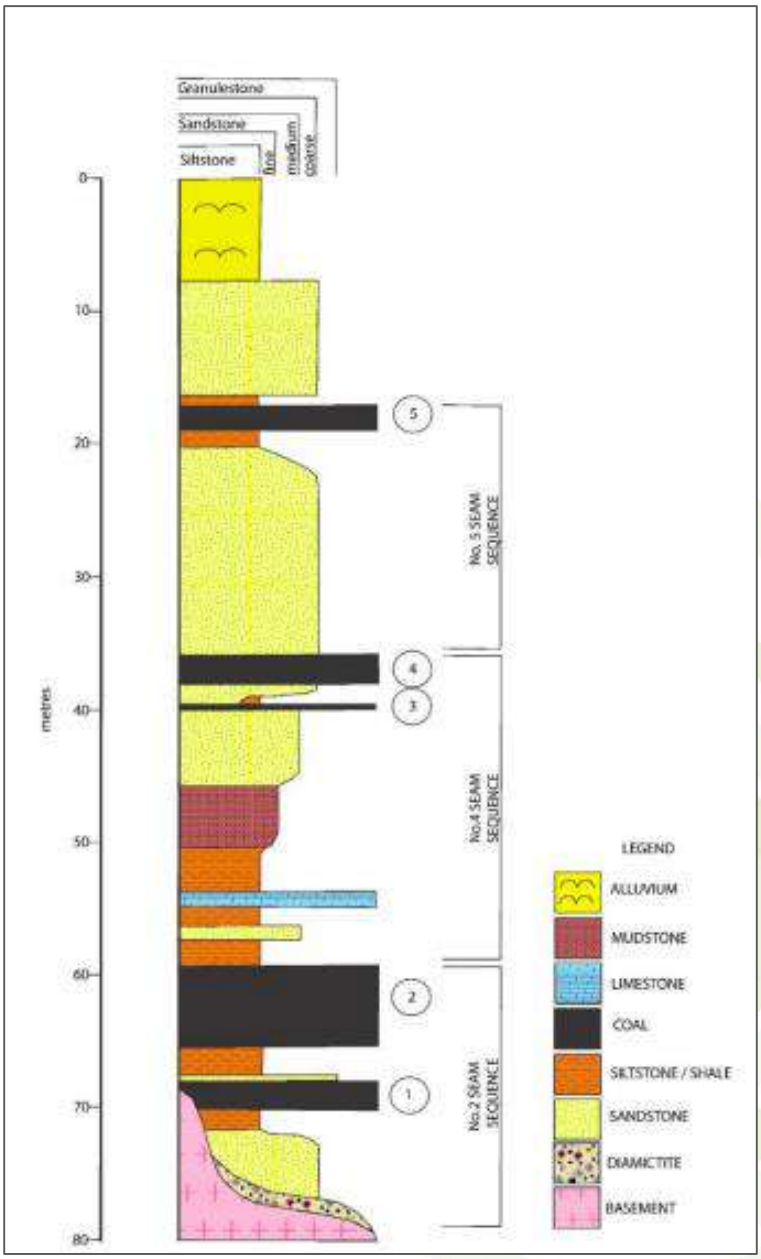


Figure 2: Geology of the project area

TOPOGRAPHY

Eastern Highveld Grassland is characterised by slightly to moderately undulating plains, including some low hills and pan depressions with an altitude 1 520–1 780 m.

Rand Highveld Grassland is characterised by areas between rocky ridges from Pretoria to Witbank, extending onto ridges in the Stoffberg and Roossenekal regions as well as west of Krugersdorp centred in the vicinity of Derby and Potchefstroom, extending southwards and northeastwards from there. The altitude ranges from 1 300–1 635 m

CLIMATE

Strongly seasonal summer rainfall, with very dry winters. MAP 650–900 mm (overall average: 726 mm), MAP relatively uniform across most of this unit, but increases significantly in the extreme southeast. The coefficient of variation in MAP is 25% across most of the unit, but drops to 21% in the east and southeast. Incidence of frost from 13–42 days, but higher at higher elevations.

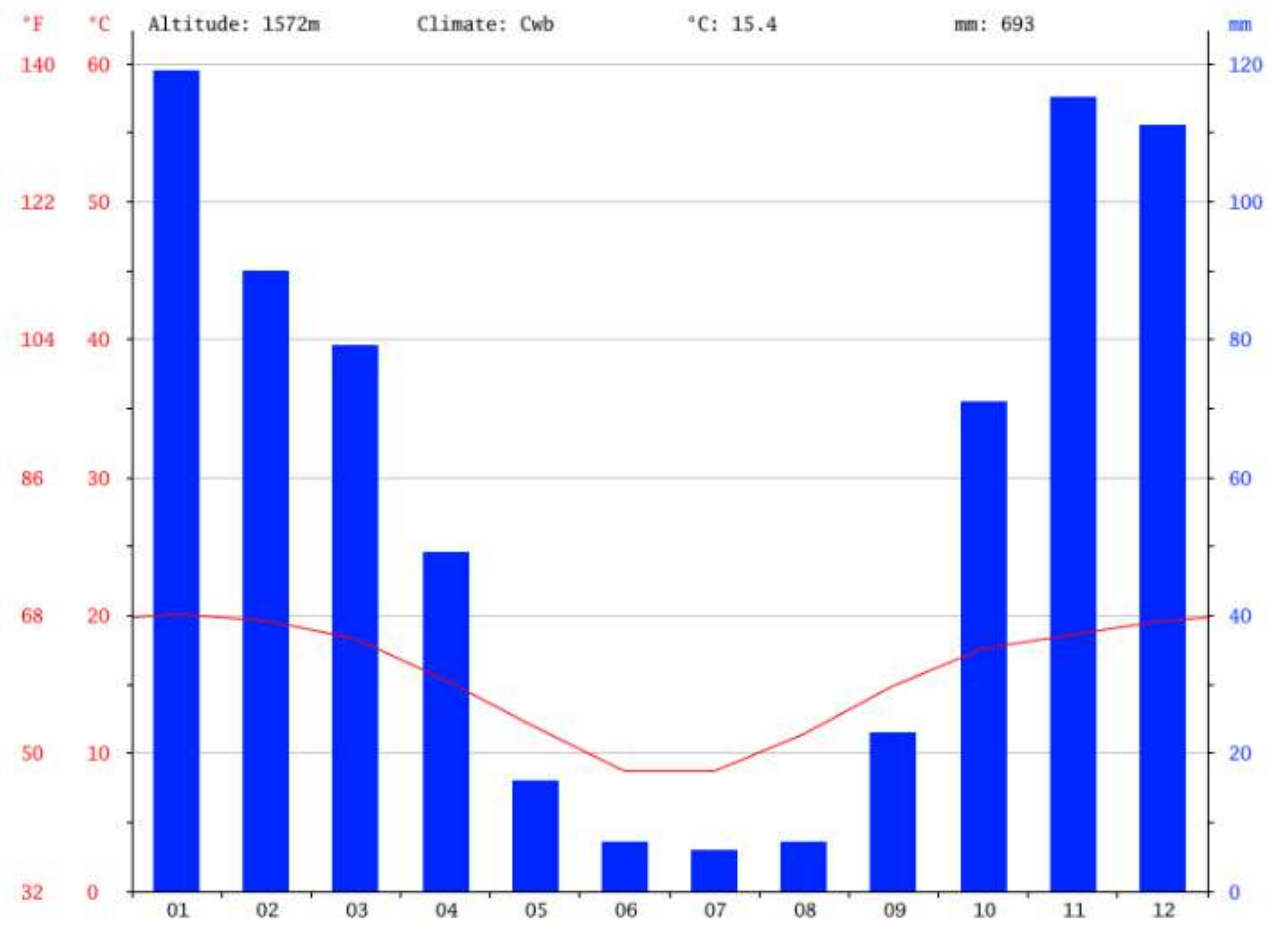


Figure 3: Average Climate Graph by month for eMalahleni

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	20.1	19.6	18.3	15.3	11.9	8.7	8.7	11.4	14.9	17.6	18.6	19.6
Min. Temperature (°C)	13.6	13.2	11.5	7.8	3.4	-0.3	-0.4	2.1	6.2	10	11.8	13.1
Max. Temperature (°C)	26.6	26.1	25.2	22.9	20.4	17.8	17.8	20.7	23.7	25.3	25.4	26.2
Avg. Temperature (°F)	68.2	67.3	64.9	59.5	53.4	47.7	47.7	52.5	58.8	63.7	65.5	67.3
Min. Temperature (°F)	56.5	55.8	52.7	46.0	38.1	31.5	31.3	35.8	43.2	50.0	53.2	55.6
Max. Temperature (°F)	79.9	79.0	77.4	73.2	68.7	64.0	64.0	69.3	74.7	77.5	77.7	79.2
Precipitation / Rainfall (mm)	119	90	79	49	16	7	6	7	23	71	115	111

Figure 4: eMalahleni weather by month

WETLAND ECOLOGY

Wetlands are sensitive ecosystems that perform many complex functions including the maintenance of water quality, carbon storage, stream-flow regulation, flood attenuation, various social benefits as well as the maintenance of biodiversity (Kotze et al.,2007). The Ramsar Convention on Wetlands refers to wetlands as one of the most important life support systems on earth owing to the services provided. Wetlands are defined according to the National Water Act, 1998 (Act 36 of 1998) (NWA) as: "*land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.*"

In accordance with the definition of a wetland in the NWA, vegetation is the primary indicator of a wetland, which must be present under normal circumstances. However, the soil wetness indicator tends to be the most important in practice and the remaining three indicators are then used in a confirmatory role. The reason for this is that the response of vegetation to changes in the soil moisture regime or management is relatively quick and may be transformed whereas the morphological indicators in the soil are significantly more longlasting and will hold the indications of frequent and prolonged saturation long after a wetland has been drained (perhaps several centuries) (DWAF, 2005).

Figure 5 shows the wetlands within the larger catchment as identified by by the National Freshwater Ecosystem Priority Areas (NFEPA) Data.

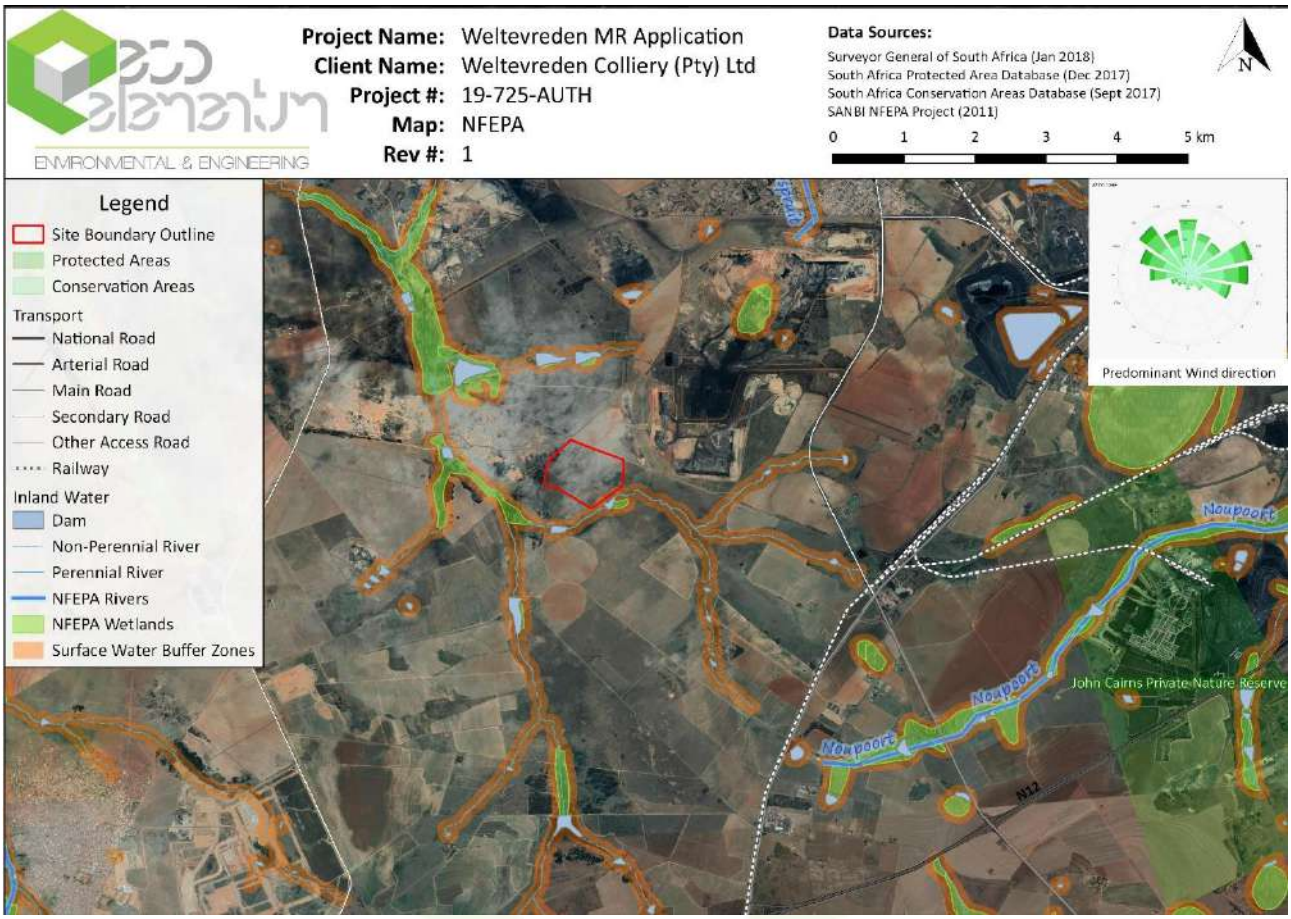


Figure 5: NFEPA for the larger project area

A Wetland Impact Assessment will be conducted and included in the EIA.

AQUATIC ECOLOGY

Figure 6: Aquatic Biodiversity combined sensitivity

From the desktop assessment it was found that the combined aquatic biodiversity of the site was of a low sensitivity.

National Freshwater Ecological Priority Areas (NFEPA)

Catchment B20G fall outside of the defined NFEPA categories which imply that they are not currently priority areas in terms of the NFEPA guidelines (Nel *et al.* 2011).

Potential fish species within the affected rivers

Quaternary catchment B20H was selected as a reference site for B20G (B20G does not have expected fish data) as they both report to the Wilge River. B20H is affected by open cast mining within their catchments and as such may contain more sensitive species than B20G.

Table 1: Species potentially occurring in the project area

Scientific Name	Common Name	IUCN Red data status (Ver 3)
Barbus anoplus	Chubby head barb	Least concern
Barbus neefi	Sidespot barb	Least concern
Barbus paludinosus	Straightfin barb	Least concern
Labeobarbus polylepis	Smallscale yellowfish	Least concern
Barbus trimaculatus	Theespot barb	Least concern
Cyprinus carpio	Carp (exotic)	Least
Clarias gariepinus	Sharptooth catfish	Least concern

Gabusia affinus	Mosquito fish (exotic)	Least concern
Labeo umbratus	Moggel	Least concern
Microterus salmoides	Largemouth bass (exotic)	Least concern
Pseudocrenulabus philander	Southern Mouthbrooder	Not Assessed
Tilapia sparrmanii	Banded tilapia	Least concern
Labeobarbus marequensis	Largescale yellowfish	Least concern
Labeo cylindricus	Redeye labeo	Least concern

Adapted from Kleynhans (2007)

An Aquatic Impact Assessment will be conducted and included in the EIA.

TERRESTRIAL ECOLOGY

A Terrestrial Impact Assessment will be conducted and included in the EIA.

Eastern Highveld Grassland

This vegetation type corresponds partially with Bankenveld and North-eastern Sandy Highveld according to the Acocks (1975) and also Moist Sandy Highveld Grassland as described by Low and Rebelo (1996).

This vegetation type occurs within the Gauteng and Mpumalanga Provinces on the plains in the areas between Belfast in the East and the eastern side of Johannesburg in the West and southwards to Bethal, Ermelo and West of Piet Retief.

The conservation status of this vegetation type is Endangered and the conservation target is 24%. By 2006 some 44% was already transformed primarily by cultivation, plantations, mining, urbanisation and building of dams. No serious invasions are reported, although *Acacia mearnsii* can become dominant in disturbed sites. Erosion is generally low. Only a small part of this vegetation type is conserved in the statutory nature reserves Nooitgedacht dam - and Jericho dam Nature Reserve of the Mpumalanga Tourism and Parks Agency and in Private Nature Reserves such as Holkranse, Kransbank and Morgenstond (Mucina and Rutherford, 2006).

Important plant species of this vegetation type are given in Table 2.

Table 2: Important plant species of the Eastern Highveld Grassland

FAMILY	SPECIES	STATUS
POACEA	*Aristida aequiglumis*	D
POACEA	*A. congesta*	D
POACEA	*A. junciformis* subsp. *galpinii*	D
POACEA	*Brachiaria serrata*	D
POACEA	*Cynodon dactylon*	D
POACEA	*Digitaria monodactyla*	D
POACEA	*D. tricholaenoides*	D
POACEA	*Elionurus muticus*	D
POACEA	*Eragrostis chloromelas*	D
POACEA	*E. curvula*	D
POACEA	*E. racemosa*	D
POACEA	*E. sclerantha*	D
POACEA	*Heteropogon contortus*	D
POACEA	*Loudetia simplex*	D
POACEA	*Microchloa caffra*	D
POACEA	*Monocymbium ceresiiforme*	D
POACEA	*Setaria sphacelata*	D
POACEA	*Sporobolus africanus*	D
POACEA	*S. pectinatus*	D
POACEA	*Themeda triandra*	D
POACEA	*Trachypogon spicatus*	D
POACEA	*Tristachya leucothrix*	D
POACEA	*T. rehmannii*	D
POACEA	*Alloteropsis semialata* subsp. *eckloniana*	
POACEA	*Andropogon appendiculatus*	
POACEA	*A. schirensis*	
POACEA	*Bewsia biflora*	
POACEA	*Ctenium concinnum*	
POACEA	*Diheteropogon amplectens*	
POACEA	*Eragrostis capensis*	
POACEA	*E. gummiflua*	
POACEA	*E. patentissima*	
POACEA	*Harpochloa falx*	
POACEA	*Panicum natalense*	
POACEA	*Rendlia altera*	
POACEA	*Schizachyrium sanguineum*	
POACEA	*Setaria nigrirostris*	
POACEA	*Urelytrum agropyroides*	
ASTERACEAE	*Berkheya setifera*	D
ASTERACEAE	*Haplocarpha scaposa*	D
ACANTHACEAE	*Justicia anagalloides*	D
GERANIACEAE	*Pelargonium luridum*	D
EUPHORBIACEAE	*Acalypha angustata*	
FABACEAE	*Chamaecrista mimosoides*	
ASTERACEAE	*Euryops gilfillanii*	
ASTERACEAE	*E. transvaalensis* subsp. *setilobus*	
ASTERACEAE	*Helichrysum aureonitens*	
ASTERACEAE	*H. caespititium*	
ASTERACEAE	*H. callicomum*	
ASTERACEAE	*H. oreophilum*	
ASTERACEAE	*H. rugulosum*	
CONVOLVULACEAE	*Ipomoea crassipes*	
RUBIACEAE	*Pentanisia prunelloides* subsp. *latifolia*	
SCROPHULARIACEAE	*Selago densiflora*	
ASTERACEAE	*Senecio coronatus*	
ASTERACEAE	*Vernonia oligocephala*	
CAMPANULACEAE	*Wahlenbergia undulata*	
IRIDACEAE	*Gladiolus crassifolius*	
AMARYLLIDACEAE	*Haemanthus humilis* subsp. *hirsutus*	
HYPOXIDACEAE	*Hypoxis rigidula* var. *pilosissima*	
HYACINTHACEAE	*Ledebouria ovatifolia*	
ASPHODELACEAE	*Aloe ecklonis*	
RUBIACEAE	*Anthospermum rigidum* subsp. *pumilum*	
ASTERACEAE	*Stoebe plumosa*	

Rand Highveld Grassland

This vegetation type corresponds partially with the Bankenveld (64%) of Acocks (1953) and with the Rocky Highveld Grassland (45%) and Moist Sandy Highveld Grassland (21%) of Low & Rebelo (1996).

Rand Highveld Grassland is distributed in parts of Gauteng, North-West, Free State and Mpumalanga Provinces in areas between rocky ridges from Pretoria to Witbank (eMalahleni), extending onto ridges in the Stoffberg and Roossenekal regions as well as west of Krugersdorp centred in the vicinity of Derby and Potchefstroom, extending southwards and northeast wards from there. Altitude 1 300-1 635 m, but reaches 1 760 m in places.

Vegetation & landscape features display a highly variable landscape with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. Most common grasses on the plains belong to the genera *Themeda, Eragrostis, Heteropogon* and *Elionurus.* High diversity of herbs, many of which belong to the Asteraceae, is also a typical feature. Rocky hills and ridges carry sparse (savannoid) woodlands with *Protea caffra* subsp. *caffra, P. welwitschii, Acacia caffra* and *Celtis africana,* accompanied by a rich suite of shrubs among which the genus *Rhus* (especially *R. magalismontana)* is most prominent.

Biogeographically Important Taxa (all Northern sourveld endemics) Geophytic Herbs: *Agapanthus inapertus* subsp. *pendulus, Eucomis vandermerwei.* Succulent Herb: *Huernia insigniflora.* Low Shrub: *Melhania randii.* Endemic Taxa Herbs: *Melanospermum rudolfii, Polygala spicata*. Succulent Herbs: *Anacampseros subnuda* subsp. *lubbersii, Frithia humilis.* Succulent Shrubs: *Crassula arborescens* subsp. *undulatifolia, Delosperma purpureum.* Small Trees: *Encephalartos lanatus, E. middelburgensis.*

The Conservation status is Endangered and the conservation target is 24%. It is currently poorly conserved (only 1 %). Small patches are protected in statutory reserves such as Kwaggavoetpad, Van Riebeeck Park, Bronkhorstspruit and Boskop Dam Nature Reserves as well as in private conservation areas such as Doornkop, Ezemvelo, Rhenosterpoort and Mpopomeni. Almost half of the vegetation type has been transformed mostly by cultivation, plantations, urbanisation or dam-building. Cultivation may also have had an impact on an additional portion of the surface area of the unit where old lands are currently classified as grasslands in landcover classifications and poor land management has led to degradation of significant portions of the remainder of this unit. Scattered aliens (most prominently *Acacia mearnsii)* occur in about 7% of this unit. Only about 7% has been subjected to moderate to high erosion levels.

Important plant species of this vegetation type are given in Table 3.

Table 3: Important plant species of the Rand Highveld Grassland

FAMILY	SPECIES	STATUS
POACEAE	*Ctenium concinnum*	D
POACEAE	*Cynodon dactylon*	D
POACEAE	*Digitaria monodactyla*	D
POACEAE	*Diheteropogon amplectens*	D
POACEAE	*Eragrostis chloromelas*	D
POACEAE	*Heteropogon contortus*	D
POACEAE	*Loudetia simplex*	D
POACEAE	*Monocymbium ceresiiforme*	D
POACEAE	*Panicum natalense*	D
POACEAE	*Schizachyrium sanguineum*	D
POACEAE	*Setaria sphacelata*	D
POACEAE	*Themeda triandra*	D
POACEAE	*Trachypogon spicatus*	D
POACEAE	*Tristachya biseriata*	D
POACEAE	*T. rehmannii*	D
POACEAE	*Andropogon schirensis*	
POACEAE	*Aristida aequiglumis*	
POACEAE	*A. congesta*	
POACEAE	*A. junciformis* subsp. *galpinii*	
POACEAE	*Bewsia biflora*	
POACEAE	*Brachiaria nigropedata*	
POACEAE	*B. serrata*	
POACEAE	*Cymbopogon caesius*	
POACEAE	*Digitaria tricholaenoides*	
POACEAE	*Elionurus muticus*	
POACEAE	*Eragrostis capensis*	
POACEAE	*E. curvula*	
POACEAE	*E. gummiflua*	
POACEAE	*E. plana*	
POACEAE	*E. racemosa*	
POACEAE	*Hyparrhenia hirta*	
POACEAE	*Melinis nerviglumis*	
POACEAE	*M. repens* subsp. *repens*	
POACEAE	*Microchloa caffra*	
POACEAE	*Setaria nigrirostris*	
POACEAE	*Sporobolus pectinatus*	
POACEAE	*Trichoneura grandiglumis*	
POACEAE	*Urelytrum agropyroides*	
CYPERACEAE	*Bulbostylis burchellii*	
ASTERACEAE	*Acanthospermum australe*	D
ACANTHACEAE	*Justicia anagalloides*	D
ILLECEBRACEAE	*Pollichia campestris*	D
EUPHORBIACEAE	*Acalypha angustata*	
FABACEAE	*Chamaecrista mimosoides*	
ASTERACEAE	*Dicoma anomala*	
ASTERACEAE	*Helichrysum caespititium*	
ASTERACEAE	*H. nudifolium* var. *nudifolium*	
ASTERACEAE	*H. rugulosum*	
CONVOLVULACEAE	*Ipomoea crassipes*	
RUBIACEAE	*Kohautia amatymbica*	
ASTERACEAE	*Lactuca inermis*	
ASTERACEAE	*Macledium zeyheri* subsp. *argyrophyllum*	
ASTERACEAE	*Nidorella hottentotica*	
RUBIACEAE	*Oldenlandia herbacea*	
LAMIACEAE	*Rotheca hirsuta*	
SELAGINACEAE	*Selago densiflora*	
ASTERACEAE	*Senecio coronatus*	

Plant species previously recorded in the grid square 2529CC, according to the PRECIS database are listed in Table 4

Table 4: Species previously recorded in the grid square 2529CC

SPECIES	RDL
Blepharis innocua C.B.Clarke	LC
Chaetacanthus costatus Nees	LC
Tulbaghia leucantha Baker	LC
Cyrtanthus breviflorus Harv.	LC
Cyrtanthus tuckii Baker var. transvaalensis I.Verd.	LC
Nerine rehmannii (Baker) L.Bolus	LC
Ozoroa paniculosa (Sond.) R.& A.Fern. var. paniculosa	LC
Searsia zeyheri (Sond.) Moffett	LC
Chlorophytum calyptrocarpum (Baker) Kativu	LC
Chlorophytum fasciculatum (Baker) Kativu	LC
Afrosciadium magalismontanum (Sond.) P.J.D.Winter	
Alepidea setifera N.E.Br.	LC
Asclepias albens (E.Mey.) Schltr.	LC
Asclepias brevipes (Schltr.) Schltr.	LC
Asclepias crispa P.J.Bergius var. crispa	LC
Asclepias eminens (Harv.) Schltr.	LC
Asclepias fallax (Schltr.) Schltr.	LC
Aspidoglossum biflorum E.Mey.	LC
Aspidoglossum glabrescens (Schltr.) Kupicha	LC
Aspidoglossum interruptum (E.Mey.) Bullock	LC
Aspidoglossum validum Kupicha	Thr*
Brachystelma rubellum (E.Mey.) Peckover	LC
Cordylogyne globosa E.Mey.	LC
Gomphocarpus glaucophyllus Schltr.	LC
Pentarrhinum insipidum E.Mey.	LC
Periglossum angustifolium Decne.	LC
Raphionacme hirsuta (E.Mey.) R.A.Dyer	LC
Disyranthus randii S.Moore	LC
Xysmalobium asperum N.E.Br.	LC
Asparagus flavicaulis (Oberm.) Fellingham & N.L.Mey. subsp. flavicaulis	LC
Aloe eckloniis Salm-Dyck	LC
Bulbine favosa (Thunb.) Schult. & Schult.f	LC
Chortolirion angolense (Baker) A.Berger	LC
Kniphofia ensifolia Baker subsp. ensifolia	LC
Kniphofia porphyrantha Baker	LC
Trachyandra asperata Kunth var. natalgencensis (Kuntze) Oberm.	LC
Trachyandra saltii (Baker) Oberm. var. saltii	LC
Aster harveyanus Kuntze	LC
Callilepis leptophylla Harv.	Declining
Dimorphotheca caulescens Harv.	LC
Dimorphotheca spectabilis Schltr.	LC
Euryops gilfillanii Bolus	LC
Gazania krebsiana Less. subsp. serrulata (DC.) Roessler	LC
Geigeria aspera Harv. var. aspera	LC
Helichrysum acutatum DC.	LC
Helichrysum aureonitens Sch.Bip.	LC
Helichrysum cephaloideum DC.	LC
Helichrysum nudifolium (L.) Less. var. nudifolium	LC
Helichrysum subglomeratum Less.	LC
Lasiospermum pedunculare Lag.	LC
Nidorella anomala Steetz	LC
Nidorella hottentotica DC.	LC
Osteospermum stratum Burtt Davy	LC
Schistostephium heptalobum (DC.) Oliv. & Hiern	LC
Senecio coronatus (Thunb.) Harv.	LC
Senecio glandulosо-pilosus Volkens & Muschl.	LC
Senecio gregatus Hilliard	LC
Senecio harveianus MacOwan	LC
Sonchus dregeanus DC.	LC
Ursinia nana DC. subsp. leptophylla Prassler	LC
Xanthium strumarium L.	
Asterella wilmsii (Steph.) S.W.Arnell	
Heliophila rigidiuscula Sond.	LC
Dianthus mooiensis F.N.Williams subsp. mooiensis var. mooiensis	
Camptorrhiza strumosa (Baker) Oberm.	LC
Commelina africana L. var. africana	LC
Commelina modesta Oberm.	LC
Cyanotis speciosa (L.f.) Hassk.	LC
Convolvulus sagittatus Thunb.	LC
Falkia oblonga Bernh. ex C.Krauss	LC
Ipomoea bathycolpos Hallier f.	LC
Ipomoea crassipes Hook. var. crassipes	LC
Ipomoea ommanneyi Rendle	LC
Merremia verecunda Rendle	LC
Bulbostylis contexta (Nees) M.Bodard	LC
Bulbostylis ortrephes (Rdl.) C.B.Clarke	LC
Bulbostylis schlechteri C.B.Clarke	LC
Bulbostylis scleropus C.B.Clarke	LC
Carex glomerabilis Krecz.	LC
Cyperus denudatus L.f. var. denudatus	LC
Cyperus difformis L.	LC
Cyperus indecorus Kunth var. decurvatus (C.B.Clarke) Kük.	LC
Cyperus margaritaceus Vahl var. margaritaceus	LC
Cyperus marginatus Thunb.	LC
Cyperus obtusiflorus Vahl var. obtusiflorus	LC
Eleocharis dregeana Steud.	LC
Eleocharis limosa (Schrad.) Schult.	LC
Fimbristylis complanata (Retz.) Link	LC
Fuirena pubescens (Poir.) Kunth var. pubescens	LC
Kyllinga alba Nees	LC
Kyllinga erecta Schumach. var. erecta	LC
Pycreus macranthus (Boeck.) C.B.Clarke	LC
Schoenoplectus corymbosus (Roth ex Roem. & Schult.) J.Raynal	LC
Schoenoplectus decipiens (Nees) J.Raynal	LC
Schoenoplectus scirpoides (Schrad.) Browning	LC
Scirpoides dioecus (Kunth) Browning	LC
Scleria sterrima (Rdl.) Napper	LC
Dioscorea dregeana (Kunth) T.Durand & Schinz	LC
Drosera madagascariensis DC.	LC
Diospyros lycioides Desf. subsp. guerkei (Kuntze) De Winter	LC
Erica drakensbergensis Guthrie & Bolus	LC
Eriospermum porphyrovalve Baker	LC
Jatropha lagarinthoides Sond.	LC
Acacia caffra (Thunb.) Willd.	LC
Chamaecrista comosa E.Mey. var. capricornia (Steyaert) Lock	LC
Elephantorrhiza elephantina (Burch.) Skeels	LC
Eriosema burkei Benth. ex Harv. var. burkei	LC
Eriosema cordatum E.Mey.	LC
Eriosema gunniae C.H.Stirt.	LC
Eriosema psoraleoides (Lam.) G.Don	LC
Eriosema salignum E.Mey.	LC
Indigofera atrata N.E.Br.	LC
Indigofera egens N.E.Br.	LC
Indigofera monocoma N.E.Br.	LC
Indigofera oxalidea Welw. ex Baker	LC
Indigofera oxytropis Benth. ex Harv.	LC
Lotononis foliosa Bolus	LC
Lotononis solitudinis Dummer	LC
Melolobium alpinum Eckl. & Zeyh.	LC
Melolobium wilmsii Harms	LC
Pearsonia cajanifolia (Harv.) Polhill subsp. cajanifolia	LC
Rhynchosia monophylla Schltr.	LC
Rhynchosia nervosa Benth. ex Harv. var. nervosa	LC
Rhynchosia totta (Thunb.) DC. var. totta	LC
Smithia erubescens (E.Mey.) Baker f.	LC
Tephrosia capensis (Jacq.) Pers. var. capensis	LC
Tephrosia longipes Meisn. subsp. longipes var. longipes	LC
Vigna vexillata (L.) A.Rich. var. vexillata	LC
Zornia linearis E.Mey.	LC
Fossombronia crispa Nees	
Fossombronia gemmifera Perold	
Chironia krebsii Griseb.	LC
Chironia purpurascens (E.Mey.) Benth. & Hook.f. subsp. humilis (Gilg) I.Verd.	LC
Pelargonium luridum (Andrews) Sweet	LC
Pelargonium pseudofumarioides R.Knuth	LC
Albuca shawii Baker	LC
Dipcadi gracillimum Baker	LC
Dipcadi marlothii Engl.	LC
Dipcadi rigidifolium Baker	LC
Dipcadi viride (L.) Moench	LC
Ledebouria cooperi (Hook.f.) Jessop	LC
Ledebouria marginata (Baker) Jessop	LC
Ornithogalum tenuifolium F.Delaroche subsp. tenuifolium	LC
Schizocarphus nervosus (Burch.) Van der Merwe	LC
Hypericum lalandii Choisy	LC
Hypoxis rigidula Baker var. rigidula	LC
Dierama mossii (N.E.Br.) Hilliard	LC
Gladiolus antholyzoides Baker	LC
Gladiolus elliotii Baker	LC
Gladiolus papilio Hook.f.	LC
Gladiolus vinosomaculatus Klies	LC
Lapeirousia sandersonii Baker	LC
Watsonia bella N.E.Br. ex Goldblatt	LC
Juncus dregeanus Kunth subsp. dregeanus	LC
Juncus exsertus Buchenau	LC
Juncus lomatophyllus Spreng.	LC
Juncus oxycarpus E.Mey. ex Kunth	LC
Acrotome hispida Benth.	LC
Ocimum obovatum E.Mey. ex Benth. subsp. obovatum var. obovatum	LC
Rotheca hirsuta (Hochst.) R.Fern.	LC
Syncolostemon pretoriae (Gürke) D.F.Otieno	LC
Teucrium trifidum Retz.	LC
Lobelia erinus L.	LC
Nesaea sagittifolia (Sond.) Koehne var. sagittifolia	LC
Nesaea schinzii Koehne	LC
Hermannia depressa N.E.Br.	LC
Hermannia lancifolia Szyszyl.	LC
Hermannia transvaalensis Schinz	LC
Hibiscus aethiopicus L. var. ovatus Harv.	LC
Nymphoides thunbergiana (Griseb.) Kuntze	LC
Frithia humilis Burgoyne	VU
Moraea inclinata (L.Bolus) N.E.Br.	LC
Disa rhodantha Schltr.	LC
Disa versicolor Rchb.f.	LC
Eulophia hians Spreng. var. hians	LC
Eulophia milnei Rchb.f.	LC
Eulophia ovalis Lindl. var. ovalis	LC
Satyrium hallackii Bolus subsp. ocellatum (Bolus) A.V.Hall	LC
Satyrium longicauda Lindl. var. longicauda	LC
Satyrium parviflorum Sw.	LC
Satyrium trinerve Lindl.	LC
Schizochilus zeyheri Sond.	LC
Alectra sessiliflora (Vahl) Kuntze var. sessiliflora	LC
Cycnium tubulosum (L.f.) Engl. subsp. tubulosum	LC
Sopubia cana Harv. var. cana	LC
Striga bilabiata (Thunb.) Kuntze subsp. bilabiata	LC
Oxalis obliquifolia Steud. ex A.Rich.	LC
Symphyogyna brasiliensis Nees & Mont.	
Calicostella trisis (Mitt.Hal.) Broth.	
Cyclodictyon vallis-gratiae (Hampe ex Mitt.Hal.) Kuntze	
Pittosporum viridiflorum Sims	LC
Cenchrus ciliaris L.	LC
Chloris gayana Kunth	LC
Cynodon dactylon (L.) Pers.	LC
Eragrostis curvula (Schrad.) Nees	LC
Eragrostis inamoena K.Schum.	LC
Eragrostis plana Nees	LC
Hyparrhenia hirta (L.) Stapf	LC
Ischaemum fasciculatum Brongn.	LC
Koeleria capensis (Steud.) Nees	LC
Leersia hexandra Sw.	LC
Leptochloa fusca (L.) Kunth	LC
Panicum repentelium Napper	LC
Phalaris arundinacea L.	
Phalaris canariensis L.	
Sporobolus africanus (Poir.) Robyns & Tournay	LC
Sporobolus albicans (Nees ex Trin.) Nees	LC
Stiburus conrathii Hack.	LC
Polygala houtboshiana Chodat	LC
Polygala producta N.E.Br.	LC
Polygala spicata Chodat	LC
Polygala transvaalensis Chodat subsp. transvaalensis	LC
Oxygonum dregeanum Meisn. subsp. canescens (Sond.) Germish. var. linearifolium Germish.	LC
Persicaria lapathifolia (L.) Gray	
Portulaca hereroensis Schinz	LC
Potamogeton octandrus Poir.	LC
Potamogeton pectinatus L.	LC
Potamogeton trichoides Cham. & Schltdl.	LC
Helinus integrifolius (Lam.) Kuntze	LC
Riccia atropurpurea Sim	
Riccia natalensis Sim	
Riccia volkii S.W.Arnell	
Canthium inerme (L.f.) Kuntze	LC
Fadogia homblei De Wild.	LC
Kohautia amatymbica Eckl. & Zeyh.	LC
Pachystigma thamnus Robyns	LC
Pentanisia angustifolia (Hochst.) Hochst.	LC
Pentanisia prunelloides (Klotzsch ex Eckl. & Zeyh.) Walp. subsp. prunelloides	LC
Pygmaeothamnus zeyheri (Sond.) Robyns var. rogersii Robyns	LC
Zanthoxylum thorncroftii (I.Verd.) P.G.Waterman	LC
Thesium procerum N.E.Br.	LC
Thesium spartioides A.W.Hill	LC
Englerophytum magalismontanum (Sond.) T.D.Penn.	LC
Chaenostoma floribundum Benth.	LC
Jamesbrittenia aurantiaca (Burch.) Hilliard	LC
Manulea parviflora Benth. var. parviflora	LC
Melanospermum transvaalense (Hiern) Hilliard	LC
Zaluzianskya spathacea (Benth.) Walp.	LC
Solanum giganteum Jacq.	LC
Solanum nigrum L.	
Solanum retroflexum Dunal	LC
Solanum sisymbriifolium Lam.	
Withania somnifera (L.) Dunal	LC
Thelypteris confluens (Thunb.) C.V.Morton	LC
Gnidia capitata L.f.	LC
Gnidia kraussiana Meisn. var. kraussiana	LC
Xerophyta retinervis Baker	LC
Chascanum adenostachyum (Schauer) Moldenke	LC
Chascanum hederaceum (Sond.) Moldenke var. hederaceum	LC
Verbena brasiliensis Vell.	
Xyris gerrardii N.E.Br.	LC

HERITAGE AND PALAEONTOLOGY

The following figures show the relative sensitivity of the area for Archaeological finds and Cultural Heritage (Figure 7).

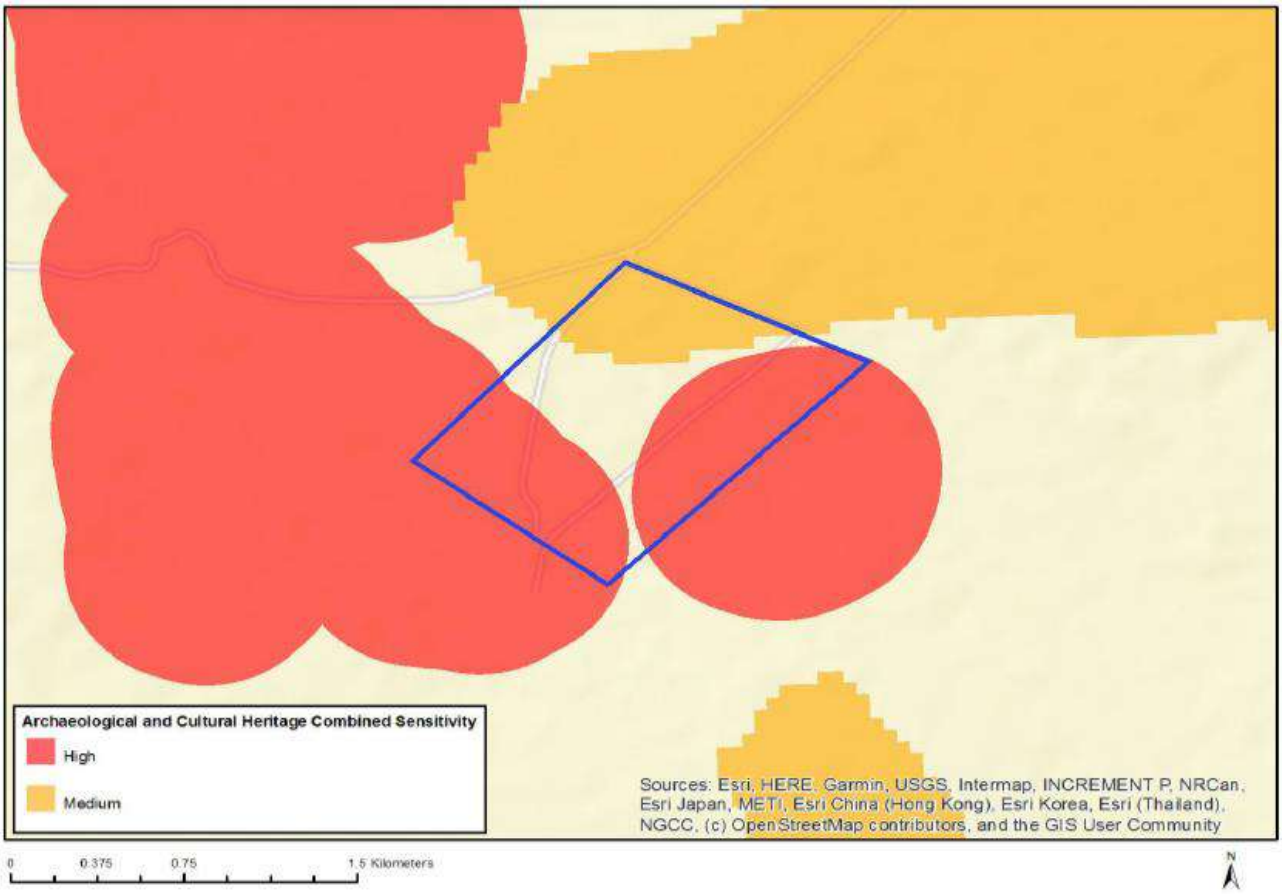


Figure 7: Relative Archaeological and Cultural Heritage Theme Sensitivity

Paleontological Record

The stratigraphic composition of the local geology contains diamictite deposits. The diamictite deposits are overlain by rocks from the Vryheid Formation consisting mainly of shales alternating with coal seams. These coal seams developed through the deposition of plant materials over a long period of time. Palaeontologically, the deposition of organic material increases the likelihood of fossil remains and therefore this coal rich formation has a high sensitivity rating. Vertebrates that occurred at this time are seldom preserved with the plants, (Bamford, 2012; SAHRIS, 2014), and none have been recorded in the Vryheid Formation. Plant fossils described by Bamford (2011) include; *Azanniodendron fertile. Cyclodendron leslii, sphenophyllum hammanskraalensis, Annularia* sp., *Raniganjia* sp., *Asterotheca* spp, *Liknopetalon enigmata, Glossopteris* > 20 species, *Hirsutum* 4 spp., *Scutm* 4 spp, *Ottokaria* 3 spp., *Estcourtia* sp., *Arberia* 4 spp., *Lidgetonnia* sp., *Noeggerathiopsis* sp. and *Podocarpidites* sp.

The Archaeological Record

The archaeological record begins with the Stone Age. Artefacts associated with the Middle Stone Age (MSA) and Late Stone Age (LSA) have been identified in the vicinity of the study area (Fourie, Steyn, Birkholtz, & Salomon, 2000). Briefly, this period is associated with the manipulation of stone to create tools, from both cores and flakes, which through time became more specialised and varied. The Stone Age dates from as early as 2.5 million years ago through to less than 150 years ago (Goodwin & Van Riet Lowe, 1929; Deacon & Deacon, 1999; Lombard, et al., 2012). During the MSA, commonly produced tools included long parallel-sided and triangular flakes. Delius and Cope (2007) notes that the MSA has not been extensively studied in the region. The LSA is marked by a series of technological changes from approximately 20 000 years ago. These include the bow and link-shaft arrow, bored stones and small stone tools for cutting meat and scraping hides (Delius & Cope, 2007). Early Iron Age sites are underrepresented in the Mpumalanga Province.

These groups moved into the eastern lowlands by the 5th century AD. Found in similar areas, most are located within close proximity to water courses to utilise nutrient rich alluvial soils for agriculture (Esterhuysen & Smith, 2007). Late Iron Age (LIA) stonewalling was also identified along the Olifants River (Fourie, Steyn, Birkholtz, & Salomon, 2000). As discussed in Delius & Cope (2007) and reproduced in De Jong (2009), the LIA in Mpumalanga dates to the 15th century onwards. These are commonly associated with the Sotho, Swazi and Ndebele in this region of Mpumalanga, however the Eastern Highveld has not been extensively researched (Maggs, 1974). Characteristic of settlements of this time period are extensive stone walling. Current understanding of the natural environment of the project area suggest that the identification of archaeological remains associated with the Stone Age and Iron Age periods are exceptions rather than the rule. This is consistent with findings contained in heritage studies previously conducted in the region, where Stone Age and Iron Age finds only constitute 4.42% of the identified heritage resources.

A Heritage Impact Assessment will be conducted and included in the EIA.

SURFACE WATER

The Weltevreden Coal Mine is located at the headwaters of the B20G quaternary catchment which is in the Wilge River catchment of the Olifants Water Management Area (WMA).

The project is located in the Upper Olifants River catchment and there are a large number of defunct mines scattered over the Wilge, Middelburg Dam and Witbank Dam catchments. The DWS report (DWAF, 2009) has reiterated on the deteriorating water quality, where Total Dissolved Solids (TDS) and sulfate concentrations in the Witbank, Middelburg and Loskop Dams have been increasing since 1970. Owing to the impacts, it is imperative that the DWS developed water management strategies. Hence the development of the Integrated Water Resource Management Plan for the Upper and Middle Olifants Catchment in 2009 (DWAF, 2009) which was responsible for setting up the Resource Water Quality Objectives (RWQO) used in this assessment. The project area lies in the greater Wilge River Catchment, which is upstream of the Loskop Dam Catchment. The confluences of the Klein Olifants, Spookspruit, Klipspruit and Wilge Rivers with the Olifants River are between Witbank and Loskop Dams.

Water Use

According to the Department of Water and Sanitation (DWS) water use database (WARMS), the main use of water in the catchment area is for agricultural irrigation and mining. Other uses identified in the area include:

- Domestic use, mainly limited to informal communities that use water for bathing and laundry, but the potential exist that the water could be used for drinking;
- Livestock watering for cattle and game.; and
- Irrigation of land. There are 36 registered users of which 98% is for irrigation use and the remaining 2% is used for mining purposes.

Water Quality

Baseline Water Quality data taken in 2015 for the Anglo Coal Umlalazi South Block Extension EIA (Shangoni, 2015) is shown in Table 5. The Umlalazi extension is located directly upstream of the proposed Weltevreden Coal Mine and also borders the Weltevreden Mining Right Application Area.

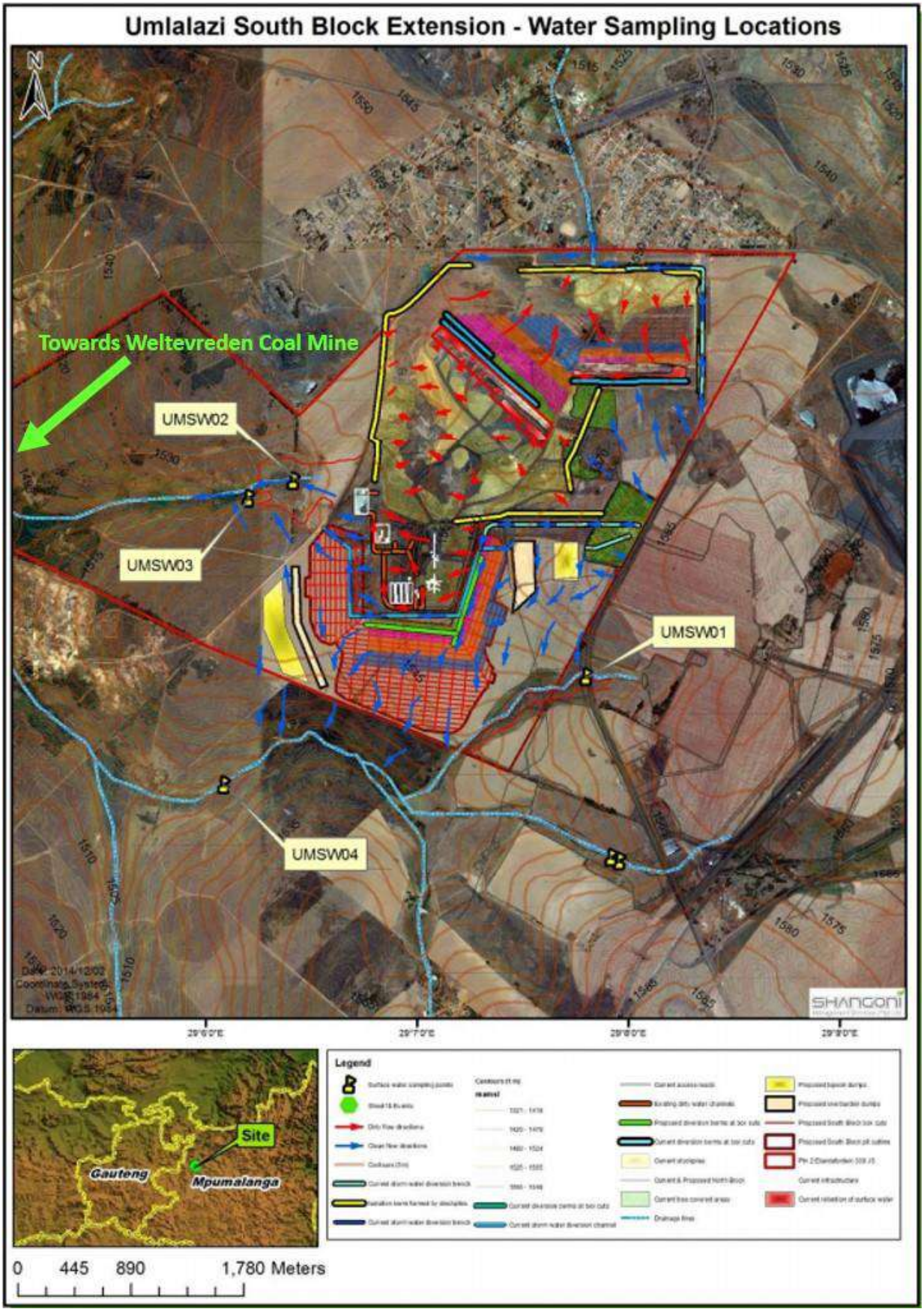


Figure 8: Umlalazi Surface Water Monitoring Points (Umlalazi South Block Extension EIA, Shangoni, 2015)

Table 5: Baseline surface water quality results (extracted from Shangoni, 2015)

Site Name	SANS 241: 2011	Livestock Watering (DWAF, 1996)	UMSW01	UMSW04	UMSW02	UMSW03
pH	≥5 to ≤9.7	-	7.45	6.84	6.96	**4.06**
EC (mS/m)	≤170	-	56.9	29.1	113	108
TDS (mg/l)	≤1200	≤2000	401	195	915	871
Ca (mg/l)		≤1000	67.4	24.8	149	125
Mg (mg/l)		≤500	32.9	14.2	75.1	67.4
Na (mg/l)	≤200	≤2000	10.6	12.8	21.9	17
K (mg/l)		-	5.99	4.78	8.34	6.18
MALK (mg/l)		-	67.8	23.3	22.5	5.22
Cl (mg/l)	≤300	≤3000	10.7	8.4	8.44	7.81
SO_4 (mg/l)	≤500 ≤250*	≤1500	**231**	114	**618**	**640**
NO_3-N (mg/l)	≤11	≤22	0.278	0.319	4.47	1.04
PO_4 (mg/l)	-	-	0.021	0.012	0.012	0.011
N_Ammonia (mg/l)	≤1.5*	-	0.054	0.028	0.078	0.073
F (mg/l)	≤1.5	-	0.251	0.263	0.254	<0.055
Al (mg/l)	≤0.3#	≤5	0.138	**1.49**	<0.003	**14.3**
Fe (mg/l)	≤2 ≤0.3*	-	0.039	0.885	<0.003	<0.003
Mn (mg/l)	≤0.5 ≤0.1*	≤10	<0.001	<0.001	**2.57**	**9.82**
Cr (mg/l)	≤0.05	≤2	<0.001	<0.001	<0.001	<0.001
Cu (mg/l)	≤2.0	≤2	<0.001	<0.001	<0.001	<0.001
Ni (mg/l)	≤0.07	≤1	<0.001	<0.001	<0.001	0.024
Zn (mg/l)	≤5	≤20	<0.002	<0.002	<0.002	<0.002
Co (mg/l)	≤0.5	≤1	<0.001	<0.001	<0.001	0.122
Cd (mg/l)	≤0.003	≤0.01	<0.001	<0.001	<0.001	<0.001
Pb (mg/l)	≤0.010	≤0.1	<0.004	<0.004	<0.004	<0.004
Tot Hardness (mg/l)		-	304	120	682	589
SAR	-	-	0.3	0.5	0.4	0.3
DWA Classification			*Good, class 1*	*Marginal, class 2*	*Marginal Class 2*	*Poor, class 3*

A detailed surface water Impact Assessment will be conducted and included in the EIA.

GROUNDWATER

Aquifer types

Hodgson and Krantz (1998) identified three distinct groundwater systems for the Olifants Catchment, namely:

- Upper weathered aquifer;
- Fractured aquifer; and
- Pre-Karoo fractured aquifer.

The weathering profile of the Ecca Group sediments on average varies between 5 m to 12 m in thickness. The upper weathered aquifer occurs within this zone, usually as a perched aquifer overlying impermeable shale or clay layers. This aquifer is generally low yielding, but of good quality as a result of dynamic groundwater flow washing away leachable salts (Hodgson and Krantz, 1998). The fractured aquifer occurs beneath the weathered aquifer, within fresh sediments. These sediments are typically well cemented, limiting significant permeation of water through, with the presence of secondary structures (fractures) providing the only pathway for groundwater movement. However, not all secondary structures are water bearing. The yields for this aquifer system are typically low with the coal seams frequently having the highest hydraulic conductivities. The water quality associated with this aquifer system contains higher salt loads as a result of longer residence times in the aquifer. The Dwyka tillite which underlay the Ecca Group sediments form a hydraulic barrier limiting the impact of mining activities (in the Ecca Group sediments) to the underlying aquifer systems (Hodgson and Krantz, 1998). Pre-Karoo aquifers have only been intersected on a few occasions, as a result of great depths required to reach the aquifer. Boreholes which have intersected this aquifer are generally low yielding with inferior water quality and low recharge capabilities due to the overlying impermeable Dwyka tillite (Hodgson and Krantz, 1998). Where dolomites of the Transvaal Supergroup underlay the Karoo Supergroup, boreholes may obtain high yields with good water quality.

Aquifer Classification

The aquifers of South Africa are defined according to their water supply potential, water quality and local importance for strategic purposes within an aquifer classification scheme and map. The aquifer classification map (Parsons, 1993) identifies the Karoo aquifers as minor systems with relatively good water quality (TDS <300mg/L), moderate vulnerability and medium susceptibility to contamination, where:

- Vulnerability is defined as the tendency or likelihood for contamination to reach a specified position in the aquifer; and
- Susceptibility is defined as a qualitative measure of the relative ease with which contamination can reach a groundwater aquifer.

Groundwater quality

Baseline Water Quality data taken in 2014 for the Anglo Coal Umlalazi South Block Extension EIA (Shangoni, 2015, AquiScience, 2014) is shown in Table 6. The Umlalazi extension is located directly upstream of the proposed Weltevreden Coal Mine and also borders the Weltevreden Mining Right Application Area.

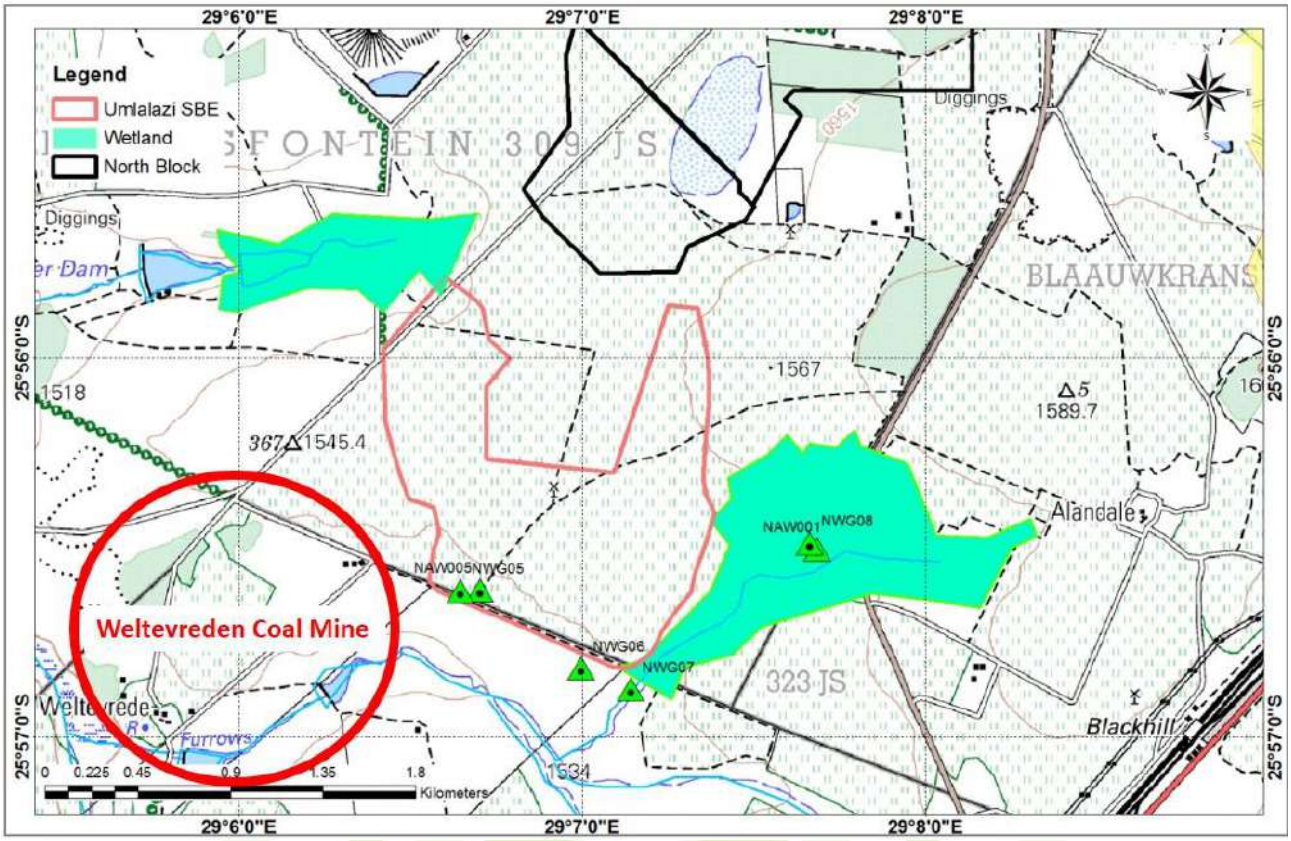


Figure 9: Position of the boreholes included in the baseline hydrocensus (extracted from AquiScience, 2014)

Table 6: Baseline hydrocensus boreholes - hydrochemical analysis results (extracted from AquiScience, 2014)

Site Name	SANS 241: 2011	NAW001	NAW005	NWG05	NWG06	NWG07	NWG08
pH	≥5 to ≤9.7	8.0	6.6	8.0	6.3	6.4	7.2
EC (mS/m)	≤170	39.1	8.9	17.8	10.4	15.5	13.4
TDS (mg/l)	≤1200	237.0	51.0	101.0	59.0	78.0	86.0
Ca (mg/l)	-	28.5	6.7	15.9	7.3	9.9	5.0
Mg (mg/l)	-	12.2	2.9	8.4	3.2	3.8	3.4
Na (mg/l)	≤200	46.7	2.8	4.2	4.7	13.9	22.3
K (mg/l)	-	3.1	2.0	2.7	3.1	1.2	1.2
MALK (mg/l)	-	211.0	8.6	85.9	18.4	42.5	70.1
Cl (mg/l)	≤300	7.2	6.7	9.7	6.3	13.4	5.4
SO_4 (mg/l)	≤500 ≤250*	7.6	1.0	1.9	3.3	8.4	4.0
NO_3-N (mg/l)	≤11	0.4	5.2	0.3	4.5	0.3	0.3
PO_4 (mg/l)	-	0.014	<0.008	<0.008	<0.008	<0.008	<0.008
N_Ammonia (mg/l)	≤1.5*	0.665	0.033	**2.82**	0.027	0.126	0.037
F (mg/l)	≤1.5	0.3	0.1	0.7	0.1	0.3	0.2
Al (mg/l)	≤0.3#	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Fe (mg/l)	≤2	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003

Site Name	SANS 241: 2011	NAW001	NAW005	NWG05	NWG06	NWG07	NWG08
	≤0.3*						
Mn (mg/l)	≤0.5 ≤0.1*	<0.001	0.171	<0.001	0.076	0.634	0.009
Cr (mg/l)	≤0.05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cu (mg/l)	≤2.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ni (mg/l)	≤0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Tot Hardness (mg/l)	-	122	29	74	32	40	26
SAR	-	1.18	0.2	0.2	0.4	1	1.9
DWS Classification		*Ideal* Class 0		Marginal, class 2	*Ideal* Class 0	Marginal, class 2	*Ideal* Class 0

A detailed Groundwater Impact Assessment will be undertaken for the EIA

Blasting and Vibration

A detailed Blasting and Vibration Impact Assessment will be undertaken for the EIA once more detail about the blasting methods have become available.

Air Quality

The following baseline information was sourced from the ***Baseline Assessment, Problem Analysis and the Air Quality Management Plan for the Highveld Priority Area (2011).***

The Highveld area in South Africa is associated with poor air quality, and elevated concentrations of criteria pollutants occur due to the concentration of industrial and nonindustrial sources (Held et al, 1996; DEAT, 2006). The Minister of Environmental Affairs and Tourism, Martinus van Schalkwyk, therefore, declared the Highveld Priority Area (HPA) on 23 November 2007. The priority area covers 31 106 km2 , including parts of Gauteng and Mpumalanga Provinces, with a single metropolitan municipality, three district municipalities, and nine local municipalities (Figure 10)

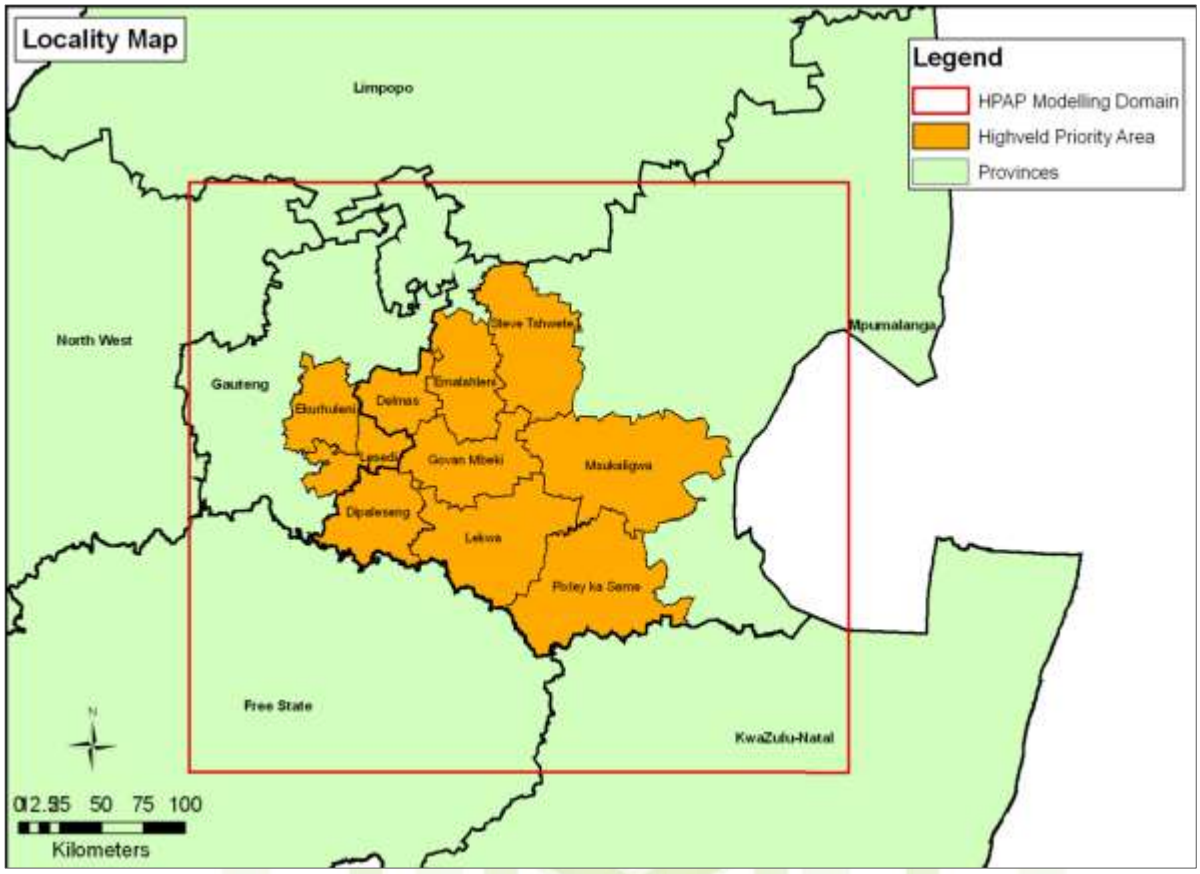


Figure 10: Highveld Priority Areas (HPA)

The total estimated annual emissions of fine particulate matter (PM_{10}) on the HPA is 279 630 tons, of which approximately half is attributed to particulate entrainment on opencast mine haul roads. The emission of PM_{10} from the primary metallurgical industry accounts for 17% of the total emission, with 12% of the total from power generation. By contrast, power generation contributes 73% of the total estimated oxides of nitrogen (NO_x) emission of 978 781 tons per annum and 82% of the total estimated sulphur dioxide (SO_2) emission of 1 633 655 tons per annum. The emission inventory for industrial sources was relatively complete and included all industries on the HPA with scheduled processes in terms of the APPA. Industrial sources in total are by far the largest contributor of emissions in the HPA, accounting for 89% of PM_{10}, 90% of NO_x and 99% of SO_2. Major industrial source contributors were grouped into the following categories:

- Power Generation
- Coal Mining
- Primary Metallurgical Operations
- Secondary Metallurgical Operations
- Brick Manufacturers
- Petrochemical Industry
- Ekurhuleni Industrial Sources
- Mpumalanga Industrial Sources

Table 7: Total emission of PM_{10}, NO_x and SO_2 from the different source types on the HPA (in tons per annum), and the percentage contribution for each source category

Source Category	PM_{10} t/a	%	NO_x t/a	%	SO_2 t/a	%
Ekurhuleni MM Industrial (incl Kelvin)	8909	3,00	15 636	2	25 772	2
Mpumalanga Industrial	684	0,00	590	0	5 941	0
Clay Brick Manufacturing	9708	3,00	-		9 963	1
Power Generation	34373	12,00	716 719	73	1 337 521	82
Primary Metallurgical	46805	17,00	4 416	0	39 582	2
Secondary Metallurgical	3060	1,00	229	0	3 223	0
Petrochemical	8246	3,00	148 434	15	190 172	12
Mine Haul Roads	135766	49,00	-		-	-
Motor vehicles	5402	2,00	83 607	9	10 059	1
Household Fuel Burning	17239	6,00	5 600	1	11 422	1
Biomass Burning	9438	3,00	3 550	0	-	-
TOTAL HPA	**279630**	**99***	**978781**	**100**	**1633655**	**101***

* *Total Percentage does not count to 100% due to rounding of figures.*

Ambient air quality

Most of the HPA experiences relatively good air quality, but ambient air quality standards for SO_2, PM_{10} and ozone (O_3) concentrations are exceeded in nine extensive areas. These "hot spots" are illustrated in Figure 10 by the number of modelled exceedances of the 24-hour SO_2 and PM_{10} standards, and are confirmed by ambient monitoring data (Table 8). The air quality hot spots result mostly from a combination of emissions from the different industrial sectors and residential fuel burning, with motor vehicle emissions, **mining** and crossboundary transport of pollutants into the HPA adding to the base loading.

Available monitoring confirms that the areas of concern are in the vicinity of **Witbank 2**, Middelburg, Secunda, Ermelo, Standerton, Balfour, and Komati where exceedances of ambient SO_2 and PM_{10} air quality standards occur (Table 8).

Table 8: Exceedances at HPA sites based on historic and new monitoring data

Municipality	Area	NO_2 *1-hr (88)*	O_3 *8-hr (11)*	PM_{10} *24-hr (4)*	SO_2 *24-hr (4); 1-hr (88)*
Emalahleni LM	Kendal 2	1	**58**		**34; 343**
	Phola	0		3	7; 27
	Witbank	37	9	**9**	**4**; 51
	Witbank 2		**17**	**25**	1; 11
Steve Tshwete LM	Columbus				
	Komati 2			**26**	1; 14

	Hendrina	1	**22**	3	1; 2
	Middelburg	71	**60**	**7**	1; 4
	Middelburg 2		1	**7**	0; 1
Govan Mbeki LM	Sasol Club	1		0	0; 25
	Langverwacht	1		0	2; 78
	Bosjesspruit				2; 27
	Elandsfontein	0	**73**	3	4; 33
	Leandra				6; 114
	eMbalenhle	2	4	**39**	0; 1
Msukaligwa LM	Camden	0	**24**	1	0; 4
	Ermelo	1	**73**	**22**	**21**; 10
Pixley Ka Seme LM	Amersfoort				
	Majuba 1				4; 87
	Majuba 2				
	Verkykkop	0	**46**	0	1; 7
Lekwa	Standerton	4	10	**29**	1; 6
Dipaleseng	Balfour		**29**	**8**	0; 4

NB. - Row 1: The averaging period for the relevant pollutant's standard is represented below the pollutant and following the allowed frequency of exceedance in brackets - Exceedances in bold are greater than the permitted frequency in the standard for the monitoring period. The permitted frequency of exceedance varies according to period for which data is presented at each monitoring site, and for Eskom and Sasol stations must be assessed against a cumulative permitted frequency of exceedance for 3 years of data

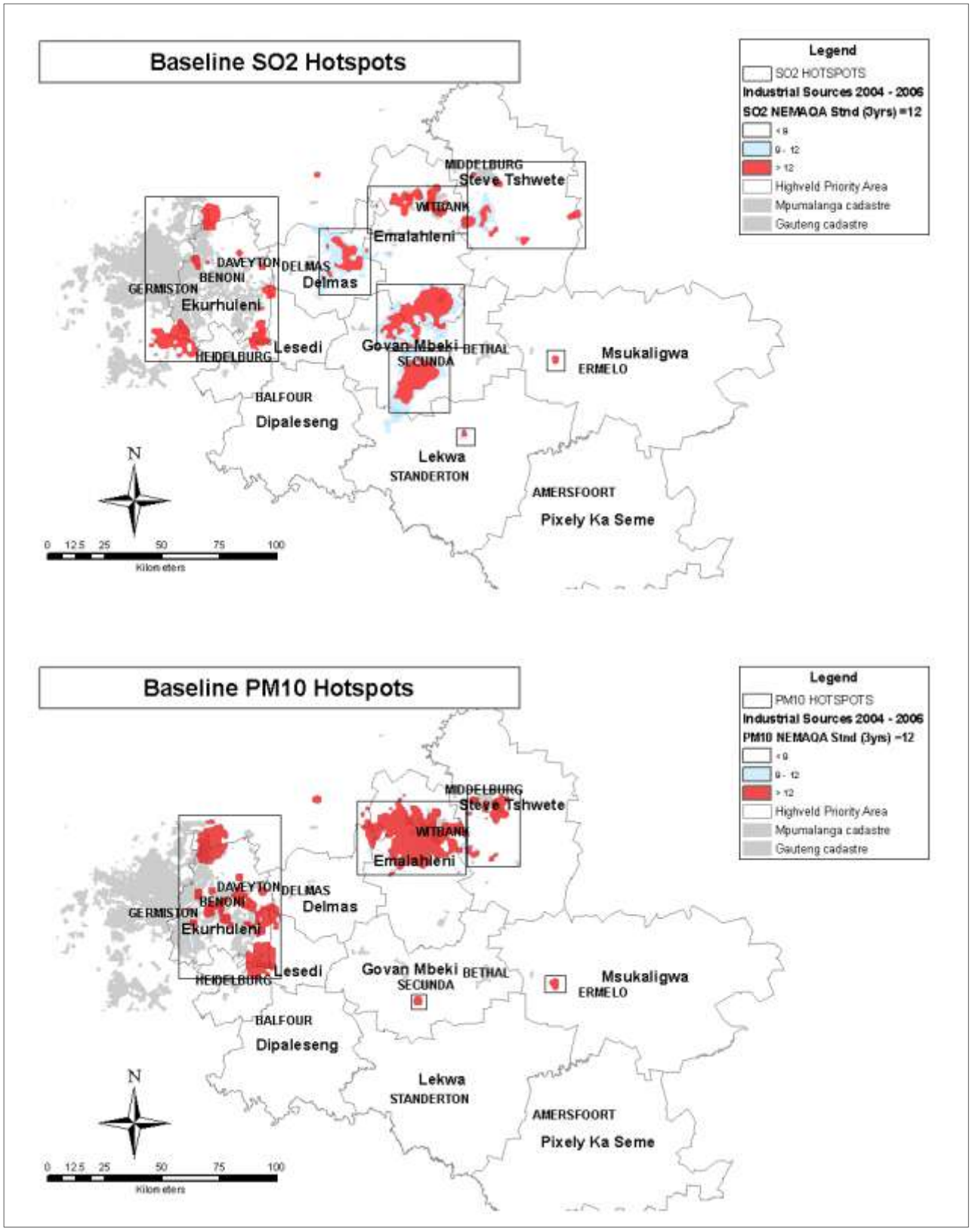


Figure 11: Modelled frequency of exceedance of 24-hour ambient SO_2 and PM_{10} standards in the HPA, indicating the modelled air quality Hot Spot areas

Detailed Air Quality Impact assessment will be undertaken for inclusion in the EIA report

NOISE

Table 9 depicts acceptable noise levels within districts according to the SANS 10103 guideline.

Table 9: Acceptable rating levels for noise in districts (SANS 10103, 2008)

Type of District	Equivalent continuous rating level ($L_{Reg.T}$) for noise (dBA)					
	Outdoors			Indoors, with open windows		
	Day-night	Day-time	Night-time	Day-night	Day-time	Night-time
	$L_{R,dna}$	$L_{Req,db}$	$L_{Req,nb}$	$L_{R,dna}$	$L_{Req,db}$	$L_{Req,nb}$
RESIDENTIAL DISTRICTS						
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
NON-RESIDENTIAL DISTRICTS						
d) Urban districts with some workshops, with business premises, and with main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50
NOTE 1 If the measurement or calculation time interval is considerably shorter than the reference time intervals, significant deviations from the values given in the table might result.						
NOTE 2 If the spectrum of the sound contains significant low frequency components, or when an unbalanced spectrum towards the low frequencies is suspected, special precautions should be taken and specialist advice should be obtained. In this case the indoor sound levels might significantly differ from the values given in columns 5 to 7						
NOTE 3 In districts where outdoor $L_{R,dn}$ exceeds 55 dBA, residential buildings (e.g. dormitories, hotel accommodation and residences) should preferably be treated acoustically to obtain indoor $L_{Req,T}$ values in line with those given in table 1.						
NOTE 4 For industrial districts, the $L_{R,dn}$ concept does not necessarily hold. For industries legitimately operating in an industrial district during the entire 24 h day/night cycle, LReq,d = LReq,n =70 dBA can be considered as typical and normal.						
NOTE 5 The values given in columns 2 and 5 in this table are equivalent continuous rating levels and include corrections for tonal character, impulsiveness of the noise and the time of day.						
NOTE 6 The noise from individual noise sources produced, or caused to be produced, by humans within natural quiet spaces such as national parks, wilderness areas and bird sanctuaries, should not exceed a maximum Weighted sound pressure level of 50 dBA at a distance of 15 m from each individual source.						
a The values given in columns 2 and 5 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness of the noise and the time of day.						
b The values given in columns 3, 4, 6 and 7 are equivalent continuous rating levels and include corrections for tonal character and impulsiveness.						

The probable community/group response to levels in excess of the acceptable rating levels are presented in Table 10, where LReq,T is the equivalent continuous A-weighted sound pressure level, in decibels (dBA), determined over a specific time period. 'A-weighted' is a standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

Table 10: Categories of community/group response (SANS 10103, 2008)

Excess ($\Delta L_{Req,T}$)[a]dBA	Estimated community/group response	
	Category	Description
0 – 10	Little	Sporadic complaints
5 – 15	Medium	Widespread complaints
10 - 20	Strong	Threats of action
>15	Very strong	Vigorous action
NOTE Overlapping ranges for the excess values are given because a spread in the community reaction might be anticipated.		
a $\Delta L_{Req,T}$ should be calculated from the appropriate of the following:		
1) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS LReq,T of the residual noise (determined in the absence of the specific noise under investigation);		
2) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the maximum rating level for the ambient noise given in table 1;		
3) $\Delta L_{Req,T}$ = $L_{Req,T}$ of ambient noise under investigation MINUS the typical rating level for the applicable district as determined from table 2; or		
4) $\Delta L_{Req,T}$ = Expected increase in $L_{Req,T}$ of ambient noise in an area because of a proposed development under investigation.		

A baseline assessment will be undertaken to determine the current ambient noise level at the nearest noise sensitive receptor to the proposed project.

SOILS

The land type occupying the project area is Bb 13 land type of the 2528 and 2628 Pretoria and East Rand Land Type maps (Land Type Survey Staff, 1989). The presence of a plinthic catena dominates this land type. A very large area of Mpumalanga Province is occupied by plinthic catena that in its perfect sequence is represented by (in order from highest to lowest in the upland landscape crest, midslope and foot slope positions). Red well drained soils for example Hutton soil types, yellow Clovelly soils in the midslope landscape position and less well drained soil in foot slope and valley bottom positions such as the Fernwood and Longlands soil forms. In addition, shallow Glencoe and Dresden soils, underlain by hard plinthite, occur in some places within the landscape.

The underlying geology of land type Bb 13 consists of sandstone, grit, shaly sandstone and shale of the Ecca Group, Karoo Sequence. The area occupied by the Bb 13 land type is 40 316 ha. The Bb 13 land type is, is dominated by 40 % crest and 45 % midslope positions, the remainder (15 %) is occupied by valley bottom landscape positions.

The Bb13 Land type is dominated by deep well drained yellow-brown apedal soils, with about 70% of the land type having these soils; they have an average slope of around 3 %. The following list of soil types occurs within the crest (40%) in this land type:

- Clovelly (Cv) – 45%
- Avalon (Av) – 15%
- Other shallow soil types such as the Glencoe (Gc) soil – 40%

The following list of soil types occurs within the midslope (45%) in this land type:

- Clovelly (Cv) – 35%
- Avalon (Av) – 35%

- Other shallow soil types such as the Glencoe (Gc) soil – 30%

A detailed soils, land use, and land capability assessment will be undertaken for inclusion in the EIA

SOCIAL ECONOMIC

The proposed Project is located in eMalahleni Local Municipality (ELM), within the Nkangala District Municipality (NDM) in Mpumalanga Province. The socio-economic characteristics of the population within each of the aforementioned areas are listed below.

Population and Demographics

According to the ELM 2013-2014 IDP, this municipality is the largest economic contributor to the NDM of the six local municipalities, contributing 45% to the districts economy. Dominant economic contributors include utilities (74.1%), mining (52.8%) and construction (52.5%). Emalahleni's population size, as recorded by Stats SA 2011, was 395 466 people which makes up 30% Nkangala District's population. The population lives in 119 874 households with an average household size of 3.3 people. This is a relatively low family size, which may reflect the young age of the urban centres in the district, in which large family structures have not had time to develop. More established towns generally have average family sizes in excess of 4.5 people, while rural areas often average 5.5 people or more per household. The ELM's population grew by 43.1% between 2001 and 2011 while annualised population growth rate was measured at 3.6%.

Educational Status

Educational achievement is a key development indicator of a population. The majority of the population (ages over twenty) in the local study area as well as district municipality have not completed matric, however, there is a large percentage of learners who complete primary level education.

Employment and Labour

According to Statistics South Africa, (2011) the employment rate for Mpumalanga Province and Nkangala District Municipality was 24% and 27% respectively (Stats SA, 2011). There has been a drop in unemployment rate in the ELM from 38.4% to 27% between 2001 and 2011. A large portion of those employed are absorbed into the mining, construction, power generation and agricultural sectors.

Annual Household Income

Over 40% of people in Mpumalanga Province have no annual income at all. Average income figures for the local study area, the ELM and the NDM are all very much in line with the provincial average; however, the income earning figures are slightly higher for the local study area, with more people earning between R3 201 and R12 800 (Stats SA, 2011). It can be gathered that the ELM has a higher income production than the provincial figures. This is attributed to the concentration of mining and power generation activities, and construction industry in this area (Stats SA, 2011).

Social Infrastructure and Services

All the urban areas within ELM (with the exception of informal settlements and townships) are fully reticulated in terms of potable water supply. A large percentage of households in the local study area have access to piped water either inside their house or within a communal yard, with an average of 77% having access to municipal water, whilst 8% have access to water through a borehole. In terms of sanitation, data from the 2011 census, show that an estimated 57% of households in the local study area have access to waterborne sewer services (flush toilets, with or without septic tanks); the majority (33%) of the remaining households use pit latrines (Stats SA, 2011). An estimated 69% of waste generated within the ELM is collected weekly by the local municipality. In contrast to the ELM, the most common means of waste disposal for populations in Ward 30 is through utilisation of their own refuse dumps (39%), 36% make use of municipal services and a significant amount of the population has no means of waste disposal at all. Of the households in local study area, 53% use electricity for cooking, heating and lighting. In contrast 69% of the households in the ELM use electricity. The bulk electricity provider throughout the municipality is Eskom (ELM IDP, 2012 - 2013). The ELM is strategically located in terms of the provincial context and transport network. It is situated in close proximity to the City of Johannesburg, City of Tshwane and Ekurhuleni Metropolitan Municipalities in Gauteng, and is connected to these areas by the N4 and N12 freeways. Although roads in the ELM are

sufficiently connected with district, provincial and national roads, many secondary road systems are in a state of disrepair, being insufficient to handle the increased traffic created by mining and other industrial developments. Crime and community safety is generally a cause of concern for communities in the local study area. There has been a history of substance abuse and widespread criminal activity in the area, with several instances of community conflict, industrial action and opposition towards the local municipality and surrounding mining companies.

Health Services

It was found in an interview with the head nurses at the Phola Community Health Centre and the Ogies Clinic that prostitution has become an increased problem within the region as a result of the mining operations; this then in turn leads to an increase in HIV/AIDS rates. The mining operations also have resulted in an influx of inhabitants into the area which has put tremendous strain on health facilities.

2.h.iv.1.b Description of the current land uses.

The current land use for the project area is agriculture (planted pastures and/or grazing with Mining activities the project area.

2.h.iv.1.c Description of specific environmental features and infrastructure on the site.

The site is traversed by a watercourse on its southern and western boundary, with built structures and farm steads located on site.

2.h.iv.1.d Environmental and current land use map.

(Show all environmental, and current land use features)

Refer to Annexure 3

2.h.v Impacts identified

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability and duration of the impacts

The anticipated impacts associated with the project is as follows:

Table 11: List of Preliminary Issues

PRELIMINARY IMPACTTO BE ASSESSED	CONSTRUCTION PHASE	OPERATIONAL PHASE	DECOMMISSIONING PHASE	POSTIVE/ NEGATIVE
POTENTIAL TO ALTER THE TOPOGRAPHY	✓	✓	✓	-
LOSS OF SOIL CHARACTERISTICS - EROSION AND COMPACTION	✓	✓	✓	-
CHANGE IN LAND USE FROM FARMING TO MINING	✓	✓	✓	-
LOSS OF BIODIVERSITY – VEGETATION CLEARANCE, HABITAT DESTRUCTION AND FAUNAL DISPLACEMENT	✓	✓	✓	-
POTENTIAL FOR ALIEN INVASIVE ESTABLISHMENT	✓	✓	✓	-

REDUCED FLOW TO DOWNSTREAM WATER CATCHMENT	✓	✓	✓	-
POTENTIAL POLLUTION TO WATER RESOURCES (SURFACE AND GROUNDWATER)	✓	✓	✓	-
DRAWDOWN CONE FROM DEWATERING ACTIVITIES (GROUNDWATER QUANTITY)	✓	✓	✓	-
INCREASED DUST AND EMISSIONS	✓	✓	✓	-
INCREASED NOISE LEVELS	✓	✓	✓	-
VISUAL AESTHETICS AND SENSE OF PLACE WILL BE ALTERED	✓	✓	✓	-
DAMAGE TO PROPERTY/INFRASTRUCTURE FROM BLAST EVENTS	✓	✓	✓	-
POTENTIAL DAMAGE TO HERITAGE SITES (GRAVE AND/OR ARCHAEOLOGICAL ARTEFACTS)	✓	✓	✓	-
INFLUX OF JOB SEEKERS TO THE AREA	✓	✓	✓	-
INCREASED TRAFFIC – COAL HAULAGE	✓	✓	✓	-
EMPLOYMENT OPPORTUNITIES	✓	✓	✓	+
ECONOMIC STIMULATION	✓	✓	✓	+

2.h.vi Methodology used in determining the significance of environmental impacts

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The assessment and evaluation of environmental impacts is often complicated by the subjective nature of these impacts. Ideally, the degree of severity or significance of a particular impact should be expressed in quantitative terms, against a quantitative assessment of the conditions that pertained before a particular activity started. There must also be some expression as to whether a particular impact is desirable or not, as the desirability of an impact will depend largely on the attitude and experience of the assessment team, subjectivity is unavoidable.

In order to address these issues and to provide a basis for comparison of the different impacts associated with the activities, a number of standard definitions and approaches will be used.

CATEGORY	DESCRIPTION OR DEFINITION
Statement	A brief written statement, stating which environmental aspect is impacted by a particular project activity or sequence of project activities.
Type of Impact	This defines what type of impact takes place. No value is allocated for a type of impact. Cumulative impacts will be dealt with in a separate table.
Direct	Direct result (impact) of an action (aspect).
Indirect	Impacts that are not a direct result (impact) of the strategic action (aspect) but occur away from the original source of impact or as a result of a complex pathway. Indirect impacts are often called secondary, tertiary etc. impacts, depending on how many steps there are between the original source and its impact

Cumulative	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

CATEGORY	VALUE	DESCRIPTION OR DEFINITION
Extent		Extent to which the impact will occur
Site	1	Only as far as the activity
Local	2	Site and immediate surroundings
Regional	3	Impact on a regional scale
National / International	4	National or International
Duration		The term or time period during which the impact is expressed, not the time until the impact is expressed. Where necessary, the latter is separately specified.
Temporary	1	This is very short term, usually a construction impact
Short term	2	During the operational activities
Long term	3	During closure / decommissioning of the operation
Permanent	4	Post-closure phase
Severity		The magnitude of the potential impact
Very Low	1	Natural, cultural and social functions are not affected
Low	2	Affected environment is altered but natural, cultural, and social functions and process continue both in a modified way
Moderate	3	Natural, cultural and social functions and processes are altered to the extent that it would temporarily cease
High	4	Natural, cultural and social functions and process are altered to the extent that it would permanently cease
Probability		The likelihood of the impact occurring
Improbable	1	Low possibility because of design or historic experience
Probable	2	Distinct probability to occur
Highly probable	3	Most likely to occur
Definitely	4	Will occur regardless of any prevention measures and/or there is a history of (an) incident/s and/or complaints
Significance		This is integration (i.e.an opinion) of the severity, type, extent, probability and duration of the impact. It is the best judgment of whether the impact is important or not within the broad context, once mitigation is taken into account. By adding the value of the extent, duration, severity and probability, a significance value will be obtained for each impact. A significance rating is assigned twice to the impact. Firstly, to indicate significance without mitigation or optimization and secondly, to indicate significance after mitigation or optimization. This is done to highlight the importance of mitigation or optimization of potential impacts.

No impact		A potential concern or impact, which, upon evaluation, is found to have no impact.
Very Low	1 - 4	Impacts will be of very low significance if the added values are between 1 and 4.
Low	5 - 8	Impacts will be of low significance if the added values are between 5 and 8.
Moderate	9 - 12	Impacts will be of moderate significance if the added values are between 9 and 12.
High	13 - 16	Impacts will be of high significance if the added values are between 13 and 16.
Very High	17 - 20	Impacts will be of very high significance if the added values are between 17 and 20.

Description of bio-physical assessment parameters with its respective weighting

Table 12: Rating Table

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

2.h.vii 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.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties)

Refer to Table 11

2.h.viii The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

To be updated once the specialist has completed their studies and comment has been received from I&APs during the Draft EIA Phase. The following is proposed in the interim:

- Design the surface and storm water infrastructure to be within the footprint of the project area
- Separate clean from dirty water and allow discharge of water to designated areas.
- Vegetate disturbed areas to limit erosion
- Implement berms, trenches and storm water management measures in accordance with GN 704 Regulations
- Pollution Control Dams to be designed to cater for the required storage capacity

- Compacted soil areas in and around the periphery of the wetland will be ripped to break up compacted soil and vegetated with indigenous seed mix
- Comply with the National Air Quality Standards and Dust Control Regulations
- Comply with the SANS noise standard
- Avoid travelling past residences. Speed limit of 40km/h will be enforced. Liaise with landowner on areas sensitive to noise. Provide a buffer of 100m from households
- Prescribe to the DWS Catchment Water Quality Standards
- Restrict traveling speed of vehicles to reduce vehicle entrainment of dust. Wet gravel roads if dust is found to be excessive.
- No-go areas to be identified. Environmental awareness training of all employees
- Preference to be given to the use of local employment, contractors and local suppliers.
- Implement measures to protect soils from pollution.
- Reduce the visual impacts of mining activities, i.e. rehabilitation
- Site selection aimed at minimising disturbance to sensitive animal habitats and breeding areas.
- Utilise existing access roads as far as possible.
- Access roads to follow slope contours where possible. Vegetation to be left in place at the sides of the road to protect the soils.

2.h.ix The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

To be submitted with the Draft EIA Report once the specialist has given their input.

2.h.x Motivation where no alternative sites were considered.

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative sites were considered.

2.h.xi Statement motivating the preferred site.

(Provide a statement motivation the final site layout that is proposed)

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout.

Once specialist studies have been undertaken the most suitable layout will be finalised and presented in the EIA.

2.i PLAN OF STUDY FOR THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

2.i.i Description of alternatives to be considered including the option of not going ahead with the activity.

Refer to Section 2.h.i

2.i.ii Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc…etc…etc.).

A team of specialist Scientists and Engineers have been appointed to undertake the following specialist studies. These studies will investigate the baseline environment, potential impacts and provide management measures where applicable.

- Socio-Economic Impact Study
- Air quality
- Traffic
- Aquatic Ecology
- Storm Water Management Plans
- Ecological
- Geo-hydrological
- Surface water
- Wetland
- Heritage, Archaeological, and Paleontology
- Soils, land use and land capability

Specialists' Scope of Work

Table 13: Specialist Scope of Work

Specialist Study	Scope of Work
Air quality	The purpose of this baseline study is to:
	- Study the available information relevant to the pre and post-development ambient air quality pollution concentrations in the environment;
	- Identify the major existing air emission sources in the environment;
	- Identify the existing sensitive air pollution areas in the environment;
	- Estimate by means of measurements and integration of the results with those of any relevant existing information the present ambient air quality climate;
	- Identify the processes and equipment that will cause the major contribution to the future air quality impact;
	- Consider, evaluate and rate the potential air quality impacts; and
	- Propose relevant management and mitigation measures to lessen the anticipated impacts.
	It is highly recommended that baseline dust monitoring be conducted for at least 3 months prior to the start of the project.
Aquatic Ecology	The assessment will be conducted as part of a three phase approach. The first phase consisted of a rapid desktop assessment. The second phase was conducted in field to gather data. The third phase consisted of an impact assessment and reporting by combining field data and desktop data.
	1. Rapid desktop assessment:
	Google Earth satellite imagery
	Aerial photographs
	GIS mapping software
	2. Field assessment by identifying the presence of one (at least) or more of the following attributes:
	Wetland/hydromorphic soils

Specialist Study	Scope of Work
	Hydrophytes
	High water table
	3. Combining desktop data, field data and calculating the Wetland Index of Habitat Integrity (DWA, 2007) by using the following indices:
	Present Ecological status
	Ecological Importance and Sensitivity
	Ecosystem Services supplied by wetland
	The following sections deal with the Wetland Index of Habitat Integrity as performed as part of the third phase of the study approach.
Social Impact Assessment	1) Identification of key stakeholders;
	2) Development of a social profile of the affected community;
	3) Identifying all applicable legislative and regulatory considerations;
	4) Undertaking stakeholder consultation;
	5) Assessment of possible social and economic impacts;
	6) Rating of impacts according to significance (severity, probability, duration, spatial extent and
	7) stakeholder sensitivity;
	8) Making a clear distinction between objective and subjective impacts;
	9) Provision of management guidelines for anticipated impacts; and
Ecological Assessment	The study will include two phases:
	10) Desktop study:
	- Review of existing information e.g. EIA, Specialist studies, Mining right, WULA etc.;
	- Analysis of recent Google maps;
	- Literature review of fauna and flora in the area;
	- Review of endangered species known to occur in the area;
	11) Detailed Terrestrial Ecology Report including a wetland delineation and functional assessment
Geo-hydrological	The scoping groundwater study will include, amongst others, the following information as required in terms of the MPRDA:
	- A description of the groundwater environment likely to be affected by the proposed mining activities;
	- An assessment of potential impacts on the groundwater environment.
	- A summary of the potential significance of identified impacts;
	- Proposed mitigation and management measures to minimise adverse impacts and to optimise benefits;
	- Planned monitoring and performance assessment of the EMP and Rehabilitation measures of areas disturbed during mining activities.
Surface water	The assessment will be conducted as part of a three-phase approach. The first phase consisted of a rapid desktop assessment. The second phase was conducted in field to gather data. The third phase consisted of an impact assessment and reporting by combining field data and desktop data
	1. Rapid desktop assessment:
	Google Earth satellite imagery
	Aerial photographs
	GIS mapping software
	2. Field assessment by identifying the presence of one (at least) or more of the following attributes:
	Wetland/hydromorphic soils
	Hydrophytes
	High water table
	3. Combining desktop data, field data and calculating the Wetland Index of Habitat Integrity (DWA, 2007) by using the following indices:
	Present Ecological status
	Ecological Importance and Sensitivity

Specialist Study	Scope of Work
	Ecosystem Services supplied by wetland
Wetland Impact Assessment	As above
Heritage, Archaeological, and Paleo	Phase 1 Archaeological Impact Assessments generally involve the identification of sites during a field survey with assessment of their significance, the possible impact development might have and relevant recommendations.
	All Archaeological Impact Assessment reports should include:
	a. Location of the sites that are found;
	b. Short descriptions of the characteristics of each site;
	c. Short assessments of how important each site is, indicating which should be conserved and which mitigated;
	d. Assessments of the potential impact of the development on the site(s);
	e. In some cases a shovel test, to establish the extent of a site, or collection of material, to identify the associations of the site, may be necessary (a pre-arranged SAHRA permit is required); and
	f. Recommendations for conservation or mitigation.
	This AIA report is intended to inform the client about the legislative protection of heritage resources and their significance and make appropriate recommendations. It is essential to also provide the heritage authority with sufficient information about the sites to enable the authority to assess with confidence:
	a. Whether or not it has objections to a development;
	b. What the conditions are upon which such development might proceed;
	c. Which sites require permits for mitigation or destruction;
	d. Which sites require mitigation and what this should comprise;
	e. Whether sites must be conserved and what alternatives can be proposed to relocate the development in such a way as to conserve other sites; and
	f. What measures should or could be put in place to protect the sites which should be conserved.
Visual	The scope of work for this Visual Impact Assessment will include:
	- Describe the existing visual characteristics of the proposed sites and its environs;
	- Viewshed and viewing distance;
	- Visual Exposure Analysis;
	- Viewer Sensitivity;
	- The overall objective of the Visual Impact Assessment (VIA) is to assess the significance of the visual impacts that will be caused by the mining activities.
Soils, land use and land capability	The following scope of work is proposed:
	· A study of the diagnostic soil horizons, soil forms and soil series for the area, including an assessment of effective profile depth and the classification of soils according to the South African Soil Classification System (Soil Working Group, 1991).
	· An assessment of the pedohydrological functioning of the area in order to shed light on the water storage capacity of the soils and occurrence of wetland or hydromorphic soils. Characteristics that will be noted include:
	- Fe(II)/Fe(III) layered double hydroxides (green rusts) that is indicative of moderate conditions of reductions and soils that are moist for prolonged periods;
	- The accumulation of ferrihydrate, lepridocrosite, goethite and hematite in vesicular nodules (mottling) owing to the reduction of Fe(III) to Fe(II), under conditions of a fluctuating water table;
	- The occurrence of grey colours, especially where mottling is not present, as a further indication of Fe mobilisation and semi-permanent or permanent conditions of water saturation;
	- The occurrence of bleached soil horizons that indicate lateral drainage of water;
	- The occurrence of uniform red and yellow colouration that is indicative of well drained areas;
	- Signs of Mn mobilisation and/or precipitation as indicating a fluctuating water table;
	- The occurrence of smectite clays that lead to swelling and shrinking characteristics in soil and that is conducive to water flow in the dry state but not in the wet state.
	- Texture of the soil horizons as a means to assess the water holding capacity, saturated water content and saturated hydraulic conductivity,
	- Textural changes, and other aspects, in the soil profile that will influence saturated and unsaturated flow of water.
	- Occurrence of layers, such as the rocks, ferricrete and/or calcrete, which impede water flow.

Specialist Study	Scope of Work
	- Occurrence of concretions, stones or pebbles in the soil horizons and the effect on water holding capacity, saturated water content and saturated hydraulic conductivity.
	· Representative soil samples will be collected and subjected to chemical and physical analyses. The following analyses will be conducted:
	- Water soluble cations and anions;
	- pH and EC (electrical conductivity);
	- Exchangeable/weakly complexed fraction of major cationic plant nutrients – calcium (Ca), sodium (Na), magnesium (Mg), potassium (K)
	- Cation exchange capacity
	- Plant available phosphorus (P), nitrogen content
	- Organic carbon content
	- Soil particle size distribution (texture including clay and silt content)
	- Soil salinity levels will be calculated.

2.i.iii Description of aspects to be assessed by specialists

Refer to previous section 2.i.ii, Table 13

2.i.iv Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

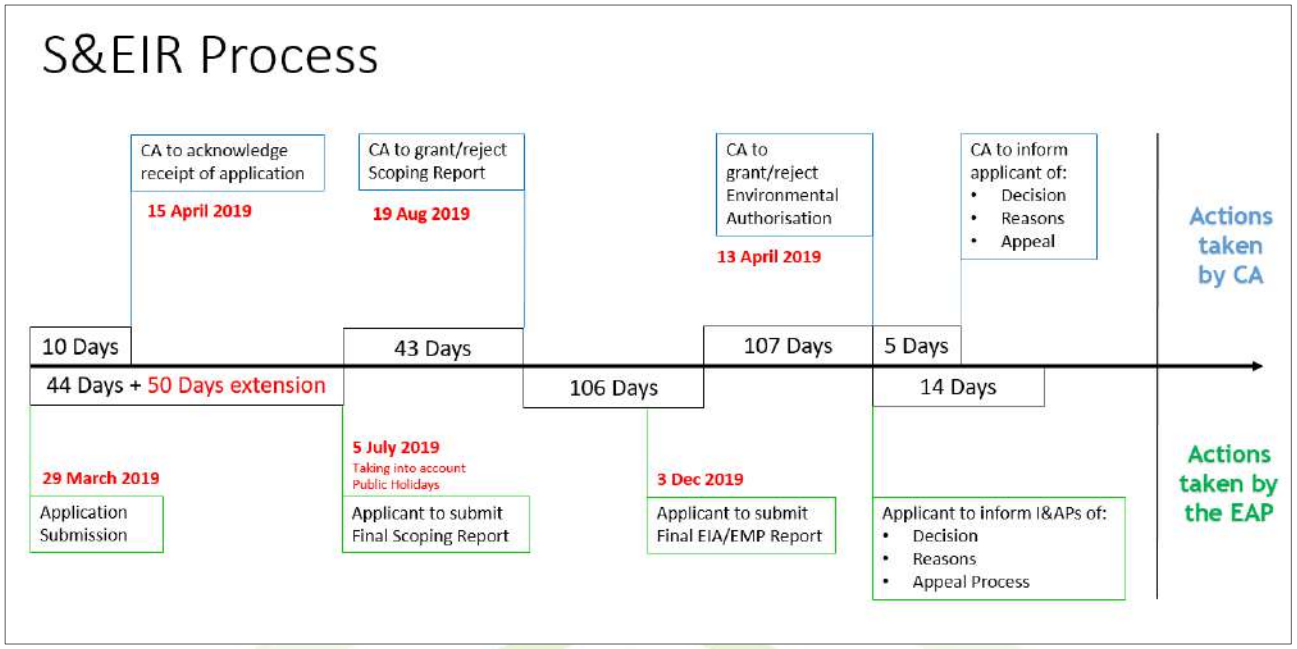
Refer to previous section 2.i.ii, Table 13

2.i.v The proposed method of assessing duration significance

Refer to previous section 2.i.ii, Table 13

2.i.vi The stages at which the competent authority will be consulted

- Application Stage (application form submitted on 29 March 2019)
- Copy of the Draft Scoping Report to be submitted for their records (17 May 2019)
- Submission of the Final Scoping Report for review and comment (5 July 2019, with granting of the extension request)
- Copy of the Draft EIA Report to be submitted for their records (TBC)
- Copy of the Final EIA Report to be submitted for review and decision making (TBC)



2.i.vii Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

2.i.vii.1 Steps to be taken to notify interested and affected parties.

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h) (ii) herein).

Section 41 of NEMA Regulation 982 (specifically Chapter 6) set out the Legal and Regulatory Requirement for Public Participation. The Public Participation Process (PPP) aims to involve the authorities and I&APs in the project process, and determines their needs, expectations and perceptions which in turn ensures a complete and comprehensive environmental study. An open and transparent process will/has been followed at all times and is based on reciprocal dissemination of information. The following was undertaken during the PPP:

a. Identification of Interested and Affected Parties (IAPs);

b. Notification of IAPs regarding the proposed project via newspaper adverts (in the Witbank News); the placing of site notices at conspicuous places, the sending of notices to affected parties via email and sms (in the form of Background Information Documents) to adjacent landowners.

c. A public information meeting (open day) with IAPs held on 31 May 2019 at the eMalahleni Public Library;

d. Gathering comments, issues and concerns from IAPs;

e. Responding to IAP comments, issues and concerns;

f. Compilation and submission of results of consultation report to the DMR; and

g. Providing IAPs with the opportunity to review and comment on the Draft Scoping and EIA Reports

h. Further personal consultation with affected landowners

2.i.vii.2 Details of the engagement process to be followed.

(Describe the process to be undertaken to consult interested and affected parties including public meetings and one on one consultation. NB the affected parties must be specifically consulted regardless of whether or not they attended public meetings and records of such consultation will be required in the EIA at a later stage).

All persons registered as I&APs and organs of state identified through the scoping phase PPP will be sent invites to attend the Scoping and EIA Phase PPP meeting. The meeting will address specialist findings, focusing on sensitive issues, and provide information on the impact probability and significance. Proposed mitigation measures will also be discussed. The meeting will be recorded and minuted, and the minutes distributed to all attendees and I&APs for comment.

I&APs will be notified of the availability of the Scoping Report and EIA and EMP reports and associated Appendices for public review and comment, the location where the hard copy and electronic copies can be viewed and the timeframe (30 calendar days, which will be extended if significant public holidays occur within this period as per NEMA EIA regulations) for comment. All comments received from the review phase will be incorporated into the issues and response table and incorporated into the Final PPP Report and Final EIA and EMPr for submission to authorities. During the EIA and EMPr phase, if the need is identified to have one-on-one micro consultations, then these will be organised with the relevant I&AP. Upon receipt of an Environmental Authorisation, all registered I&APs will be notified of decision and the appeal process they can follow under NEMA.

2.i.vii.3 Description of the information to be provided to Interested and Affected Parties.

(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land).

I&APs will have access to any of the project information as per the NEMA and PAIA. They will also be given ample opportunity to comment and provide input on the relevant pieces of information during the S&EIR process.

2.i.viii Description of the tasks that will be undertaken during the environmental impact assessment process

- Public Review of the Draft Scoping Report (30 days)
- Public Engagement and gathering of issues and comments
- Finalising of the Scoping Report and submission to the DMR for consideration
- Undertaking of the specialist studies and risk assessment phase
- Drafting of the EIA Report, EMP and IWULA
- Public Review of the Draft EIA Report and EMP (30 days) including the IWULA
- Public Engagement and gathering of issues and comments
- Finalisation of the EIA Report and EMP, submission to the DMR for decision making

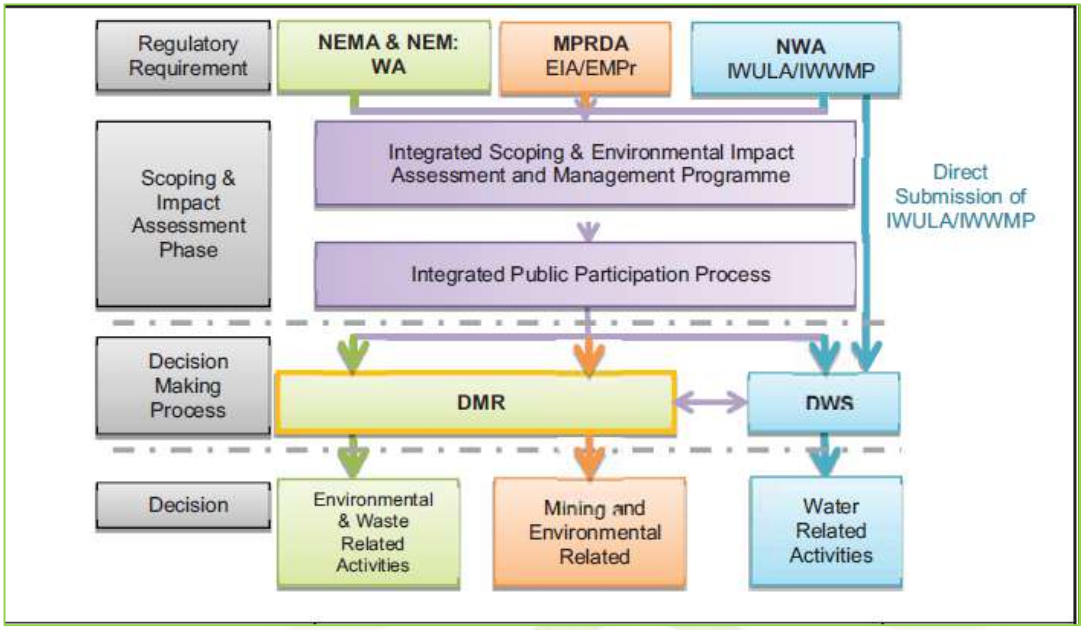


Figure 12: Authorisation Process Overview

2.i.ix Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

- Design the surface and storm water infrastructure to be within the footprint of the project area
- The water from the voids must be pumped out in order to facilitate and ensure safe and effective mining.
- The water from the voids must be contained in the PCDs because it is considered polluted. The water can therefore not be discharged into the nearest river, nor be used as potable or irrigation water. As a result, it can only be used on the dirty water areas of the mine, for dust suppression. The area has windy dry seasons and the mine will require dust suppression on site.
- The stockpiling of potentially acid-generating material (interburden material and ROM coal) is only a temporary measure. This material will be stockpiled on a compacted surface, with adequate surrounding drainage systems that will contain any polluted water arising off these stockpiles. This dirty water will be directed to the PCDs. There is no other option for the handling of this material other than stockpiling temporarily. The interburden material will be placed back into the progressively rehabilitated pits, and the ROM coal will be loaded and transported after it has been crushed.
- Separate clean from dirty water and allow discharge of water to designated areas.
- Vegetate disturbed areas to limit erosion
- Implement berms, trenches and storm water management measures in accordance with GN 704 Regulations
- Pollution Control Dams to be designed to cater for the required storage capacity
- Compacted soil areas in and around the periphery of the wetland will be ripped to break up compacted soil and vegetated with indigenous seed mix
- Comply with the National Air Quality Standards and Dust Control Regulations
- Comply with the SANS noise standard
- Avoid travelling past residences. Speed limit of 40km/h will be enforced. Liaise with landowner on areas sensitive to noise. Provide a buffer of 100m from households
- Prescribe to the DWS Catchment Water Quality Standards

- Restrict traveling speed of vehicles to reduce vehicle entrainment of dust. Wet gravel roads if dust is found to be excessive.
- No-go areas to be identified. Environmental awareness training of all employees
- Preference to be given to the use of local employment, contractors and local suppliers.
- Implement measures to protect soils from pollution.
- Reduce the visual impacts of mining activities, i.e. rehabilitation
- Site selection aimed at minimising disturbance to sensitive animal habitats and breeding areas.
- Utilise existing access roads as far as possible.
- Access roads to follow slope contours where possible. Vegetation to be left in place at the sides of the road to protect the soils.

2.l OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

2.l.i Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-

2.l.i.1 Impact on the socio-economic conditions of any directly affected person. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix 2.19.1 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

Section to be populated once the public participation process of the Draft EIA Phase commences.

2.l.i.2 Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act. (Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) with the exception of the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

Section to be populated once the public participation process commences. Information to be uploaded on the SAHRIS website once received.

2.m OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as Appendix 4).

The site location is limited to the Prospecting Right Area, which is constrained by the location of other mining houses. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative sites were considered.

2.j UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I _____herewith undertake that the information provided in the foregoing report is correct, and that the comments and inputs from stakeholders and Interested and Affected parties has been correctly recorded in the report.

_____

Signature of the EAP

_____

DATE

2.k UNDERTAKING REGARDING LEVEL OF AGREEMENT

I _____herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

_____

Signature of the EAP

_____

DATE:

ANNEXURE 1: QUALIFICATIONS OF THE EAP

24296521

Universiteit van Pretoria

Die Raad en die Senaat verklaar hiermee dat die graad

Magister Artium

in

Omgewing en Samelewing

met al die regte en voorregte daaraan verbonde by geleentheid van 'n kongregasie van die Universiteit toegeken is aan

Vernon Siemelink

kragtens die Wet op Hoër Onderwys, 1997 en die Statuut van die Universiteit

Namens die Raad en die Senaat

C. de la Rey

Visekanselier en Rektor

Namens die Fakulteit Geesteswetenskappe

N Duncan

Dekaan

M. Smit

Registrateur

2014-04-23

2429652

University of Pretoria

The Council and Senate hereby declare that
at a congregation of the University the degree

Baccalaureus Societatis Scientiae Honores
with specialization in
Geography

with all the associated rights and privileges
was conferred on

VERNON SIEMELINK

in terms of the Higher Education Act, 1997 and the Statute of the University

On behalf of the Council and Senate

Vice-Chancellor and Principal

On behalf of the Faculty of
Humanities

Dean

Registrar

2008-04-24

ANNEXURE 2: EAP CV

VERNON SIEMELINK

2019

Director

ENVIRONMENTAL & ENGINEERING

ABOUT

Vernon is an ISO 14001 Lead Auditor and environmental professional with over 11 years' experience. His experience ranges from Environmental Auditing, Due Diligences, Technical Legal opinions, Impact Assessments, Stakeholder Engagement and technical specialist in the mining and manufacturing sectors. Vernon provided environmental consulting and auditing services in nearly every industry sector. He is a SGS IRCA Certified EMS Lead Auditor and a SETA accredited assessor. He also completed the CEM auditor conversion training for ISO 9001, ISO 14001 and OHSAS 18001 Integrated Management Systems.

CAREER HISTORY

Senior Environmental Consultant/EAP
Founder & Director
Eco Elementum (Pty) Ltd
Pretoria
2013- Current

Role:
Business, Project and Port-folio Management
Senior Environmental Consultant/EAP

Senior Environmental Consultant/Senior Manager
ENVASS -Environmental Assurance (Pty) Ltd & established ENVISO, sub company of ENVASS
Pretoria
2010

Role:
Senior Environmental Consultant/ ISO 14001 Lead Auditor
SETA Accredited Assessor, Facilitator and Moderator.

QUALIFICATIONS

Senior Certificate Matric
Afrikaanse Hoër Seunskool (Affies)
2001

BSSci: Urban, Rural and Social Development
University of Pretoria
2006

Honours in Geo-Science
University of Pretoria
2007

Masters in Environmental Management
University of Pretoria
2013

KEY ACHIEVEMENTS

Awards

- 06/2000 Represented RSA in Germany as exchange student - Inter Exchange
- 06/2000 Received 3rd Year tutor position - University of Pretoria
- 02/2007 Awarded Academic bursary - University of Pretoria
- 04/2007 Finished first in my Degree - University of Pretoria

Academic Papers & Publications

-
-

REGISTRATIONS

Professional Registrations

- 02/2008 - Geographical Counsel of South Africa, Member since 12/2008
- 2011 - AIAI- International Association of Impact Assessors, ELA – Environmental Law Association AND iema – Institute of Environmental Management & Assessment
- 2014 - NACA – National Association for Clean Air

442 Rodericks Road, Lynnwood, Pretoria, 0081
vernon@ecoelementum.co.za
072 196 9928
www.ecoelementum.co.za

Riana Panaino

ENVIRONMENTAL CONSULTANT

ABOUT

With more than 10 years' experience in the environmental consulting industry she has a firm understanding of Environmental Management. She can adapt to a wide range of working environments, has a strong problem-solving ability and work towards team and client satisfaction. Riana has a passion for Environmental Authorisation Processes (Basic Assessments, Environmental Impact Assessments, Monitoring, Environmental Management Plans, Waste Licence Applications, Closure Application and Integrated Water Use License Applications) in terms of the South African legislative regime.

CAREER HISTORY

Environmental Consultant
Eco Elementum (Pty) Ltd
Pretoria
April 2019 - Present

Role: Environmental Impact Assessments, Water Use Licenses, Waste Applications, Rectification Applications, Stakeholder Engagement, Project Mangement, Specialist Management.

Senior Environmental Consultant
GCS
Pretoria
March 2012 – March 2019

Role: Project Management, management and coordination of specialists, compilation of Environmental Impact Assessments, Environmental Waste Licence application, Public Participation, Environmental Management Programs.

QUALIFICATIONS

BSc Hons (Biodiversity & Conservation)
University of Johannesburg
2007

BSc (Botany and Zoology)
University of Johannesburg
2004 - 2006

Senior Certificate Matric
Hoërskool Westernaria
2003

EXPERTISE AND SKILLS

Skills include, but are not limited to:

- Specialist Co-ordination
- Project Management
- Moniting and Compliance
- Compilation of Environmental Management
- Compilation of Environmental Impact Assessment
- Government Department Liaison
- Assessment of Wetland Status and Functionality
- Determination of Wetland Boundaries

REGISTRATIONS

Professional Registrations

- Environmental Law Association (ELA)
- South African Council of Natural Science Professionals (SACNASP)

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Riana Panaino

ENVIRONMENTAL CONSULTANT

ENVIRONMENTAL & ENGINEERING

PROJECT EXPERIENCE

ENVIRONMENTAL MANAGEMENT AND MONITORING

2008, 2009, 2010 — **Matla,Mpumalanga, South Africa**
Matla Wetland Monitoring and Management Plan for Matla coal mine. Responsibilities included: weekly site visits and reporting of findings during the construction of the Matla river diversion and assisted in compilation of the wetland management plan

BIOLOGICAL SCIENCES

2009 — **Eskom DPSS, Freestate/KwaZulu Natal, South Africa**
Assisted in the capture of fish for genetic sampling to map distribution patterns between two different catchment.

ENVIRONMENTAL IMPACT ASSESSMENT

2016 — **Exxaro NBC Project**
Project Consultant, coordination, BA and EMP report compilation as well as public consultation of the various aspects on this project.

2016 — **Exxaro Coal Central Eloff Project, Mpumalanga, South Africa**
Project Consultant, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2015 — **Exxaro Belfast Project, Mpumalanga, South Africa**
Environmental Control Officer

2015 — **Exxaro Matla Project, Mpumalanga, South Africa**
Project Consultant, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2015 — **Exxaro UCG Project, Limpopo, South Africa**
Project Management, coordination and public consultation of the various aspects on this project.

2014 — **Quantum Crushing and Screening, KwaZulu-Natal, South Africa**
Project Management, coordination and BA and EMP report compilation as well as public consultation of the various aspects on this project.

2013 — **Glencore Rietvly – Northwest, South Africa**
Project Management, coordination and BA and EMP report compilation as well as public consultation of the various aspects on this project.

2012 — **Jacomynspan, Northern Cape, South Africa**
Project Management, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2012 — **Bighorn Substation, Northwest, South Africa**
Project assistance, coordination and report compilation as well as public consultation of the various aspects on this project.

2012 — **Otjozondu, Namibia**
Environmental Impact Assessment Report Compilation

2012 — **Leeuwpan, Mpumalanga, South Africa**
Project Management, coordination and EIA and EMP report compilation as well as public consultation of the various aspects on this project.

2008 — **Lonmin Akanani, Limpopo, South Africa**
Project assistance, coordination and report compilation of the various studies done on this project.

ECOLOGY

2012 — **Schoongezicht, Mpumalanga South Africa**
Ecological studies with responsibilities that included wetland input for the IWULA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

2012 — **Mooiplaats, Mpumalanga South Africa**
Ecological studies with responsibilities that included wetland input for the IWULA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

2011 — **Kromdraai Pipeline, Mpumalanga, South Africa**
Ecological studies with responsibilities that included wetland input for the project EIA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

2010 — **New Vaal Life Expansion, Freestate, South Africa**
Ecological studies with responsibilities that included wetland input for the project EIA. Wetland delineation, classification and characterisation were done on the wetlands found during this study.

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ANNEXURE 3: LOCALITY MAPS

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Locality
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)

N

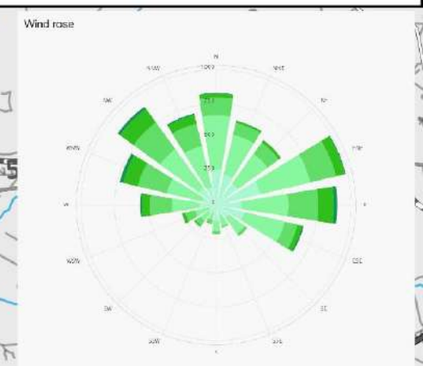
0 4 8 12 16 20 km

Legend

- Site Boundary
- Protected Areas
- Conservation Areas

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Inland Water
- Dam
- Non-Perennial River
- Perennial River



Predominant Wind direction

Lon: 29.101594721
Lat:-25.9440279889

Kwa Guqa
Witbank
Ogies
Van Dyks Drift

N4
N12
R104
R544
R555
R545
R547
545
555
544
575
542

ANNEXURE 4: SITE LAYOUT AND INFRASTRUCTURE

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Topography
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)
Geo-i 5m Contours (2014)

0 2 4 6 8 10 km

N

Legend

- Site Boundary Outline
- Conservation Areas
- Protected Areas

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Contours
- 100m
- 20m
- 5m

Inland Water
- Dam
- Non-Perennial River
- Perennial River

Wind rose

Predominant Wind direction

N4
R104
Witbank
N12
R555
R547
544
545
John Cairns Private Nature Reserve
Ogies
1500
1600
olifantsrivier

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Landcover
Rev #: 1

Data Sources:
Surveyor General of South Africa (Jan 2018)
DEA Landcover (2013-2014)

N

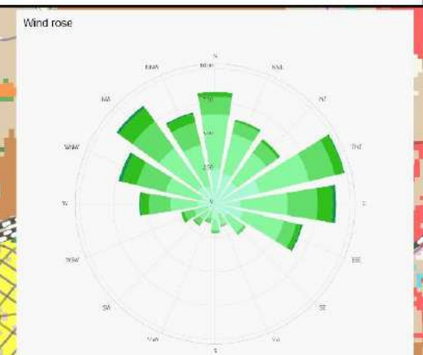
0 1 2 3 4 5 km

Legend

Site Boundary Outline
Boundary Farm Portions

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Landcover
- Indigenous Forest
- Thicket / Dense Bush
- Woodland / Open Bush
- Low Shrubland
- Plantations / Woodlots
- Cultivated Commercial Crop Non-Pivot
- Cultivated Commercial Crop Pivot
- Cultivated Commercial Orchards
- Cultivated Commercial Vines
- Cultivated Subsistence Crops
- Settlements
- Wetlands
- Grasslands
- Fynbos - Forest
- Fynbos - Thicket
- Fynbos - Open Bush
- Fynbos - Low Shrub
- Fynbos - Grassland
- Fynbos - Bare Ground
- Nama Karoo - Forest
- Nama Karoo - Thicket
- Nama Karoo - Open Bush
- Nama Karoo - Low Shrub
- Nama Karoo - Grassland
- Nama Karoo - Bare Ground
- Succulent Karoo - Forest
- Succulent Karoo - Thicket
- Succulent Karoo - Open Bush
- Succulent Karoo - Low Shrub
- Succulent Karoo - Grassland
- Succulent Karoo - Bare Ground
- Mines
- Waterbodies
- Bare Ground
- Degraded



Predominant Wind direction

RE/2/309
40/325
2/324
7/324
R555
R547

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Site Layout
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)
SANBI NFEPA Project (2011)

0 0.3 0.6 0.9 1.2 1.5 km

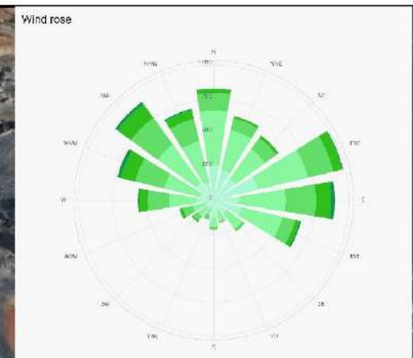
N

Legend

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Acces Road
- Railway

Inland Water
- Dam
- Non-Perennial River
- Perennial River

Infrastructure
- Dumps - Hards, Softs
- First Cuts Open
- Hard Park
- Haul Road
- Pit Area
- Topsoil Stockpile
- Haul Road



Predominant Wind direction

ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: NFEPA
Rev #: 1

Data Sources:

Surveyor General of South Africa (Jan 2018)
South Africa Protected Area Database (Dec 2017)
South Africa Conservation Areas Database (Sept 2017)
SANBI NFEPA Project (2011)

0 1 2 3 4 5 km

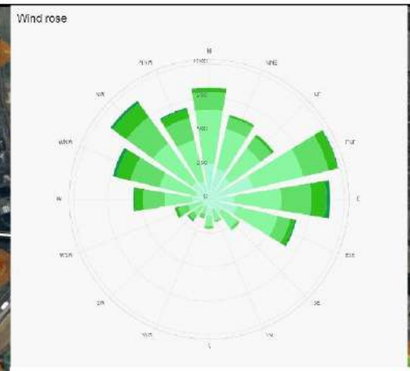
N

Legend

- Site Boundary Outline
- Protected Areas
- Conservation Areas

Transport
- National Road
- Arterial Road
- Main Road
- Secondary Road
- Other Access Road
- Railway

Inland Water
- Dam
- Non-Perennial River
- Perennial River
- NFEPA Rivers
- NFEPA Wetlands
- Surface Water Buffer Zones



Predominant Wind direction

sprui

Noupoort

Noupoort

Noupoort

John Cairns Private Nature Reserve

N12

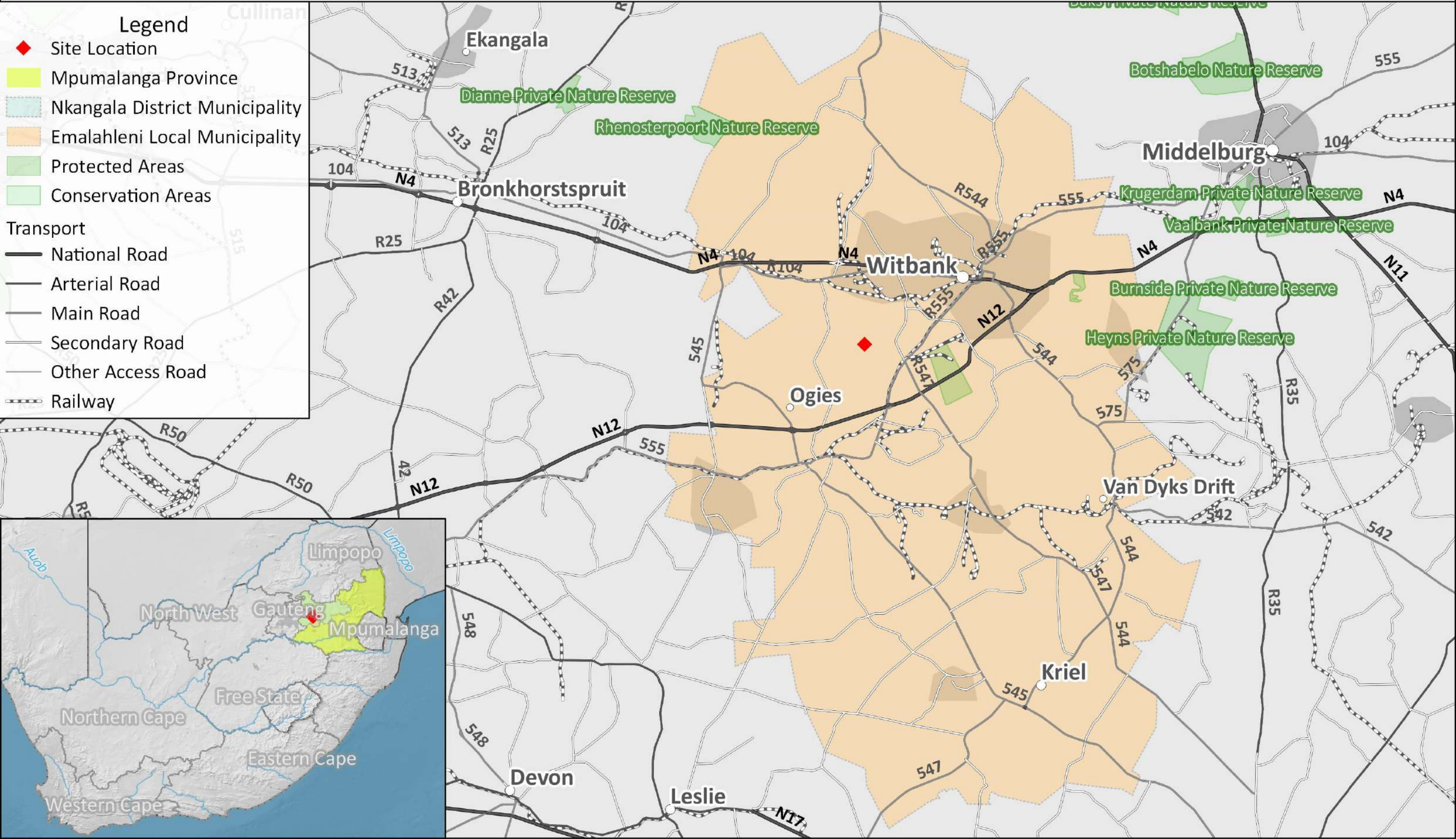
ENVIRONMENTAL & ENGINEERING

Project Name: Weltevreden MR Application
Client Name: Weltevreden Colliery (Pty) Ltd
Project #: 19-725-AUTH
Map: Regional Overview
Rev #: 1

Data Sources:
Surveyor General of South Africa (Jan 2018)

N

0 9 18 27 36 45 km



Legend
Site Location
Mpumalanga Province
Nkangala District Municipality
Emalahleni Local Municipality
Protected Areas
Conservation Areas
Transport
National Road
Arterial Road
Main Road
Secondary Road
Other Access Road
Railway
Ekangala
Bronkhorstspruit
Witbank
Middelburg
Ogies
Van Dyks Drift
Kriel
Devon
Leslie
Dianne Private Nature Reserve
Rhenosterpoort Nature Reserve
Botshabelo Nature Reserve
Krugerdam Private Nature Reserve
Vaalbank Private Nature Reserve
Burnside Private Nature Reserve
Heyns Private Nature Reserve
N4
N12
N11
N17
R25
R42
R50
R35
R544
R555
R547
R104
104
513
555
545
544
547
575
542
548
42
Limpopo
North West
Gauteng
Mpumalanga
Free State
Northern Cape
Eastern Cape
Western Cape
Auob