ENVIRONMENTAL & ENGINEERING

DRAFT REPORT

SALDOMATE (PTY) LTD – WELTEVREDEN COLLIERY

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

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DOCUMENT AND QUALITY CONTROL

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QUALITY CONTROL BY:

Nature of Signoff:	**Responsible Person:**	**Role / Responsibility**	**Qualification**
Author	Riana Panaino	Senior Environmental Consultant	BSc Honns Biodiversity and Conservation
Quality Reviewer	Leoni le Roux	Administrator	Professional Secretary and Personal Assistant
Reviewer	Vernon Siemelink	Director	BSc Honn Environmental Analysis and Management MSc Project Management
Client	Ferdie Nieman	Esimeme (Pty) Ltd	BSc Honns Environmental Sciences

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DECLARATION OF INDEPENDANCE

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.

15/11/2019

Signature **Date**

Mr. Vernon Siemelink
M (EnvMan) Environmental Management
ISO 14001:2004 Lead Auditor
IAIA Member

1. EXECUTIVE SUMMARY

PROJECT DESCRIPTION

The Saldomate (Pty) Ltd Weltevreden Colliery is a proposed greenfields project. The project involves the development of a new mining operation within eMalahleni (near Clewer) in the Mpumalanga Province. The mine will be located on Portions 2 and 6 of the Farm Weltevreden 324 JS. The coal resource will be mined using open pit methods.

LEGAL REQUIREMENTS

The intention to undertake mining activities requires an application for a Mining Right (MR) in terms of the Minerals and Petroleum Resources Development Act, Act No. 28 of 2002 (MPRDA). An application for Environmental Authorisation (EA) was submitted simultaneously, as per the requirements of the National Environmental Management Act, Act No. 107 of 1998 (NEMA) and the NEM: Waste Act, Act No. 59 of 2008 (NEM:WA); read with the requirements of the MPRDA.

In terms of the NEMA and other applicable laws, it is required that the environmental and social impacts associated with mining activities be assessed to identify any potential negative and / or positive consequences as result thereof. Following which measures must be proposed to avoid or minimise these impacts.

MINING PROCESS

ITEM	DETAIL
Type of mineral	Coal
Mining method	Strip and Rollover Mining Techniques
Depth of the mineral below surface	Ave 17.81 meters
Geological formation	Located on the central part of the Witbank Coalfield, the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic level that tend to influence stratigraphy and coal qualities.
Life of mine	5 Years.
Production rate	25,000t of ROM coal per month, with a total of 618 600t for the Life of Mine
Saleable Product	The coal produced from Weltevreden Colliery will be sold to the ROM off-taker directly from the ROM stockpile after being crushed into the client agreed specifications. The Weltevreden mining operation will focus on extracting the No 2 seam primarily S2 Lower as the upper is too thin and too dispersed to be regarded as a resource. The quality of the No 2 seam coal is such that it can be sold to Eskom's Primary Energy Division for the generation of electricity at various power stations.
Target Market	Local market

IMPACT ASSESSMENT SUMMARY

Impact description		**Significance before mitigation**	**Significance after mitigation**	**Risk after prioritisation / Cumulative impact**
Phases	**Impact**			
Groundwater impacts				
Decommissioning	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	M	M	M
Construction	Increase in surface run-off and therefore decrease in aquifer recharge	L	L	L

Impact description				
Phases	**Impact**	**Significance before mitigation**	**Significance after mitigation**	**Risk after prioritisation / Cumulative Impact**
Construction	Decrease in water level should the pit floor be lower than the water level	M	M	M
Operation	Acid generation in the case of carbonaceous material placement.	M	M	M
Operation	Acid generation as a result of carbonaceous material.	M	M	M
Operation	Spills from mining vehicles can infiltrate to the aquifer and cause a down gradient plume migration.	M	L	L
Operation	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level of up to 55 m.	H	H	H
Closure and decommissioning	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the exposure to oxygen and potential acid generation.	M	L	L
Rehabilitation	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	M	L	L
Residual	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	H	H	H
Fauna and Flora				
Operation	Loss of Indigenous Vegetation and Habitat	H	M	M
Construction	Habitat Loss/Fragmentation	M	L	M
Wetland Impacts				
Construction	Physical degradation of Wetland 3	M	L	M
Construction	Desiccation of certain areas in Wetland 2 and 3	M	M	M
Construction and Operation	Increase in Alien Vegetation	M	L	L
Construction and Operation	More solar penetration within the different water zones, impacting on primary production and phytoplankton within the system	M	L	L
Construction	Loss of aquatic ecosystem services, decrease in wetland functioning	M	L	M
Construction and Operation	Wetland degradation	M	L	M
Operation	Decreased wetland function	H	M	M
Operation	Accelerated erosion and changes in sediment entering the Grootspruit wetland	M	M	M
Operation	Pollution and degradation of wetland	H	M	M
Operation	Loss of species diversity and wetland functioning	M	L	M
Closure and decommissioning	Increase in Alien Vegetation	M	L	L
Closure and decommissioning	Physical degradation of Wetland	M	L	L
Noise				
Construction	Noise disturbance	L	L	M
Construction	Noise disturbance	L	L	M
Construction	Noise disturbance	L	L	M
Operation	Noise disturbance	M	M	M
Operation	Noise disturbance	M	M	M
Operation	Noise disturbance	M	M	M
Operation	Noise disturbance	M	M	M
Operation	Noise disturbance	M	M	M
Closure and decommissioning	Noise disturbance	L	L	L
Rehabilitation	Noise disturbance	L	L	L
Rehabilitation	Noise disturbance	L	L	L
Soils				
Construction	Exposure of soil surface to erosion	H	M	H
Construction	Soil compaction and reduced water infiltration capacity	M	M	H
Construction	Destruction of in situ soil profiles	M	M	H
Construction	Destruction of soil nutrient cycles and hydropedological functioning	M	M	H
Construction	Soil chemical pollution	M	M	M
Construction	Destruction of arable and grazing land capability	H	H	H
Operation	Soil compaction and reduced water infiltration capacity	M	M	H
Operation	Soil chemical pollution	M	M	M
Closure and decommissioning	Soil chemical pollution	M	M	M
Rehabilitation	Soil compaction and reduced water infiltration capacity	M	M	M

Impact description				
Phases	**Impact**	**Significance before mitigation**	**Significance after mitigation**	**Risk after prioritisation / Cumulative Impact**
Air Quality				
Construction	Fugitive dust (containing TSP (total suspended particulate, will give rise to nuisance impacts as fallout dust), as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts	M	M	M
Construction	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	M	M	M
Construction	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	M	M	M
Closure and decommissioning	fugitive dust emissions	M	M	M
Rehabilitation	fugitive dust emissions	M	M	M
Visual Assessment				
Construction	Change in sense of place	M	L	M
Cumulative	Change in sense of place	M	M	M
Heritage				
Cumulative	Destruction of potential subsurface remains at POI 1	L	L	L
Cumulative	Destruction of potential subsurface remains at POI 2	M	M	M
Cumulative	Destruction of potential subsurface remains at POI 3	M	M	M
Blasting				
Construction	Ground Vibrations	M	M	M
Construction	Air blasts	M	M	M
Aquatics				
Construction	Water Quantity and Loss Of Water/Flow	M	L	M
Construction	Habitat Loss/Fragmentation	M	L	M
Construction	Sedimentation and Erosion	H	M	M
Construction	Water quality deterioration	H	M	M
Operation	Sedimentation and Erosion. Water quality deterioration	H	M	M
Operation	Loss of Indigenous Vegetation and Habitat	H	M	M
Hydrology				
Construction and Operation	Reduced Peak Runoff and Discharge volumes	M	M	M
Construction and Operation	Increased Sediment Yield	M	L	L
Construction and Operation	Water Quality Deterioration	M	L	L
Social				
Construction	Job creation (Positive Impact)	M	H	H
Operation	Job creation (Positive Impact)	M	H	H
Construction and Operation	Increased Economic input (Positive Impact)	M	H	H
Construction and Operation	Community Development and Social Upliftment (Positive Impact)	L	H	H
Construction and Operation	Health and Safety concern	M	M	M
Construction and Operation	Restriction of movement	M	M	M
Construction and Operation	Loss of and/or Damage to Agricultural Land and Infrastructure	H	M	M
Construction and Operation	Physical and Economical Displacement	H	M	M
Construction and Operation	Poor / Failed service delivery for increasing population	H	M	M
Construction and Operation	Increased social pathologies	H	M	M
Construction and Operation	Changed Sense of Place	M	L	M
Closure and decommissioning	Dependency on mine for sustaining local Economy	H	M	M

SUMMARY OF COMMENTS RECEIVED BY COMMENTING AUTHORITIES

Organisation	Name Surname	Method of comment	Comment	EAP Response
Mpumalanga Tourism and Parks Agency	DR. M.C. LOTTER	Official letter, via email: 12 June 2019	The MTPA has no objection to this application but has the following concerns and require the following: 1. A botanical survey is required for the proposed mining site and immediate adjacent natural	A Botanical Survey has been undertaken by M² Environmental Consultants, and the report is provided in Appendix 3, as well as a summary in Section 12.3.

Organisation	Name Surname	Method of comment	Comment	EAP Response
			areas. The MTPA have modeled the distribution of the Critically Endangered orchid, the Albertina Sisulu Orchid (*Brachycorythis conica* subsp. *transvaalensis*), and it has the potential for occurring in this area. It flowers February to May. All the species of conservation concern (Protected plants) should be marked for rescue purposes.	
			2. Wetland delineation and wetland biodiversity studies are required. The Mpumalanga Biodiversity Sector Plan (MBSP) freshwater assessment, Figure 1 indicates the presence of a Critical Biodiversity Area Wetland system that must be avoided and indicated as such in the mine layout plan.	A Wetland Survey has been undertaken by M² Environmental Consultants, and the report is provided in Appendix 3, as well as a summary in Section 12.3.
			3. A rehabilitation plan is required to prevent and avoid the dewatering of the wetland system.	The rehabilitation plan will be compiled alongside the Closure Report, and is provided in Appendix 3, as well as a summary in Section 12.3.
			4. An active water purification system must address the possible pollution through AMD decanting, underground pollution plume, storm water pollution from discard dumps, overflow from pollution control facilities and leachates. Clean water must be provided back into the natural system.	Saldomate will look into water treatment and release closer to the time of closure.
			5. In terms of the Mpumalanga Biodiversity Sector Plan terrestrial assessment, Figure 2, and the recommended land use guidelines in the MBSP Handbook, the remaining natural areas would support the functioning of the wetland and the MTPA recommend that a 100 m buffer from the edge of the wetland soils and vegetation is implemented.	Saldomate will be applying for exemption in terms of Regulations 4 and 5 of GN 704: • Restrictions on locality • Restrictions on use of material The mine with transgress the 500m buffer zone of a wetland and subsequently the 100m buffer from a watercourse as well. The mine and its associated activities will however not transgress the 1:100 year floodline area of the watercourse. A Section 21 (c) and (i) Water use will be applied for in this instance and mitigations put in place.

SUMMARY OF ISSUES RAISED BY I&APS

Name Surname	Involvement	Method of comment	Comment	EAP Response
Mr Nkkosinathi Mtsweni	Greater eMalahleni Youth Forum	Open Day 31 May 2019	GEYF is a non-profit organisation that would like to join and participate in the SLP as they do community outreach programmes. The Mine needs to give the GEYF an opportunity and align the SLP/CSI projects to achieve goals and social objectives	Once the Mine starts with construction the SLP will be implemented and the communities will be approached regarding job opportunities.
			They face a high rate of youth unemployment in the country they think this is one of the positive ways to reduce the unemployment rate in eMalahleni. They want to create job opportunities and skills development and empower the young people and build their capacity.	Once the Mine starts with construction the SLP will be implemented and the communities will be approached regarding job opportunities.
Thia Oberholzer	Environmental Manager Highveld Steel	Email 6 May 2019	Please forward documentation to me once available. I would like to register as I&A party.	Draft Scoping report sent on 17 may 2019 when made available for Public Review
Doreen Manamela	B1 Safety	Email 7 May 2019	We would kindly like to request an appointment for Doreen Manamela to call on your company with regards to the supply of Personal Protective Equipment (PPE)	This will be brought to the attention of the mining company

REASONED OPINION

Taking all specialist assessments into consideration and with the implementation of mitigation and management measures the EAP s of the opinion that the project can be recommended for approval with conditions contained in this report.

CONDITIONS FOR INCLUSION IN THE ENVIRONMENTAL AUTHORISATION

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Methods of handling the potential decant should be investigated, approved and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An Alien Invasive eradication plan should be compiled, approved and implemented.
- Once mining commences a proper operational blast design and code of practice must be compiled, implemented, monitored, evaluated and improved.
- Should the need arise to expand the proposed development beyond the surveyed area mentioned in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated area that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites.

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Definition of Terms

Audit	a systematic, independent and documented review of operations and practises to ensure that relevant requirements are met. Qualified professionals with relevant auditing experience should conduct audits and, where possible, independent external auditors should also be used.
Borehole	is a narrow shaft bored in the ground, either vertically or horizontally. A borehole may be constructed for many different purposes, including the extraction of water or other liquid (such as petroleum) or gases (such as natural gas), as part of a geotechnical investigation, environmental site assessment, mineral exploration, temperature measurement, as a pilot hole for installing piers or underground utilities, for geothermal installations, or for underground storage of unwanted substances, e.g. in Carbon capture and storage.
Clean Water	clean water is any water that has maintained the chemical, physical, and biological integrity of the waters by preventing point and nonpoint pollution sources.
Compliant	a full achievement of the performance requirement of a particular condition of the license or programme.
Conservation	in relation to a water resource means the efficient use and saving of water, achieved through measures such as water saving devices, water-efficient processes, water demand management and water rationing;
Construction	the time period that corresponds to any event, process, or activity that occurs during the Construction phase (e.g., building of site, buildings, and processing units) of the proposed project. This phase terminates when the project goes into full operation or use.
Corrective Action Plan	an action plan developed by the proponent, contractor, or facility owner and approved by the external auditor that describes how the contractor or facility owner intends to resolve the non-conforming item. The Corrective Action Plan should be specific, measurable, achievable, realistic, and timely.
Director-General	means the Director-General of the Department;
Effluent	is defined by the United States Environmental Protection Agency as "wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall. Generally, refers to wastes discharged into surface waters". The Compact Oxford English Dictionary defines effluent as "liquid waste or sewage discharged into a river or the sea". Effluent in the artificial sense is in general considered to be water pollution.
Environmental Audit Report	a summary report prepared after an environmental audit that describes the attributes of the audit and the audit findings and conclusions.
Environmental Authorisation	is an environmental authorisation issued by a state department.
Environmental Component	an attribute or constituent of the environment (i.e., air quality; marine water; waste management; geology, seismicity, soil, and groundwater; marine ecology; terrestrial ecology, noise, traffic, socio-economic) that may be impacted by the proposed project.
Environmental Impact	a positive or negative condition that occurs to an environmental component as a result of the activity of a project or facility. This impact can be directly or indirectly caused by the project's different phases (i.e., Construction, Operation, and Decommissioning).
Environmental Management Plan	an Environmental Management Plan (EMP) can be defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced".
Groundwater	is the water located beneath the earth's surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water. The depth at which soil pore spaces or fractures and voids in rock become completely saturated with water is called the water table. Groundwater is recharged from, and eventually flows to, the surface naturally; natural discharge often occurs at springs and seeps, and can form oases or wetlands.
Non-conformance	constitutes a non-compliance or an action plan or initial actions taken without tangible deliverables. Non-conformance may also be associated with activities breaching legislation. Non-Conformance findings therefore have a high priority and mitigation measures are mandatory.
Operation	the time period that corresponds to any event, process, or activity that occurs during the Operation (i.e., fully functioning) phase of the proposed project or development. (The Operation phase follows the Construction phase, and then terminates when the project or development goes into the Decommissioning phase.)

Partially Compliant	achievement with shortcomings (such as documented proof and or work in progress) and achievement where there is an obvious shortcoming in the delivery of the performance requirement.
Pollution	is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution.
Protection	in relation to a water resource, means - (a) Maintenance of the quality of the water resource to the extent that the water resource may be used in an ecologically sustainable way; (b) Prevention of the degradation of the water resource; and (c) the rehabilitation of the water resource;
Proponent	the person, company, or agency that is the primary responsible party for a development project and that is the permit applicant/holder for the project.
Rehabilitation	is the act of restoring something to its original state;
Responsible Authority	in relation to a specific power or duty in respect of water uses, means - (a) if that power or duty has been assigned by the Minister to a catchment management agency, that catchment management agency; or (b) if that power or duty has not been so assigned, the Minister;
Water Resource	includes a watercourse, surface water, estuary, or aquifer;
Wetland	means 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.

Abbreviations

AEL	Atmospheric Emissions License in terms of NEM:AQA
AMD	Acid Mine Drainage
ASTM	American Standard for Testing and Materials (followed by protocol number)
BA	Basic Assessment (process or report)
BID	Background Information Documents
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983) as amended
CBD	Central Business District
COP	Codes of Practice
C-Plan	Conservation Plan (specifically Mpumalanga Conservation Plan)
DMC	Dense Medium Circuit (associated with processing plant)
DMR	Department of Mineral Resources
DO	Dissolved Oxygen
DWS	Department of Water Affairs and Sanitation
EA	Environmental Authorisation in terms of NEMA
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989) as amended
EIA	Environmental Impact Assessment (process or report)
EIA Regulation	Environmental Impact Assessment Regulation published under NEMA
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme Report
GDP	Gross Domestic Product
GIS	Geographical Information Systems
GN	General Notice (issued under an Act, providing notice or information)
GNR	General Notice Regulation (issued under an Act, providing instruction)
HSTP	Human Settlement Plan
I&AP	Interested and Affected Parties
IAIA SA	International Association of Impact Assessment South Africa
IDP	Integrated Development Plan
IWUL	Integrated Water Use License
IWULA	Integrated Water Use License Application
IWWMP	Integrated Water and Waste Management Plan
LED	Local Economic Development
LoM	Life of Mine
MHSA	Mine Health and Safety Act (Act 29 of 1996) as amended
MPRDA	Mineral and Petroleum Resources Development Act (Act 28 of 2002) as amended
MR	Mining Right in terms of the MPRDA
MRA	Mining Right Application in terms of the MPRDA
NAEIS	National Atmospheric Emissions Inventory System
NEA	National Energy Act, Act 34 of 2008
NEM:AQA	National Environmental Management: Air Quality Act (act 59 of 2008) as amended

NEM:BA	National Environmental Management: Biodiversity Act (Act 10 of 2004) as amended
NEM:PAA	National Environmental Management: Protected Areas Act (Act 57 of 2003) as amended
NEM:WA	National Environmental Management: Waste Act (Act 39 of 2004) as amended
NEMA	National Environmental Management Act (Act 107 of 1998) as amended
NFEPA	National Freshwater Ecological Priority Areas
NHRA	National Heritage Resources Act (Act No. 25 of 1999) as amended
NPAES	National Protected Area Expansion Strategy
NWA	National Water Act (Act 35 of 1998) as amended
PCD	Pollution Control Dam
PDA	Potential Development Area (in terms of the SDF)
PES	Present Ecological State (usually followed by category A-F)
PM10/5/2.5	Particulate Matter up to 10/5/2.5 micrometers
POI	Points of Interest
PPP	Public Participation Process
RoD	Record of Decision (for specific application)
RWD	Return Water Dam
RWQO	Resource Water Quality Objectives
SCC	Species of Conservation Concern
S&EIR	Scoping and Environmental Impact Reporting process
S&LP	Social and Labour Plan
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resource Agency
SAMRAD	South African Mineral Resources Administration System
SANBI	South African National Biodiversity Institute
SANS	South African National Standard (followed by standard number)
SASS5	South African Scoring System version 5 (in terms of aquatic invertebrate assessments)
SAWIS	South African Waste Information System
SDF	Spatial Development Framework (specifically LLM)
SEMA	Specific Environmental Management Acts
SMME	Small and Medium and Micro Enterprise
SOP	Standard Operating Procedure
SPLUMA	Spatial Planning and Land Use Management Act (Act No.16 of 2013)
Stats SA	Statistics South Africa
Tph	Tons per hour
WMA	Water Management Area
WML	Waste Management License in terms of NEM:WA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

Submitted for Environmental Authorisations 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).

DETAILS OF APPLICANT

Table 1.1: Applicant Details

Applicant Name:	Saldomate (Pty) Ltd
Contact Person:	Edmund William Johnstone (Director)
Telephone:	+27 (11) 783-9810
Fax:	+27 (86) 625-4121
E-mail:	Balele.eddie@gmail.com
Postal Address:	P.O. Box 1216, Isando, 1600
Physical Address:	5 Sulawezi, 17 Fish Eagle Drive, Hilltop Estate, 4420

2. 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 a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore, please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

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

3. OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

a. determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

b. describe 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 the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

d. determine the—-

   i. nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

   ii. degree to which these impacts—

      (aa) can be reversed;
      (bb) may cause irreplaceable loss of resources, and
      (cc) can be avoided, managed or mitigated;

e. identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

f. identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

g. identify suitable measures to manage, avoid or mitigate identified impacts; and

h. identify residual risks that need to be managed and monitored.

PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

4. INTRODUCTION

Saldomate (Pty) Ltd as a legal entity applied for a Prospecting Right on portions 2 and 6 of the farm Weltevreden 324 JS covering a total of 231.5 Hectares. During 1996, Ingwe Coal Corporation (Pty) Ltd drilled some 29 holes on the greater Weltevreden property, of which two are located on the project property. The drilling was completed as part of a more regional programme, during which a number of different coal seams were encountered, including the No 2, 4 and 5 seams. These borehole logs were acquired from the Council of Geoscience. No QA/QC was done on these holes and the stratigraphic data has been taken at face value. Since no analytical data was available for these samples, they are mentioned only for historical completeness

The holes drilled on the project property are # WEL03 and WEL07. WEL 03 was identified to intersect seams No 1,2 4 and 5, and WEL07 intersected seams No 2 and 3. South Africa Energy Coal (formerly known as Ingwe Collieries Ltd), a wholly owned subsidiary of South32, continues to mine coal on the southern portions of Weltevreden, where the coal seams are thicker, and the infrastructure is more suitable for larger mining operation.

4.1 PROJECT DESCRIPTION

The project involves the development of a new mining operation within eMalahleni (near Clewer) in the Mpumalanga Province (Figure 4.1). The mine will be located on Portions 2 and 6 of the Farm Weltevreden 324 JS. It is anticipated that mining will involve removing about 25,000t of ROM coal per month, with a total of 618 600t for the Life of Mine (LoM).

The coal resource will be mined using open pit methods due to the seemly depth of the coal reserve below surface. Strip and Rollover Mining Techniques will be utilised considering the site layout and resources. Rollover Mining involves the development of an open pit through a series of benches at varying depths. Strip mining involves the movement of overburden laterally to an adjacent empty pit where the mineral has already been extracted. This further assist with the concurrent rehabilitation and is also proven to be the most effective way of handling materials. The proposed project will include one open pit.

Topsoil and subsoil will be stripped using an excavator and will be stored in separate stockpile areas on the mining area. Drilling and blasting will be employed for the hard overburden or bedrock to expose the coal seams. Once blasted, the hard overburden will be excavated and stockpiled separately for rehabilitation. The mined coal from the open pit will be transported via the haul roads and stored on the Run of Mine (RoM) stockpile area on the nearby Elandsfontein Colliery. Elandsfontein Colliery have an approved authorisation to accommodate this additional coal at its processing facilities. The coal will be processed either through only Crushing and Screening or through the washing plant to develop sellable products that will be sold to either the local or export markets.

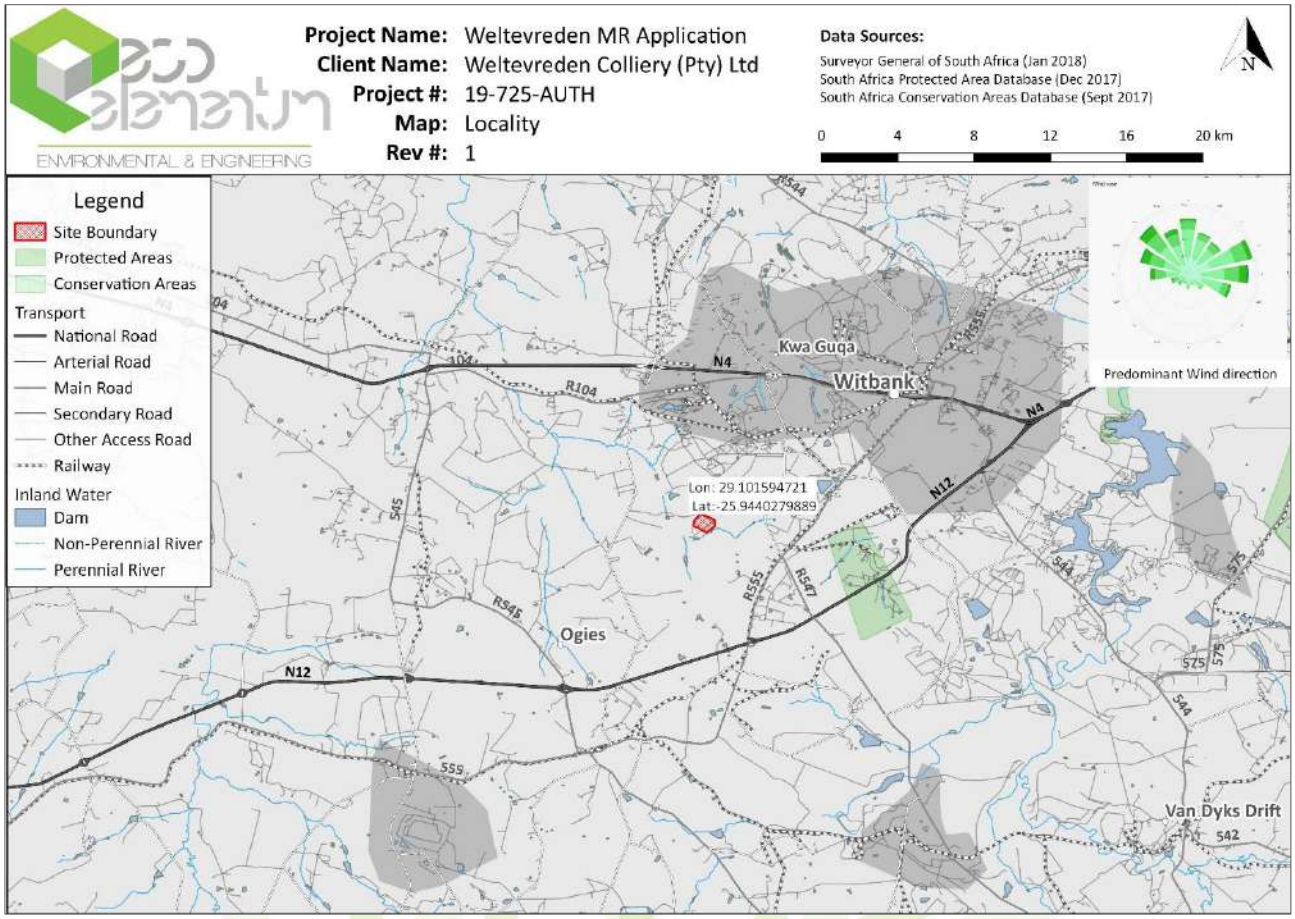

Figure 4.1: Project Locality

4.2 MINING PROCESS

Table 4.1: Mining Activities

ITEM	DETAIL
Type of mineral	Coal
Mining method	Strip and Rollover Mining Techniques
Depth of the mineral below surface	Ave 17.81 meters
Geological formation	Located on the central part of the Witbank Coalfield, the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic level that tend to influence stratigraphy and coal qualities.
Life of mine	5 Years.
Production rate	25,000t of ROM coal per month, with a total of 618 600t for the Life of Mine
Saleable Product	The coal produced from Weltevreden Colliery will be sold to the ROM off-taker directly from the ROM stockpile after being crushed into the client agreed specifications. The Weltevreden mining operation will focus on extracting the No 2 seam primarily S2 Lower as the upper is too thin and too dispersed to be regarded as a resource. The quality of the No 2 seam coal is such that it can be sold to Eskom's Primary Energy Division for the generation of electricity at various power stations.
Target Market	Local market

5. CONTACT DETAILS

5.1 APPLICANT

Table 5.1: Applicant Details

Applicant Name:	Saldomate (Pty) Ltd
Contact Person:	Edmund William Johnstone (Director)
Telephone:	+27 (11) 783-9810
Fax:	+27 (86) 625-4121
E-mail:	Balele.eddie@gmail.com
Postal Address:	P.O. Box 1216, Isando, 1600
Physical Address:	5 Sulawezi, 17 Fish Eagle Drive, Hilltop Estate, 4420

5.2 ITEM 3(A)(I): ENVIRONMENTAL ASSESSMENT PRACTITIONER

Table 5.2: EAP Details

EAP:	Eco Elementum (Pty) Ltd - Environmental and Engineering
Contact Person:	Riana Panaino
Telephone:	012 807 0383
Fax:	N/A
E-mail:	riana@ecoe.co.za
Postal Address:	26 Greenwood Crescent, Lynnwood Ridge, 0040
Physical Address:	442 Rodericks Road, Lynnwood, Pretoria 0081

5.3 ITEM 3(A)(II): EXPERTISE OF THE EAP

5.3.1 The Qualifications of the EAP

Table 5.3: EAP Qualifications

Name	Riana
Surname	Panaino
Company	Eco Elementum (Pty) Ltd
Position	Senior Environmental Consultant
Location	442 Rodericks Road, Lynnwood, Pretoria 0081
Email	riana@ecoe.co.za
Telephone Number	012 807 0383
Qualifications	BSc - Honours in Biodiversity and Conservation at University of Johannesburg, South Africa (Mpumalanga)
Professional skills	- Riana Panaino is Pr. Scant registered in the field of Environmental Sciences - Riana Panaino has been an environmental consultant and professional since 2008, specialising in the fields of: • Environmental Impact Assessments and Authorisations; • Water use license application; • Waste use license application; • Environmental Monitoring and Control; • Mine Closure and Rehabilitation; • Environmental Compliance and Audits; • Environmental Management Systems; and Specialist Impact Studies - During this time, she has provided quality, environmental consulting and auditing services in the mining and power industry sector.

5.3.2 Summary of the EAP's Past Experience

Table 5.4: EAP Experience

Skills	- Environmental Impact Assessments - Basic assessments, - Water use license application - Waste use license application - Prospecting and Mining Right Authorizations - Environmental Management Plans - Public Participation - Environmental Authorizations
EAP Experience	Riana is a Senior Environmental Consultant and has worked in the Environmental field since 2008. Riana has 7 years' experience in the environmental management field and 4 years' experience as a wetland ecologist. She has worked with the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the associated regulations, the National Water Act, 1998 (Act No. 36 of 1998), as well as DWA Wetland Guidelines. Her key roles include Environmental Impact Assessment Reports, Basic Assessment Reports, Environmental Management Programmes, Integrated Water Use Licenses and Wetland Assessments. All of the above functions require in depth communication with government departments and well as the public.

6. ITEM 3(B): DESCRIPTION OF THE PROPERTY

Table 6.1: Location of the property

Farm Name:	A portion of portion 2 and Portion 6 of the farm Weltevreden 324 JS
Application area (Ha)	192,8112 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

Table 6.2: Summary of Surface Right Owners

Farm	Portion	Surface Right owner	Title Deed	Extent of farm (ha)
Weltevreden 324 JS	2	Mahlangu Family Communal Prop Assoc	T7601/2013	128.6562
Weltevreden 324 JS	6	National Department Of Land Affairs	T336178/2007	64.1550
		Total Area:		192,8112

6.1 LOCALITY MAP

(Nearest town, scale not smaller than 1:250000 attached as Annexure 3)

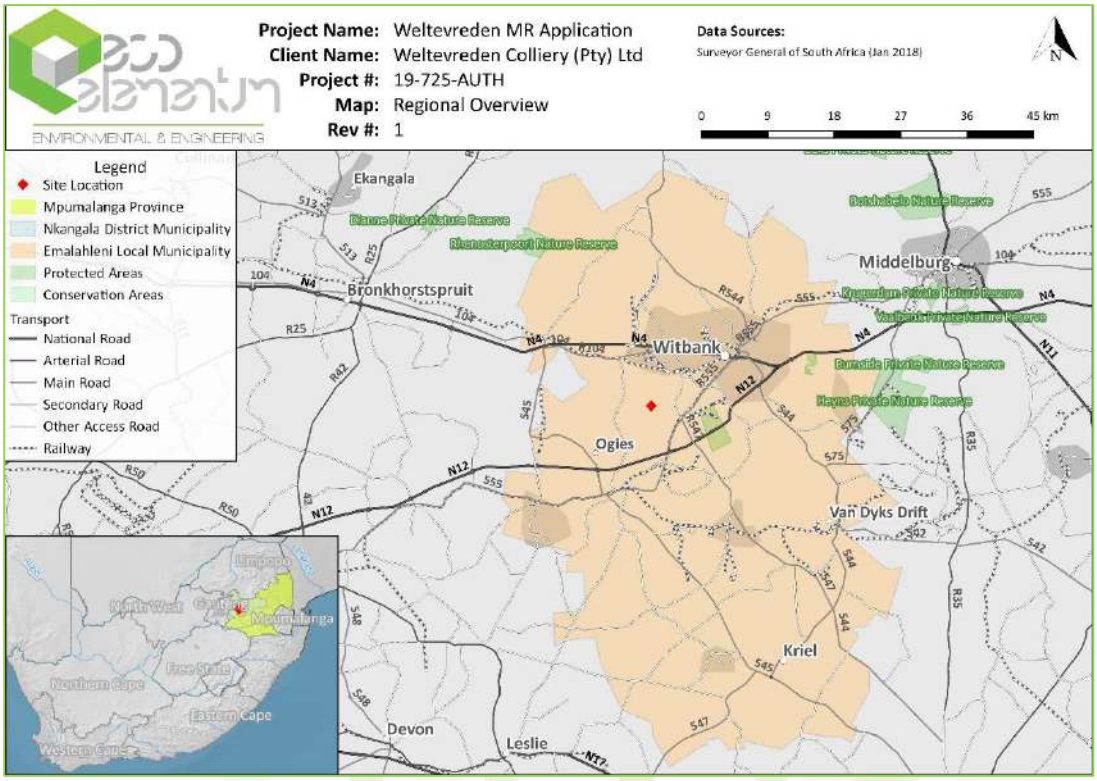

Figure 6.1: Regional Overview

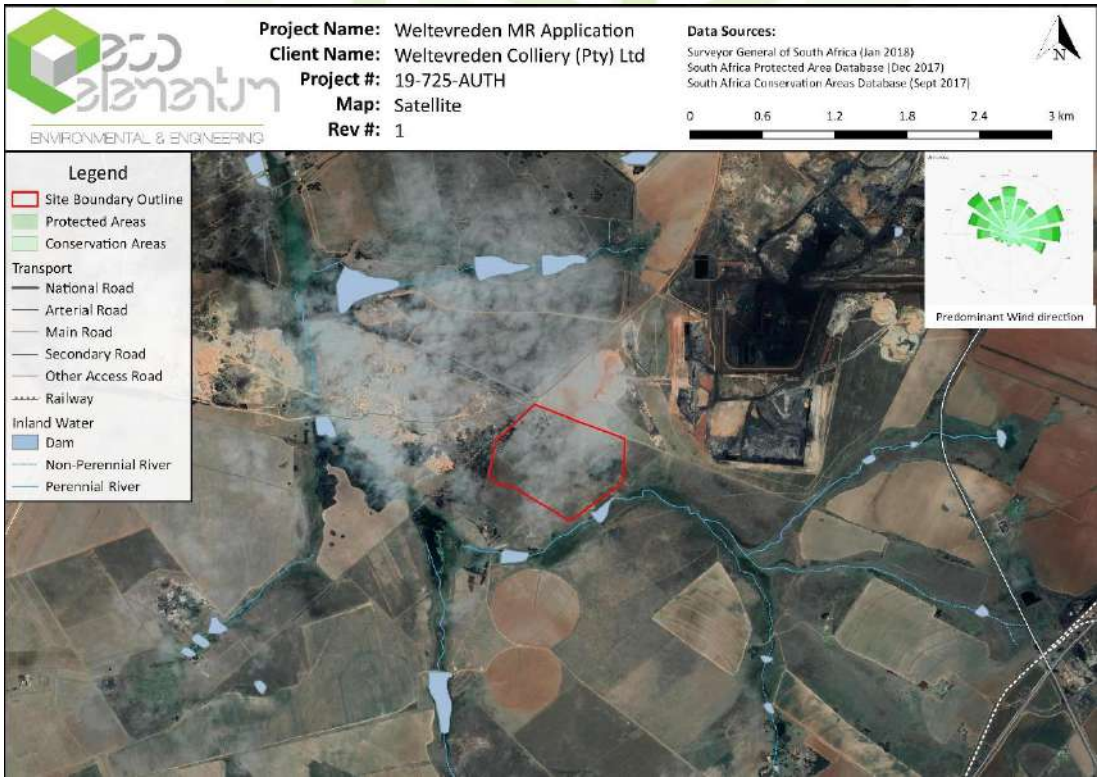

Figure 6.2: Local setting

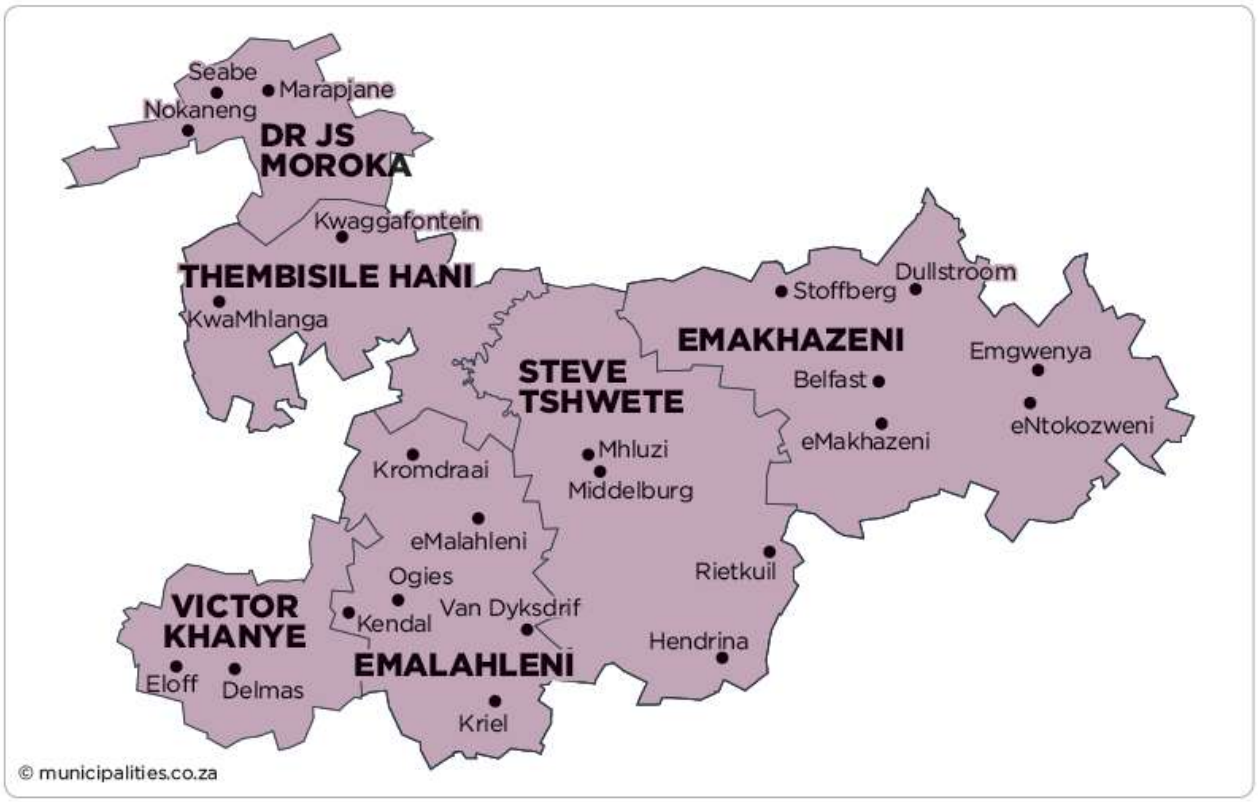

Figure 6.3: Nkangala District Municipality

7. ITEM 3(D) (II): DESCRIPTION OF THE OVERALL ACTIVITY

7.1 Description Of The Scope Of The Proposed Overall Activity

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 – please refer to Annexure 4.

Table 7.1: Description of the Overall Activity

ITEM	DETAIL
Type of mineral	Coal
Mining method	Strip and Rollover Mining Techniques
Depth of the mineral below surface	Ave 17.81 meters
Geological formation	Located on the central part of the Witbank Coalfield, the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic level that tend to influence stratigraphy and coal qualities.
Life of mine	5 Years.
Production rate	25,000t of ROM coal per month, with a total of 618 600t for the Life of Mine
Saleable Product	The coal produced from Weltevreden Colliery will be sold to the ROM off-taker directly from the ROM stockpile after being crushed into the client agreed specifications. The Weltevreden mining operation will focus on extracting the No 2 seam primarily S2 Lower as the upper is too thin and too dispersed to be regarded as a resource. The quality of the No 2 seam coal is such that it can be sold to Eskom's Primary Energy Division for the generation of electricity at various power stations.
Target Market	Local market

7.2 Listed Activities To Be Undertaken

Section 16 of the Mineral and Petroleum Resources Development Act, 200 2 (Act No. 28 of 2002) requires, upon request by the Minister that an Environmental Management Plan be submitted and that the applicant must notify and consult with Interested and Affected Parties (I&APs).

Section 37 of the MPRDA confirms that the principles set out in the NEMA apply to all prospecting and mining operations and must be carried out in accordance with the generally accepted principles of sustainable development Section 24 of the NEMA requires that activities, which may impact on the environment must obtain an environmental authorisation from a relevant authority before commencing with the activities.

Such activities are listed under Regulations Listing Notice 1 Government Notice (GN) 983, Listing Notice 2 GN 984 and Listing Notice GN 985 (dated 4 December 2014 as amended in 2017) of NEMA. The proposed mining activity triggers are listed in Table 7.2.

Table 7.2: Listed and Specified Activities

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- (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.

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
Overburden (Hards and Softs) dump, Temporary ROM Stockpile	5.8ha	X	NEMWA GN 921 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 meters; 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 kilometer or shorter.
Topsoil Stockpile	0.67ha		*Contributes to clearance of 20ha or more*
Opencast Mining	36ha	X	GNR983, Activity 19 The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving- (a) will occur behind a development setback;

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
			(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
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-

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) 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 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;

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
			(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.

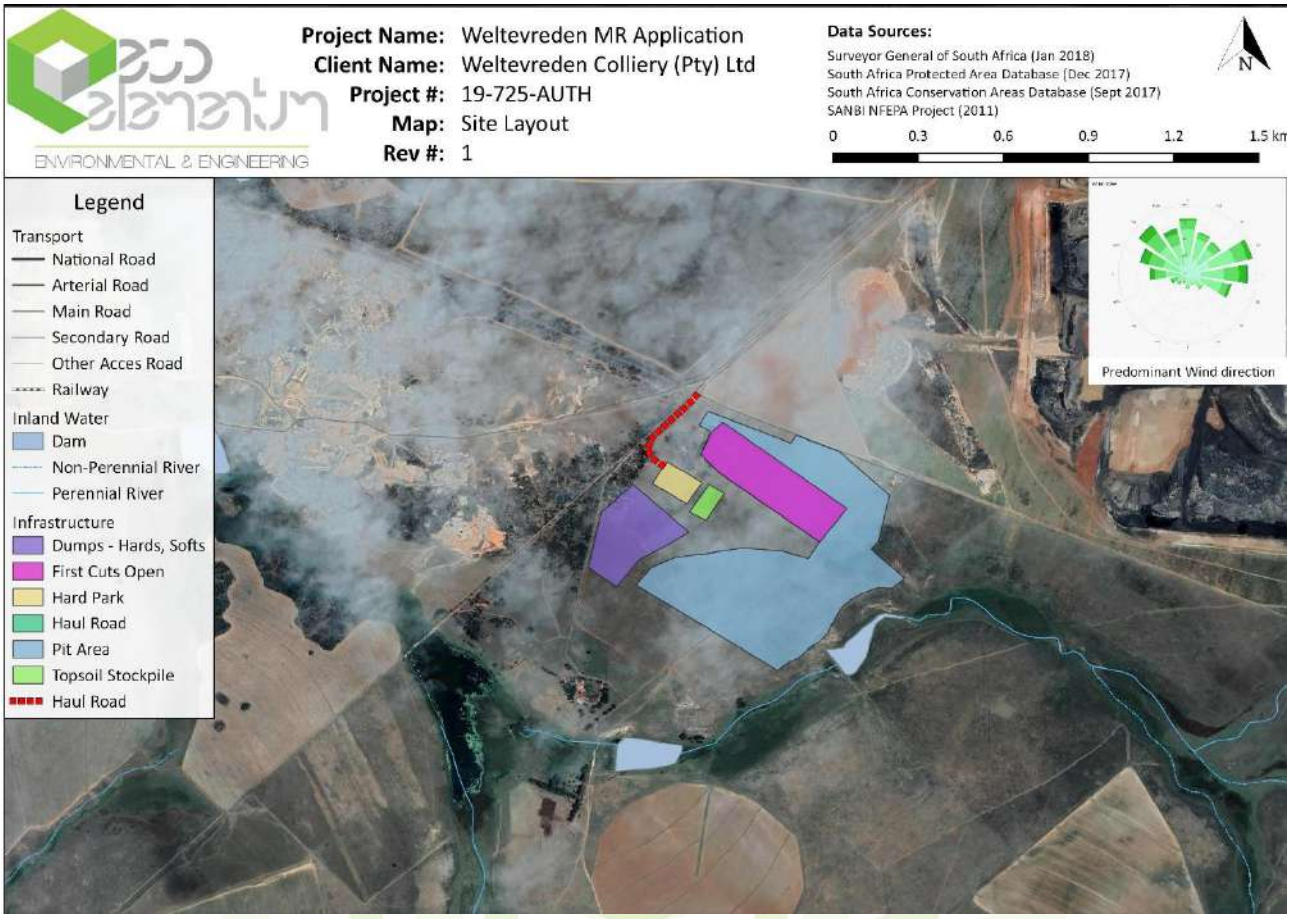

Figure 7.1: Site Layout

7.3 Item 3 (d) (ii) Description Of The Activities To Be Undertaken

7.3.1 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 box cut 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).

7.3.2 ROM Production

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 past both the two Mine properties. ROM will be transported directly from the pit to the Elandsfontein Mine for beneficiation The discard will be discarded in the current Elandsfontein discard handling facility (off site). With no ROM Discard going back to the Weltevreden Pit, the rehabilitation can commence immediately when the operation reaches a steady state scenario.

7.3.3 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 past both the two Mine properties.

The agreement entails that all coal will be run from the Weltevreden Colliery as ROM to Elandsfontein where the No. 4 and No. 1 coal seams will be washed and screened into Nuts, Peas and Duff products. The No. 2 coal seam will be crushed and screened to a 0-50 mm product.

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

7.3.4 Potable Water

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

7.3.5 Diesel Storage

Storage facility consist of 2 x 23 000 ℓ storage tanks. Total storage capacity is 46 000 litres.

7.3.6 General Waste Storage

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

7.3.7 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.

7.3.8 Sewerage

Sewerage is removed on a need basis.

7.3.9 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 50 000-80 000 ℓ/day dependant on distance of haulage.

7.3.10 Ancillary infrastructure

- Haul roads from pit to Dumps and Hard Parks;
- Haul roads inside mining area to mine access point;
- Site Offices;
- Security Offices.

8. POLICY AND LEGISLATIVE CONTEXT

Table 8.1 outlines the legislation and guidelines that are considered to be applicable to the proposed project; and which were considered at the time of compiling this report.

Table 8.1: Applicable legislation and guidelines

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	In terms of the list of Section 19 waste management activities, a S&EIR process is required. The	In terms of GN718 of 2009, under NEMWA, various Category A and B waste management activities are applicable to the proposed

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
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 license 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.	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.	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).	A 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 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.	An IWULA will be submitted to DWS for consideration for the 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.	The DWS will provide comment and an application will be lodged for their review prior to the 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.

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 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.

8.1 LEGAL REQUIREMENTS

The intent to mine requires the various applications and subsequent approvals prior to commencement. Refer to **Table 7.2 and** Table 8.1 in the previous sections. To this effect, an integrated environmental application process was followed by means of S&EIR. A S&EIR process typically has three phases as illustrated by Figure 8.1 below. The report is the final step in the environmental assessment phase, before authorisation can take place.

Figure 8.1: S&EIR flow diagram

9. NEED AND DESIRABILITY OF THE PROPOSED PROJECT

- 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.
- Through the Weltevreden Project, Weltevreden Colliery is committed to delivering improvements in the social and human capacities of the people who will surround this operation, not only to maintain their social licence to operate, but to create real opportunities for socio-economic advancement.
- Decades distorted development in the area has manifested in highly skewed distribution of income and wealth. The unemployment rate is approximately 27.3 % in 2011 (Stats SA). The leading industry in terms of employment is trade with 21.1%, followed by mining 20.6% and manufacturing 14.2%. Since 2001 there has been an increasing role/share of mining, construction, community services & finance as employer and a decrease in the role/share of trade, manufacturing, transport, agriculture, private households and utility. To aid in combatting unemployment the local community will be consulted with regards to recruitment, bursaries, learnerships, etc. The local community will also form part of the Future Forum.
- A preliminary socio-economic survey and investigation will continue to be conducted in order to enable and empower the Mine Committee to develop a much needed programme of action with measurable activities and timeframes to implement its social responsibility plan once the mining right has been awarded. This programme will contribute to skills development, job creation and education opportunities, with a knock on effect of local economic development, and SMME development.

10. ALTERNATIVES ASSESSMENT

Refer to Annexure 4 where the final layout plan is provided in terms of the motivation provided below.

10.1 THE PROPERTY OR LOCATION

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 or locations were considered.

10.2 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. Opencast mining is a more economically viable method for the extraction of the largest amount of resource at such a shallow depth. This will also ensure a longer period of job creation and input into the local economic development.

Description	Advantages	Disadvantages
Mining Method Alternatives		
Underground board-and-pillar.	• Smaller footprint associated with surface disturbance. • Alternative/current land uses can continue on areas not directly impacted by surface activities. • Reduced impact on dust, noise and air quality. • No blasting during operational phase. • Reduced rehabilitation costs.	• Not economically viable as large pillars will remain. • Risk of subsidence during operation. • Risk of subsidence post-closure. • Potential decrease in groundwater quantity and quality. • Potential decrease in groundwater interaction with wetland. • De-watering of the surrounding aquifer. • Potential AMD post mining and closure phase. • Potential undermining of aquifer. • Drawdown of water levels of privately owned boreholes. • Potential decrease in base flow to the streams and wetlands running through the MRA.
Opencast mining (preferred method)	• Additional employment opportunities. • Economically viable as more coal will be efficiently extracted. • Increased LOM – extended employment opportunities. • No subsidence risk during operation. • No subsidence risk post-closure.	• Greater surface area disturbance. • Change in land use required for all farm portions in the MRA. • Decrease in agricultural area/cultivated land. • Decrease in surface water runoff to catchment. • Potential decrease in surface and ground water quantity and quality. • Potential decrease in groundwater interaction with wetland. • Increased dust generation. • Increased blast and vibration impacts. • Increased noise from the use of construction and mining machinery on surface during operations. • Higher rehabilitation costs.

10.3 The Design Or Layout Of The Activity

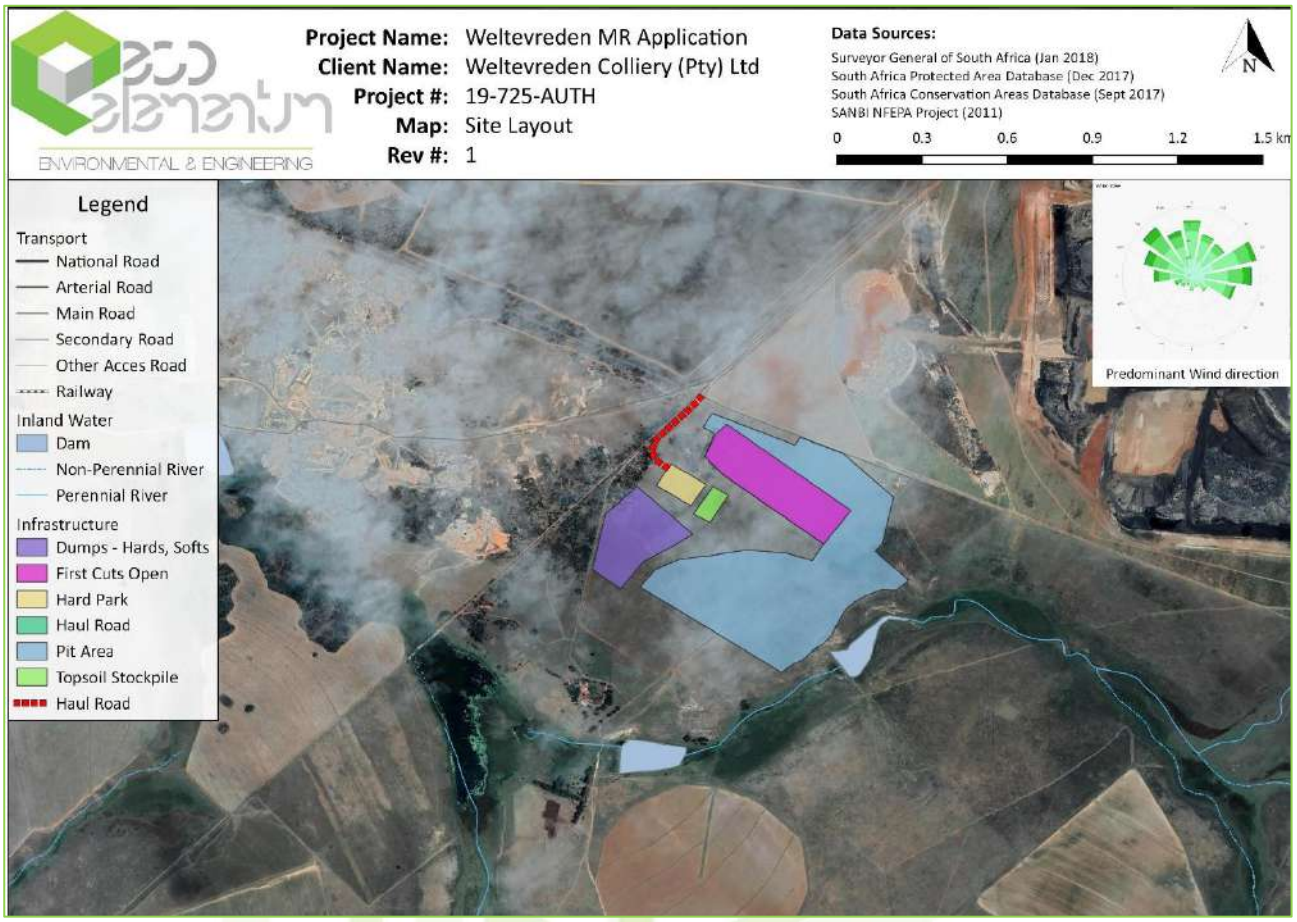

Figure 10.1: Site Layout

10.4 Operational Aspects Of 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.

10.5 The Technology To Be Used In The Activity

Refer to section 10.4

10.6 The Option Of Not Implementing The Activity

The no-go option will result in the protection of the environment in situ and the continued use of the land for agricultural purposes. Not mining the area for coal will result in the sterilisation of the coal resource. The no-go option would also prevent the socioeconomic benefits, including the need for job creation, increased socio-economic activity and social upliftment. If Saldomate (Pty) Ltd does not proceed with the Mining Right Application, another company is almost certain to apply for the rights.

The following negative impacts will however be avoided should the project not go-ahead:

- Potential surface and groundwater pollution associated with the Olifants River Catchment;
- Loss of natural habitat and faunal disturbance;

- Loss of sensitive riparian habitats associated with identified wetland areas on site;
- Additional traffic loads and on the local road network;
- Increased noise and dust levels (PM_{10} and $PM_{2.5}$);
- Potential decant of acid mine drainage during post closure (as a result of the sulphides) which may result in significant water quality modification;
- Lowering of the water table in the coal seam aquifer as a result of mine dewatering; and
- Loss of agricultural land/grazing land (current land use).

11. PUBLIC PARTICIPATION PROCESS (PPP)

11.1 Details Of The Public Participation Process Followed

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 was held on 31 May 2019 at the eMalahleni Main Library and another will be held on 29 November 2019 at Ogies Library, during the EIA phase;
- 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

Refer to the PPP report in Appendix 2 for the full details of the PPP carried out to date.

11.2 Summary Of Landowner Consultation And Public Participation

11.2.1 Adjacent Landowners

Adjacent landowners were identified through windeed and other projects in the surrounding areas. These landowners were then notified of the project via email and sms notification. Adjacent landowners were further invited to comment on the project / reports, and to attend the Public Open Days where questions can be asked and answered and concerns raised.

11.2.2 Interested and Affected Parties

All other interested and affected parties (I&APs) were notified through the placement of site notices around the Project Area, and Advertisements placed in the Witbank News. I&APs were invited to comment on the Draft Reports and also to attend the Public open days.

11.2.3 Commenting Authority Consultation

Commenting Authorities were provided with a hard copy of the Draft Reports and urged to give comments on the project. The following Commenting Authorities were provided with reports:

Department	Attention to
Department: Water Affairs - Bronkhorstspruit	Musa Lubambo
Mpumalanga Provincial Government DARDLEA	Ms. S.P. Xulu (HOD)
Nkangala District Municipality	Pierre Rossouw
eMalahleni LM	Erald Nkabinde
Mpumalanga Tourism and Park Agency	Komilla Narasoo
Department of Roads and Transport	Mr Mxolisi Cyril Dlamini

Department	Attention to
Department of Agriculture forestry and fisheries	Doreen Sithole
Mpumalanga Economic Development & Tourism	Mr PS Mohlala
Department of Mineral Resources (Competent Authority)	Registry

11.3 Comment And Response Report

Table 11.1: Summary of the issues raised by the various I&APs and the EAP's response/feedback thereto

Name Surname	Involvement	Method of comment	Comment	EAP Response
Mr Nkkosinathi Mtsweni	Greater eMalahleni Youth Forum	Open Day 31 May 2019	GEYF is a non-profit organisation that would like to join and participate in the SLP as they do community outreach programmes. The Mine needs to give the GEYF an opportunity and align the SLP/CSI projects to achieve goals and social objectives	Once the Mine starts with construction the SLP will be implemented and the communities will be approached regarding job opportunities.
			They face a high rate of youth unemployment in the country they think this is one of the positive ways to reduce the unemployment rate in eMalahleni. They want to create job opportunities and skills development and empower the young people and build their capacity.	Once the Mine starts with construction the SLP will be implemented and the communities will be approached regarding job opportunities.
Thia Oberholzer	Environmental Manager Highveld Steel	Email 6 May 2019	Please forward documentation to me once available. I would like to register as I&A party.	Draft Scoping report sent on 17 may 2019 when made available for Public Review
Doreen Manamela	B1 Safety	Email 7 May 2019	We would kindly like to request an appointment for Doreen Manamela to call on your company with regards to the supply of Personal Protective Equipment (PPE)	This will be brought to the attention of the mining company

Table 11.2: Summary of the issues raised by the Commenting Authorities and the EAP's response/feedback thereto

Organisation	Name Surname	Method of comment	Comment	EAP Response
Mpumalanga Tourism and Parks Agency	DR. M.C. LOTTER	Official letter, via email: 12 June 2019	The MTPA has no objection to this application but has the following concerns and require the following: 1. A botanical survey is required for the proposed mining site and immediate adjacent natural areas. The MTPA have modeled the distribution of the Critically Endangered orchid, the Albertina Sisulu Orchid (*Brachycorythis conica* subsp. *transvaalensis*), and it has the potential for occurring in this area. It flowers February to May. All the species of conservation concern (Protected plants) should be marked for rescue purposes.	A Botanical Survey has been undertaken by M² Environmental Consultants, and the report is provided in Appendix 3, as well as a summary in Section 12.3.
			2. Wetland delineation and wetland biodiversity studies are required. The Mpumalanga Biodiversity Sector Plan (MBSP) freshwater assessment, Figure 1 indicates the presence of a Critical Biodiversity Area Wetland system that must be avoided and indicated as such in the mine layout plan.	A Wetland Survey has been undertaken by M² Environmental Consultants, and the report is provided in Appendix 3, as well as a summary in Section 12.3.
			3. A rehabilitation plan is required to prevent and avoid the dewatering of the wetland system.	The rehabilitation plan will be compiled alongside the Closure Report, and is provided in Appendix 3, as well as a summary in Section 12.3.
			4. An active water purification system must address the possible pollution through AMD decanting, underground pollution plume, storm water pollution from discard dumps, overflow from pollution control facilities and leachates. Clean water must be provided back into the natural system.	Saldomate will look into water treatment and release closer to the time of closure.

Organisation	Name Surname	Method of comment	Comment	EAP Response
			5. In terms of the Mpumalanga Biodiversity Sector Plan terrestrial assessment, Figure 2, and the recommended land use guidelines in the MBSP Handbook, the remaining natural areas would support the functioning of the wetland and the MTPA recommend that a 100 m buffer from the edge of the wetland soils and vegetation is implemented.	Saldomate will be applying for exemption in terms of Regulations 4 and 5 of GN 704: • Restrictions on locality • Restrictions on use of material The mine with transgress the 500m buffer zone of a wetland and subsequently the 100m buffer from a watercourse as well. The mine and its associated activities will however not transgress the 1:100 year floodline area of the watercourse. A Section 21 (c) and (i) Water use will be applied for in this instance and mitigations put in place.

12. THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE SITES

12.1 SPECIALIST INVESTIGATIONS

The following specialist studies have been undertaken as part of the EIA process.

Table 12.1: List of Specialists

Specialist Study	Appointed Specialist	Company
Socio-Economic Impact Study	Vumile Ribeiro	Niara Environmental Consultants (Pty) Ltd
Air quality	Neel Breitenbach	Eco Elementum (Pty) Ltd
Aquatic Ecology	Joppie Schrijvershof	Oasis Environmental Specialists (Pty) Ltd
Visual Impact Assessment	Neel Breitenbach	Eco Elementum (Pty) Ltd
Noise Assessment	Barend van der Merwe	dB Acoustic (Pty) Ltd
Blasting and Vibration	Marica Pretorius	Big C Rock Engineering
Ecological	Reuhl Lombard	M² Environmental Connections (Pty) Ltd
Geo-hydrological	Elida Naude	Eco Elementum (Pty) Ltd
Surface water	Jaco Badenhorst	J B Umwelttecknick
Wetland	Johan Maré	M² Environmental Connections (Pty) Ltd
Heritage, Archaeological, and Paleo	Tobias Coetzee	Mr. Tobias Coetzee
Soils, land use and land capability	Mariné Pienaar	Terra Africa

12.2 Description Of The Current Land Uses

The current land use for the project area is agriculture (crop production) and grazing with Mining activities directly adjacent to the North of the Project. Agricultural land is present on the remainder of the surrounding areas.

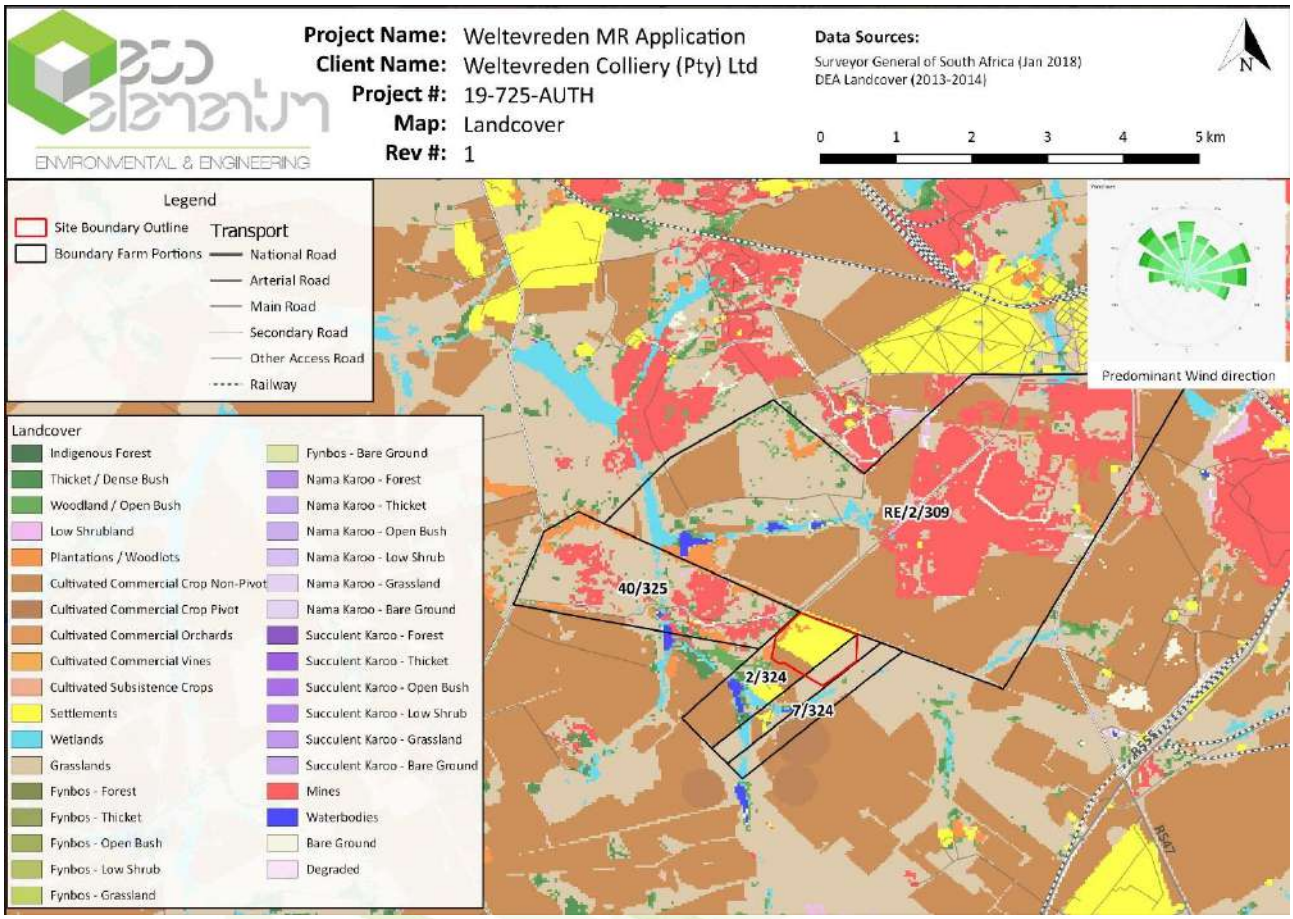

Figure 12.1: Landcover of the project area

12.2.1 Land Conversion

The land use patterns of the surrounding area are defined as a mixture between agriculture, mining with intermittent residential and business use. Since the proposed new mining operations will consist of opencast mining, the land use in these areas will change from agriculture to mining. The areas where the pit, site infrastructure and stock piles will be located will be sterilized from agriculture. High production areas should be avoided as far as possible.

12.3 Type Of Environment Affected By The Proposed Activity

12.3.1 Climate and Air Quality

Information for this field were taken from the Air Quality Impact Assessment for Weltevreden Colliery done by Eco Elementum (Pty) Ltd

12.3.1.1 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.

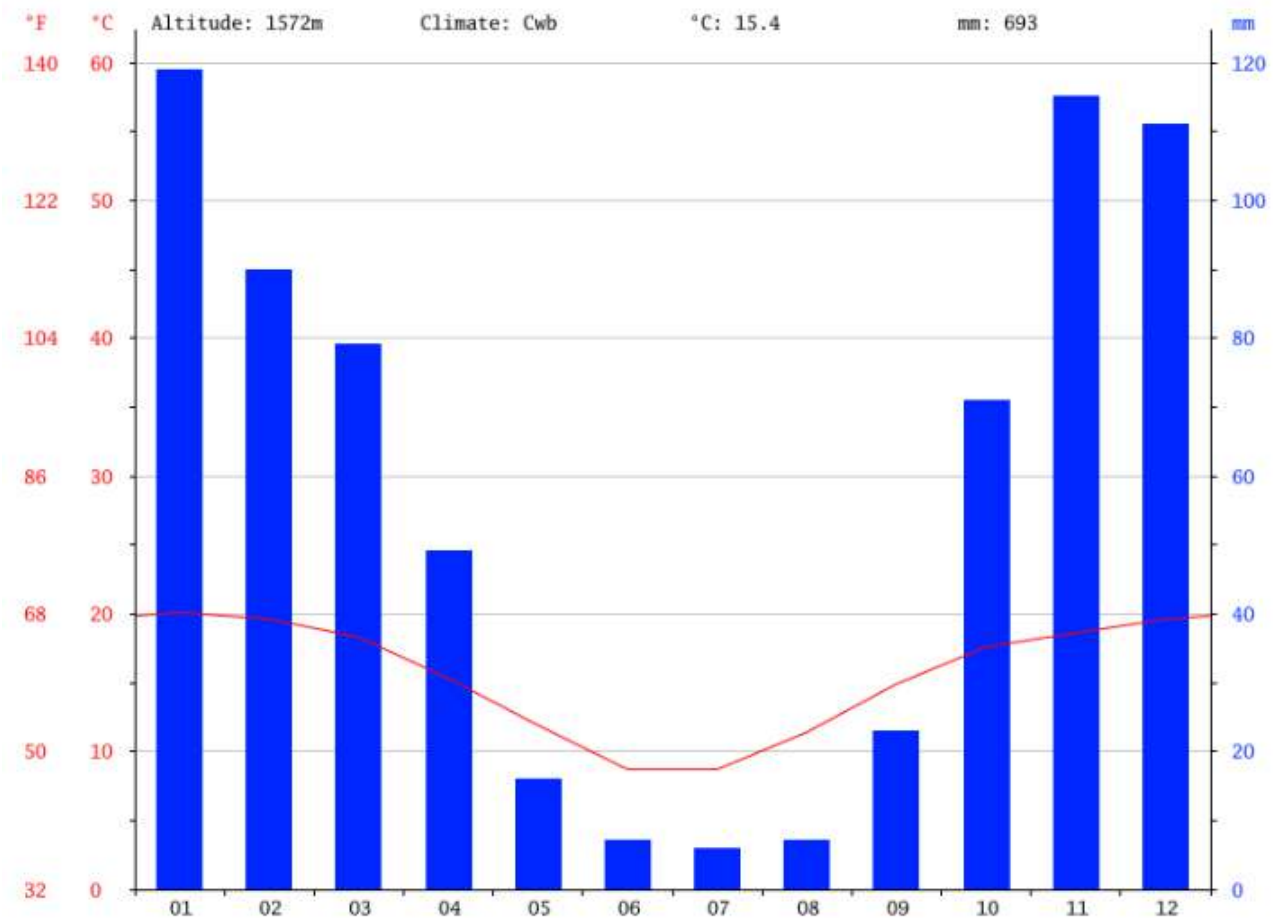

Figure 12.2: Average Climate Graph by month for eMalahleni

	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 12.3: eMalahleni weather by month

12.3.1.2 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 km^2, including parts of Gauteng and Mpumalanga Provinces, with a single metropolitan municipality, three district municipalities, and nine local municipalities (Figure 12.4).

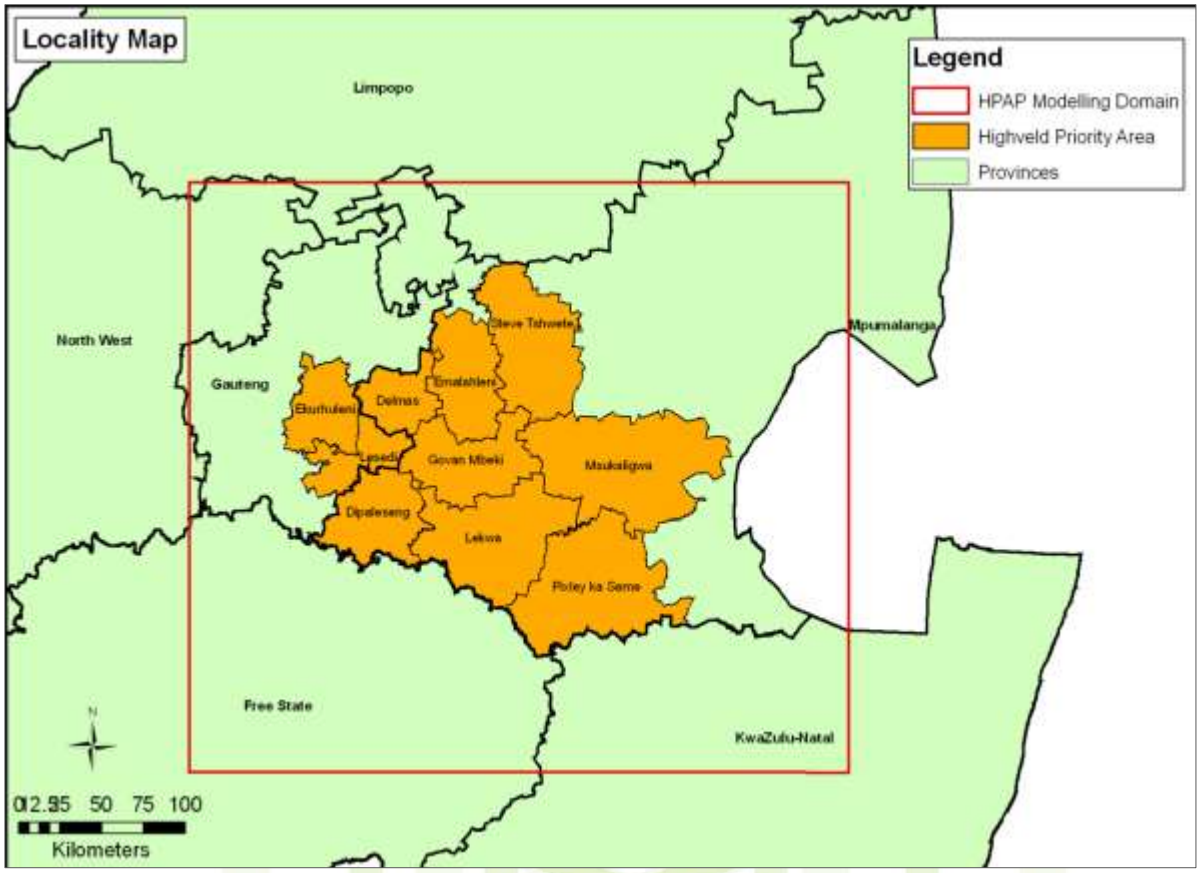

Figure 12.4: Highveld Priority Areas (HPA)

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 12.2: 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.*

12.3.1.3 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 12.4 by the number of modelled exceedances of the 24-hour SO_2 and PM_{10} standards, and are confirmed by ambient monitoring data (Table 12.3). 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 cross boundary 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 12.3).

Table 12.3: 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				

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)*
	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.

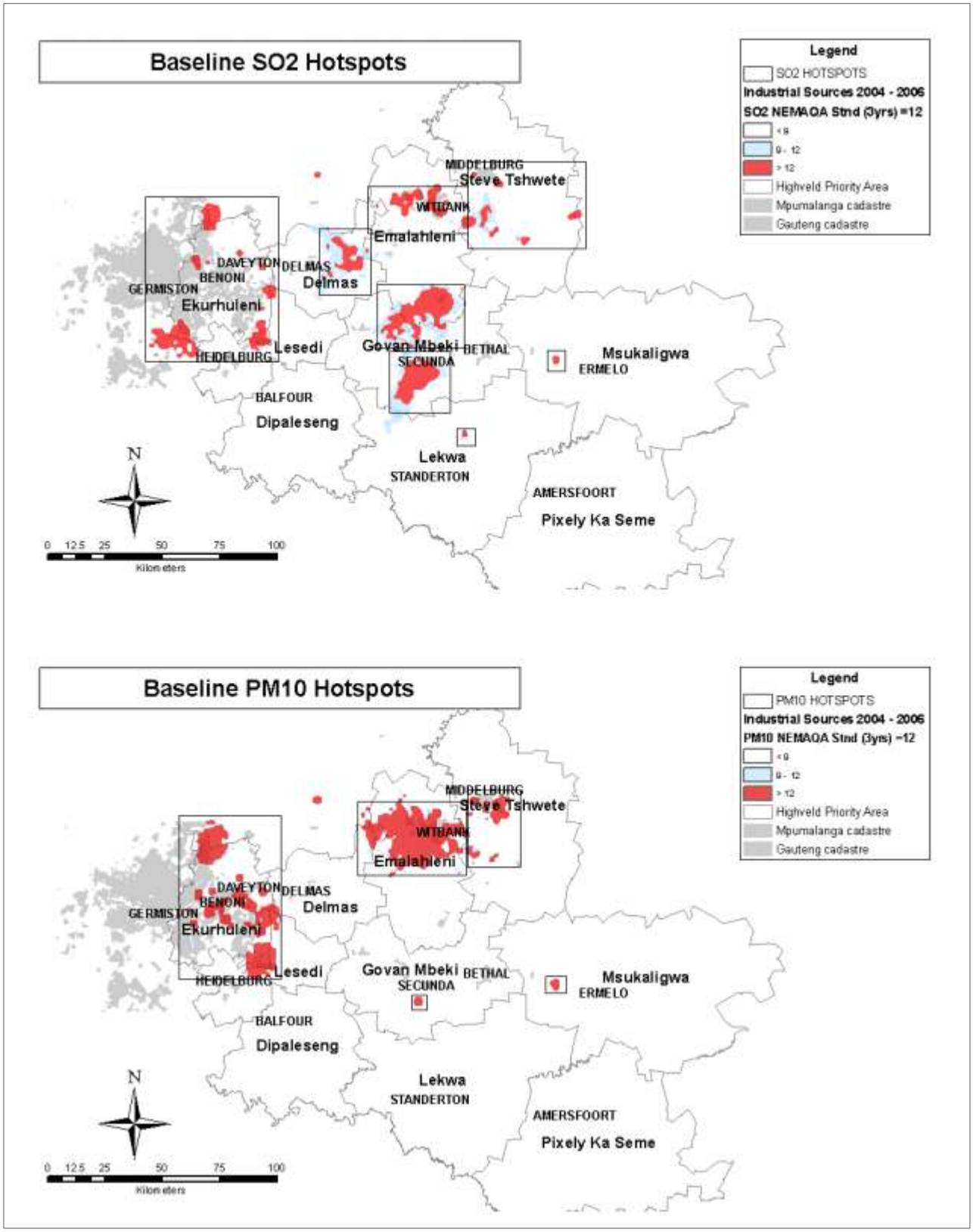

Figure 12.5: Modelled frequency of exceedance of 24-hour ambient SO_2 and PM_{10} standards in the HPA, indicating the modelled air quality Hot Spot areas

12.3.1.4 Sensitive Receptors

Sensitive receptors identified in the immediate vicinity of the study area and proposed project area have been listed below:

- Farm steads; and
- Outskirts of the town of Clewer and Phola.

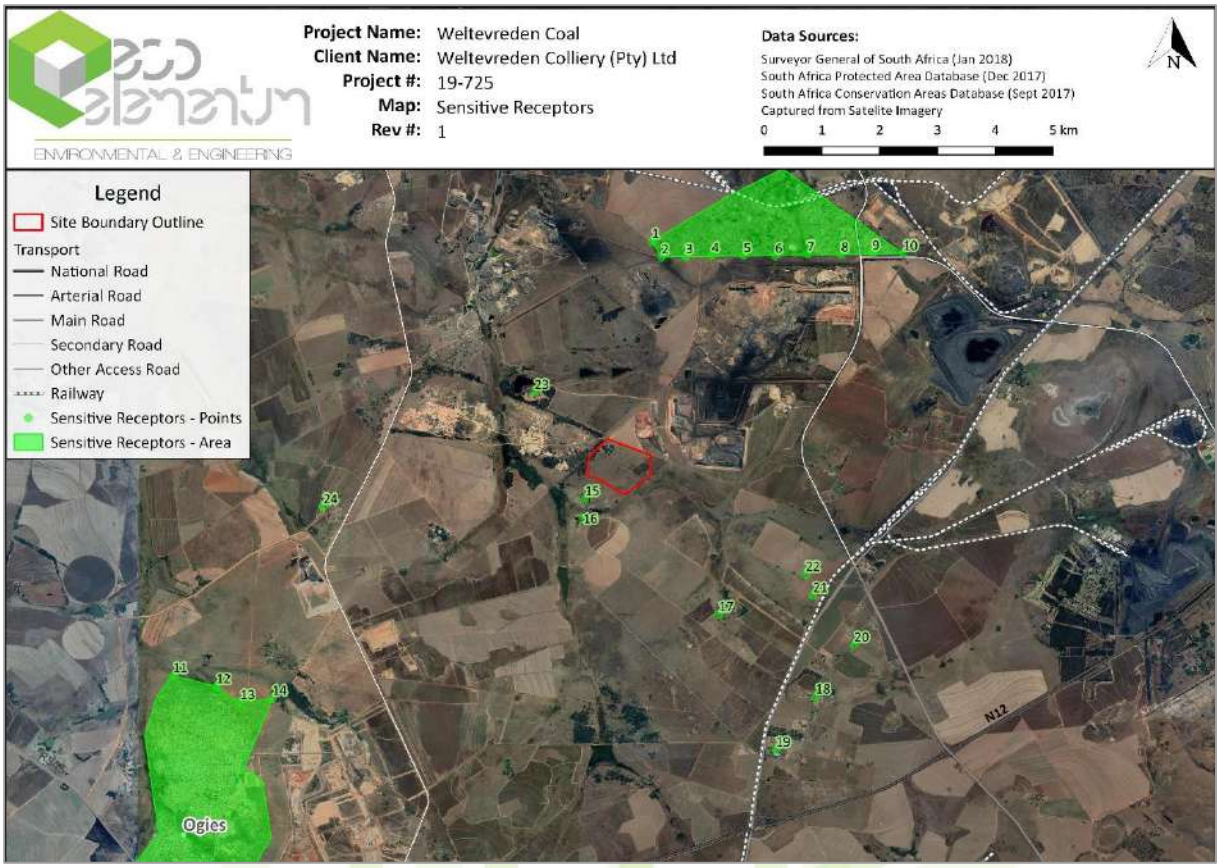

Figure 12.6: Sensitive receptors in the immediate area of the mining boundary.

12.3.1.5 Site-Specific Dispersion Potential

A period wind rose for the site is presented in Figure 12.8 below. Wind roses comprise of 16 spokes which represents the direction from which winds blew during the period. The colours reflect the different categories of wind speeds. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories.

Based on an evaluation of the meteorological data simulations run from a global NEMS weather model at ~30 km resolution from 1985 to current of the project area. The following deductions regarding the prevailing wind direction and wind frequency can be assessed. Looking at Figure 12.8 below, the predominant wind direction is predicted to occur mainly from the north-west and east direction more than 740 and 700 hours per year respectively with wind speeds higher than 5 km/h. Secondary winds of more than 5 km/h can be expected from the west-north-west and east-north-east 0268 and 648 hours per year respectively.

At the site, calm conditions with wind speeds of 12 km/h or less, are predicted 2-9 days per month throughout the year. 12-19 km/h winds are predicted 10-16 days per month through the year. Wind speeds of more than 19 km/h are predicted to occur 7-17 days per year on average.

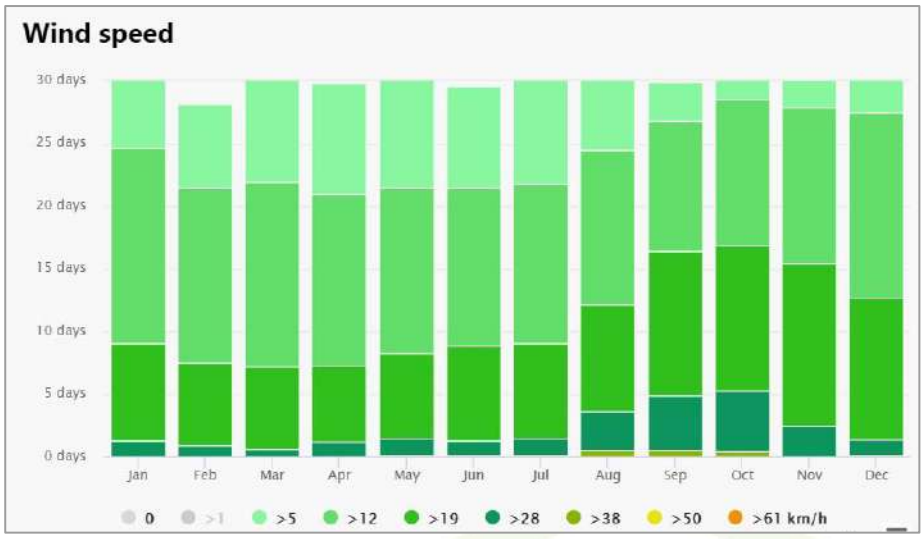

Figure 12.7: Wind Class Frequency Distribution per month.

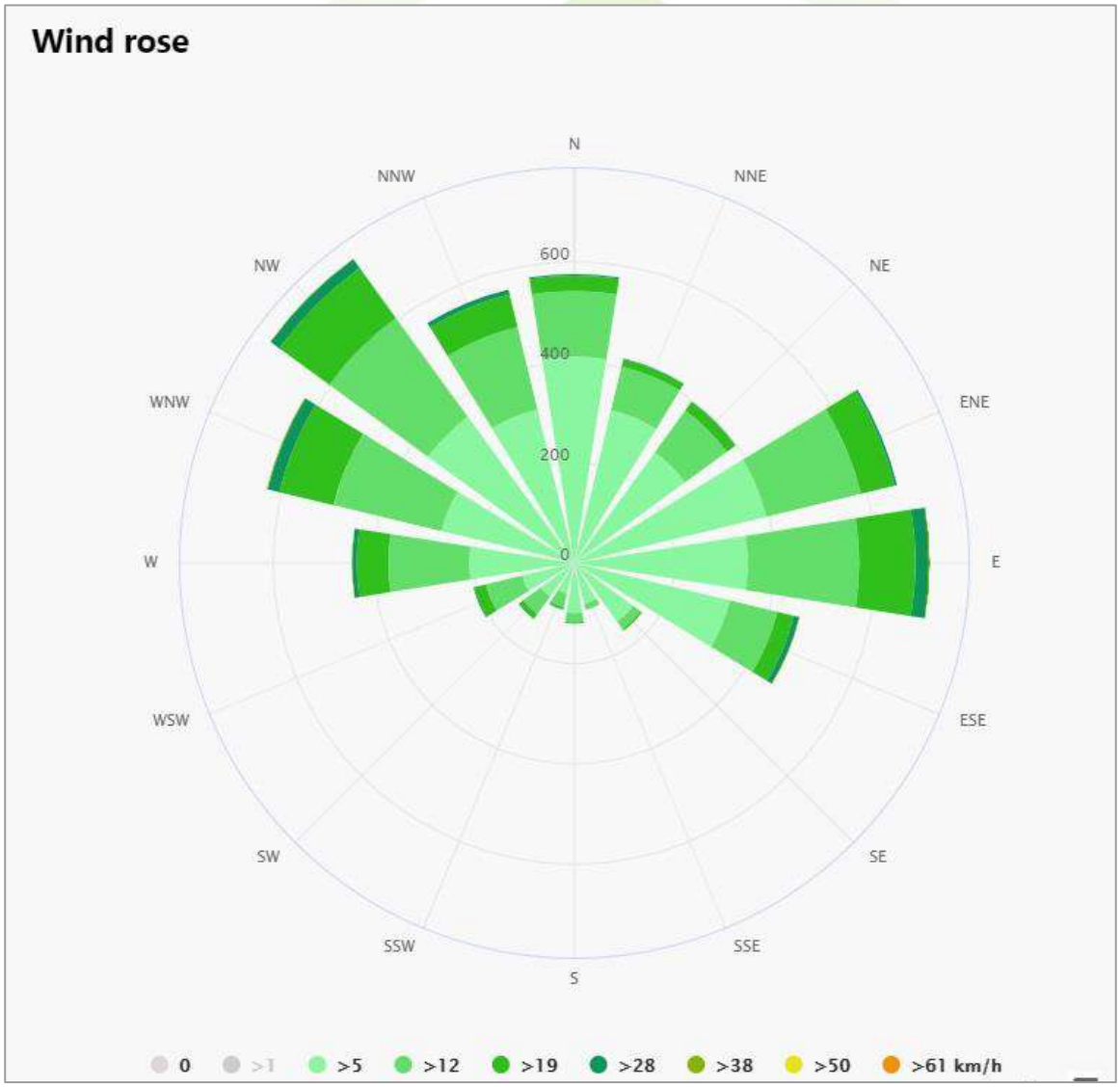

Figure 12.8: NEMS 30 km simulation model wind rose for the proposed Weltevreden Coal project area for the period 1985 to current.

12.3.1 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 north-eastwards from there. The altitude ranges from 1 300–1 635 m.

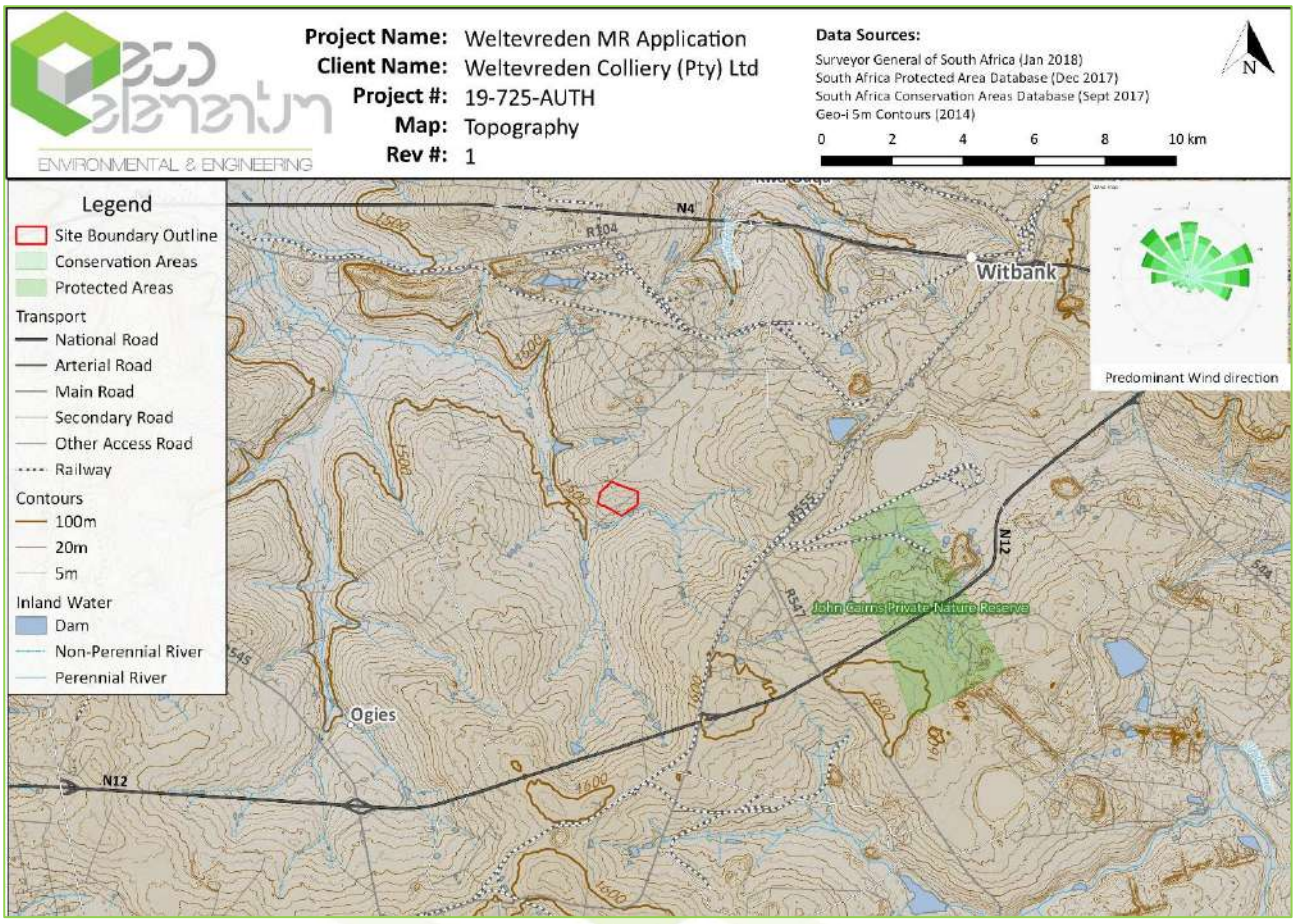

Figure 12.9: Site topography

12.3.2 Soil Forms and Land Capability

Soil, land use, land capability and agricultural potential study for the Weltevreden colliery project, Mpumalanga (Terra Africa, 2019).

The site is dominated by oxidic soil of the Hutton and Clovelly forms ranging in depths from 35cm in the middle of the study area to deeper than 150 cm along the north-eastern and south-western boundaries. The middle of the site consists of hydromorphic soil forms where water accumulation has been intensified through the construction of historical earth dam walls (most of them within the site area still intact). The hydromorphic soil forms include Willowbrook and small sections of the Kroonstad form. A small section of the Wasbank soil form also has wetland land capability in the study area. The impact of previous anthropogenic activities on the properties are visible at two sites that were used as quarries as well as the areas where farm houses and other farming infrastructure has been constructed.

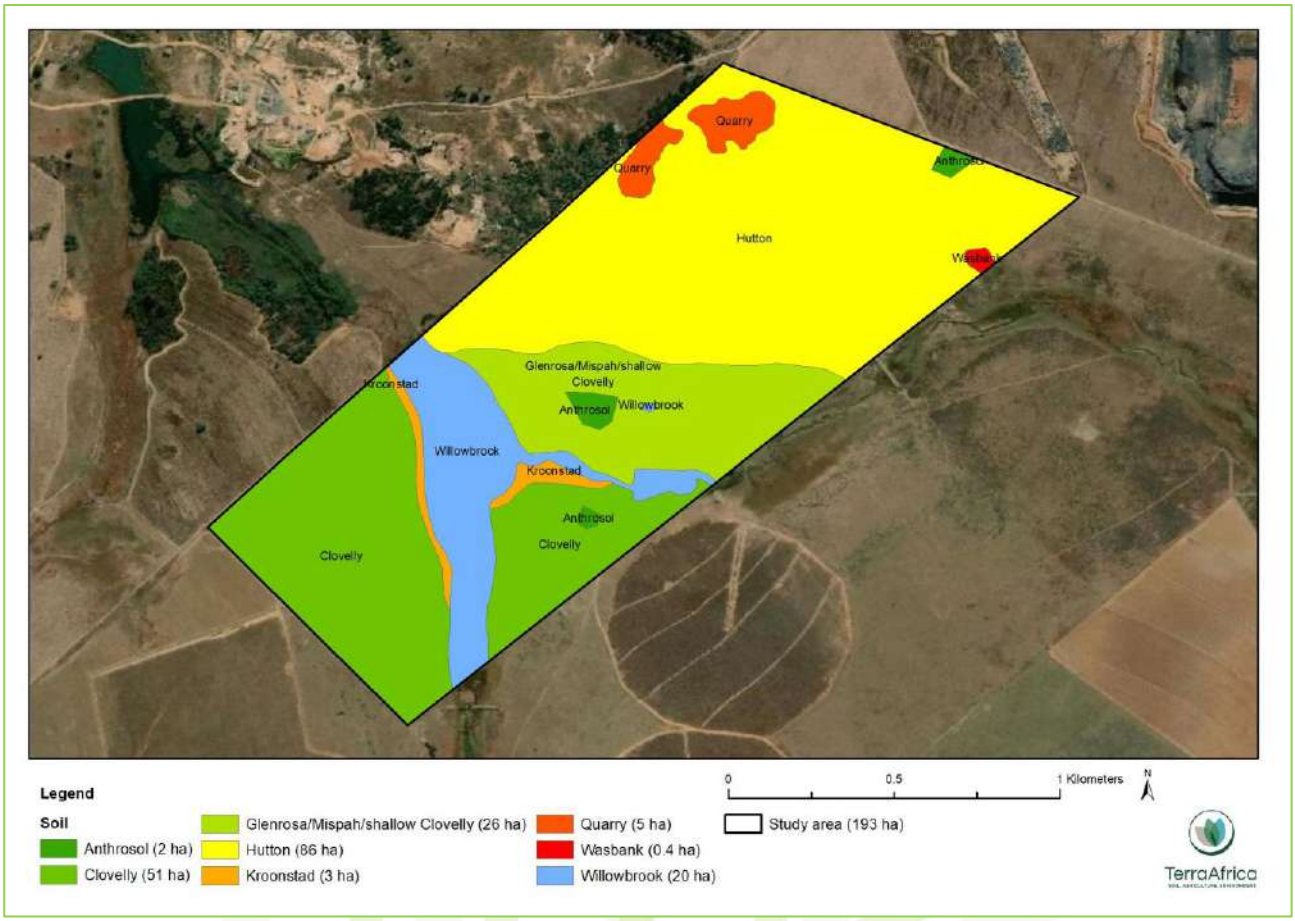

Figure 12.10: Soil Classification for the project area

The land capability of an area is the combination of the inherent soil properties and the climatic conditions as well as other landscape properties such as slope and drainage patterns that may inhibit agricultural land use or result in the development of specific land functionality such as wetlands. Land capability affects the socio-economic aspects of human settlements and determine the livelihood possibilities of an area. Baseline land capabilities are also used as a benchmark for rehabilitation of land in the case of project decommissioning.

The site can be divided into all four the land capabilities of the classification system advocated by the South African Chamber of Mines namely arable, grazing and wilderness (Figure 9). The largest area (137 ha) consist of soil with arable land capability where the Hutton and Clovelly soil profiles are present.

The shallower soil profiles of the Glenrosa/Mispah/shallow Clovelly forms have grazing land capability and is better suited to livestock farming. The Willowbrook, Kroonstad and Wasbank forms have wetland land capability following the classification criteria as stipulated by the South African Chamber of Mines guidelines.

The areas with Wilderness Land Capability are associated with the two quarries as well as the Anthrosol areas where farmhouses and supporting infrastructure is present. Since the soil surface is either covered (Anthrosols) or excavated (quarries) it cannot be used for arable agriculture or grazing without site rehabilitation.

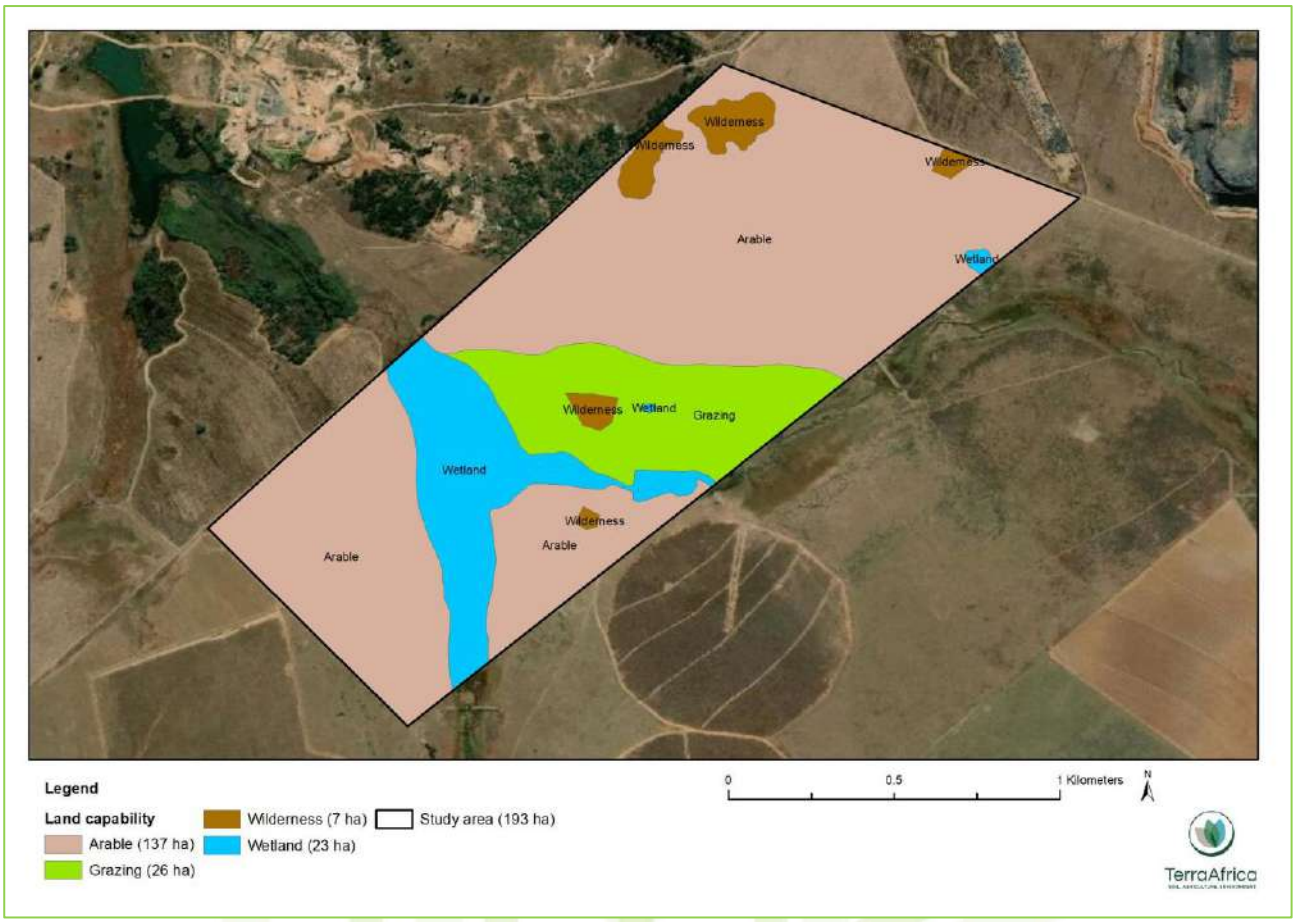

Figure 12.11: Land Capability

12.3.3 Surface Water

Weltevreden is situated within the Upper Olifants sub-WMA of the Olifants WMA. The quaternary drainage region applicable to the activities associated with the mine is the B20G quaternary drainage region.

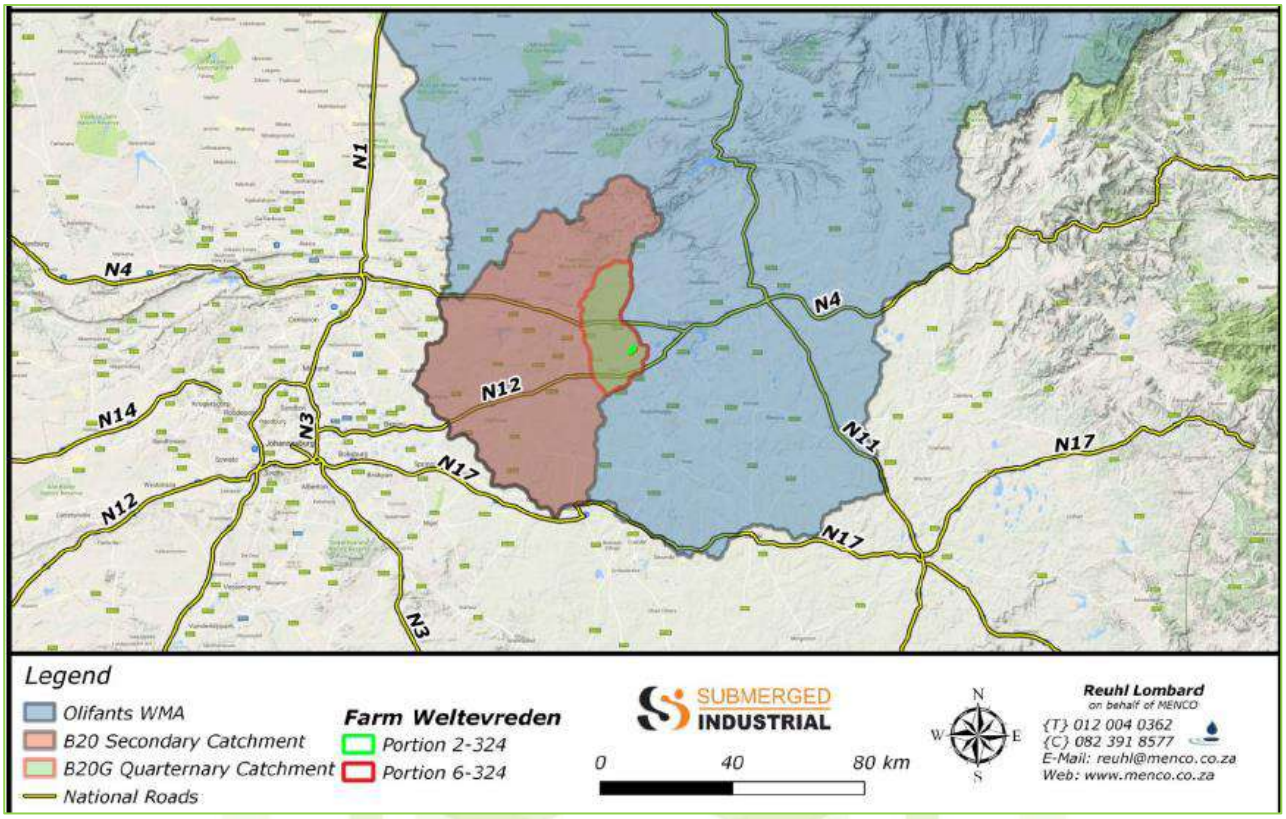

Figure 12.12: Water Management Areas applicable to the study area

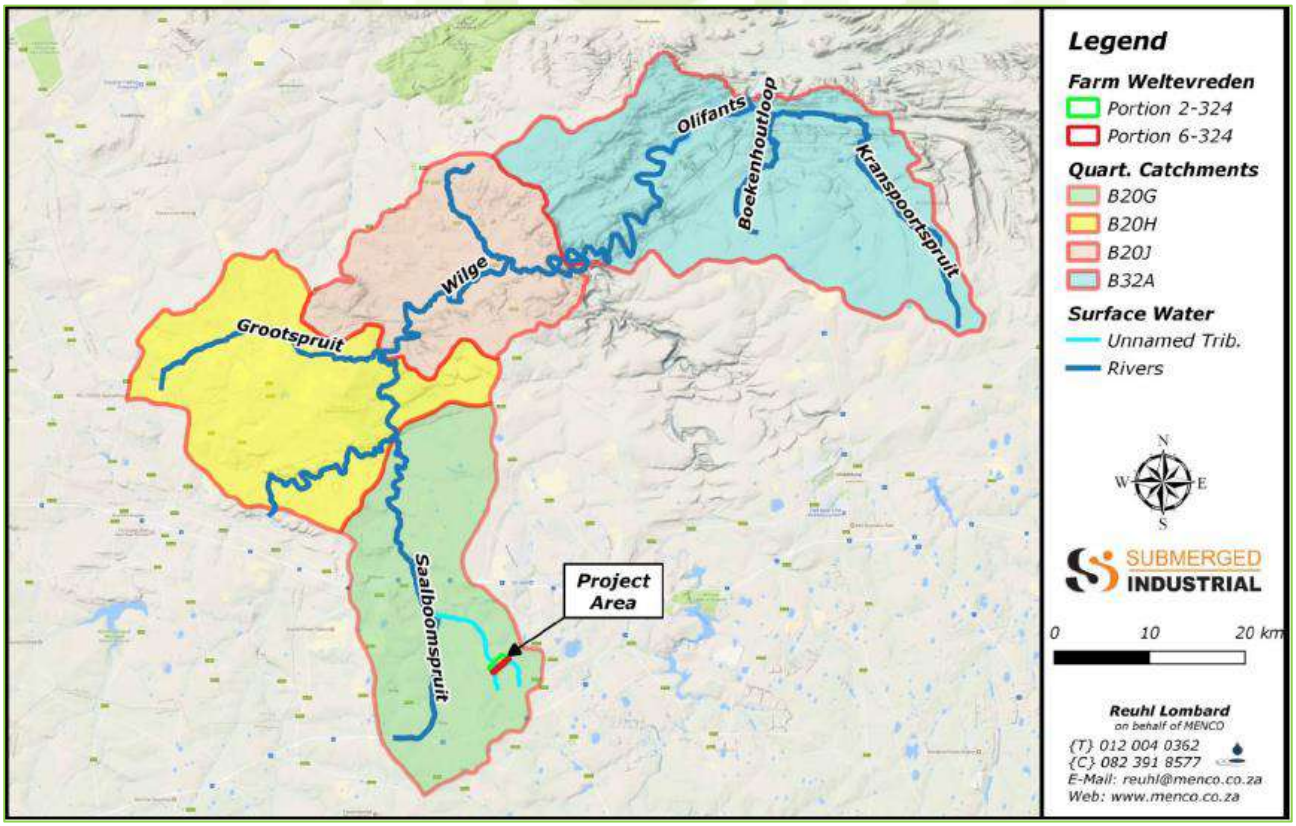

Figure 12.13: Quaternary Catchment applicable to the study area

12.3.3.1 Resource Classification and The Reserve

According to the approved reserve for the various river ecosystems in the Upper Olifants, Wilge and Olifants-Loskop catchments, dated 2010 (DWA, 2010b and Blue Science 2012), the Present Ecological State (PES) of the rivers the B20G catchment is generally in an E ecological category which represents a seriously modified system where there has been a great or extensive loss of natural habitat, biota and basic ecosystem functions. As a result, there are few fish species present, the riparian vegetation is disrupted, and tolerant and exotic fauna and flora is dominant.

12.3.3.2 Water Quality

Table 12.4: Surface Water Quality Laboratory Analyses Results – upstream and downstream of the site (2018)

Variable	Unit	Sampling Point 2018		Domestic TWQR
		US	DS	
pH		7.5	7.3	6.0 – 9.0
EC	mS/m	23.3	21.4	0 – 70
TDS	mg/l	146	130	0 – 450
Total Alkalinity as $CaCO_3$	mg/l	80	74	---
Chloride as Cl	mg/l	15	15	0 – 100
Sulphate as SO_4	mg/l	48	35	0 – 200
Fluoride as F	mg/l	0.3	0.3	0 – 1
Nitrate as N	mg/l	0.05	0.1	0 – 6
Nitrite as N	mg/l	0.05	0.1	0 – 6
Free and Saline NH_4	mg/l	0.7	0.1	---
Potassium as K	mg/l	3.1	2.2	0 – 1
Sodium as Na	mg/l	11	12	0 – 100
Calcium as Ca	mg/l	17	16	0 – 32
Magnesium as Mg	mg/l	9	18	0 – 30
Aluminium as Al	mg/l	0.1	0.1	0 – 0.15
Iron as Fe	mg/l	0.52	0.475	0 – 0.1
Manganese as Mn	mg/l	0.03	0.048	0 – 0.05

The water quality of the Grootspruit downstream of Elandsfontein Colliery is known to be of poor quality. The water quality in the upper reaches of the Grootspruit as indicated in Table 12.4 is of good quality as all variables measured fall within the limits of the Target Water Quality Range for domestic use.

12.3.4 Groundwater

12.3.4.1 Unsaturated Zone

The unsaturated zone is the zone between the ground surface and the static water table. In the unsaturated zone the pores between the ground particles are filled with air and water- thus below saturation. Static water levels in the region of the Weltevreden Colliery as obtained from the monitoring information, range between 4.2 to 14.4 mbs, therefore also the thickness of the unsaturated zone. The unsaturated zone may consist of soil, weathered bedrock and even solid bedrock from the sandstone and shale of the Ecca Group.

12.3.4.2 Saturated Zone

The saturated zone is that part of the aquifer below the regional static water level where all pores and fractures are filled with water at a pressure greater than atmospheric pressure. The depth of the saturated zone in the Weltevreden Colliery area, is therefore more than 4.2 to 14.4 mbs. From drilling results at the proposed Weltevreden Colliery and studies compiled for the Elandsfontein Colliery, the saturated zone consists of two aquifer systems.

- Firstly, the weathered, unconfined aquifer that typically occurs on the transition between soil and weathered bedrock (typically sandstone and shale). The groundwater flow closely mimics the surface topography. Groundwater levels are usually shallow in the low lying topographical regions and may even daylight on surface which is referred to as springs. The weathered aquifer is more prominent in the wet season because it is located on top of solid bedrock or clayey layers. This aquifer normally has a low yield.
- The second aquifer is known as the deeper, confined aquifer. Flow in this aquifer mainly occurs along fractures, bedding planes and other groundwater flow paths. The presence of fractures generally decreases with depth in this aquifer. The secondary aquifer, due to its heterogeneous nature, may be higher yielding than the weathered aquifer.

12.3.4.3 Hydraulic Conductivity

Hydraulic conductivity refers to the ease with which water passes through a porous medium in a certain time under a hydraulic gradient (m/d). Hydraulic Conductivity (K) can be determined as:

$$K = \frac{\text{Transmissivity (T)}}{\text{Aquifer thickness (d)}}$$

Aquifer testing were conducted on nine boreholes at Elandsfontein Colliery during the 2018 study by Digby Wells. As mentioned previously, the aquifer characteristics at Weltevreden Colliery is expected to be very similar than at Elandsfontein Colliery due to its close proximity. The hydraulic conductivity was estimated with these tests to be an average of 0.05 m/d.

12.3.4.4 Groundwater vulnerability

Groundwater vulnerability refers to the likelihood for contamination to reach a certain area/receptor after it has been introduced to the surface. For the Weltevreden Colliery area the vulnerability was estimated from the Aquifer Vulnerability map of South Africa (DWA, 2013) and by the Groundwater Vulnerability Classification System. According to the Aquifer Vulnerability map the Weltevreden Colliery is located in a moderate vulnerability rating area. Therefore, an area that if continuously exposed to contamination may be vulnerable to some pollutants.

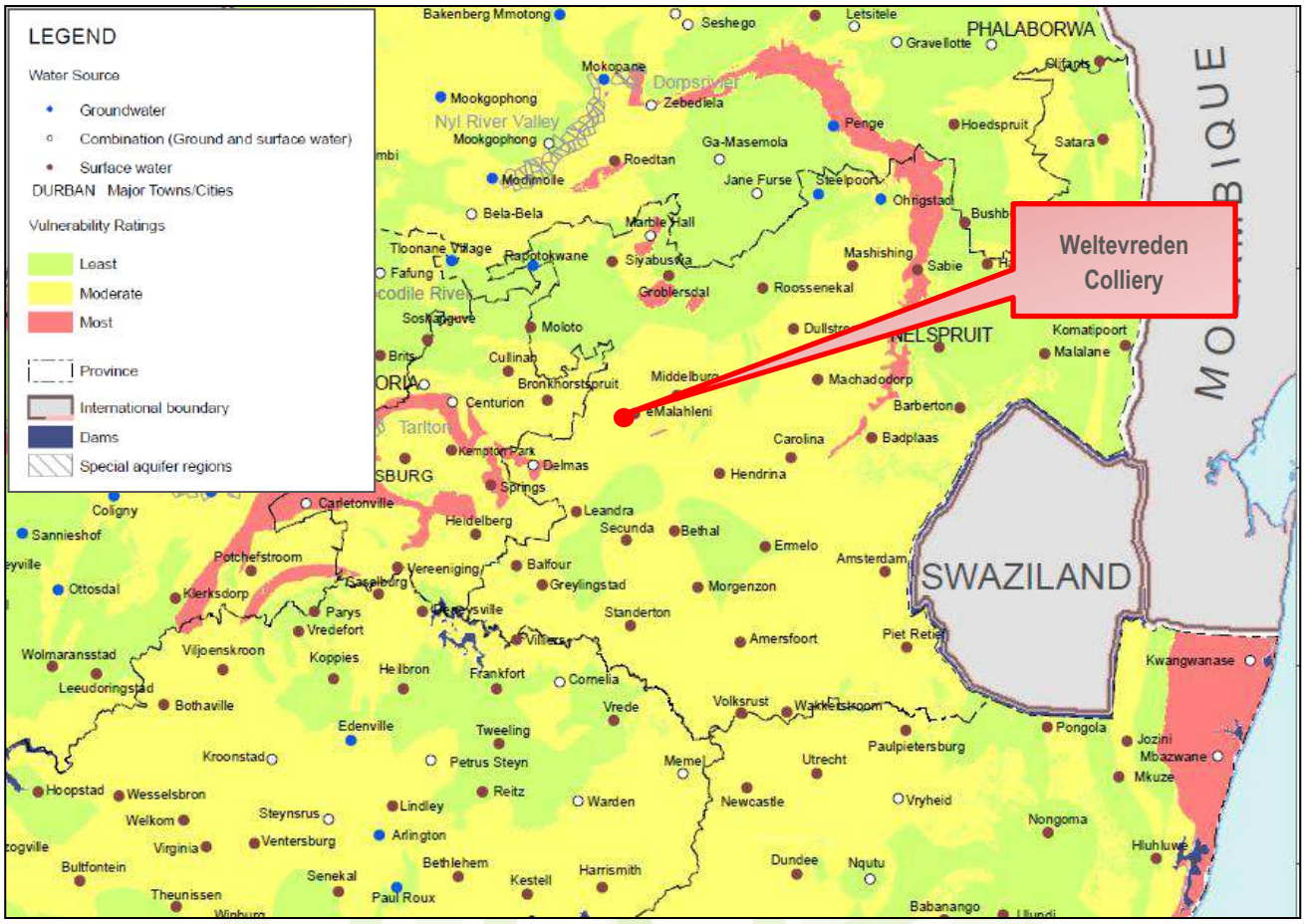

Figure 12.14: Aquifer vulnerability rating of the proposed Weltevreden Colliery (DWA, 2013)

The Groundwater Vulnerability Classification System incorporates the Parsons Aquifer Classification System (Section 6.2) and the drinking water guidelines from the Department of Water Affairs and Forestry.

Table 12.5: Groundwater Vulnerability Classification System

Rating	Depth to Water Level	Groundwater Quality	Aquifer Type- Parsons
1	> 10 m	Poor (TDS > 2 400 mg/l)	Non-Aquifer System
2	6 – 10 m	Marginal (TDS > 1 000 < 2 400 mg/l)	Minor Aquifer System
3	3 – 6 m	Good (TDS > 450 < 1 000 mg/l)	Major Aquifer System
4	0 – 3 m	Excellent (TDS < 450 mg/l)	Sole Aquifer System

Table 12.6: Groundwater Vulnerability Rating

Rating	Vulnerability
≤ 4	Low
> 4 ≤ 8	Medium
≥ 9	High

Table 12.7: Groundwater Vulnerability for Weltevreden Colliery.

Rating	
Depth to water level	3
Groundwater quality	4

Aquifer Type	2
Total Score	**9**

According to the Groundwater Vulnerability Classification System, the Weltevreden Colliery aquifer scored a rating of 9 which is indicative of a high vulnerability. Due to many of the groundwater qualities in terms of TDS concentrations being excellent, the aquifer in some areas may even be highly vulnerable.

12.3.4.5 Aquifer Classification

According to the Aquifer Classification map (DWA, 2012), the Weltevreden Colliery is situated in a **minor** aquifer classification area. Aquifer classification is based on the Parsons System (1995). Qualities in these aquifers can vary and is typically moderately yielding aquifers.

Table 12.8: Aquifer System Management Classes.

Sole Aquifer System	An aquifer that is used to supply 50% or more of domestic water for a given area, and for which there is no reasonably available alternative sources should the aquifer be impacted upon or depleted. Aquifer yields and natural water quality are immaterial.
Major Aquifer System	Highly permeable formation, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes. Water quality is generally very good (less than 150 mS/m).
Minor Aquifer System	These can be fractured or potentially fractured rocks that do not have a primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although these aquifers seldom produce large volumes of water, they are important both for local suppliers and in supplying base flow for rivers.
Non-Aquifer System	These are formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities. Water quality may also be such that it renders the aquifer unusable. However, groundwater flow through such rocks, although impermeable, does take place, and needs to be considered when assessing the risk associated with persistent pollutants.
Special Aquifer System	An aquifer designated as such by the Minister of Water Affairs, after due process.

Two aquifer systems exist in the Weltevreden Colliery area. Firstly, is a swallow, weathered aquifer which is found in the transitional soil and weathered bedrock zone. Due to direct recharge and dynamic groundwater flow through the weathered sediments, the natural groundwater qualities are often good. The direct recharge and dynamic groundwater flow are also the reason why this aquifer is vulnerable to pollution. Water levels in this aquifer are often shallow (few meters below ground level) and follow the surface topography.

Secondly is a deeper semi-confined to confined fractured aquifer where groundwater flow is predominantly fracture flow. The fractured Karoo aquifer consists of sedimentary successions of siltstone, shale, sandstone and the coal seams. Groundwater flow is dominated by secondary porosities like faults, fractures, joints, bedding planes or other geological contacts. Yields can be higher in this aquifer along these geological structures. The rock matrix is characterised by a low permeability. Borehole yields in the in the Ecca aquifers are generally low and can be expected to be less than 2 l/s.

12.3.4.6 Aquifer Protection Classification

As part of policy and regulation development and implementation, the aquifer classification used in Table 11 alone is not sufficient. To minimise misinterpretation, the decision support tool in Table 12 also needs to be incorporated as part of aquifer classification (Parsons, 1995). The combination of the Aquifer System Management Classification and the Aquifer Vulnerability Classification rating is referred to as the Groundwater Quality Management (GQM) classification, which provide a level of aquifer protection.

GQM = Aquifer System Management x Aquifer Vulnerability

Table 12.9: GQM Classification for the Weltevreden Colliery.

Aquifer System Management Classification		Aquifer Vulnerability Classification		GQM		GQM
Class	Points	Class	Points	Index	Level of protection	Weltevreden Colliery
Sole Source Aquifer System	6	High	3	<1	Limited	
Major Aquifer System	4			1 - 3	Low	
Minor Aquifer System	2	Medium	2	3 - 6	Medium	6
Non-aquifer System	0			6 - 10	High	
Special Aquifer System	0-6	Low	1	>10	Strictly non-degradation	

The level protection for the Weltevreden Colliery according to the GQM Index is 6. This indicates a medium level of protection. Based on the findings of the geohydrological study it is highly recommended that a proposed monitoring protocol should be in place for the proposed project area.

The DWA has also compiled a susceptibility map for South Africa (2013). This map indicates the qualitative measure of the relative ease with which an aquifer can potentially be contaminated. According to the aquifer susceptibility map, the Weltevreden Colliery is also classified as medium susceptible to contamination.

12.3.4.7 Groundwater Elevation Gradient

Groundwater within the Weltevreden Colliery model area decrease from approximately 1 595 mamsl (eastern boundary of the Weltevreden Colliery) to 1 497 mamsl north-west of the mine area (**Figure 12.16**). Groundwater gradients over the area is approximately 1.7%.

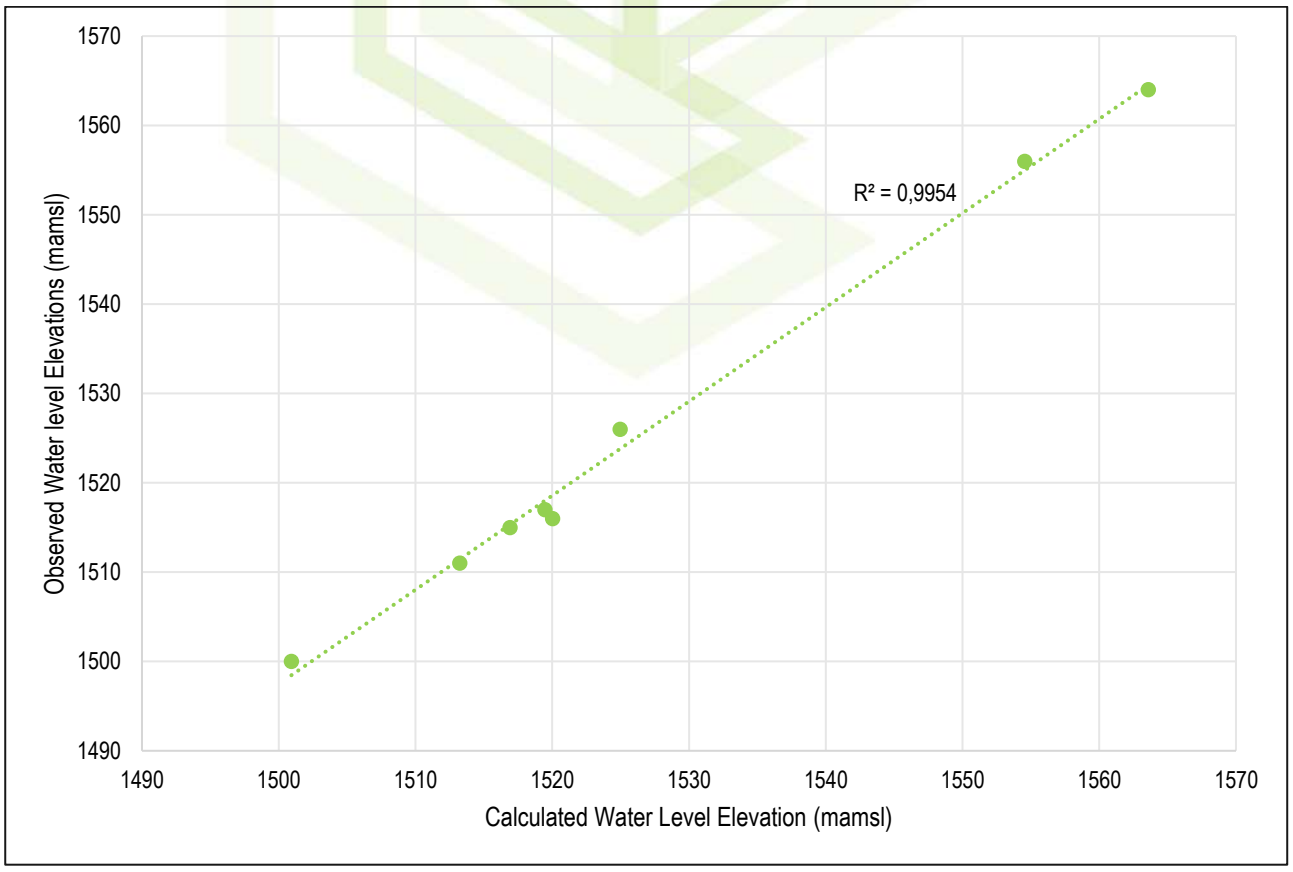

Figure 12.15: Model calculated water level elevations vs observed water level elevations correlation.

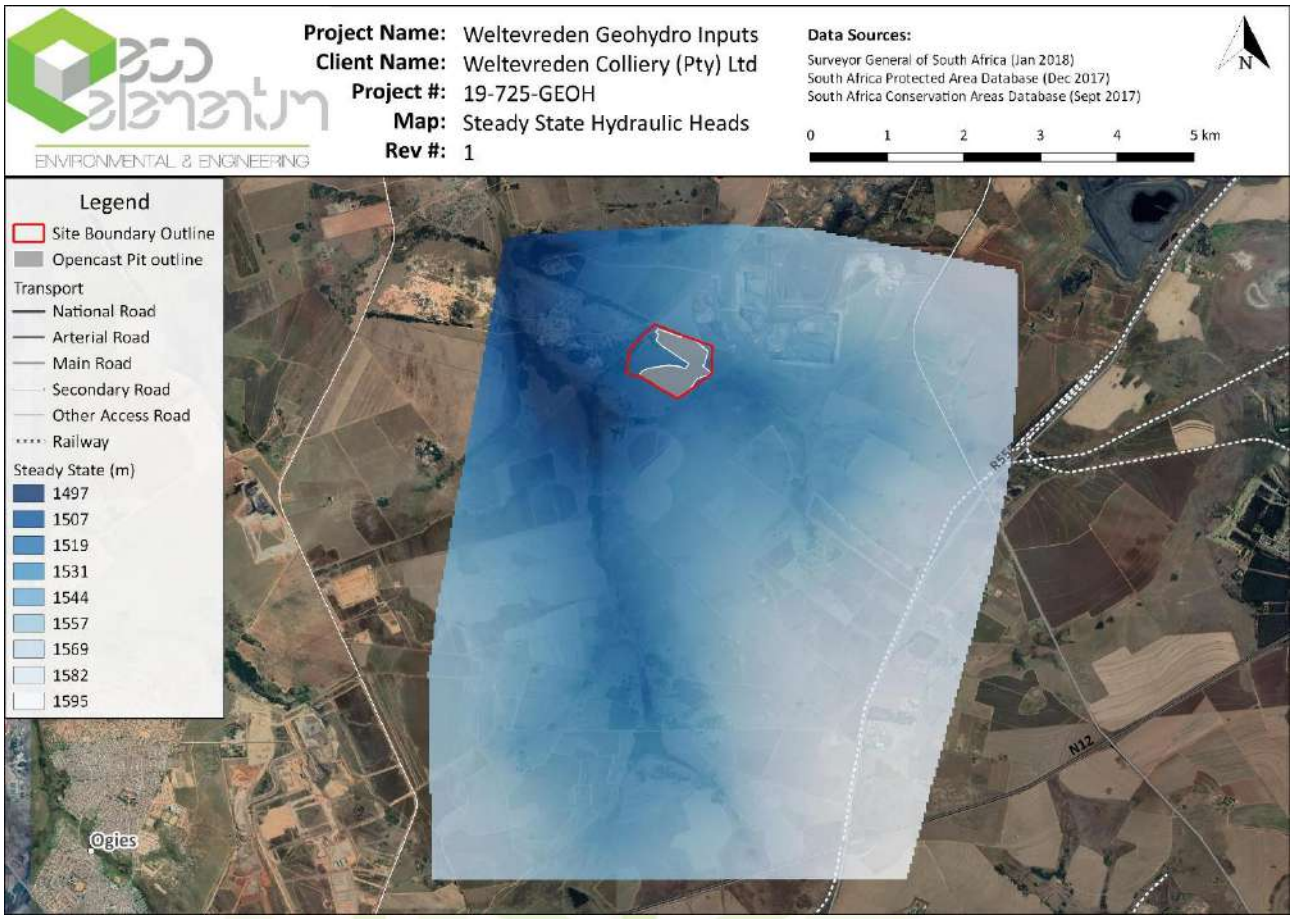

Figure 12.16: Steady state water level elevation contours.

12.3.5 Geology

12.3.5.1 Regional Geology

The Weltevreden Colliery is underlain by rocks from the Karoo Supergroup. The site is also situated in the Witbank Coalfields which is the most important coal producing coalfields in South Africa (**Figure 12.17**). Five coal seams exist in the coal field, but not all are economically viable. These coal seams are hosted in Vryheid Formation the middle Ecca Group sediments.

The Karoo Supergroup mainly consist of sedimentary successions of sandstone, shale and coal. The Ecca group is underlain by the Dwyka Formation which consist of tillites and diamictites.

Geological features such as dykes (dolerite intrusions) and faults are commonly found in the coal field. The dolerite intrusions typically act as groundwater flow barriers due to its low permeability, while the contact zone of the intrusions act as flow pathways due to cracks and faults leading to higher flow rates along these contact zones.

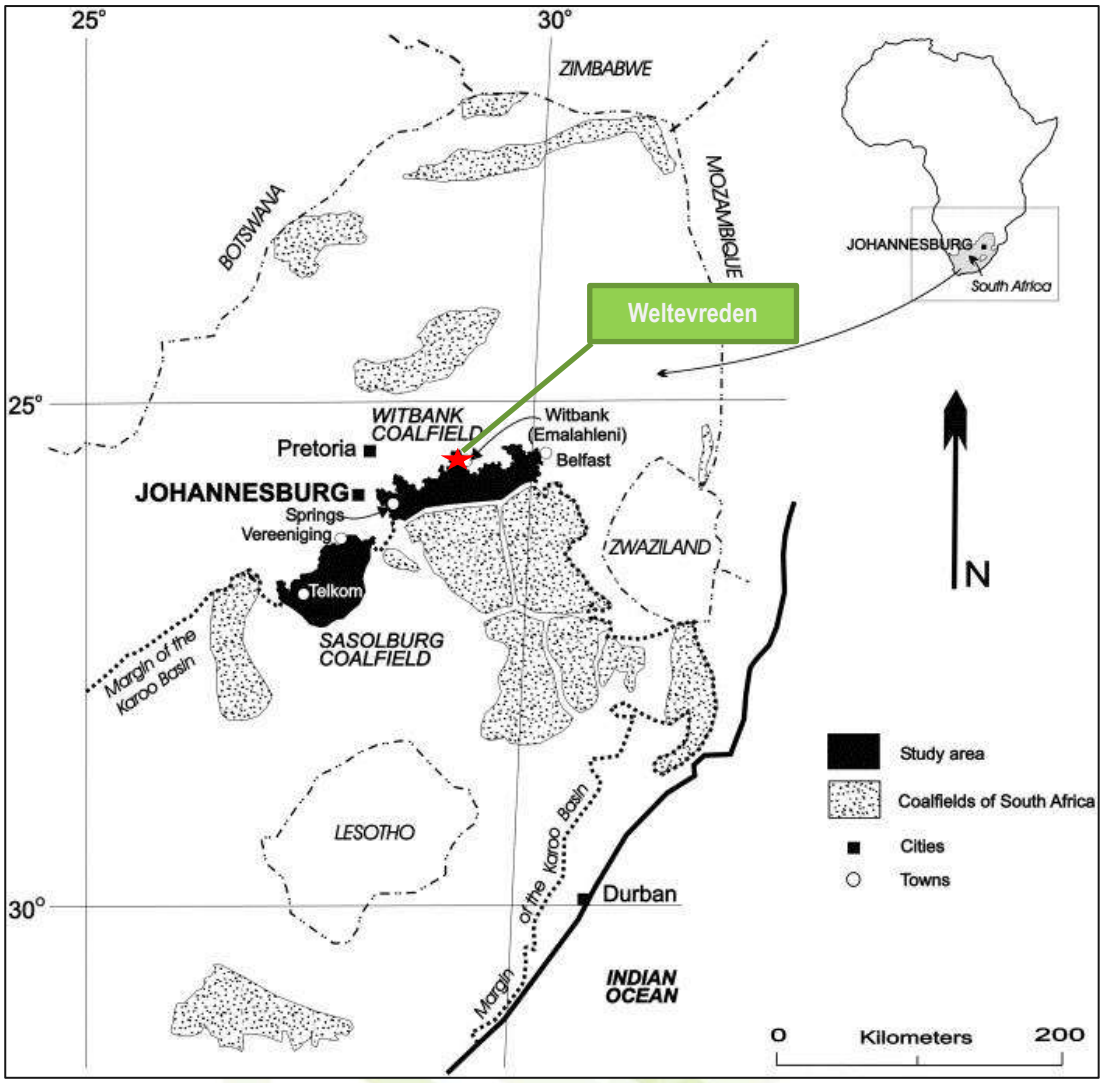

Figure 12.17: Witbank Coalfields and the position of Weltevreden Colliery in relation to it (Denis et.al., 2007).

12.3.5.2 Local Geology

Four new monitoring boreholes have been drilled for the proposed Weltevreden Colliery. The lithology of the four drilled monitoring boreholes are indicated in **Table 12.10**. Typical of the geology in the area sandstones, shales and coal measures dominated the lithology of the boreholes.

Table 12.10: Lithology of the newly drilled monitoring boreholes.

Borehole	Lithology
WBH01	Sandstone, Shale, Coal, Carbonaceous shale
WBH02	Clayey soil, Sandstone, Dolerite
WBH03	Sandy soil, Shale, Carbonaceous Shale, Sandstone
WBH04	Shale, Sandstone, Carbonaceous Shale

12.3.6 Wetland Assessment

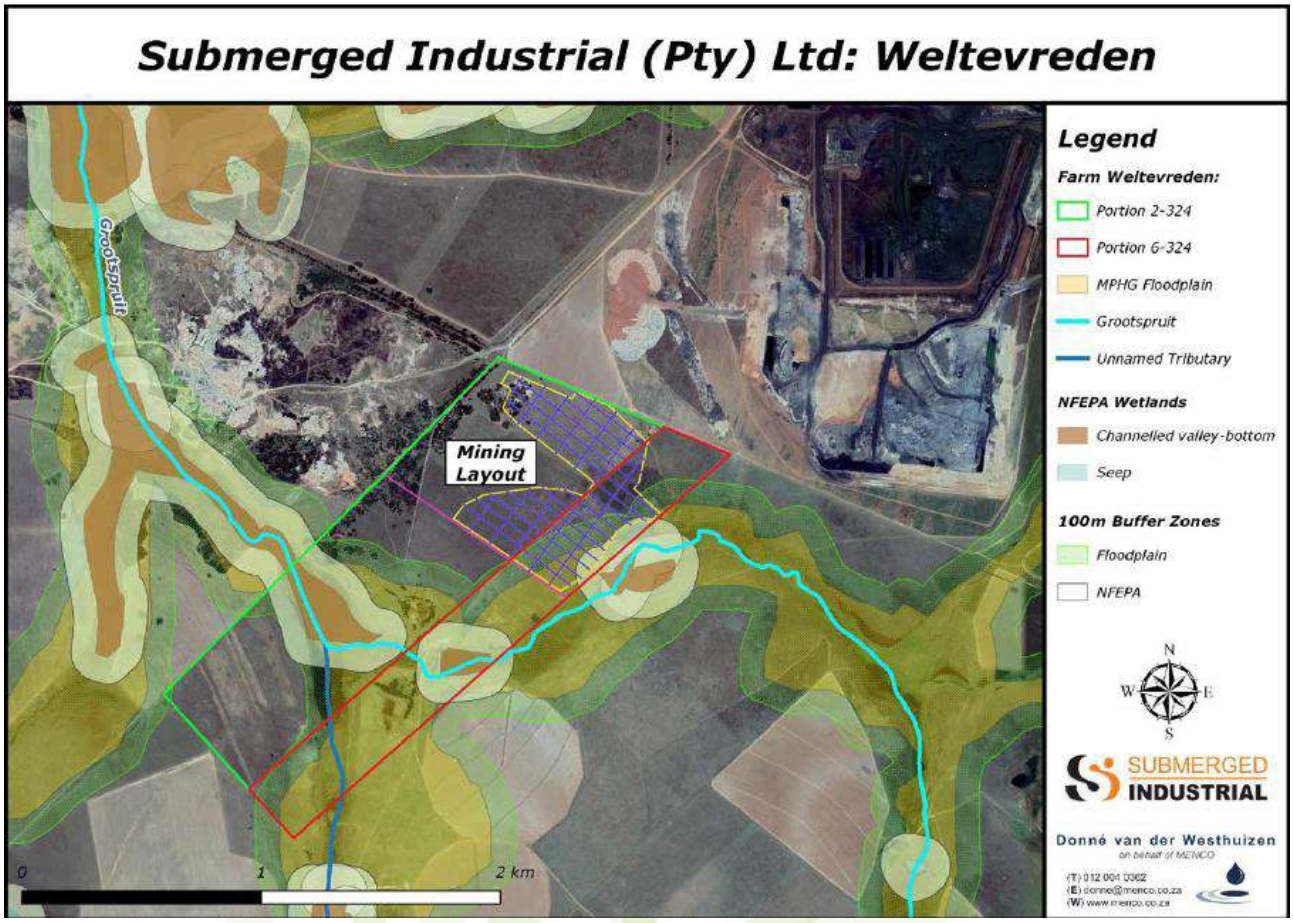

Figure 12.18: Map indicating property and delineated wetlands

Table 12.11: Summary of findings of relevant wetland systems identified on Weltevreden

No.	Source / Location	Origin	Landscape	Type – Level 4	wetveg group	PES	Wetness	EIS	Relevance to development
1	Grootspruit	Natural	Valley floor Floodplain	Channelled Valley bottom	Mesic Highveld Grassland Group 4	DEF	Permanent	High	Downstream – indirectly affected by increased pressure due to upstream changes.
2	Grootspruit (upstream: north-west)	Largely Natural	Hillslope	Un-channelled Valley bottom and Hillside Seep	Mesic Highveld Grassland Group 4	D	Seasonal	Low	Upstream – fall within proposed mining footprint and protective buffer zone. Rehabilitation and Licensing.
3[14]	Grootspruit (confluence)	Natural	Depression	Flats	Mesic Highveld Grassland Group 4	D	Seasonal	Low	Footprint, Direct impacts expected and WUL Authorisation need to be obtained.
River banks	Grootspruit (River channel) [15]	Natural	Valley floor (River Channel)	Channelled Valley Bottom	Mesic Highveld Grassland Group 4	C	Permanent	Moderate	Footprint, Direct impacts expected and WUL Applies for Riparian zones.

In accordance with the Wetland classification the wetlands (Wetland 1) within Weltevreden farm was determined to be the 'valley bottom, channelled wetland type'. Channelled valley bottom may be defined as a linear fluvial, net depositional valley bottom surfaces which do not have a channel. The valley floor is a depositional environment composed of fluvial or colluvial deposited sediment. These systems tend to be found in the upper catchment areas. Weltevreden 324 JS is situated upstream of an FEPA Phase II management zone. Ecosystem Services Scores obtained for Wetland 1 indicate Moderate Natural Services and very low Human services as can be seen in Figure 12.19.

Wetland 2 within this report may be classified as a Hill seepage wetland. A Seepage type of wetland is one occurring on slopes, usually characterised by diffuse i.e. un-channelled (and often subsurface) flows.12 It is usually dominated by the colluvial (gravity-driven), unidirectional movement of material down-slope. Flow in these wetlands is mainly in the form of interflow, with diffuse overland flow

(sheetwash) often significant after rainfall events. The scores obtained for the Hillslope seepage Wetland (Wetland 2) indicate Moderate Natural Services and very low Human services as can be seen in Figure 12.20.

Wetland 3 within this report may be classified as a depression wetland. A depression type of wetland is one occurring on flats, usually characterised by diffuse (and often subsurface) flows.13 It is usually dominated by the colluvial (gravity-driven), unidirectional movement of material down-slope. Flow in these wetlands is mainly in the form of interflow, with diffuse overland flow (sheetwash) often significant after rainfall events. he scores obtained indicate Low Natural Services and very low Human services (Figure 12.21).

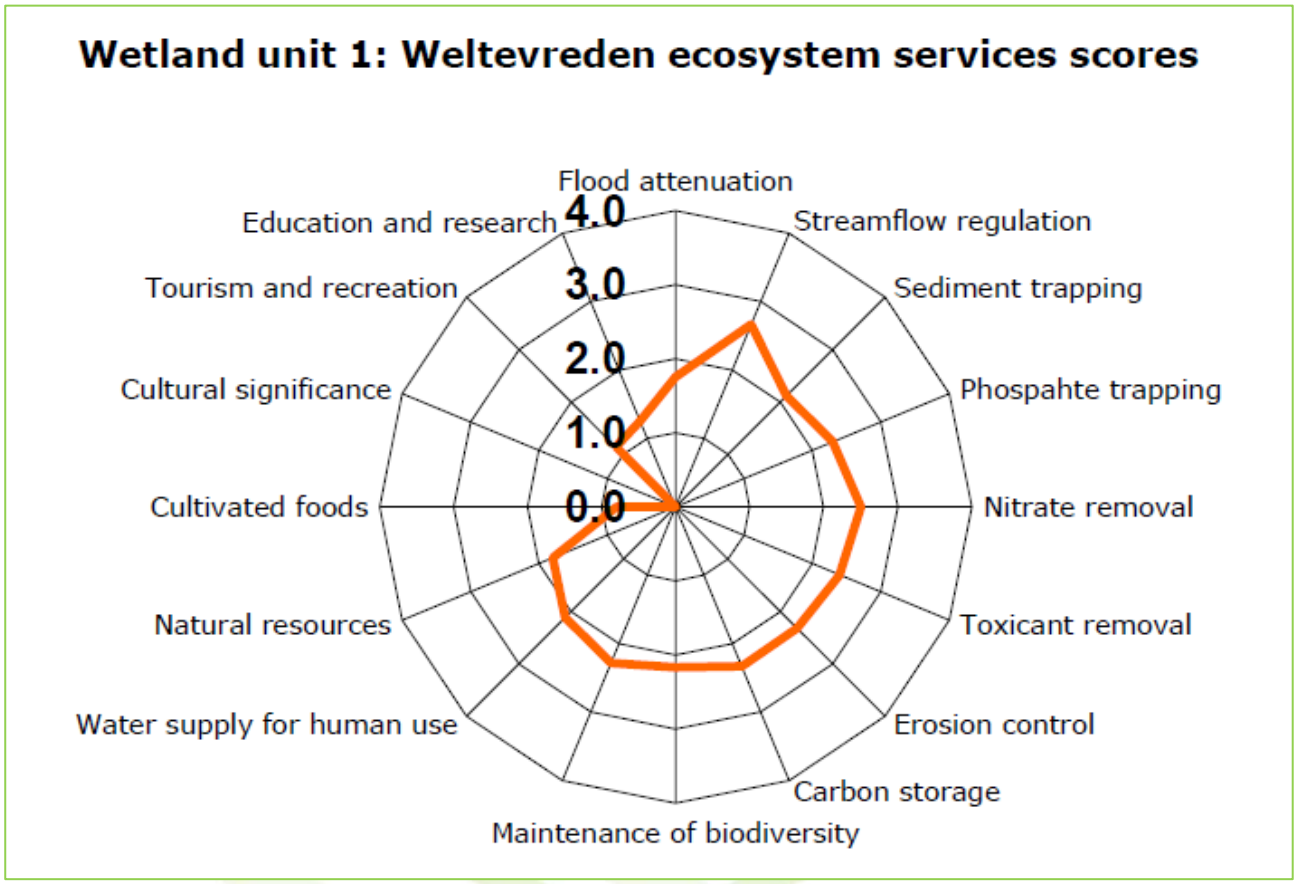

Figure 12.19: Graph of Ecosystem services score of the Grootspruit confluence wetland (Wetland 1)

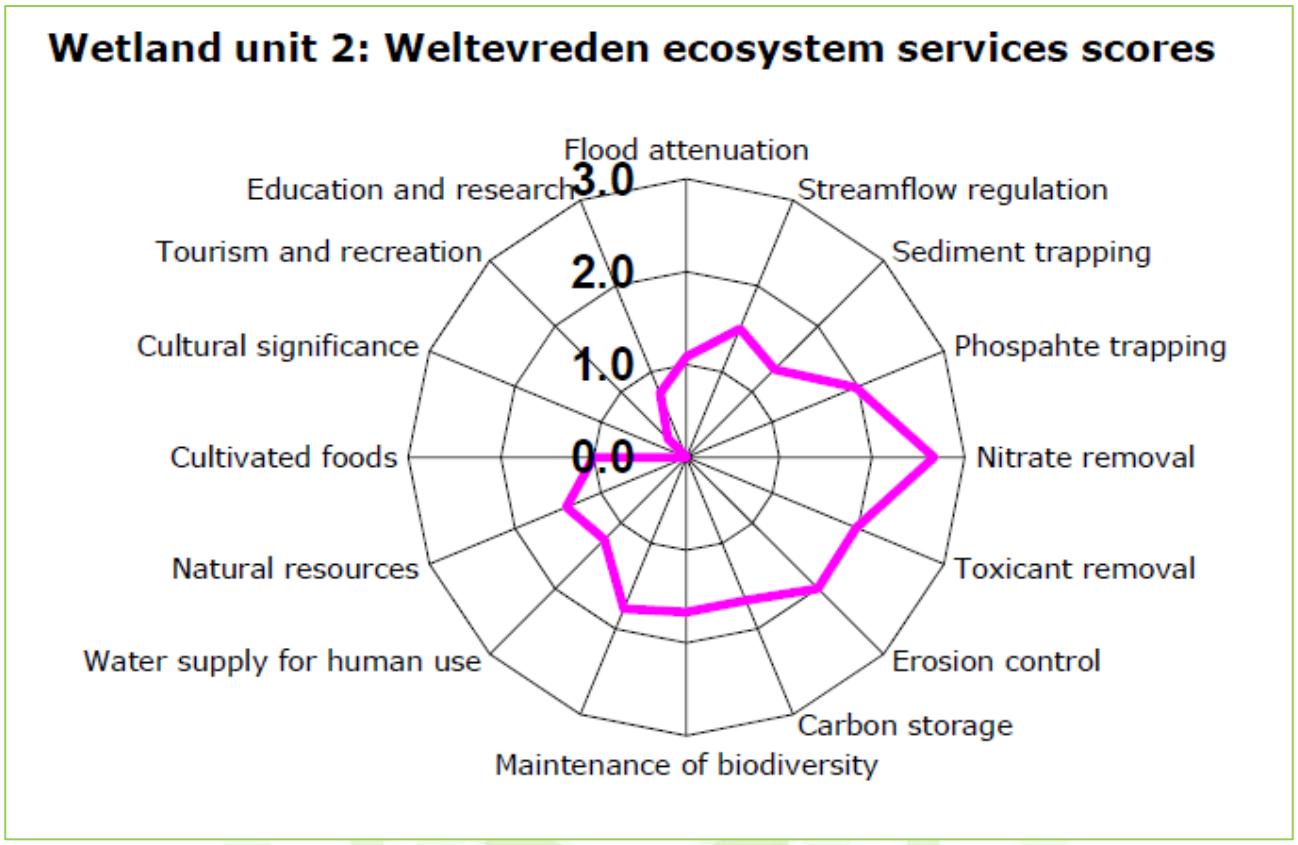

Figure 12.20: Graph of Ecosystem services score of the Grootspruit (upstream seepage) wetland (Wetland 2)

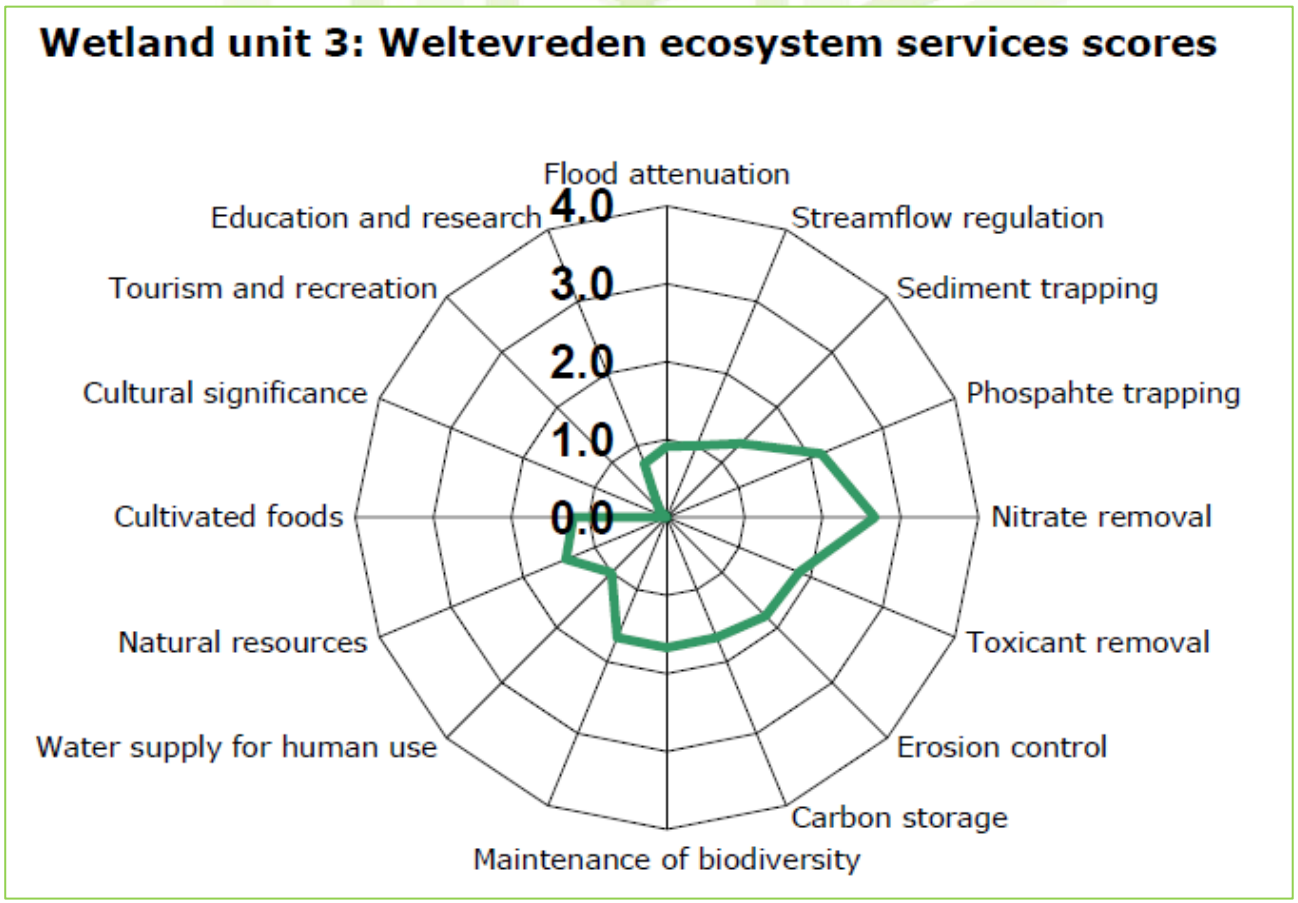

Figure 12.21: Graph of Ecosystem services score of the Grootspruit (depression) wetland (Wetland 3)

12.3.7 Aquatics

Bio-monitoring was conducted at four sites across the proposed study area. The selected sites consist of three downstream and one upstream site which were found within unknown tributaries of the Noupoort and SaalboomSpruit.

Table 12.12: Descriptions of the selected bio-monitoring sampling sites

Sites	Descriptions	Latitude	Longitude
US 1	Upstream point in the unknown tributary of the Saalboomspruit closely situated to the Noupoortspruit.	-25.946419°	29.105436°
DS 1	This is the first downstream site which is situated approximately 700m downstream of the upstream site. It is expected that confluence of mine waste water will reach the tributary just upstream of this point.	-25.950825°	29.100060°
DS 2	This is the second downstream point and consists of a stream in between two dams further downstream of the DS 1 point.	-25.950222°	29.096055°
DS 3	This is considered to be the furthest downstream point and also consists of a stream in between two dams. This site forms part of a channel that eventually confluences with the Saalboomspruit.	-25.948667°	29.086677°

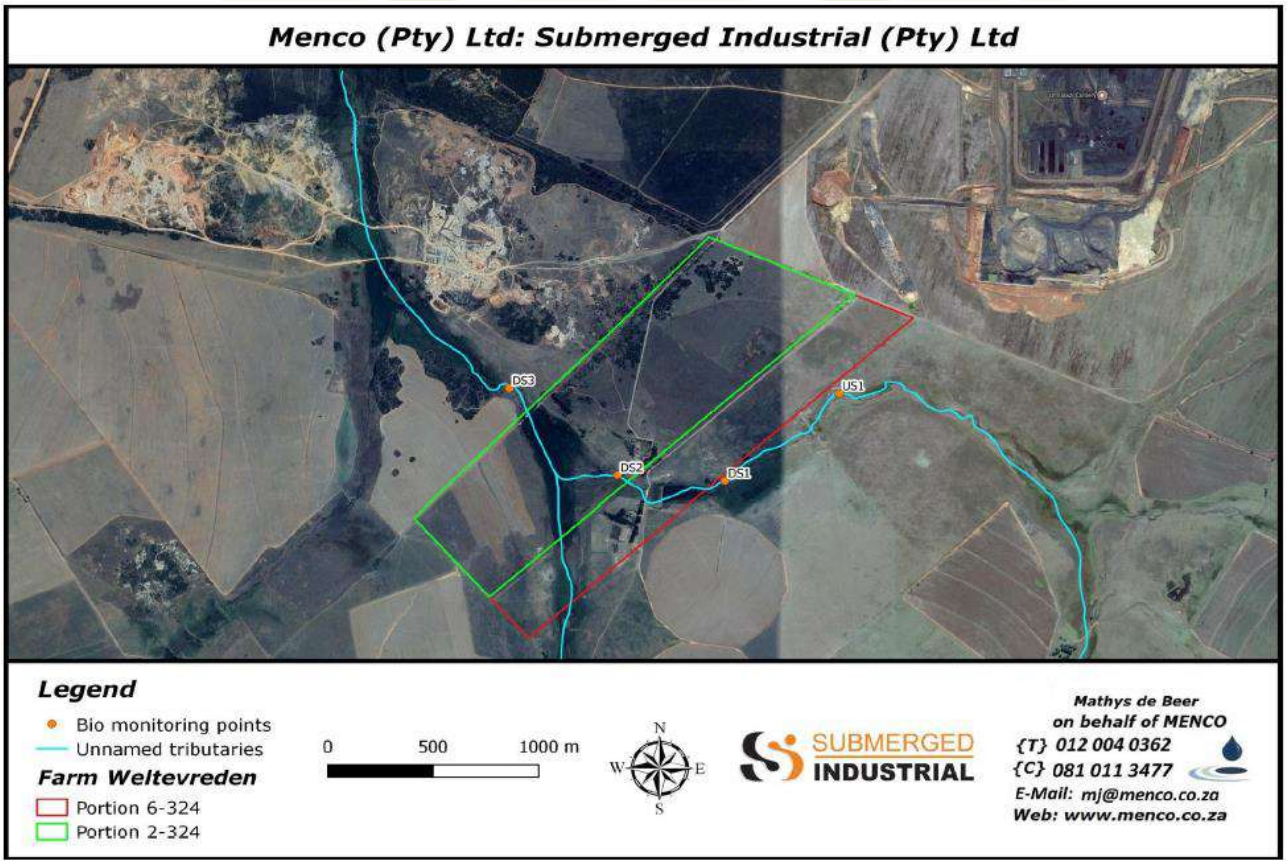

Figure 12.22: Monitoring sites applicable to the study area

Table 12.13: Physical habitat descriptions and site characteristics

DS 3		This is considered to be the farthest away downstream point and also consists of a stream in between two dams. This point is taken after the tributary of the Saalboomspruit confluences with another unknown tributary that eventually flows into the Saalboomspruit. This downstream river channel was however a bit wider when being compared to the other downstream sites. The substrate mostly consisted of mud with aquatic and riparian vegetation also being present in a large variety of species. Despite for a wider river channel and an increased amount of mud present the river conditions for all three the downstream sites seem to be very similar with an overall good habitat integrity.
US 1		Upstream point in the unknown tributary of the Saalboomspruit. Situated just upstream of potential confluence of mine water. More frequent deep pools are present at this site despite the river channel being slightly confined. The same water colour was present as in the other sites with aquatic vegetation and riparian vegetation being the dominant biotope. Sampling was restricted to a certain extent due to the pools being slightly too deep for sampling purposes. Thus the vegetation biotope especially bank vegetation (Marginal) was considered to be the main sampling biotope. It should also be noted that daphnia was present within this segment of the river.
DS 3		This is considered to be the farthest away downstream point and also consists of a stream in between two dams. This point is taken after the tributary of the Saalboomspruit confluences with another unknown tributary that eventually flows into the Saalboomspruit. This downstream river channel was however a bit wider when being compared to the other downstream sites. The substrate mostly consisted of mud with aquatic and riparian vegetation also being present in a large variety of species. Despite for a wider river channel and an increased amount of mud present the river conditions for all three the downstream sites seem to be very similar with an overall good habitat integrity.

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The following in field findings were observed and indicates the lack of certain characteristics at the monitoring sites.

- During the extent of the bio-monitoring event eight (8) sensitive aquatic macro invertebrate specimens were found throughout the four sampling sites. This could be an indication that the habitat conditions are favourable for sensitive species and the habitat is suitable for all species with minimal disturbances on the tributaries. It is expected that the amount of sensitive species will definitely decrease during the dry winter period.
- During the site visit it was noticed that there were various fluctuations in the river depth with many areas having small deep pools. These deep pools limited sampling at some of the monitoring sites due to the water depth being too deep in certain places. These pools could also potentially affect the river structure and SASS5 score during the dry winter period. Once the dry winter period has started and the river flow decreases these pools could absorb all the water and could potentially cause the stream to be divided in to various stagnant pools. These stagnant pools will most definitely influence the migration routes of aquatic macro invertebrates as well as fish species and could potentially cause a decrease in sensitive specimen.
- During the sampling it was evident that the applicable sampling sites had very similar habitat conditions with a large amount of riparian and aquatic vegetation with only a limited amount of gravel. Thus the vegetation biotope was assessed to the largest extent and also produced the most amount of sensitive aquatic macro invertebrate specimen.
- The water quality results which were obtained indicated that the water quality were of a high standard with minimal non compliances. During the visual assessment of the applicable sampling site it was noted that there were minimal disturbances and impacts on the sampling sites with only some hill slope erosion occurring at isolated areas. External influences affecting these tributaries are thus considered to be minimal.
- The applicable tributaries produced SASS5 and ASPT scores which were considered to be fairly high when being compared to the current PES set for the catchment. Results for all four (4) sites where also fairly similar indicative of homogenous habitat conditions throughout the extent of the stream.
- From a visual aspect it was also noted that there were various dams located within the river channel of the Saalboomspruit as well as the associated tributaries. This could potentially increase the non-perennial status of the river and might also decrease water quality to a certain extent.
- The obtained water quality was of a good standard with no non compliances noted within the sampling sites. This might also be beneficial in explaining the high SASS5 and ASPT scores.

Table 12.14: Data score comparison for the 2018 wet season survey

Site comparison				
Sites	**SASS5**	**ASPT**	**IHAS**	**Health Class (PES)**
US 1	77	4.88	65	**C: Moderately Modified**
DS 1	99	4.95	69	**B: Slightly Modified**
DS 2	115	5.48	73	**B: Slightly Modified**
DS 3	79	4.78	62	**C: Moderately Modified**

12.3.8 Flora

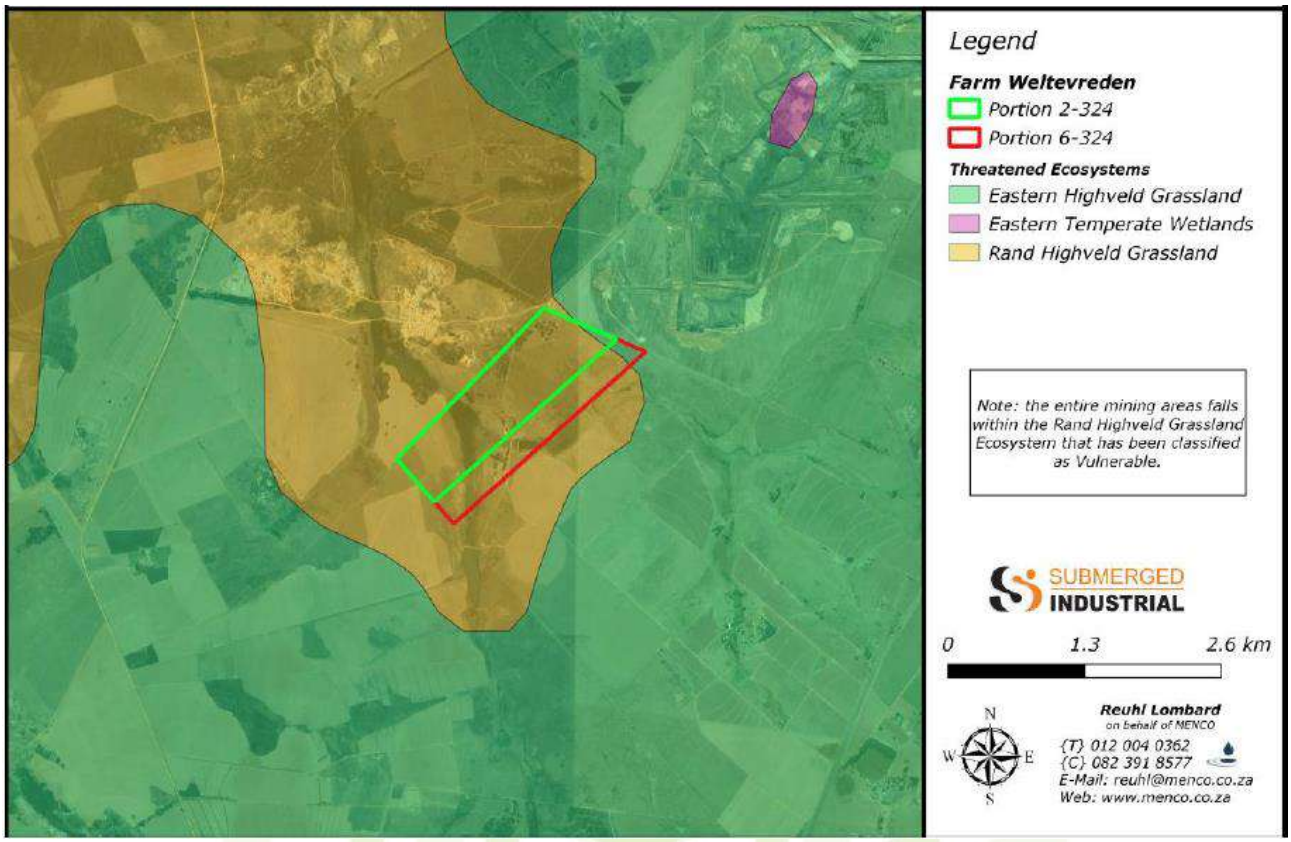

Figure 12.23: Project area in relation to Terrestrial Ecosystems

Figure 12.24: Terrestrial Biodiversity Assessment Classification

The only veld type present on the proposed development site is the Rand Highveld Grassland veld type. The elevation profile of the project area can be described as generally shallow sloping towards the south-east, with the highest (1540 amsl) and lowest (1519 amsl) points respectively being found in the North and South of the project area.

200 plant species have been recorded in the quarter degree square 2529CC (POSA, http://newposa.sanbi.org/). Of these only one species, *Frithia humilis*, is of conservation concern, however was not recorded on site.

The area surveyed comprises mostly of grassland dominated by*, P. plumosum, Koeleria capensis, Eragrostis sp, Cynodon dactylon and Chloris gayana, Tagetes minuta* and *Vernonia sp.* Among the less common species were *Diospyros lycioides*, *Lopholaena coriifolia, Gomphocarpus fruticosus, Felicia mossamedensis*, *Commelina Africana, Senecio sp. Ledebouria sp*. Individual specimens of *Aloe sp*, *Cheilanthes sp*, *Hybiscus trionum, Monopsis decipiens and Wahlenbergia sp.* were also observed on site.

Figure 12.25: Photographic record of site characteristics

The most prominent alien invasive species present on site were *Cirsium vulgare (1b), Solanum sisymbriifolium (1b), Acacia mearnsii (2), Eucalyptus sp and Populus alba (2)*. In terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016, NEM:BA defines a Category 1(b) as “Invasive species requiring on-going control as part of a management plan. The spread of alien species in this category must be contained, and in cases where effective control by individuals is generally not possible, an integrated programme (typically managed by a local, regional or national authority) would be necessary to bring them under control.” Category 2 invasive species are regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones. It is therefore recommended that the Guidelines for Monitoring, Control and Eradication Plans as Required by Section 76 of The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 Of 2004) (NEM:BA) for species listed as invasive in terms of Section 70 of the Act, be considered when a management plan is to be drafted. In addition, exotic weeds, *Bidens pilosa, Conyza canadensis, Cosmos bipinnata* and *P. plumosum* were identified on site and should also be considered in the environmental management for the proposed project area.

12.3.9 Fauna

12.3.9.1 Mammals

Commonly occurring small mammal species such as rodents, which are more resilient to anthropogenic changes, were found to be present on the site. Based on scat and spoor, Cape Clawless Otter (*Aonyx capensis*) and Marsh Mongoose (*Atilax paludinosus*) were found to be present, generally in close proximity to surface water features along the South-east boundary of the property. Burrowing mounds, indicating the presence of mole-rat species (Family Bathyergidae) were found throughout the site, excluding areas with saturated soil and rocky outcrops. Evidence of Cape Porcupine (*Hystricomorph hystricadae*) was also found on site. This is not unexpected as this species is very plastid in terms of diet, and preferred habitat type. Other species such as Yellow Mongoose (*Cynictis penicillata*) and Scrub Hare (*Lepus saxatilis*), although not found during the survey, are expected to be present on site. Similarly, Black-backed Jackal, Serval, Small-spotted Genet and the South African Hedgehog, are all also expected to be present on site, possibly preferring the invaded tree-line to the North and North-West of the site. Active and in-active termitaria were found to be scattered throughout the project area, concurrently fauna species associated with these can also be expected to make use of the area.

12.3.9.2 Avifauna

According to data collected during 2017 of SABAP2 (http://udp.adu.org.za/), a total of 269 bird species have been recorded in the quarter degree grid cell encompassing the project site (2529CC). These data also indicate that 8 of the listed species are of conservational concern in terms of their IUCN Conservation Status.

Table 12.15: Observed bird species

Common Name	Scientific Name
Banded Martin	*Riparia cincta*
Cape longclaw	*Macronyx capensis*
Red-Eyed Dove	*Streptopelia semitorquata*
Cape Turtle-Dove	*Streptopelia capicola*
Laughing Dove	*Spilopelia senegalensis*
Speckled Pigeon	*Columba guinea*
Crowned lapwing	*Vanellus coronatus*
African Stonechat	*Saxicola torquata*
Common Fiscal	*Lanius collaris*
Black-winged Kite	*Elanus caeruleus*
Blacksmith Lapwing	*Vanellus crassirostris*
Reed Cormorant	*Microcarbo africanus*
Hadeda Ibis	*Bostrychia hagedash*
Common Myna	*Acridotheres tristis*
Fork-tailed Drongo	*Dicrurus adsimilis*
Long-tailed Widowbird	*Euplectes progne*

12.3.9.3 Reptiles and Amphibians (Desktop Study)

A list of 24 reptile and amphibian species have been recorded in the quarter degree square 2529CC. None of these species have conservation statuses other than Least Concern. Therefore, the proposed mining activity is not expected to influence any species of conservation concern.

12.3.10 Heritage and Archaeological Resources

12.3.10.1 Emalahleni general history

Emalahleni, previously known as Witbank, has a rich history in terms of development and mineral exploitation. Mpumalanga, especially the area between Emalahleni, Middelburg, Bethal, Hendrina, Ermelo and Carolina, is associated with vast coal fields. These coal fields formed between 200 and 300 million years ago from rotten forests in swamps. During this period, Africa was still attached to South America, India and Antarctica as part of the Gondwana supercontinent. By 250 million years ago the climate changed to dry warm conditions and the swamps in Mpumalanga were replaced by desert-like conditions around 200 million years ago. By 180 million years ago, when the Gondwana supercontinent started to split up, volcanic lava fields covered areas in Mpumalanga (De Wit 2007: 37).

With the rich coal deposits in Mpumalanga, it was only a matter of time before its value was realised and the coal extracted. Coal mining is Mpumalanga's most important industrial activity and produces about 80% of South Africa's coal. The earliest coal mining in the area dates to 1868 when farmers extracted coal for personal use in the Middelburg district. Large-scale coal mining around Emalahleni, however, only started after the discovery of gold on the Witwatersrand in 1886. Due to the discovery of coal in the Brakpan and Springs surroundings in 1887 and no railway linking Emalahleni with the Rand, these early Emalahleni coal mines closed down. It was more cost effective to exploit the closer Brakpan and Springs coal deposits than the coal found at Emalahleni (Schirmer 2007: 316).

After the construction of the railway line between the Rand and Emalahleni the deposits were exploited on large scale again. The coal fields, which are about 40 km wide, are concentrated around Emalahleni and run towards Belfast in the east. The first collieries around Emalahleni were Douglas, Transvaal, Delagoa Bay, Witbank and Landau and are of a higher quality compared to the coal found at Brakpan and Springs. During the 1890s some of the coal was exported via Delagoa Bay. In addition, the coal was readily accessible as the deposits occurred at a depth of 100 m or less (Schirmer 2007: 316-317). It should also be noted that the railway line between Pretoria and Lorenço Marques (Maputo) was completed on 2 November 1894 and the connection between Emalahleni and Johannesburg during the 1910s (Heydenrych 1999).

Between 1900 and 1920 many new collieries were established and the coal price dropped. This led to the establishment of the Transvaal Coal Owners' Association with the main aim to regulate output coal prices. This also acted to counter possible competition. It should also be noted that not all collieries joined this association. The establishment of the Transvaal Coal Owners' Association had positive as well as negative influences. On the one hand eliminating the competition might have impacted negatively on efficiency and the workers. On the other hand, it is possible that the capacity of coal mines was enhanced and facilitated further development in the industry. One positive point was that the association eased interaction with international buyers. During the 1930s, however, the coal price continued to drop and resulted in mechanisation. This introduced electric coal cutters and eliminated the need for high number of unskilled workers. By 1946 Emalahleni and Middelburg saw the emergence of a modern coal industry. The Transvaal had 34 large collieries that were responsible for 99.7% of the province's coal (Schirmer 2007: 317-319).

Between 1940 and 1960 coal output in the Eastern Transvaal increased from 13 million to 25 million tons. Although industrialisation expanded throughout this time in South Africa and a demand existed for coal both locally and internationally, a steady shift to oil as the dominant form of energy was noted. In light of these developments Anglo American Corporation launched three research programmes in the 1960s. As a result of these programmes the region's coal mines became export orientated. This trend continued throughout the 1980s. During these times a series of coal-burning power stations around the eastern Highveld coal deposits were constructed (Schirmer 2007: 321).

The town of Witbank was founded in 1903 by Neumann's Witbank Colliery as a result of the mining activity. In 1906 Witbank became a health board, a village council in 1910 and a municipality in 1914 (Schirmer 2007: 338).

On 3 March 2006 Witbank was renamed Emalahleni.

12.3.10.2 Site Assessment

One site that might be significant from a heritage perspective was found on site, however no historical remains remain within the demarcated study area. Several structures appear to have existed in past years, but have since been demolished.

The earliest aerial photograph of the study area dates to 1943, therefore indicating structures that are 76 years of age. On the 1960 topographical map (Figure 12.28), however, only two homesteads are indicated within the demarcated study area, suggesting that the other structures were demolished. A possible reason for this destruction might relate to agricultural activities as a portion of the study area is marked as agricultural land. These sites were marked as Points of Interest (POI) and visited during the site visit. POI 1 is located in close proximity of the north-eastern boundary and the modern settlement located to the northeast, but revealed no material remains or signs of a structure (Figure 12.31). POI 2, located on the south-western boundary, initially revealed no signs of past human activity (Figure 12.32). A short distance from POI 2, however, a small angular depression measuring roughly 5 X 5m was observed. Due to topographical mapping inaccuracies, a high probability exists that POI 2 (Figure 12.33) indicates the location of homestead indicated on the 1960 topographical map. The 1962 aerial photograph (Figure 12.27), however, shows that structures are no longer visible and appear to have been demolished. Given the general level of disturbance of the study area by agricultural land and cattle grazing, the chances are slim for locating surface remains dating to the time these homesteads were occupied. Although all structures dating to historical times were demolished, the possibility exists that subsurface material dating to historical times might still exist.

The study done by Van Vollenhoven (2015) recorded the remains of a building likely to exceed 60 years of age.

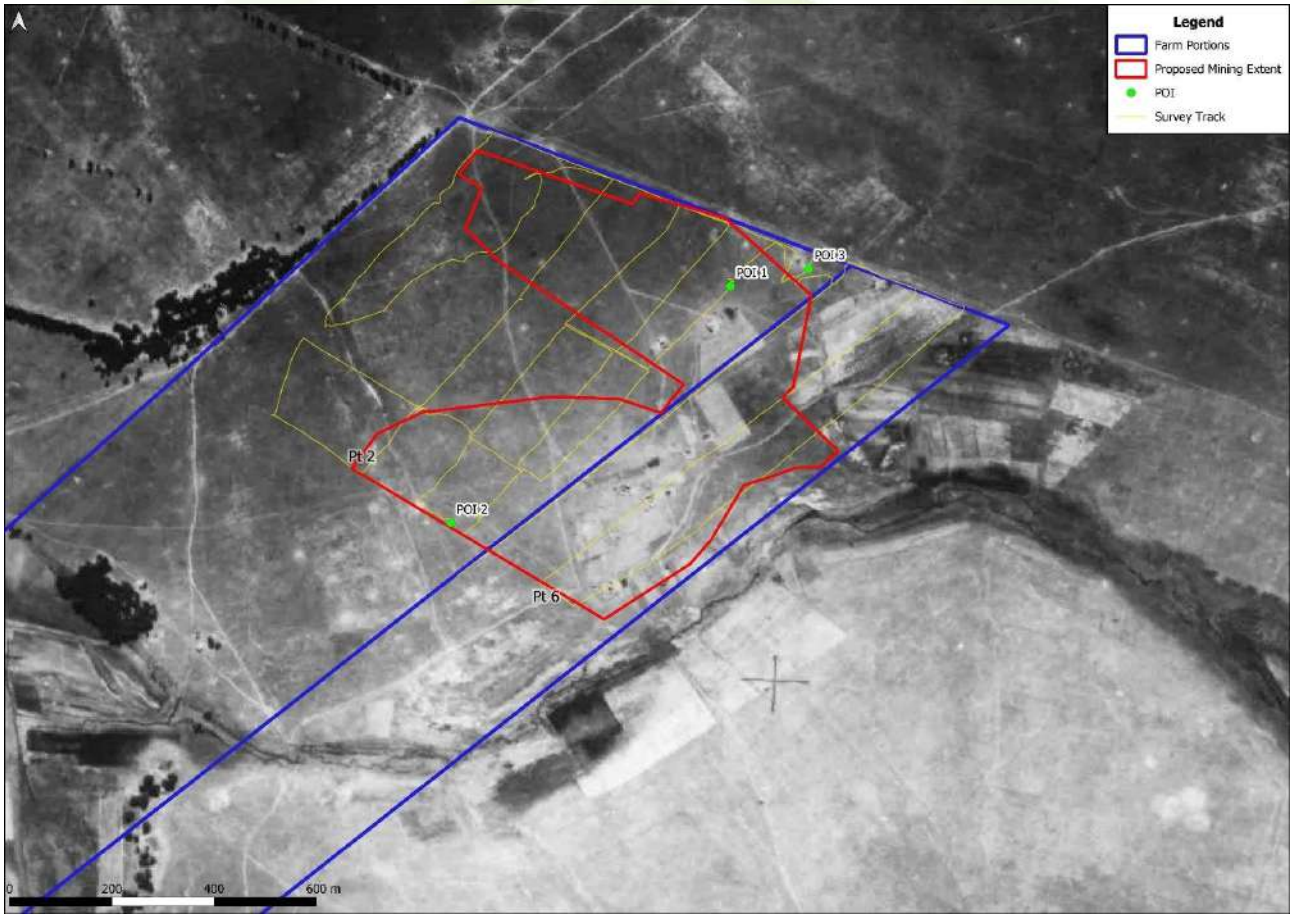

Figure 12.26: Study area superimposed on a 1943 aerial photograph

Figure 12.27: Study area superimposed on a 1962 aerial photograph

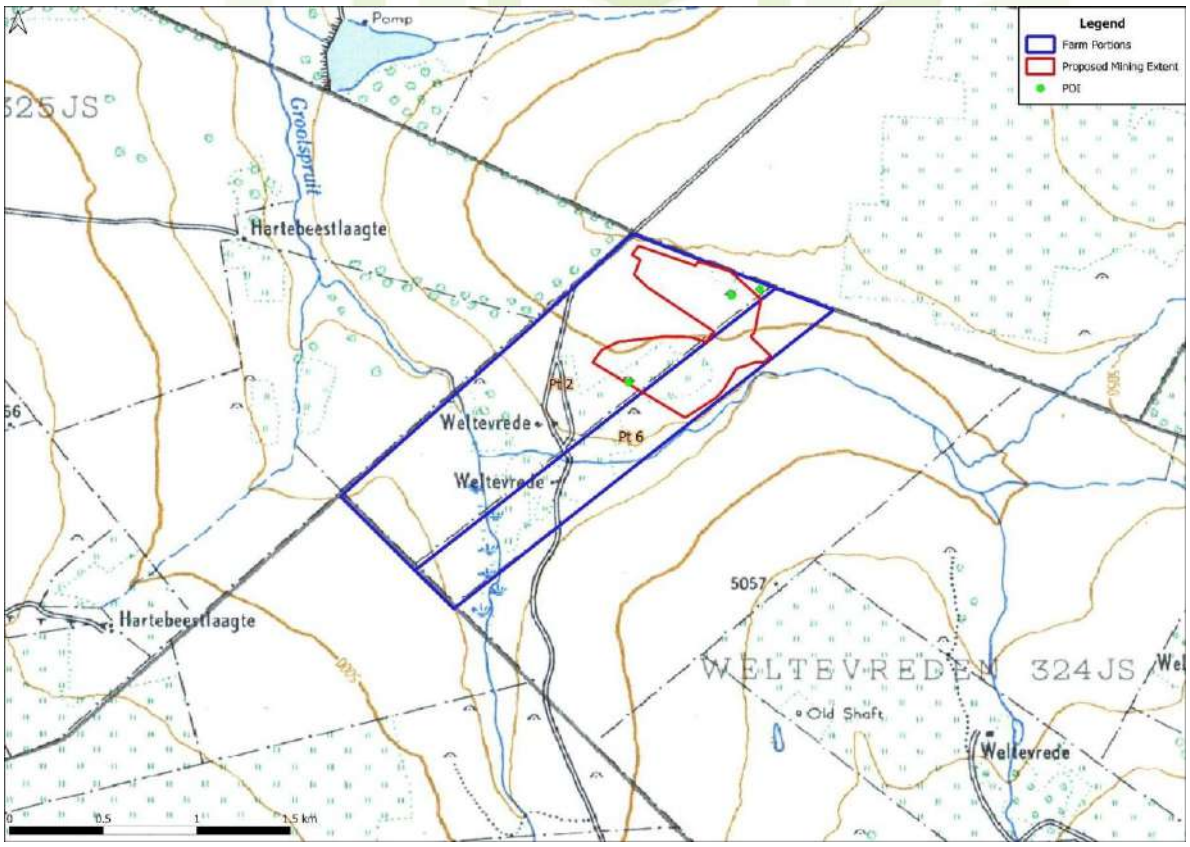

Figure 12.28: Study area superimposed on a 1960 topographical map

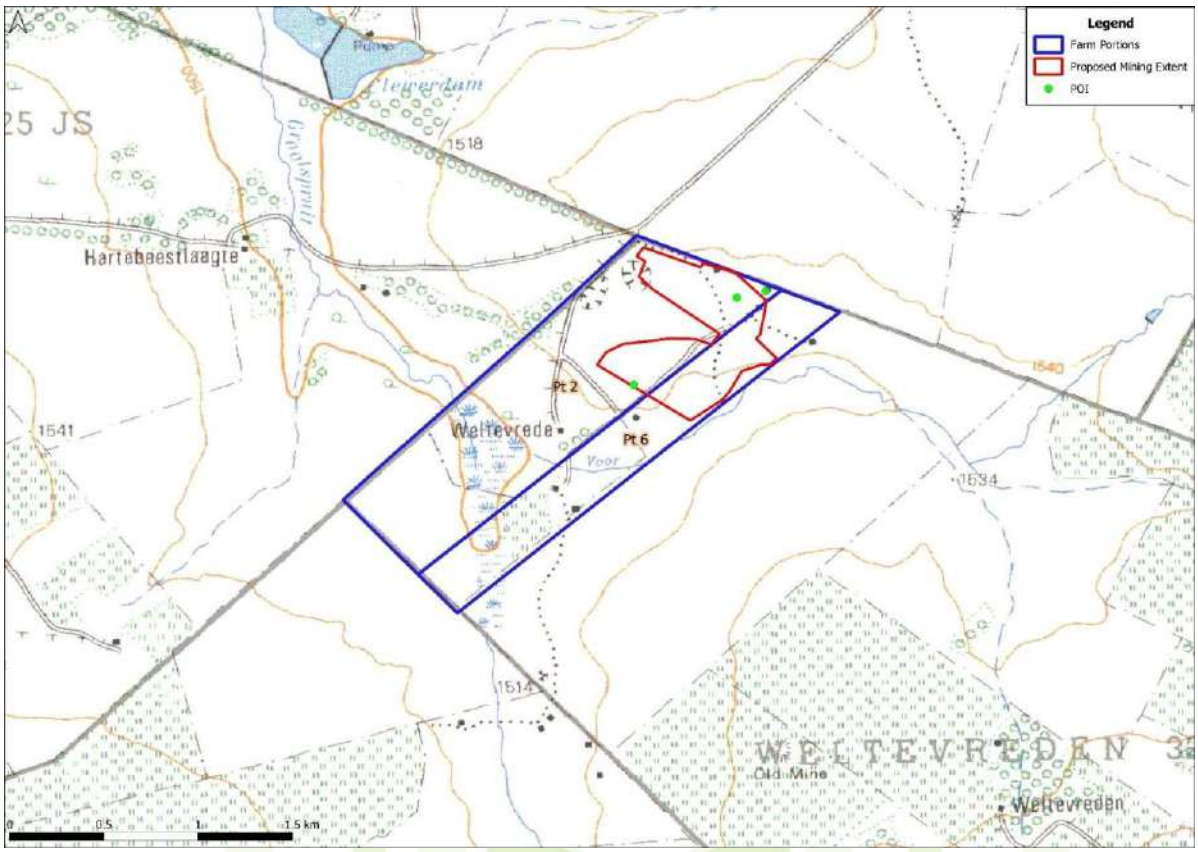

Figure 12.29: Study area superimposed on a 1974 topographical map

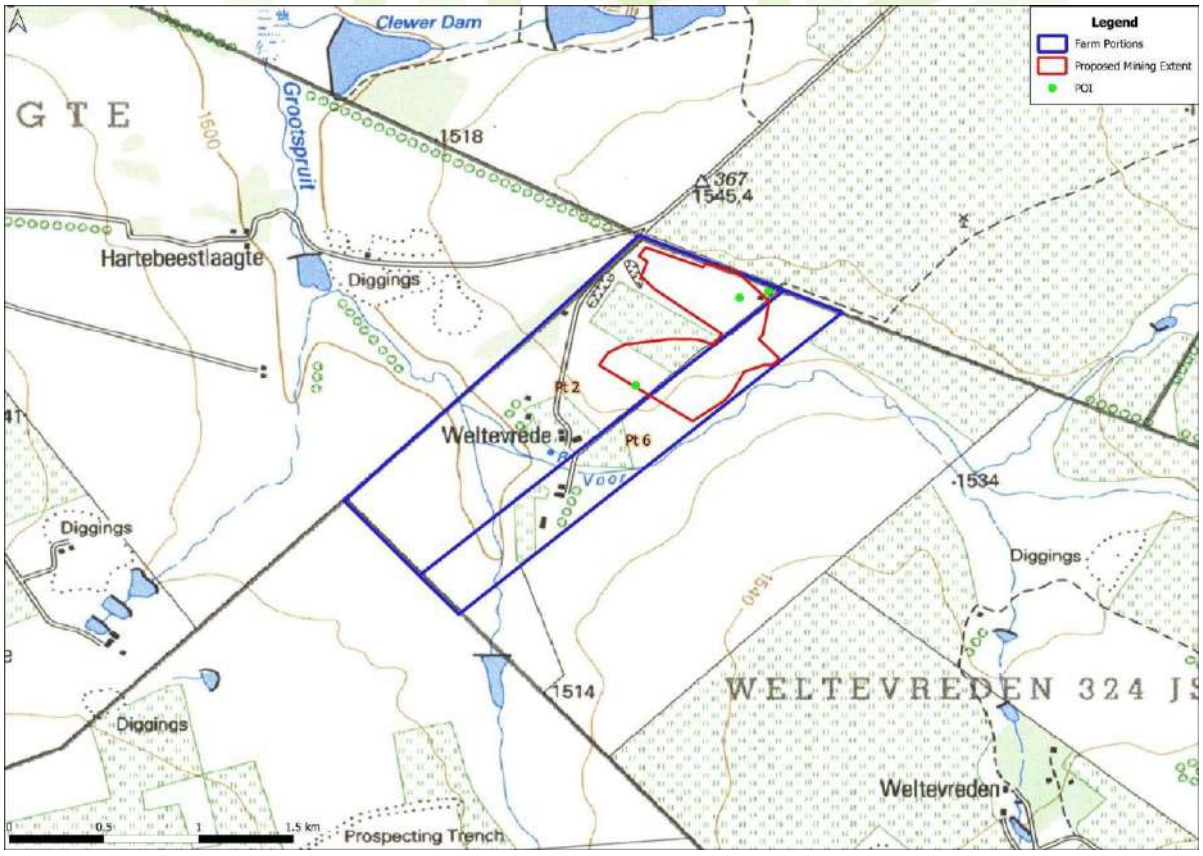

Figure 12.30: Study area superimposed on a 1996 topographical map

Figure 12.31: POI 1 identified on a 1960 topographical map.

Figure 12.32: POI 2 plotted from a 1960 topographical map.

Figure 12.33: Possible location of POI 2.

Several structures appear to have existed in past years, but have since been demolished. The 1974 topographical map (Figure 12.29) no longer shows previously indicated structures, but a few structures appear in new locations, including the current settlement in the north-eastern corner of Portion 2 (POI 3), as well as the diggings in the north-western corner. These structures were therefore constructed between 1962 and 1974. Figure 12.34 depicts the current settlement POI 3, while Figure 12.35 shows a kraal. According to the residents of the settlement, the first homestead at POI 3 was constructed at the location of the kraal in 1966, but have since been demolished and rebuilt closer to the rest of the structures. The account of the residents is therefore verified by the historical aerial images and topographical maps. On the 1996 topographical map (Figure 12.30) no homesteads are indicated, except for the modern residence in the north-eastern corner of Portion 2.

Figure 12.34: POI 3 indicating the modern settlement.

Figure 12.35: The location of the first homestead at POI 3.

12.3.11 Paleontological Resources

12.3.11.1 Regional Setting

The Karoo Supergroup is renowned for its fossil wealth. The Vryheid Formation (Pe, Pv), Ecca Group is rich in plant fossils such as the *Glossopteris* flora represented by stumps, leaves, pollen and fructifications (Appendix 1). This formation is early to mid-Permian (Palaeozoic) in age and consists of sandstone, shaly sandstone, grit, conglomerate, coal and shale. Coal seams are present in the Vryheid Formation within the sandstone and shale layers. Fossils are mainly present in the grey shale which is interlayered between the coal seams (Kent 1980, Visser 1989). Borehole logs in the coalfields show the following layers; soil, shale and sandstone, shale and sandstone interbedded, sandstone, coal, conglomerate reworked diamictite, Dwyka Tillite, and the Pre-Karoo Basement.

Fossils in South Africa mainly occur in rocks of sedimentary nature and not in rocks from igneous or metamorphic nature. Therefore, if there is the presence of Karoo Supergroup strata the palaeontological sensitivity can generally be LOW to VERY HIGH, and here locally **VERY HIGH** for the Vryheid Formation (SG 2.2 SAHRA APMHOB, 2012).

12.3.12 Noise

Table 12.16 depicts acceptable noise levels within districts according to the SANS 10103 guideline.

Table 12.16: 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
	$L_{R,dn}$a	$L_{Req,d}$b	$L_{Req,n}$b	$L_{R,dn}$a	$L_{Req,d}$b	$L_{Req,n}$b
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 12.17, 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 12.17: 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.		

The measuring points for the study area were selected to be representative of the prevailing ambient noise levels for the study area and include all the noise sources such as distant traffic noise, agricultural activities but exclude traffic noise which was intermittent in the vicinity of the measuring points. The measuring points are illustrated in Figure 12.36.

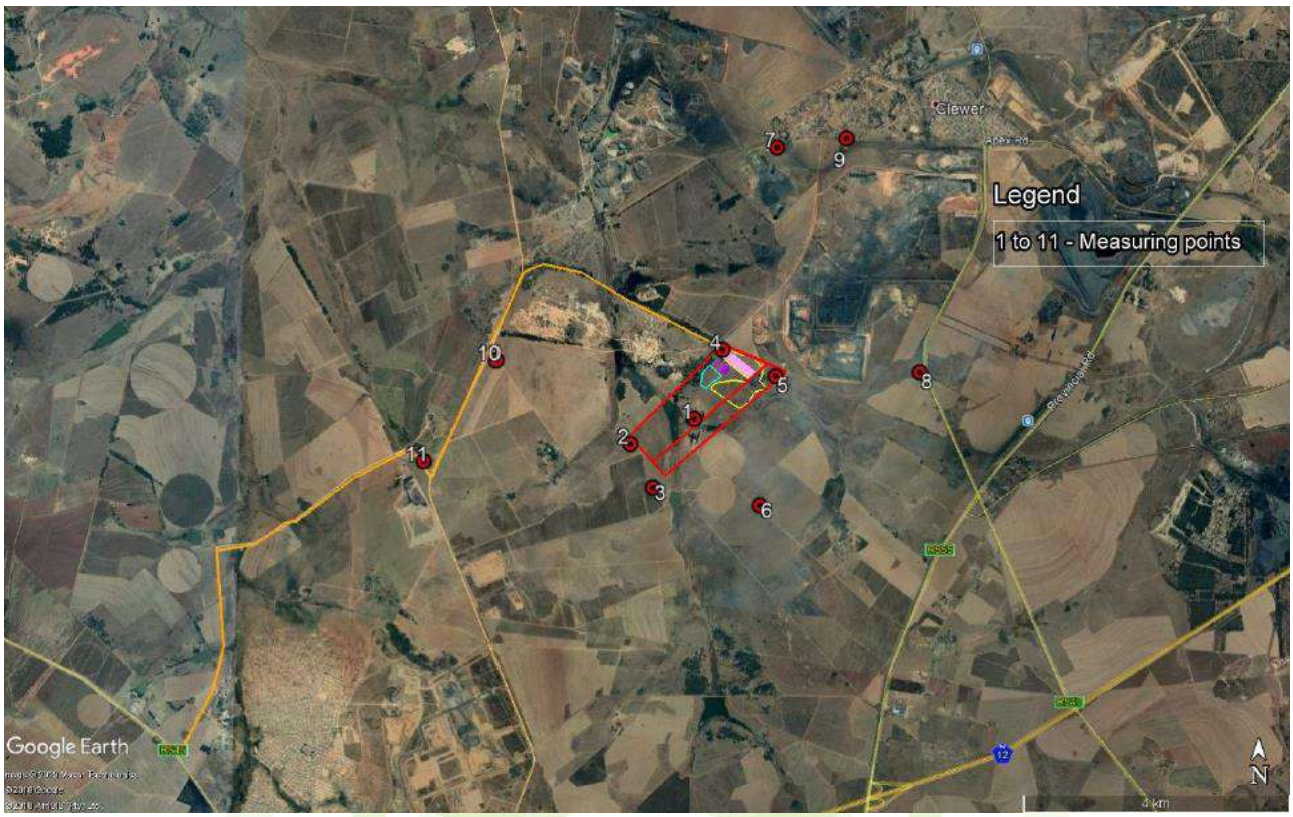

Figure 12.36: Noise measuring points within the study area

Table 12.18: Measuring points and co-ordinates for the study area

Position	Latitude	Longitude	Remarks
1	25⁰ 56.988' S	029⁰ 5.739' E	Middle of the Weltevreden prospecting area.
2	25⁰ 57.198' S	029⁰ 5.161' E	Southwestern side of the prospecting right boundary.
3	25⁰ 57.552' S	029⁰ 5.739' E	South-eastern of the prospecting right boundary.
4	25⁰ 56.422' S	029⁰ 5.990' E	North of the prospecting right boundary at the entrance to the mine.
5	25⁰ 56.633' S	029⁰ 6.475' E	At the north-eastern corner of the Weltevreden Mine.
6	25⁰ 57.686' S	029⁰ 7.911' E	Eastern side of the Weltevreden Mine prospecting boundary.
7	25⁰ 54.764' S	029⁰ 6.471' E	Northern side at Clewer township.
8	25⁰ 56.590' S	029⁰ 7.780' E	Along the R547 Road.
9	25⁰ 54.681' S	029⁰ 7.103' E	South side of Clewer.
10	25⁰ 56.529' S	029⁰ 3.940' E	Along the gravel road.
11	25⁰ 57.357' S	029⁰ 3.300' E	Along the gravel road.

12.3.12.1 Current Noise Source

The following are noise sources in the vicinity of and the boundaries of the study area:

- Mining related noise;
- Seasonal agricultural activities;
- Traffic noise along the feeder roads;
- Distant traffic noise from the abutting feeder roads;
- Insects;
- Birds; and

- Wind noise.

12.3.12.2 Noise Survey Results

In Table 12.19 are the different prevailing ambient noise levels for the specific areas, which include all the noise sources currently in the area such as domestic, traffic noise, distant mine noise and natural noise sources. Leq is the average noise level for the specific measuring point over a period of time, the Lmax is the maximum noise level and the Lmin is the minimum noise level registered during the noise survey for the specific area in dBA.

Table 12.19: Noise levels for the day and night in the study area.

Position	Day time				Night time			
	Leq - dBA	Lmax (Fast) - dBA	Lmin (Fast) - dBA	Remarks	Leq - dBA	Lmax (Fast) - dBA	Lmin (Fast) - dBA	Remarks
1	39.7	58.0	33.4	Distant mining activities.	40.4	62.0	32.3	Distant mining activities.
2	35.2	62.6	30.4	Distant mining activities.	34.4	60.1	24.6	Distant mining activities.
3	38.2	62.3	31.0	Distant mining activities.	38.9	52.4	33.1	Distant mining activities.
4	35.6	55.9	35.1	Distant mining activities.	39.6	66.7	35.9	Distant mining activities.
5	39.8	60.9	32.2	Distant mining activities.	38.5	54.8	30.6	Distant mining activities.
6	36.5	62.6	34.2	Distant mining activities.	40.6	61.2	36.1	Distant mining activities.
7	53.3	68.5	42.4	Entrance to mining area opposite Clewer.	53.9	64.8	42.1	Entrance to mining area opposite Clewer.
8	50.2	67.3	39.2	Along the R547 Road Traffic noise.	50.8	63.9	40.3	Along the R547 Road Traffic noise.
9	53.9	64.8	42.1	Southern side of Clewer. Distant traffic.	53.2	70.0	40.9	Distant mining & traffic noise.
10	45.7	61.5	33.0	Distant hauling vehicles.	32.8	59.4	28.2	Distant mining activities.
11	40.5	64.1	36.9	Distant hauling vehicles.	31.9	54.1	22.8	Distant mining activities.

12.3.13 Visual Assessment

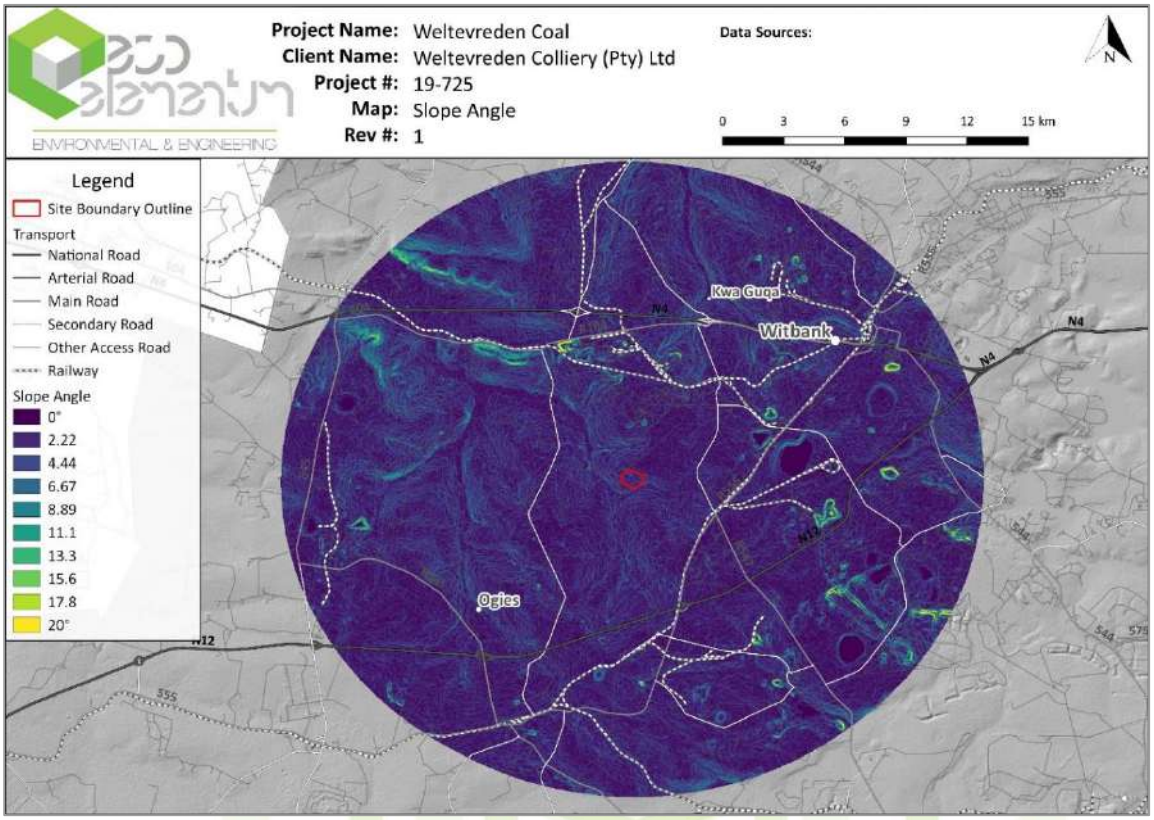

Figure 12.37: Slope angles of the terrain in the 15 km buffer area surrounding the proposed Weltevreden Coal project

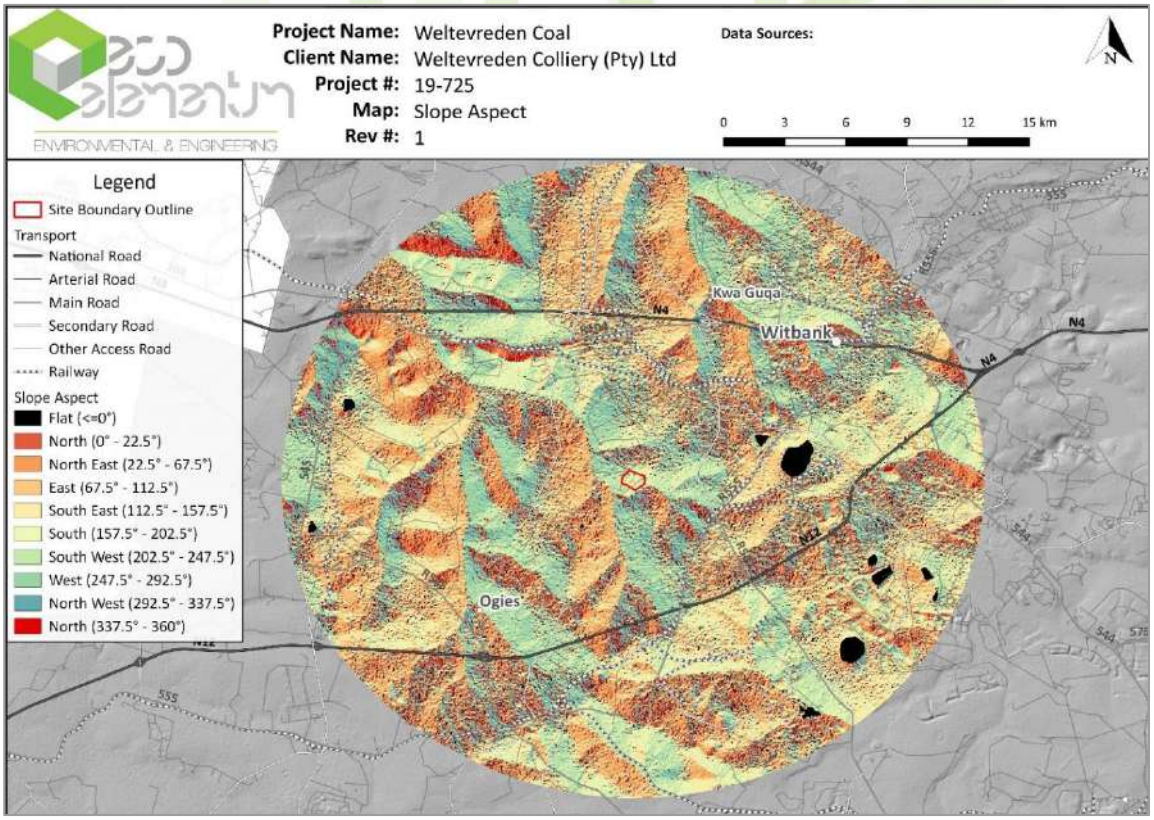

Figure 12.38: Aspect direction of the terrain in a 15 km buffer area surrounding the proposed Weltevreden Coal project

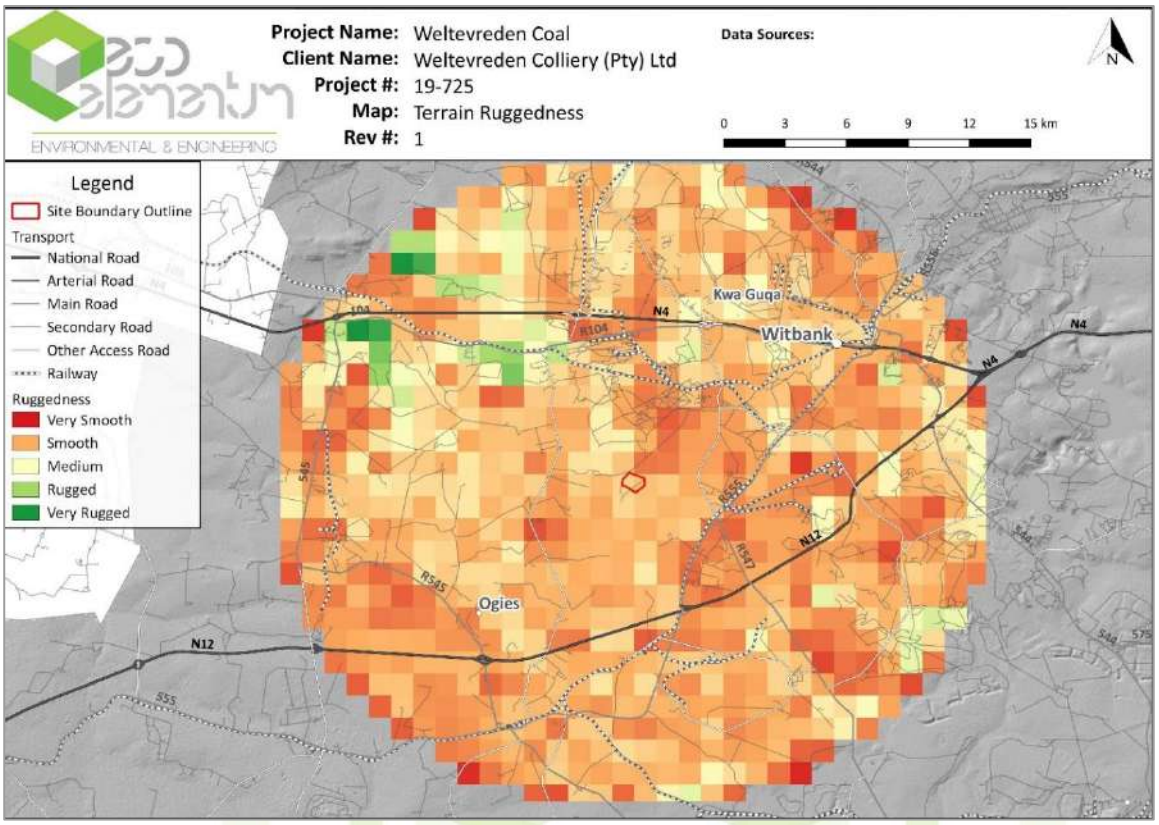

Figure 12.39: Terrain ruggedness in a 15 km buffer area surrounding the proposed Weltevreden Coal project

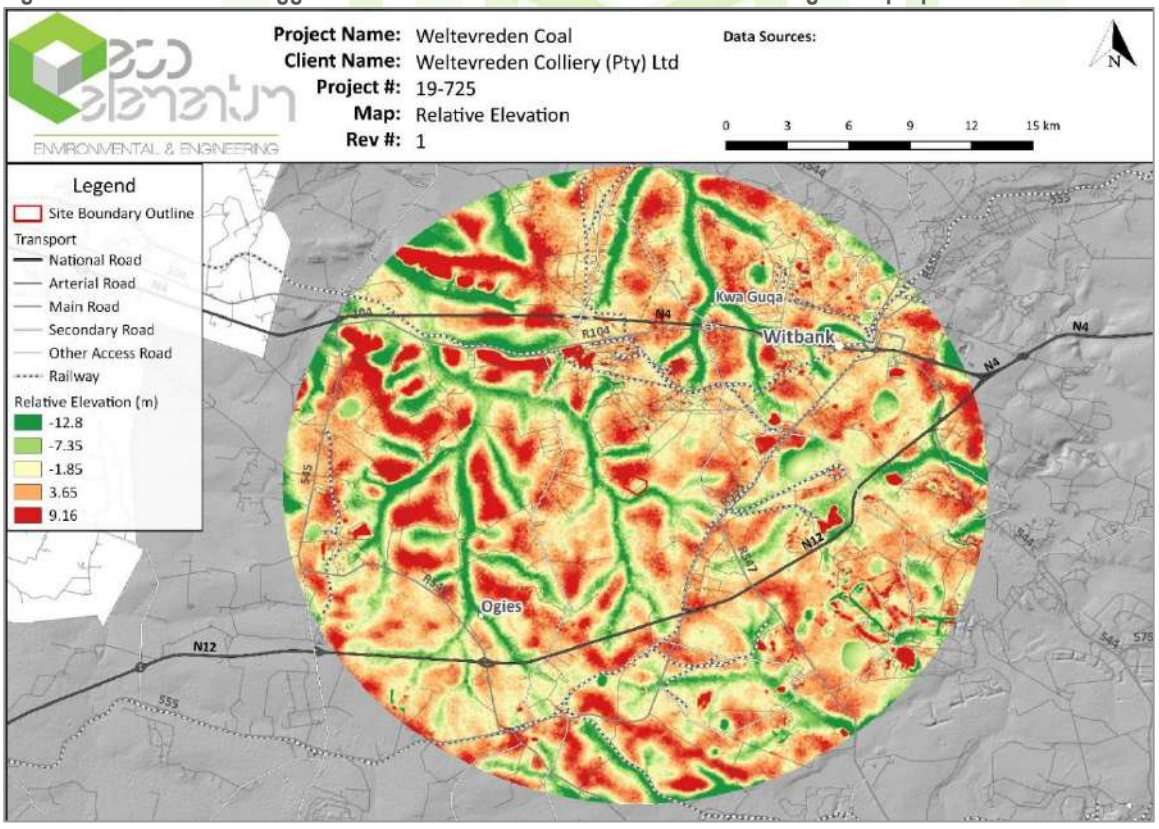

Figure 12.40: Relative Elevation of terrain in a 15 km buffer area surrounding the proposed Weltevreden Coal project

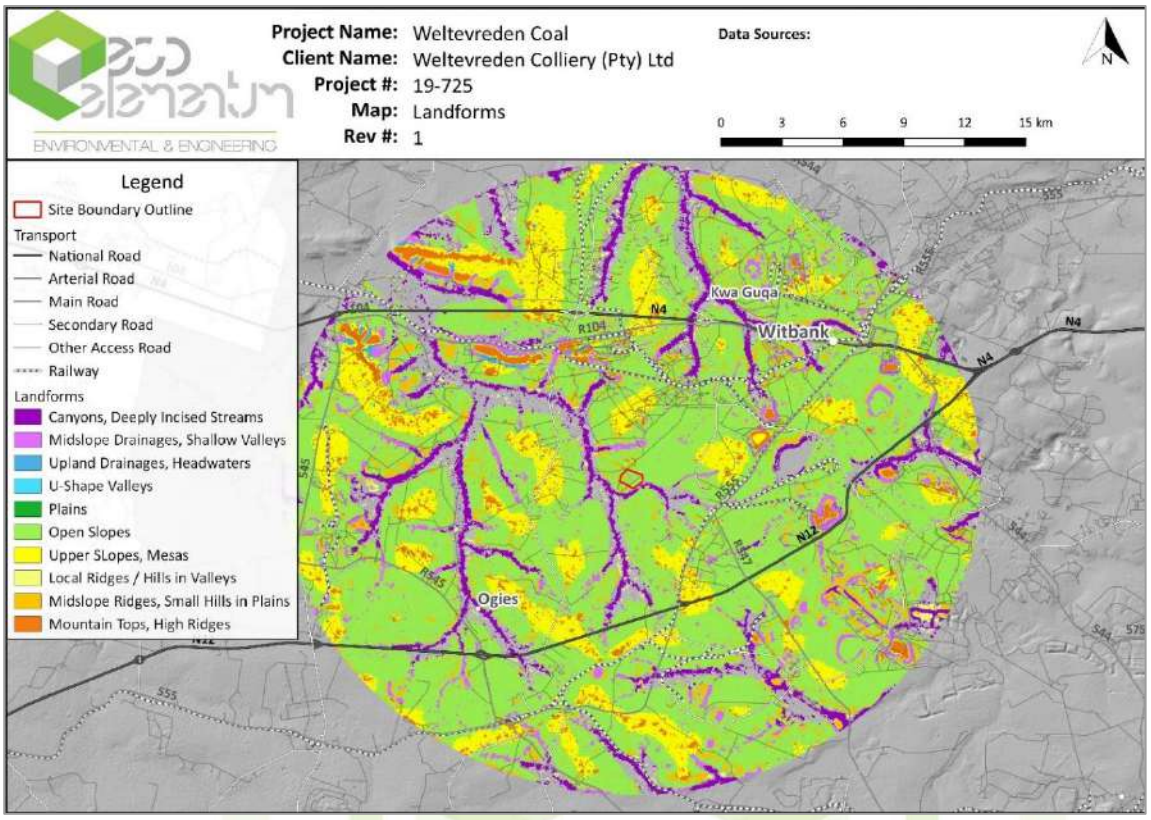

Figure 12.41: Landforms in a 15 km buffer area surrounding the proposed Weltevreden Coal project

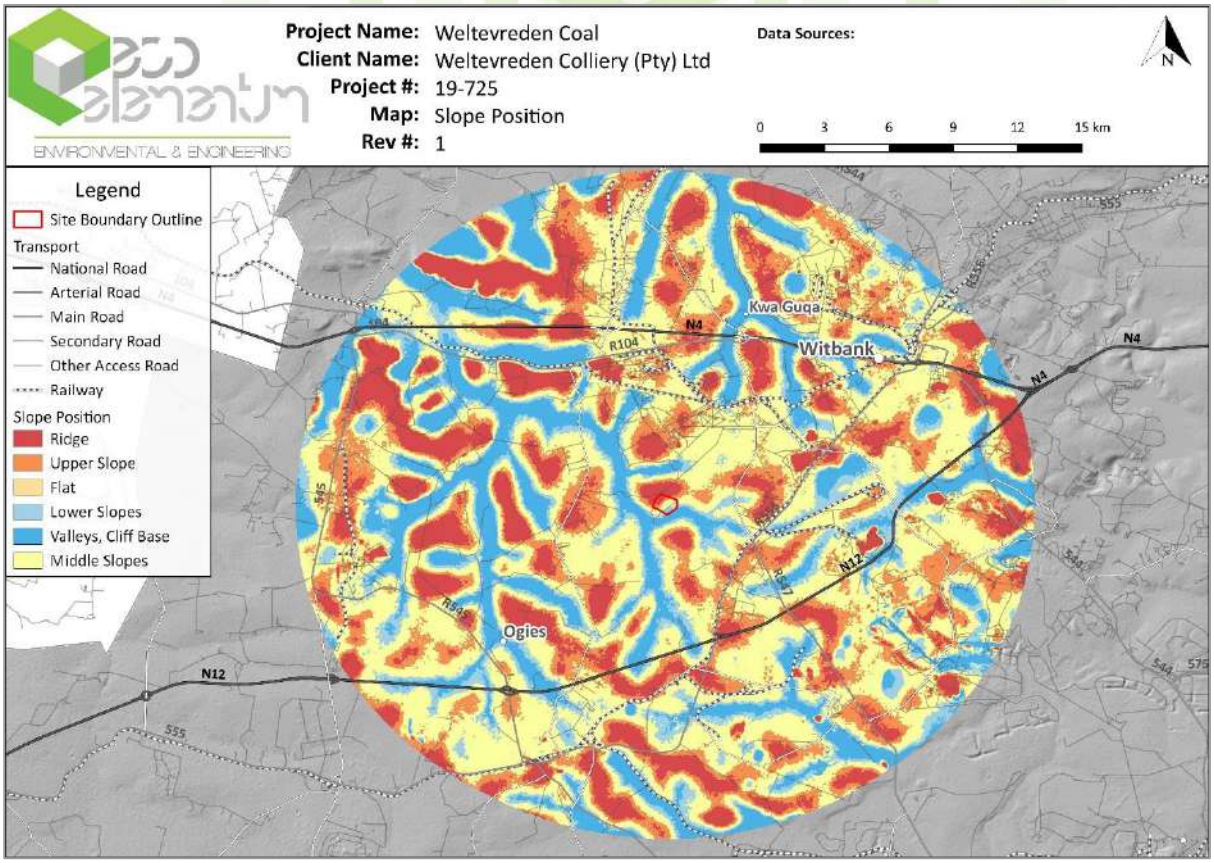

Figure 12.42: Slope Positions in a 15 km buffer area surrounding the proposed Weltevreden Coal project

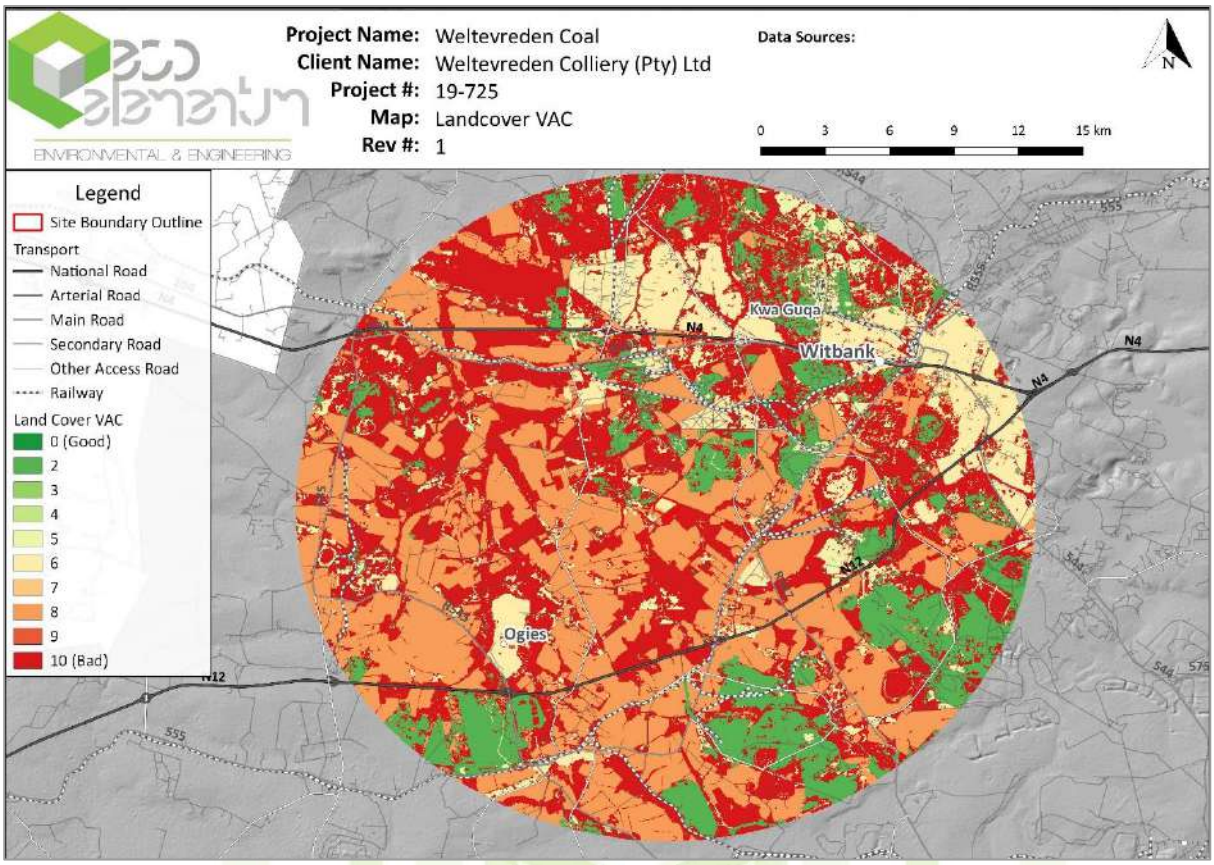

Figure 12.43: Possible VAC of the Landover in a 15 km buffer area surrounding the proposed Weltevreden Coal project

12.3.14 Socio-Economics

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.

12.3.14.1 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%.

12.3.14.2 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.

12.3.14.3 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.

12.3.14.4 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).

12.3.14.5 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.

12.3.14.6 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.

12.3.14.7 Agriculture Sector in Mpumalanga

Between 1996 to 2012, the agricultural sector for Gert Sibande has remained fairly constant with only a 0.3% decline, while Nkangala has witnessed a slight decline in agricultural sector from 23.9% in 1996 to 22.9% in 2012 (Gert Sibande District Municipality, 2017). The agricultural sector contributes the least towards the GVA of the Nkangala (1.91%), however, the agricultural sector is an important sector as it has the potential for the development of rural areas and the country as a whole (Nkangala District Municipality, 2017).

Agricultural activity within Gert Sibande is a large sector producing products such as maize, grain, wheat, mutton, dairy, wool and sorghum and are grown mainly through dryland agriculture. The lack of training, capacity and support has resulted in Gert Sibande collaborating with various stakeholders to coordinate programmes in the development of the agricultural sector. According to the Gert Sibande District Municipality (2017), agricultural land within Gert Sibande is constantly under threat by mining activities.

Food security is an issue faced by both District municipalities. Due to the competition of land between mining and agricultural sectors, the prevalence of food security as a challenge has increased (Gert Sibande District Municipality, 2017; Nkangala District Municipality, 2017).

12.3.14.8 Mpumalanga's Tourism Sector

The Mpumalanga Tourism and Parks Agency had divided the Province into seven different tourism regions that are geographically diverse and offer tourists very different experiences. Significantly, the District hosts three of the seven regions, namely "Cosmos Country," "Grass and Wetlands," and the "Wild Frontier". Unfortunately, though, with the exception of the Wild Frontier towards Barberton which is currently rated as the second most popular area in the Province, the other two regions are currently ranked very low.

Tourism contribution in Mpumalanga is of strategic importance especially because it boosts provincial employment and GDP. In 2015, tourism's direct contribution towards GDP is estimated at R17.6 billion and the total contribution is estimated at R35.1 billion compared to national at R 357 billion. The contribution is estimated at a percentage of 3.4 and 9.4 respectively during the same year. The sector also contributes significantly to employment in the province as well as the country.

The site under investigation is however not linked to any major tourism attraction and not located on any of the main roads associated with tourism routes.

12.4 Description Of Specific Environmental Features And Infrastructure On The Site

The proposed infrastructure has been discussed under Heading 7.3 and 12**Error! Reference source not found.**. The following is a summary of the identified sensitive environmental features and other structures on the proposed site:

12.4.1 Specific Sensitive Environmental Features

Table 12.20: Specific Environmental Features associated with the site

Sensitive Environmental Features	Details
Wetlands and Surface Water	The study area is associated with a tributary of the Olifants River. A channeled valley bottom wetland is situated within the 500 m buffer zone of the proposed mining infrastructure.
Ecological	Sensitive ecological habitats are associated with the riparian area of the wetland area.

12.4.2 Specific Infrastructure on site

Table 12.21: Specific Infrastructure Features associated with the site

Aspect	Infrastructure
Heritage	One site (POI 2), consisting of a small angular depression, might be significant form a heritage perspective as the site might indicate the location of a historical homestead. The site was recorded and no material of heritage importance was observed in close proximity of this site. Although this recording is deemed sufficient, care must be exercised during construction and development phases. Sections associated with structures visible on the 1943 aerial image date to historical times, but these structures have been demolished in past times. It should also be noted that the general area is disturbed by agricultural activities and cattle grazing. Care must, however, still be exercised during construction and development phases in order to ensure the safeguarding of potential subsurface heritage resources.

12.5 Environmental Sensitivity And Current Land Use Map

The land cover / land use for the project area is illustrated in Figure 12.44. The study area consists of settlements, cultivated crops, and degraded areas.

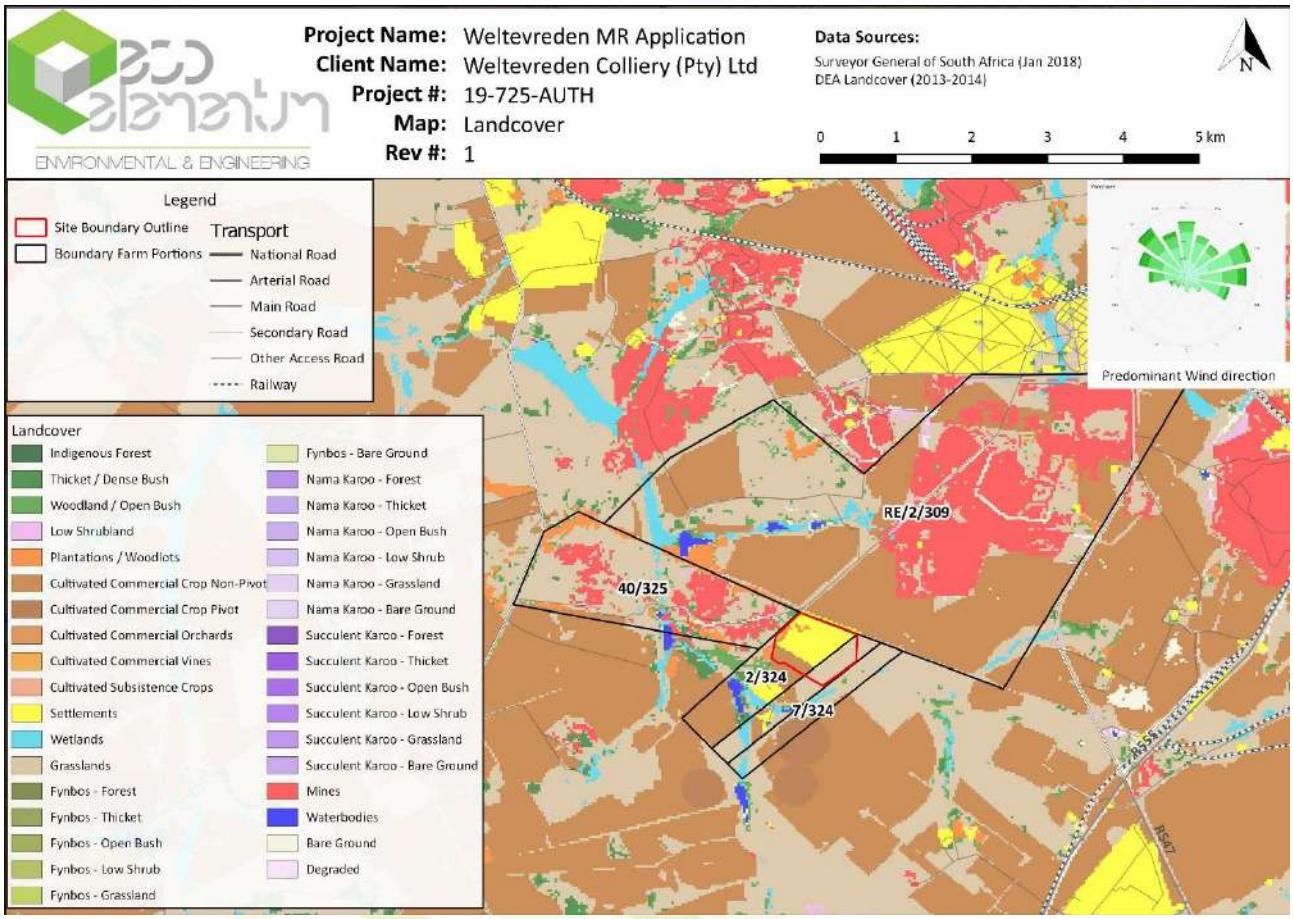

Figure 12.44: Land cover for the Study Area

Figure 12.45 and Figure 12.46 below depicts the environmentally sensitive areas, in relation to, the proposed project infrastructure. The valley bottom wetland associated with the site are the main factors determining the overall site sensitivity map.

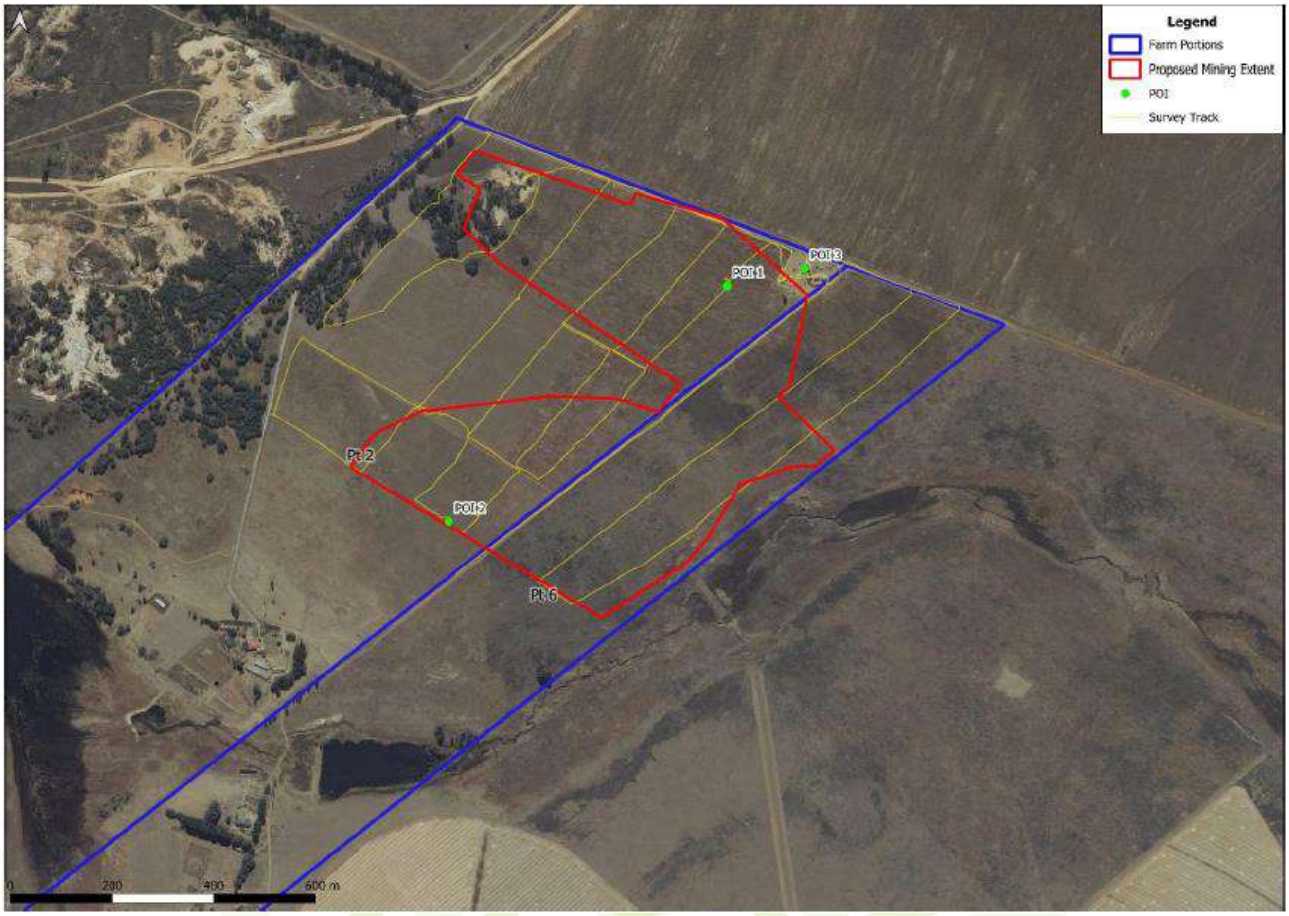

Figure 12.45: Areas of cultural sensitivity

Figure 12.46: Wetlands and infrastructure

13. ITEM 3(G)(V): IMPACT ASSESSMENT PROCESS AND FINDINGS

13.1 Summary Of Impacts And Risks Identified By Specialists

This section summarises the main findings of various specialists' impact assessments with respect to the proposed project.

13.1.1 Air Quality Impacts

During site clearance and site establishment a number of operations take place such as land clearing, topsoil removal, loading of material, hauling, grading, stockpiling, bulldozing and compaction. Initially, topsoil and subsoil will be removed with large scrapers. The topsoil will be stockpiled for rehabilitation in the infrastructure area. It is anticipated that each of the above mentioned operations will have its own duration and potential for dust generation. Fugitive dust (containing TSP (total suspended particulate, will give rise to nuisance impacts as fallout dust), as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts)). It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity, the specific operations, and the prevailing meteorological conditions. This activity will be short-term and localised, seizing after construction activities. Material will be removed by using a bulldozer and then storing this material separately for use during rehabilitation at end of life of mine when the operation cease. These construction sites are ideal for dust suppression measures as land disturbance from clearing and excavation generates a large amount of soil disturbance and open space for wind to pick up dust particles and deposit it elsewhere (wind erosion). Issues with dust can also arise during the transportation of the extracted material, usually by truck and shovel methods, to the stock piles. The dust can further be created by the entrainment from the vehicle itself or due to dust blown from the back of the bin of the trucks during transportation of material to and from stockpiles

13.1.2 Soils, Land Use and Land Capability

13.1.2.1 Soil compaction

Soil compaction will take place due to unnatural load and increased traffic by construction vehicles in the area that will change soil structure. In addition, the weight of the stockpiles also causes compaction of the soil surface underneath. Soil compaction generally reduces the amount of water that plants can take up. This is because compaction crushes many of the macropores and large micropores into smaller pores, and the bulk density increases. As the soil particles are forced closer together, soil strength increases and limits root penetration. Compaction also results in aggravation of run-off erosion as compaction reduces the water infiltration rate.

Soil compaction will be an impact during all the entire construction phase, operational phase and decommissioning phase. While it may still be present at the closure phase, mitigation and management measures should aim to alleviate the compaction before roll-over rehabilitation commences.

The effect of this will largely be within the site boundary and is highly likely to occur frequently due to the constant movement of vehicles as well as the weight of the topsoil berm overlying the in situ soil profiles underneath.

13.1.2.2 Destruction of soil nutrient cycles

Earthworks will include clearing of vegetation from the surface, stripping topsoil (soil excavation) and stockpiling in order to access the coal resource. The removal of vegetation from the surface and the stripping of topsoil in areas where necessary, negatively affects the nutrient cycles of topsoil horizon and results in loss of soil fertility. Disruption of soil nutrient cycles are considered reversible when the activities causing the impact is short-term (less than six months). However, in the case of the new open pit void, it may take longer than six months before roll-over rehabilitation of an area can commence. The impact is localised to the surface footprint where topsoil will be removed as well as all the areas where stockpiles will be located.

13.1.2.3 Soil chemical pollution

The use of vehicles that can result in oil and fuel spills on site as well as waste generation (both hazardous and general waste) can result in possible chemical soil pollution. In addition to this, dust suppression can result in soil pollution, especially when the water used

contains additives to aid the dust suppression or the water used is of marginal quality. Listed activities that will be part of the project and from which spills can cause soil pollution include:

- Dirty water diversion infrastructure
- Pollution Control Dam (PCD)
- Diesel storage

13.1.2.4 Soil erosion

Soil erosion is anticipated as a result of vegetation clearance that will leave the soil surface exposed. Topsoil stockpiles are also susceptible to erosion, especially when not covered by any vegetation. Soil erosion results in the loss of the nutrient-rich upper layers of the soil. Soil erosion can only be prevented for once it has occurred, it is a permanent impact as soil particles transported away from the landscape by wind and water energy, cannot be recovered. Although there are off-site indirect impacts associated with soil erosion, the impact is mainly considered to be local.

13.1.2.5 Loss of land capability

Land with arable land capability will be affected by the proposed mining activities with small areas of grazing and wilderness land capability that will also be affected. Once vegetation clearance and stripping of topsoil commences, the in situ soil profiles are disturbed and the inherent soil fertility associated with the original horizon organisation is lost. While several research and rehabilitation projects have aimed to re-establish the arable potential of the land, it has not been proven yet that the rain fed agricultural potential of the land can be restored. Roll-over rehabilitation should still aim though to get the land as productive as possible. In addition to roll-over rehabilitation, it should be aimed to incorporate other agricultural projects that increase the food production capacity of the larger study area around the surface footprint as a form of off-set of the land capability impacts

13.1.3 Surface Water

The Grootspruit together with its unnamed tributary forms a tributary of the Saalboomspruit which ultimately feeds into the Wilge River. It is essential for the proposed coal mine to adapt a pro-active management and remediation programme to ensure compliance with relevant legislation as well as to protect the Grootspruit from further degradation. This would entail the implementation of appropriate pollution control measures to be enforced by approved Environmental Management Plans (EMP's) and Integrated Water and Waste Management Plans (IWWMP's) which needs to be updated on a regular basis.

The main impacts on water-based ecosystems from coal mining activities include the following:

- Increased pollutants such as heavy metals in streams (heavy metals are dangerous to human health and the environment);
- Addition of toxic and non-toxic metals into the water resources;
- Acid mine drainage (which effectively increases the acidity of the water);
- Increased suspended solids;
- Increased dissolved solids rendering water supply impure;
- Increased water hardness (i.e. increased mineral content in the water);
- Increased sulphates (which compromises the health of people drinking it);
- Increased trace metal concentrations that could result in increased toxicity;
- Decrease in Dissolved Oxygen making the water to unsustainable to support aquatic life; and
- Decreased pH implying the water is more acidic contributing towards corrosion problems.

13.1.4 Groundwater

13.1.4.1 Construction Phase

13.1.4.1.1 Impacts on Groundwater Quantity

No significant impacts are expected during the construction phase in terms of groundwater quantity. The removal of vegetation in preparation of the mining area and haul road construction may cause an increase in surface runoff and therefore a small decrease in aquifer recharge.

The box-cut may cause a decrease in the water level due to dewatering if the base of the box-cut is lower than the groundwater level at that position.

13.1.4.1.2 Impacts on Groundwater Quality

The proposed Weltevreden Colliery is not expected to impact on the groundwater quality during the construction phase. The only possible impacts may be from example fuel spillages from the construction vehicles.

13.1.4.2 Operational Phase

13.1.4.2.1 Impacts on Groundwater Quantity

The operational phase impacts on the groundwater quantity will mainly be as a result of the dewatering of the surrounding aquifer during the opencast mining. The groundwater level in close proximity of the pit is expected to decrease since groundwater seepage to the void will be abstracted. Groundwater levels may rise below facilities such as the pollution control dam should leakage from the dam occur.

As simulated with the numerical model the extent of the dewatering cone is not expected to extent more than 250 m from the pit area in the shallow aquifer. Any groundwater users within this dewatering cone extent may experience a decrease in water levels.

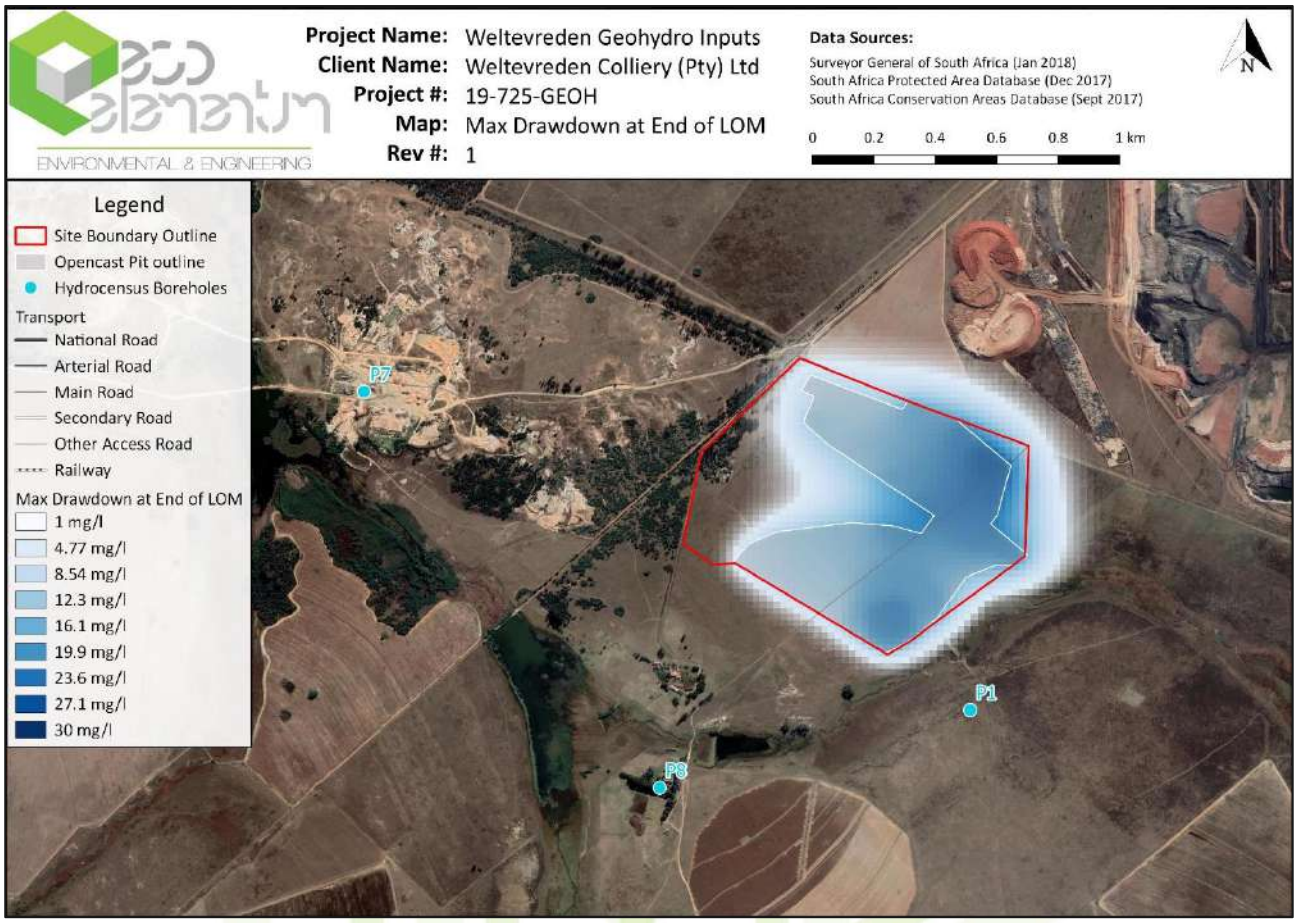

Figure 13.1: The simulated maximum drawdown cone in the shallow aquifer for the Wildebeestfontein Colliery.

13.1.4.2.2 Impacts on Groundwater Quality

During the operational phase and for the period after mining when the groundwater level has not yet recovered, the mine void will act as a groundwater sink area. Groundwater gradients and therefore groundwater flow will be towards the pit area. For this reason, groundwater contamination will not be able to flow down gradient from the pit area during the operational phase.

The acid-base accounting results indicated a potential to generate acid. The dewatering of the pit will result in any contaminated water in the pit to be removed. For this reason, no impacts in terms of contamination is expected to influence any surrounding groundwater users.

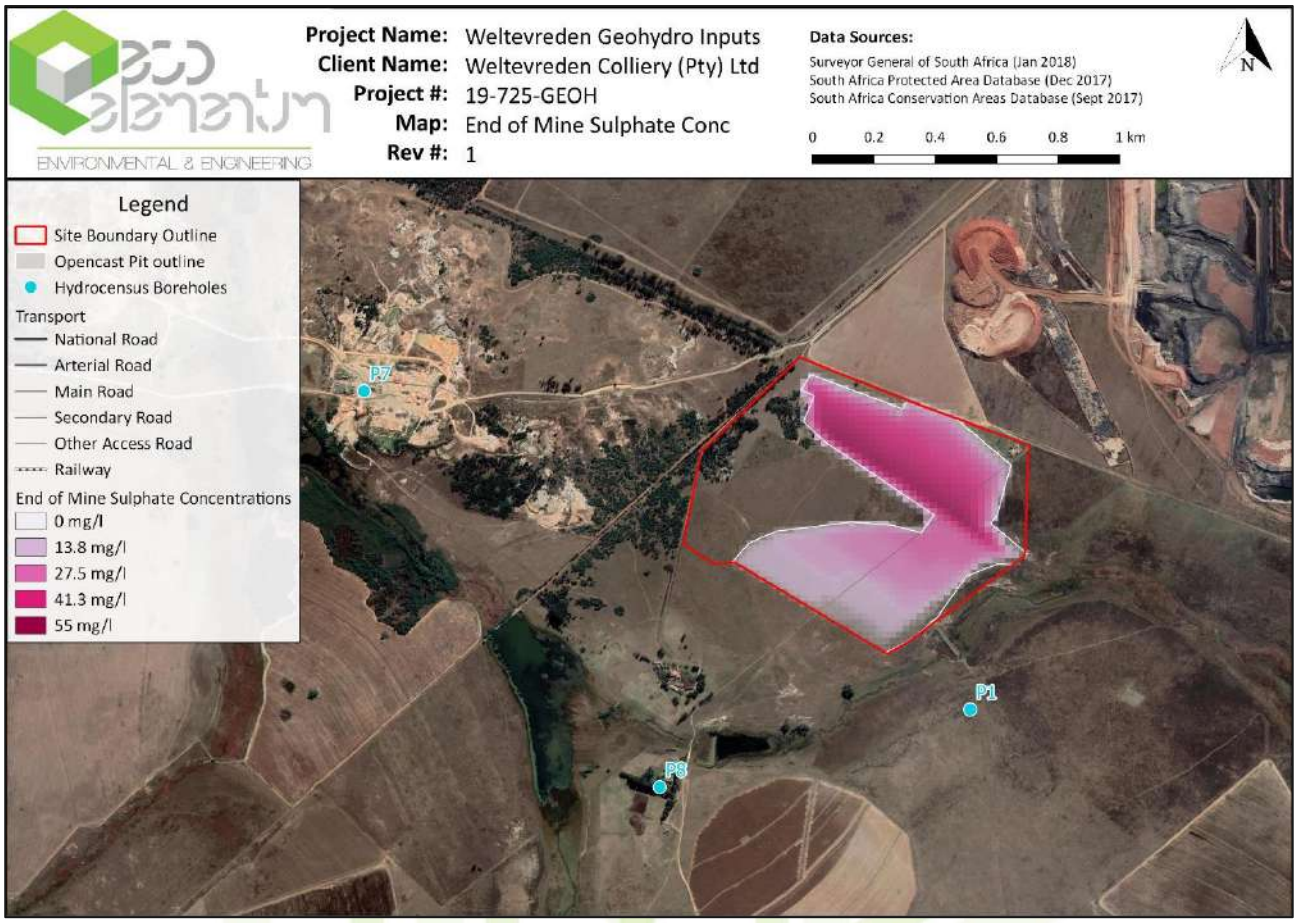

Figure 13.2: The simulated mass transport at the end of the operational phase at Weltevreden Colliery.

13.1.4.3 Decommissioning Phase

During the decommissioning phase all the potential contamination sources will be removed. These include the discard and ROM stockpiles, the pollution control dam and all carbonaceous or contaminated material. This will decrease the surface sources for further groundwater contamination.

The opencast pit area will be rehabilitated which will have a positive impact on the groundwater regime in some areas since the poor-quality seepage to the groundwater will decrease.

13.1.4.4 Post Closure

13.1.4.4.1 Groundwater Quantity

Since dewatering has ceased at the end of the operational phase, the groundwater level will start to recover to a state of equilibrium. Decant from the lowest elevation on the pit boundary may occur once the groundwater levels have recovered.

With sufficient and adequate rehabilitation, the recharge to the opencast pits will decrease to approximately 12,5%.

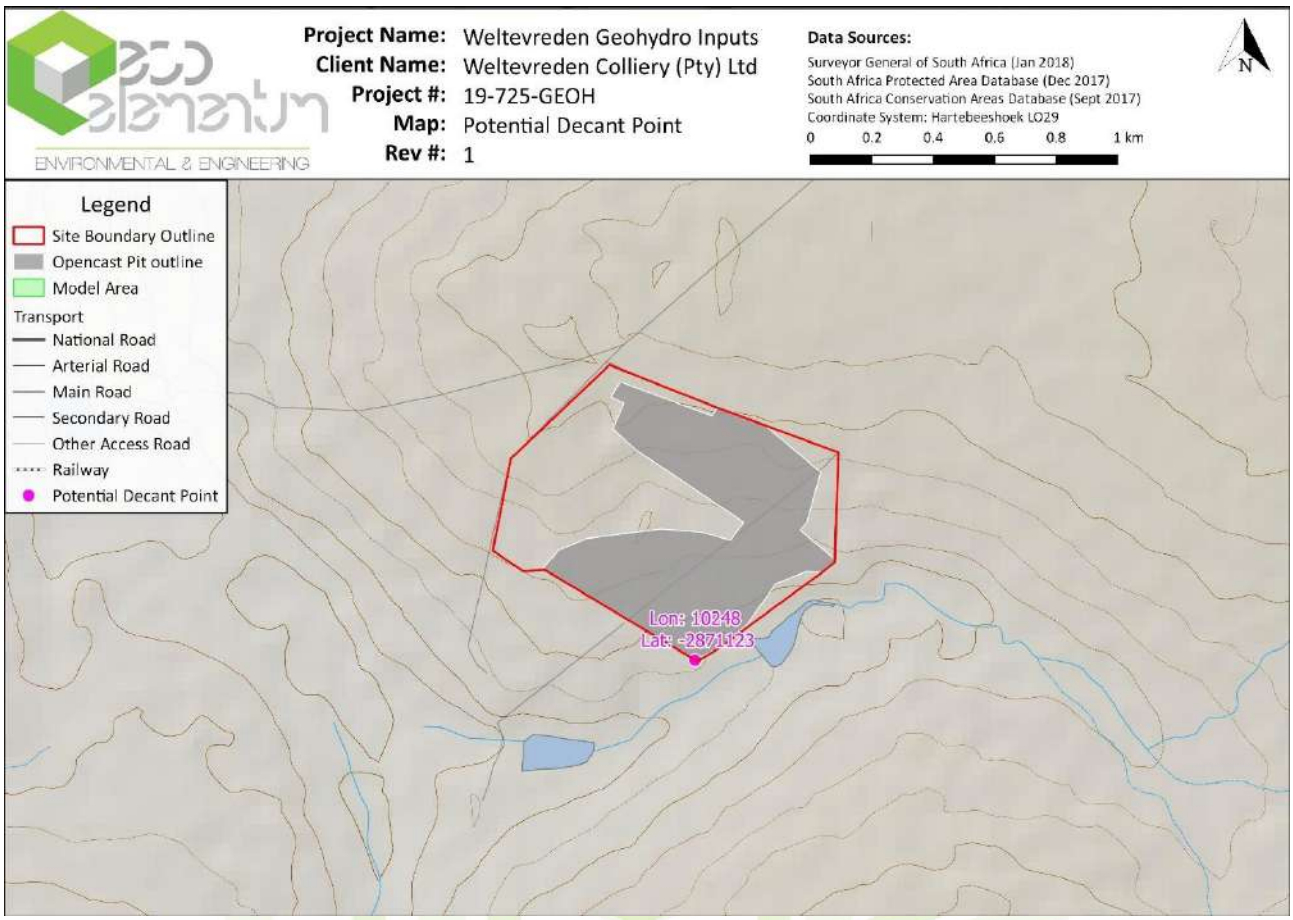

Figure 13.3: The potential decant point position.

13.1.4.4.2 Groundwater Quality

Geochemical analysis conducted for the Weltevreden Colliery area indicated a probability for acid generating. Therefore, the groundwater quality in the pit region will decrease as a result of the acidification. It is highly recommended that all carbonaceous material be placed on the pit floor and covered with overburden material. This will result in coverage of the carbonaceous material with water first, which will eliminate oxygen from the system to decrease the process of acid generation. As discussed in Section 7.8.3 of this report some areas at the opencast pit will not be covered by water once the decant elevation is reached. It is therefore suggested that carbonaceous material not be placed in these areas exposed to oxygen.

A groundwater pollution plume will start to migrate down gradient once the groundwater level has reached a point of equilibrium. Please refer to Section 7.8.3 of this document for more information in the expected groundwater quality conditions post closure.

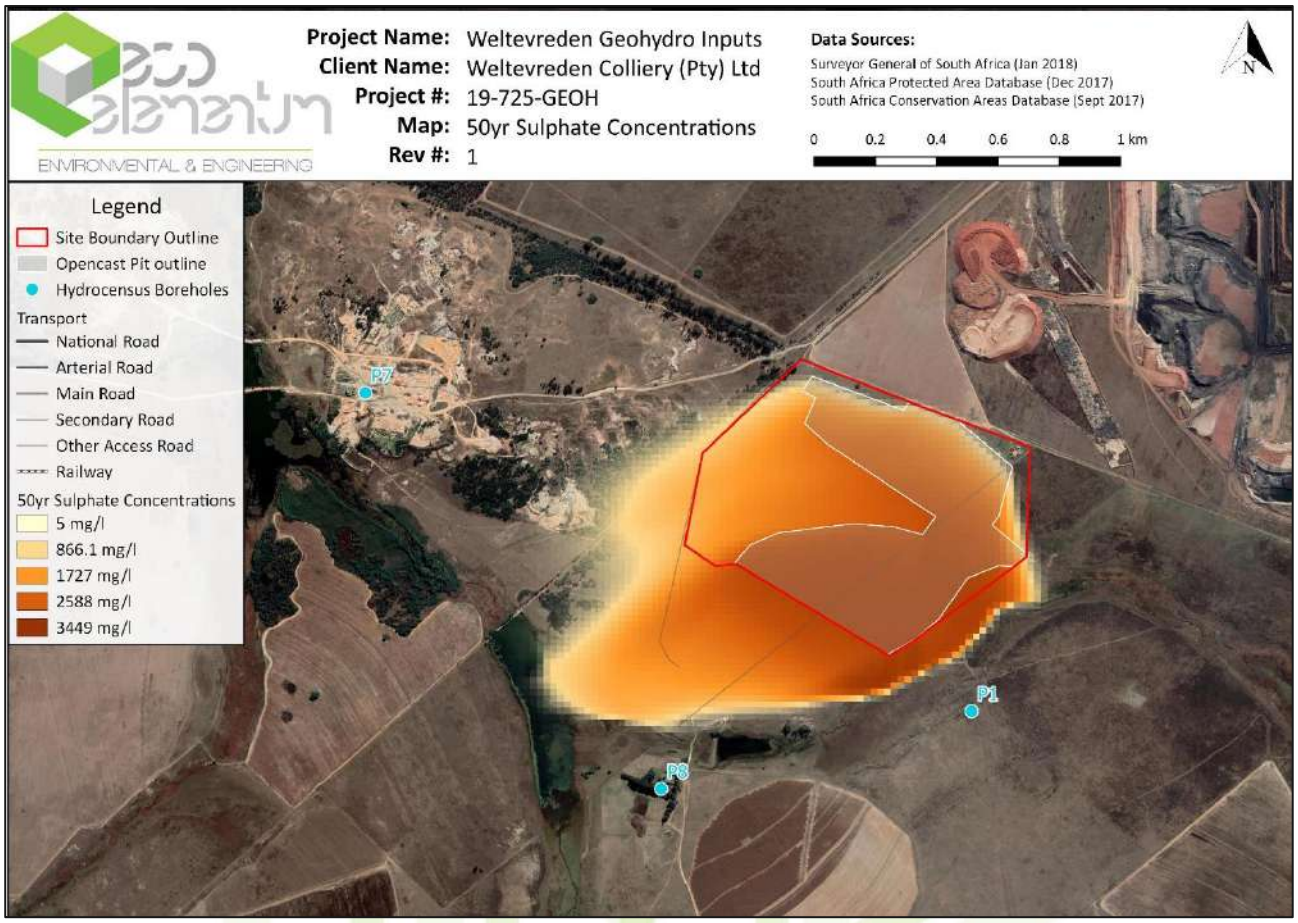

Figure 13.4: Model Simulated groundwater contamination plume 50 years post facility.

13.1.4.5 Cumulative Impact

The Weltevreden Colliery is situated in an area with several mining and industrial activities at or near its boundaries. These include:

- Elandsfontein Colliery just north of Weltevreden,
- Highveld Steel activities 6km north of Weltevreden,
- Anglo Umlalazi Colliery to the north;
- Anglo Landau 5 km to the east;
- Anglo Greenside Colliery 4 km to southeast;
- Sand mining operation immediately north-west and
- Agricultural activities to the west, south and northern sections.

Elandsfontein Colliery and Umlalazi Colliery are of special interest as it is bounding Weltevreden, all within the B20G quaternary catchment. Their impacts could superimpose to have a cumulative impact on the catchment. In fact, a discussion with Anglo environmental officers in 2015 revealed that their PCD had at least once spilled over to the Umlalazi Nature Reserve (Digby Wells, 2018).

13.1.5 Wetlands and Aquatics

The construction of the proposed Weltevreden Coal Project is thought to impact directly on the wetland that is adjacent to the construction site and proposed activities to commence. This is the Grootspruit/Zaalklap confluence wetland (Wetland 3) on the Weltevreden property. The Grootspruit tributary wetland system (Wetland 1) will be slightly less impacted but largely due to indirect impacts stemming from the degradation of the Grootspruit confluence.

Operational impacts on the wetland system are expected to be in the same order than those predicted during the Construction phase of the Weltevreden Coal Project. After construction has ended, operational management may commence and rehabilitation of all degraded areas will work to limit and reverse any damage that may have been caused by the resulting activities within the wetlands.

Operational risks may be described as risks in terms of malpractice and management of potential "dirty" areas and the overburden dump proposed. The haul road is not expected to generate further negative impacts as long as it is maintained well. Spillage and incidents may not only contaminate the local area but may also migrate downstream if not detected early or not planned for in terms of emergency response planning.

The impacts anticipated during the decommissioning phase will be critical due to the fact that it is all long-term residual impacts and mitigation will be subject final rehabilitation planning. Control over the placement of waste material during backfilling is the most important preventative guideline and if managed properly, impacts may be considered as low to moderate significant after rehabilitation has started.

Decommissioning and rehabilitation practices of the open pit complex will be similar as described above and should commence concurrently with mining to turn positive due to success of rehabilitation practices and the return of the natural state of the environment. If rehabilitation is done correctly, it may even better the current situation due to ready degraded state of the environment and loss of scenic beauty of the wetland systems as is the baseline condition (when the study was conducted).

13.1.6 Flora & Fauna

The site has already been impacted on by the dumping of rubbish, past agricultural activities, presence of invasive species and informal settlements. As a result of this, the proposed site has poor species richness. What remains is fragmented and of low conservational concern. Impacts can be grouped in terms of the phase of the mining activity (i.e. construction, operational and closure phases).

13.1.6.1 Potential Construction Phase Impacts

The clearance of vegetation will result in the loss of Rand Highveld Grassland vegetation. Impacts related to this loss can be minimised by restricting vegetation clearance and road construction to the designated areas, thereby minimising the footprint area and reducing the required rehabilitation effort. As disturbed areas are more susceptible to alien species encroachment, a pre-emptive Invasive Species Management Plan will reduce impacts related to alien invasive species.

13.1.6.2 Potential Operational Phase Impacts

Topsoil and overburden will be stripped and stockpiled. Primarily the actual soil stripping footprint will temporarily loose its entire species assemblage, while secondarily, the stockpile area will undergo the same loss. Increased vehicle movement and associated human activities on the site can result in increased roadkills and vegetation disturbance, particularly if the rules of the road are not followed. In addition, alien plant species may also establish due to the level of expected soil disturbance. Provision must also be made for unplanned impact events such as hydrocarbon spills and illegal poaching of fauna and flora species.

13.1.6.3 Potential Rehabilitation Phase Impacts

As rehabilitation will focus on alien invasive species eradication, this will temporarily lead to a reduction in habitat heterogeneity. Care must be taken to correctly apply topsoil to disturbed areas, without disturbing additional vegetation and ultimately increasing areas of potential invasion.

13.1.7 Heritage Sites

Apart from the angular depression observed at POI 2, no remains were observed that might be of heritage importance. It should be noted that several sites were identified on historical aerial imagery dating to 1943. These sites, however, were demolished in subsequent years and no remains were observed. The significance of these areas, located on the eastern and north-eastern sections of the study area, is that subsurface material might exist and would date to a time period exceeding 60 years of age and would therefore be protected under the NHRA act 25 of 1999. Also, the area has been significantly disturbed by agricultural activities and cattle grazing. Because the

general area saw some activities dating to historical times, care must be exercised during construction and development phases in order to ensure the safeguarding of heritage resources.

13.1.8 Noise, Blasting and Vibration

The following Noise intrusion level criteria are applicable:

Increase Δ -dBA	Assessment of impact magnitude	Color code
0 < Δ ≤ 1	Not audible	
1 < Δ ≤ 3	Very Low	
3 < Δ ≤ 5	Low	
5 < Δ ≤ 10	Medium	
10 < Δ ≤ 15	High	
15 < Δ	Very High	

13.1.8.1 Construction phase

The noise intrusion levels during the construction phase at opencast pit and infra-structure are illustrated in Table 13.1. The noise intrusion during the construction phase will be insignificant.

Table 13.1: Noise intrusion levels (in dBA) during construction phase

Position	Clearing and grubbing of the plant footprint	Construction activities at plant	Construction of the infra-structure	Civil construction activities	Construction of the overland conveyor	Construction of hauling roads	Cumulative Levels	Cumulative noise level - Daytime	Cumulative noise level - Night time	Intrusion noise level - daytime	Intrusion noise level - night time
A	11.9	11.9	5.8	7.8	7.8	7.8	13.8	40.3	38.7	0.0	0.0
B	10.6	10.6	10.6	12.6	12.6	12.6	17.9	40.3	36.8	0.0	0.1
C	6.9	6.9	6.4	8.4	8.4	8.4	14.3	40.3	36.7	0.0	0.0
D	4.5	4.5	4.2	6.2	6.2	6.2	12.7	40.3	36.7	0.0	0.0
E	2.1	2.1	1.9	3.9	3.9	3.9	11.3	40.3	36.7	0.0	0.0
F	9.7	9.7	9.2	11.2	11.2	11.2	16.6	50.2	50.8	0.0	0.0
G	12.2	12.2	10.6	12.6	12.6	12.6	17.8	53.6	53.7	0.0	0.0

13.1.8.2 Operational phase

The calculated noise levels and subsequent noise intrusion levels at the abutting noise receptors during mining activities at the mine footprint (plant and open cast) will be illustrated in Table 13.2.

The mine activities will not be audible during the day and night after the implementation of the noise mitigatory measures. The threshold value of 7.0dBA will not be exceeded at any of the noise receptors.

Table 13.2: Noise intrusion levels (dBA) at the residential areas during pit activities

Position	Crushing activities	Screening activities	Pit activities	ROM	Hauling of material to the plant	Hauling of waste rock to the waste rock dump	Traffic	Emergency generator	Cumulative Levels	Cumulative noise level - Daytime	Cumulative noise level - Night time	Intrusion noise level - daytime	Intrusion noise level - night time
A	15.6	10.6	21.9	16.0	10.7	10.7	6.9	21.9	23.6	40.4	36.9	0.1	0.2
B	20.4	15.4	20.6	21.0	15.8	15.8	5.6	20.6	25.1	40.4	37.0	0.1	0.3
C	16.4	11.4	16.9	16.7	12.1	12.1	1.9	16.9	21.2	40.4	36.8	0.1	0.1
D	14.2	9.2	14.5	14.4	9.7	9.7	-0.5	14.5	19.0	40.3	36.8	0.0	0.1
E	11.8	6.8	12.1	12.0	7.1	7.1	-2.9	12.1	16.7	40.3	36.7	0.0	0.0
F	19.6	14.6	19.7	19.5	14.9	14.9	4.7	19.7	24.0	50.2	50.8	0.0	0.0
G	21.4	16.4	22.2	21.0	15.5	15.5	7.2	22.2	25.7	53.6	53.7	0.0	0.0

13.1.9 Visual

13.1.9.1 Viewshed Visibility

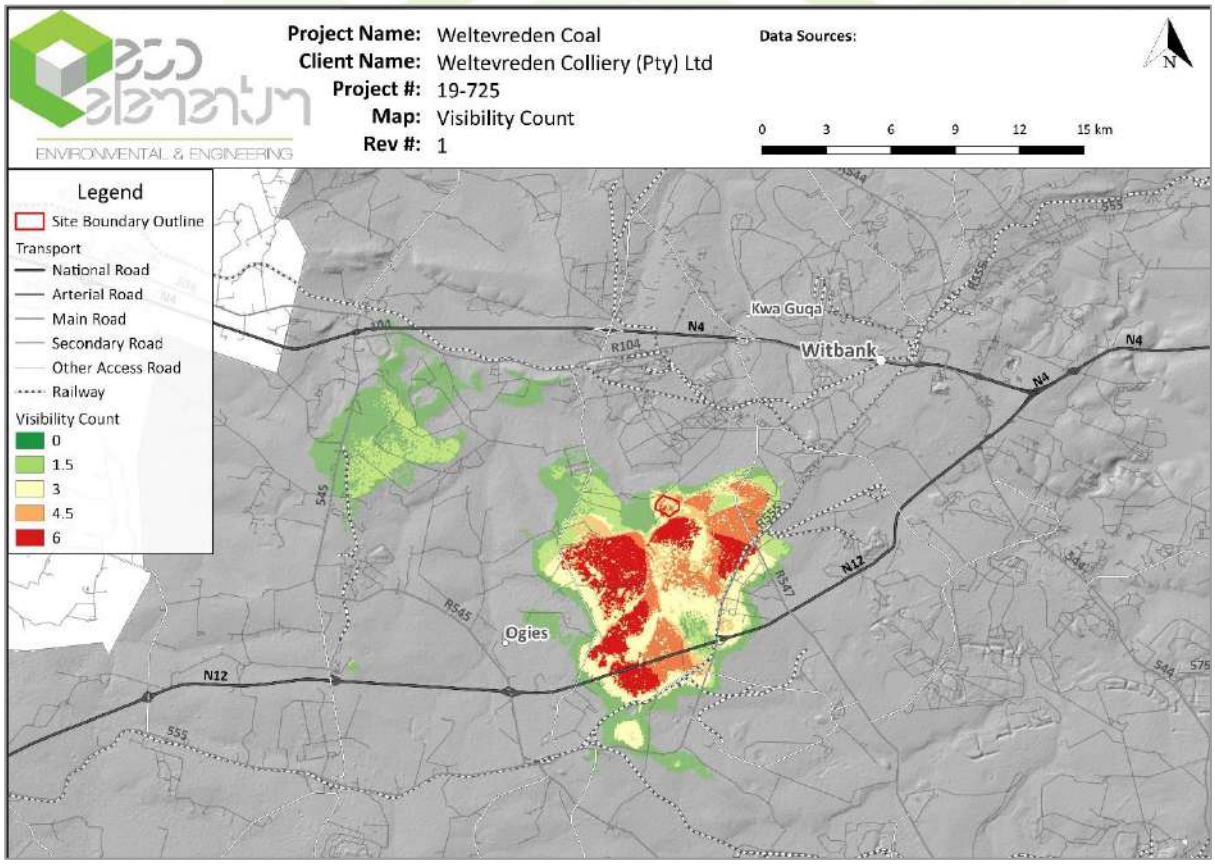

Figure 13.5: Viewshed of proposed Weltevreden Coal project – Visibility Count (How many surface infrastructure locations can be seen from any location on the map)

For the assessment of the visibility of the area, the viewshed has been calculated for the amount of surface infrastructure features that can be seen from any point on the map. The opencast Pit have been split up in multiple positions to simulate how much of the pit is visible.

Table 3: Visibility Rating – Count of infrastructure visible of the proposed development

1 Structure	Very Low
2 Structures	Low
3 Structures	Medium
4 - 5 Structures	High
6 Structures	Very High

13.1.9.2 Viewshed Visibility – Distance Ranking

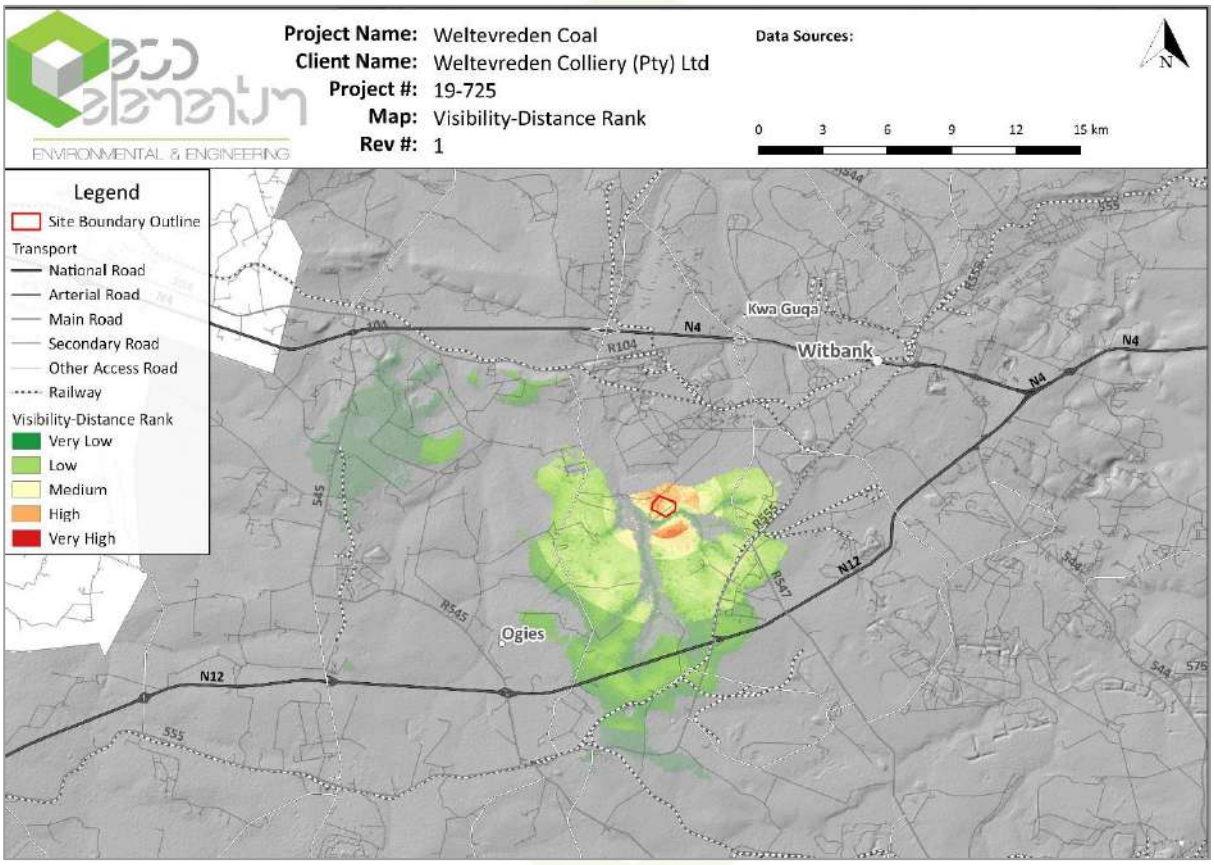

Figure 13.6: Viewshed of proposed Weltevreden Coal project – Visibility Count (How many surface infrastructure locations can be seen from any location on the map) ranked according to distance from source

The View Counts from the visibility section above is then further ranked based on distance from the centre of the proposed infrastructure site. Distances are ranked according to the table below.

Table 4: Visibility rating – Distance from proposed infrastructure development

12 – 15 km	Very Low
9 – 12 km	Low
6 – 9 km	Medium
3 – 6 km	High

0 – 3 km	Very High

13.1.9.3 Visual Exposure Ranking

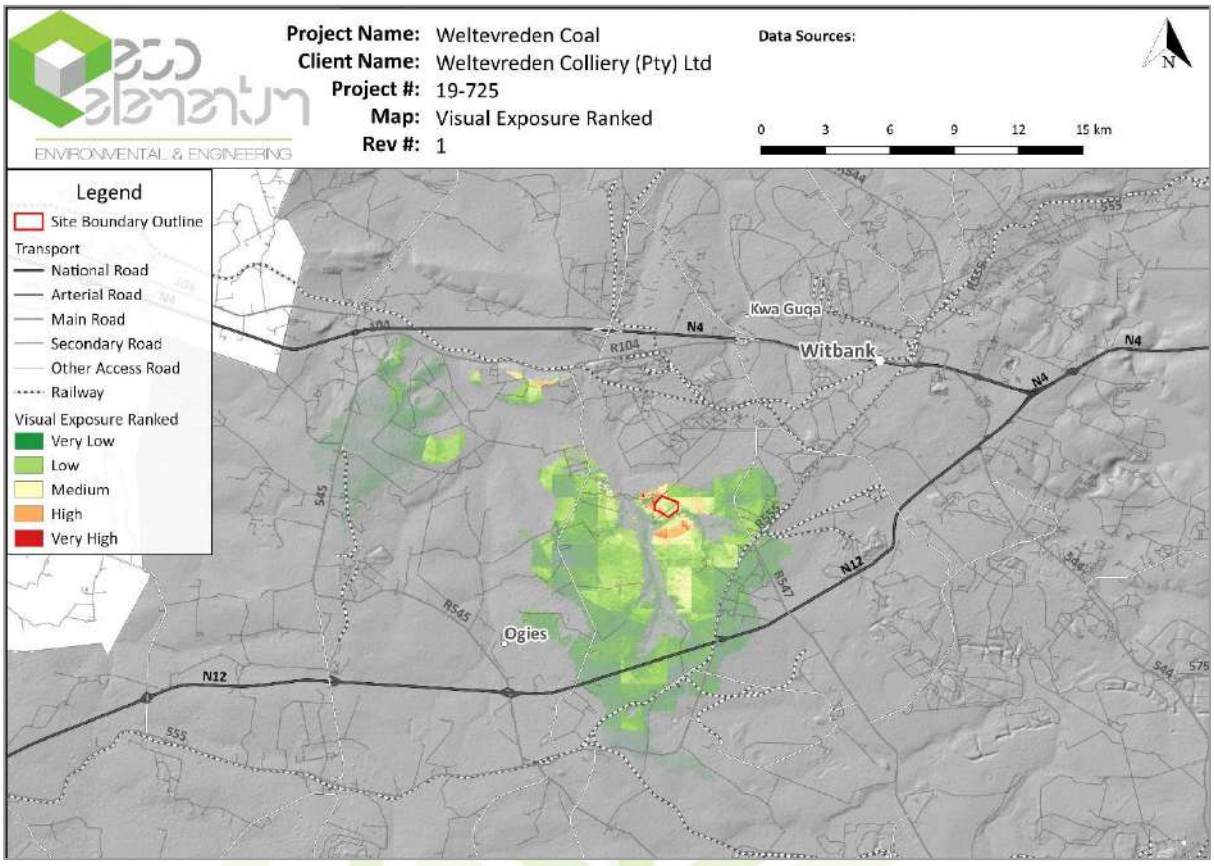

Figure 13.7: Visual Exposure ranking within a 15 km radius of the proposed Weltevreden Coal project

The visible infrastructure count is combined with the distance from the source ranking together with the VAC of the land cover types, the slope, aspect, ruggedness, relative elevation, landforms and slope position to get a quantitative Visual Exposure ranking of all the areas where it may be possible to see the proposed development.

Table 5: Visibility rating – Distance from Proposed Infrastructure Development

1	Very Low
2	Low
3	Medium
4	High
5	Very High

13.1.9.4 View Points

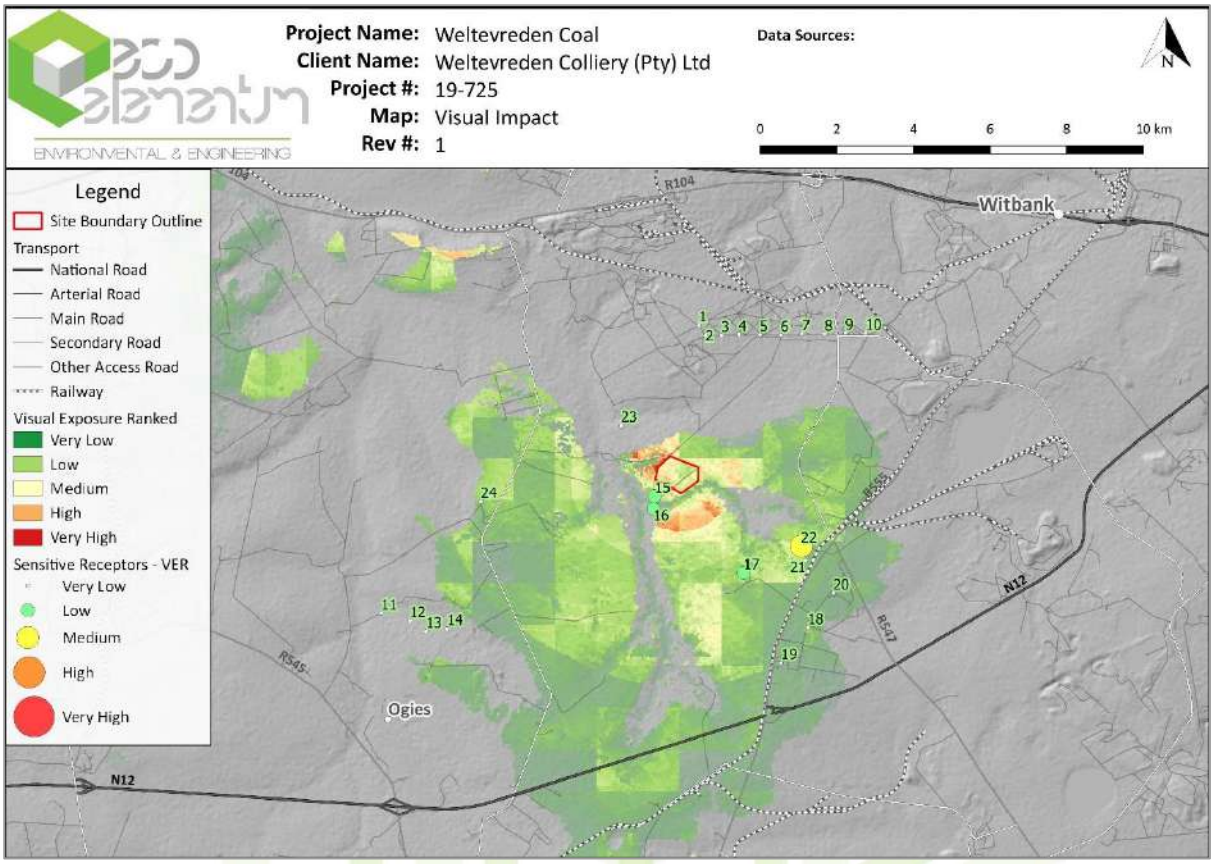

Figure 13.8: Viewpoint sensitive receptors overlaid on the Visual Exposure Ranking

Each identified sensitive receptor is then overlaid on the Visual Exposure Ranking and the value extracted to that pixel to give a quantitative ranking for each of the identified sensitive receptors. Ranking is done from 1 to 10, 1 being very low and 10 very high.

Due to fact that topographic modification can take place by agricultural, vegetation and other activities in the area, the viewshed is only a theoretical study. The viewpoints have been identified based on the sensitivity of the areas to visual disturbance and areas that can be negatively impacted by the related structures.

Table 6: Quantified ranking of the Visual Exposure each identified sensitive receptor may have due to the proposed infrastructure

Visibility ratings	
ID	**Rating**
15	2.45
16	3.08
17	2.13
18	1.59
19	0.84
20	1.20
21	0.94
22	4.23
24	1.68

The above table display the results as calculated by the GIS. Only locations that did not receive a 0 are shown. Ratings are ranked 1 - 10, 1 being very low and 10 very high. The system only takes into account the variables as described in this report and the amount of infrastructure that would be visible. Factors like real time and micro scale vegetation are not taken into account, thus the actual rating may be lower or higher depending on the updated land use in the vicinity or latest vegetation growth or height on a micro and macro scale.

The table is by no means a rating of visual quality; it is rather used to determine the likelihood that the proposed infrastructure will be seen from the viewpoint receptors.

13.1.10 Broad level Socio-Economic Environment

It is expected that the proposed Weltevreden Mining Project will result in social changes which may positively and negatively affect communities within the study area. In terms of the social changes that have been assessed, the following social impacts are have been identified:

- Employment opportunities;
- Multiplier impacts on the local economy
- Change in movement patterns;
- Loss of agricultural land and infrastructure;
- Physical and economical displacement;
- Impacts on the local tourism industry
- Increased pressure on Municipal infrastructure;
- Increased social pathologies linked to influx of workers and job seekers;
- Increased nuisance factors and changed sense of place.

13.1.11 Specific Issues raised by Interested and Affected Parties

Table 13.7: Summary of the issues raised by the various I&APs and the EAP's response/feedback thereto

Name Surname	Involvement	Method of comment	Comment	EAP Response
Mr Nkkosinathi Mtsweni	Greater eMalahleni Youth Forum	Open Day 31 May 2019	GEYF is a non-profit organisation that would like to join and participate in the SLP as they do community outreach programmes. The Mine needs to give the GEYF an opportunity and align the SLP/CSI projects to achieve goals and social objectives	Once the Mine starts with construction the SLP will be implemented and the communities will be approached regarding job opportunities.
			They face a high rate of youth unemployment in the country they think this is one of the positive ways to reduce the unemployment rate in eMalahleni. They want to create job opportunities and skills development and empower the young people and build their capacity.	Once the Mine starts with construction the SLP will be implemented and the communities will be approached regarding job opportunities.
Thia Oberholzer	Environmental Manager Highveld Steel	Email 6 May 2019	Please forward documentation to me once available. I would like to register as I&A party.	Draft Scoping report sent on 17 may 2019 when made available for Public Review
Doreen Manamela	B1 Safety	Email 7 May 2019	We would kindly like to request an appointment for Doreen Manamela to call on your company with regards to the supply of Personal Protective Equipment (PPE)	This will be brought to the attention of the mining company

Table 13.8: Summary of the issues raised by the Commenting Authorities and the EAP's response/feedback thereto

Organisation	Name Surname	Method of comment	Comment	EAP Response
Mpumalanga Tourism and Parks Agency	DR. M.C. LOTTER	Official letter, via email: 12 June 2019	The MTPA has no objection to this application but has the following concerns and require the following: 1. A botanical survey is required for the proposed mining site and immediate adjacent natural areas. The MTPA have modeled the distribution of the Critically Endangered orchid, the Albertina Sisulu Orchid (*Brachycorythis conica* subsp. *transvaalensis*), and it has the potential for occurring in this area. It flowers February to May. All the species of conservation concern (Protected plants) should be marked for rescue purposes.	A Botanical Survey has been undertaken by M² Environmental Consultants, and the report is provided in Appendix 3, as well as a summary in Section 12.3.
			2. Wetland delineation and wetland biodiversity studies are required. The Mpumalanga Biodiversity Sector Plan (MBSP) freshwater assessment, Figure 1 indicates the presence of a Critical Biodiversity Area Wetland system that must be avoided and indicated as such in the mine layout plan.	A Wetland Survey has been undertaken by M² Environmental Consultants, and the report is provided in Appendix 3, as well as a summary in Section 12.3.
			3. A rehabilitation plan is required to prevent and avoid the dewatering of the wetland system.	The rehabilitation plan will be compiled alongside the Closure Report, and is provided in Appendix 3, as well as a summary in Section 12.3.
			4. An active water purification system must address the possible pollution through AMD decanting, underground pollution plume, storm water pollution from discard dumps, overflow from pollution control facilities and leachates. Clean water must be provided back into the natural system.	Saldomate will look into water treatment and release closer to the time of closure.

Organisation	Name Surname	Method of comment	Comment	EAP Response
			5. In terms of the Mpumalanga Biodiversity Sector Plan terrestrial assessment, Figure 2, and the recommended land use guidelines in the MBSP Handbook, the remaining natural areas would support the functioning of the wetland and the MTPA recommend that a 100 m buffer from the edge of the wetland soils and vegetation is implemented.	Saldomate will be applying for exemption in terms of Regulations 4 and 5 of GN 704: • Restrictions on locality • Restrictions on use of material The mine with transgress the 500m buffer zone of a wetland and subsequently the 100m buffer from a watercourse as well. The mine and its associated activities will however not transgress the 1:100 year floodline area of the watercourse. A Section 21 (c) and (i) Water use will be applied for in this instance and mitigations put in place.

13.2 Impact Assessment And Ranking Methodology

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.

For the purpose of assessing impacts of the proposed project has been divided into the following phases:

Table 13.9: Impact Phases

Construction Phase:	All the construction related activities on site, until the contractor leaves the site
Operational Phase:	All activities, including the operation and maintenance of the proposed development. Life of Mine is planned for 7 years.
Decommissioning & Mine Closure	Mine closure is the period of time when the ore-extracting activities of a mine have ceased and final decommissioning and mine reclamation is being completed.

13.2.1 Impact Rating Assessment Approach

The following methodology was used to rank these impacts. Clearly defined rating and rankings scales (Table 13.10 to Table 13.17) were used to assess the impacts associated with the proposed activities. The impacts identified by each specialist study and through public participation were combined into a single impact rating table for ease of assessment.

Each impact identified was rated according the expected magnitude, duration, scale and probability of the impact (Table 13.17).

To ensure uniformity, the assessment of potential impacts will be addressed in a standard manner so that a wide range of impacts is comparable. For this reason, a clearly defined rating scale will be provided to the specialist to assess the impacts associated with their investigation.

Each impact identified will be assessed in terms of scale (spatial scale), magnitude (severity) and duration (temporal scale). Consequence is then determined as follows:

Consequence = Severity + Spatial Scale + Duration

The Risk of the activity is then calculated based on frequency of the activity and impact, how easily it can be detected and whether the activity is governed by legislation. Thus:

Likelihood = Frequency of activity + frequency of impact + legal issues + detection

The risk is then based on the consequence and likelihood.

Risk = Consequence x likelihood

In order to assess each of these factors for each impact, the ranking scales in Table 13.10 – Table 13.17 were used.

Table 13.10: Severity.

Insignificant / non-harmful	1
Small / potentially harmful	2
Significant / slightly harmful	3
Great / harmful	4

Disastrous / extremely harmful / within a regulated sensitive area	5

Table 13.11: Spatial Scale - How big is the area that the aspect is impacting on?

Area specific (at impact site)	1
Whole site (entire surface right)	2
Local (within 5km)	3
Regional / neighbouring areas (5km to 50km)	4
National	5

Table 13.12: Duration.

One day to one month (immediate)	1
One month to one year (Short term)	2
One year to 10 years (medium term)	3
Life of the activity (long term)	4
Beyond life of the activity (permanent)	5

Table 13.13: Frequency of the activity - How often do you do the specific activity?

Annually or less	1
6 monthly	2
Monthly	3
Weekly	4
Daily	5

Table 13.14: Frequency of the incident/impact - How often does the activity impact on the environment?

Almost never / almost impossible / >20%	1
Very seldom / highly unlikely / >40%	2
Infrequent / unlikely / seldom / >60%	3
Often / regularly / likely / possible / >80%	4
Daily / highly likely / definitely / >100%	5

Table 13.15: Legal Issues - How is the activity governed by legislation?

No legislation	1
Fully covered by legislation	5

Table 13.16: Detection - How quickly/easily can the impacts/risks of the activity be detected on the environment, people and property?

Immediately	1
Without much effort	2
Need some effort	3

Remote and difficult to observe	4
Covered	5

Environmental effects will be rated as either of high, moderate or low significance on the basis provided in Table 13.17.

Table 13.17: Impact Ratings.

RATING	CLASS
1 – 55	(L) Low Risk
56 – 169	M) Moderate Risk
170 – 600	(H) High Risk

13.3 Advantages And Disadvantages Of Proposed Activity

Table 13.18: Advantages and Disadvantages regarding Mining Methods Alternatives

Description	Advantages	Disadvantages
Mining Method Alternatives		
Underground board-and-pillar.	• Smaller footprint associated with surface disturbance. • Alternative/current land uses can continue on areas not directly impacted by surface activities. • Reduced impact on dust, noise and air quality. • No blasting during operational phase. • Reduced rehabilitation costs.	• Not economically viable as large pillars will remain. • Risk of subsidence during operation. • Risk of subsidence post-closure. • Potential decrease in groundwater quantity and quality. • Potential decrease in groundwater interaction with wetland. • De-watering of the surrounding aquifer. • Potential AMD post mining and closure phase. • Potential undermining of aquifer. • Drawdown of water levels of privately owned boreholes. • Potential decrease in base flow to the streams and wetlands running through the MRA.
Opencast mining (preferred method)	• Additional employment opportunities. • Economically viable as more coal will be efficiently extracted. • Increased LOM – extended employment opportunities. • No subsidence risk during operation. • No subsidence risk post-closure.	• Greater surface area disturbance. • Change in land use required for all farm portions in the MRA. • Decrease in agricultural area/cultivated land. • Decrease in surface water runoff to catchment. • Potential decrease in surface and ground water quantity and quality. • Potential decrease in groundwater interaction with wetland. • Increased dust generation. • Increased blast and vibration impacts. • Increased noise from the use of construction and mining machinery on surface during operations. • Higher rehabilitation costs.

13.4 Possible Mitigation Measures For I&AP-Identified Impacts

The proposed mitigation measures or alterations that could be implemented specifically to address issues and concerns raised by I&APs are summarised below and discussed in terms of overall risks if these mitigation measures are implemented on site.

All mitigation measures included in the EMP have taken cognizance of any I&AP issues during the process.

13.5 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 and residential areas. The resource location and the presence of a watercourse on the site boundary further restrict the infrastructure layout. Therefore, no alternative sites were considered.

13.6 Statement Motivating The Alternative Development Location Within The Overall Site

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.

The most suitable layout presented in the EIA is based on specialist investigations, and the economic viability of the resource.

13.7 Detailed Assessment Of Each Identified Potentially Significant Impact And Risk

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
Groundwater impacts								
Decommissioning	Backfilling	Reshaping of area	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	M	M	M	Carbonaceous material at deeper base of pit. Rehabilitation to direct surface runoff away from pit and recharge to pit minimized. Flow paths including fracture zones sealed.	Refer to rehabilitation plan
Construction	Surface clearing and preparation	Removal of vegetation	Increase in surface run-off and therefore decrease in aquifer recharge	L	L	L	Re-vegetate	Rehabilitation plan
Construction	Box cut opening	Dewatering	Decrease in water level should the pit floor be lower than the water level	M	M	M	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.	Quarterly monitoring of monitoring boreholes. Compensate users should water levels decreases cause losses of groundwater availability.
Operation	Topsoil and overburden stockpiling	Leaching from stockpiles	Acid generation in the case of carbonaceous material placement.	M	M	M	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes
Operation	ROM stockpiling	Leaching from stockpiles	Acid generation as a result of carbonaceous material.	M	M	M	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes
Operation	Hydrocarbon spills	Plume migration	Spills from mining vehicles can infiltrate to the aquifer and cause a down gradient plume migration.	M	L	L	Clean any hydrocarbon spills in the appropriate manner.	Report any hydrocarbon spillage.
Operation	Pit dewatering	Dewatering	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level of up to 55 m.	H	H	H	No management can be incorporated to limit the impacts of dewatering.	Quarterly monitoring of monitoring boreholes. Compensate users should water levels decreases cause losses of groundwater availability.

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
Closure and decommissioning	Topsoil and overburden removal	Placement of topsoil and overburden into pit	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the exposure to oxygen and potential acid generation.	M	L	L	Remove the top soil and overburden dumps during rehabilitation. Placement of carbonaceous material at bottom of pit.	Rehabilitation Plan- placement of topsoil and overburden in pit.
Rehabilitation	Revegetation	Reshaping of area and revegetating the area	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	M	L	L	Remove the ROM stockpile. This will eliminate the ROM stockpile as a potential source.	Rehabilitation Plan
Residual	Pit dewatering	Backfilling of the pit and no more dewatering.	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	H	H	H	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (abstraction).	Abstracted/decant water to be treated or handled in appropriate manner and within legislation. Continue quarterly monitoring post-closure.
Fauna and Flora								
Operation	Roll Over Mining	Removal of surface growth	Loss of Indigenous Vegetation and Habitat	H	M	M	Avoid wetland areas and their associated buffer zones.	Implement a wetland sensitive mine layout. Demarcate wetland areas and boundaries
Construction	Surface clearing and preparation	Less available water	Habitat Loss/Fragmentation	M	L	M	Avoid wetland areas and their associated buffer zones.	Implement a wetland sensitive mine layout. Demarcate wetland areas and boundaries
Wetland Impacts								

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
Construction	Heavy machinery and vehicle movement	Compaction and removal of soils and vegetation	Physical degradation of Wetland 3	M	L	M	Prevent any unlawful access into the sensitive area. Restrict all movement to designated areas. Prevent harvesting from the wetland	Fence buffer zone area. Restrict workers movement
Construction	Surface clearing and preparation	Canalisation and erosion	Desiccation of certain areas in Wetland 2 and 3	M	M	M	Prevent sediment movement with runoff water. Prevent runoff from the construction area directly into the wetland. Prevent excessive dust formation. Prevent long term surface exposure.	Installation of silt traps. Properly designed storm water measures. Dust suppression practices. Re-vegetation and concurrent rehabilitation.
Construction and Operation	Infrastructure construction	Loss of natural riparian zone and changes in the population numbers and community dynamics	Increase in Alien Vegetation	M	L	L	Management of local vegetation communities and preventing destruction. Protect local vegetation populations and numbers and when replanting	Prevent introduction of new species by irresponsibly seeding and transporting and movement of soil from different areas. Revegetation with indigenous species. Implement Alien and invasive species eradication.
Construction and Operation	Surface clearing and preparation	Degradation and loss of plant coverage	More solar penetration within the different water zones, impacting on primary production and phytoplankton within the system	M	L	L	Constant monitoring of vegetation communities and quick response to problems detected	Constant rehabilitation and re-vegetation. No harvesting or use of products from wetland and vegetation occurring in the wetland
Construction	Surface clearing and preparation	Alterations which will result in riparian vegetation degradation	Loss of aquatic ecosystem services, decrease in wetland functioning	M	L	M	Prevent needless destruction and destructive practices during the construction phases	Control of movement of construction vehicles.
Construction and Operation	Hydrocarbon spills	Vehicles and waste material	Wetland degradation	M	L	M	Proper waste management and disposal at correct facilities. Manage waste correctly on-site and limit distribution and pollution potential	Have waste management plans in place and suitable contractors to remove waste on sites from designated points. Dispose and manage sewerage and domestic waste correctly and safely. Use simple but effective measures such as drip trays to prevent oil and petroleum spillage. Immediate/emergency response to spillages and spillage kits to be kept on-site at all times
Operation	Roll Over Mining	Prolonged impacts to the wetland habitat integrity due to	Decreased wetland function	H	M	M	Prevent any unlawful access into the sensitive area. Restrict all movement to designated	Fence buffer zone area. Restrict workers movement

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
		increased traffic and constant personnel at the mine and related infrastructure					areas. Prevent harvesting from the wetland	
Operation	Roll Over Mining	Changes in water flow amounts in the Grootspruit/Zaalklap river system and possible operational water discharges from the Weltevreden Coal Mine	Accelerated erosion and changes in sediment entering the Grootspruit wetland	M	M	M	Properly designed storm water management and culverts. Properly designed storm water measures to prevent runoff from the construction area directly into the wetland	Installation of silt traps at designated areas to prevent sediment movement with runoff water. Erosion control measures at the construction sites and areas of exposed soil Re-vegetation and concurrent rehabilitation to protect exposed surfaces
Operation	Roll Over Mining	chemical and hydrocarbon spills and AMD	Pollution and degradation of wetland	H	M	M	Ensure AMD management and pollution prevention	Restrict all movement to designated areas. Implement concurrent rehabilitation. Use of synthetic liners and leachate collection systems at all PCD's. Extensive monitoring systems and groundwater monitoring
Operation	Roll Over Mining	Fluctuations in water chemistry, toxicity of water, microbial growth and algal blooms, sedimentation of wetland vegetation habitats	Loss of species diversity and wetland functioning	M	L	M	Proper waste management and disposal at correct facilities	Manage waste correctly on-site and limit distribution and pollution potential. Dispose and manage sewerage and domestic waste correctly and safely via approved contractors. Dispose of coal related residue correctly and do not let it enter the natural environment on site. Use simple but effective measures such as drip trays to prevent oil and petroleum spillage. Immediate/emergency response to spillages and spillage kits to be kept on-site
Closure and decommissioning	Infrastructure removal	Further disturbance to the area	Increase in Alien Vegetation	M	L	L	Management of local vegetation communities and preventing destruction. Protect local vegetation populations and numbers and when replanting	Prevent introduction of new species by irresponsibly seeding and transporting and movement of soil from different areas. Revegetation with indigenous species. Implement Alien and invasive species eradication.
Closure and decommissioning	Revegetation	Soil Compaction	Physical degradation of Wetland	M	L	L	Prevent any unlawful access into the sensitive area. Restrict all movement to designated areas.	Fence buffer zone area. Restrict heavy machinery movement implement soil amelioration activities. Implement rehabilitation plan
Noise								

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
Construction	Surface clearing and preparation	Noise increase at the boundary of the mine footprint and at the abutting residential Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	L	L	M	Cleaning and grubbing of the plant footprint and other areas to be done during daytime working hours unless there is no heavy duty machinery which may create a noise problem.	N/A
Construction	Infrastructure construction	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	L	L	M	Construction of the infra-structure activities to be done during daytime working hours unless there is no heavy duty machinery which may create a noise problem.	N/A
Construction	Topsoil and overburden stockpiling	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	L	L	M	Construction of the Dumps Hard/Softs to be done during daytime working hours unless there is no heavy duty machinery which may create a noise problem.	N/A
Operation	Crushing and Screening of Coal	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	M	M	M	All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off	Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the footprint boundaries are in line with the 70.0dBA threshold value.
Operation	Roll Over Mining	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	M	M	M	All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off.	Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the footprint boundaries are in line with the 70.0dBA threshold value.
Operation	Hauling of material	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	M	M	M	All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off.	Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the footprint boundaries are in line with the 70.0dBA threshold value.
Operation	Heavy machinery and vehicle movement	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	M	M	M	Road surfaces to be maintained in a good order without any pot holes	Speed limit of 40km/h to be adhered to at all times; road maintenance plan
Operation	Generators	Noise increase at the boundary of the mine	Noise disturbance	M	M	M	Generator to be situated in an area away from any residential areas and the	Generator placement in a generator building with adequate mufflers.

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
		footprint and at the abutting residential					noise from the generator not to be audible at the residential areas.	
Closure and decommissioning	Infrastructure removal	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	L	L	L	Removal of infra-structure to be done during daytime only	N/A
Rehabilitation	Area preparation, shaping and topsoil placement	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	L	L	L	Removal of infra-structure to be done during daytime only	N/A
Rehabilitation	Revegetation	Noise increase at the boundary of the mine footprint and at the abutting residential	Noise disturbance	L	L	L	Planting of grass and vegetation to be done during daytime only.	N/A
Soils								
Construction	Surface clearing and preparation	Removal of vegetation	Exposure of soil surface to erosion	H	M	H	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion	Implement Soil Management Plan (SMP) and monitor site for signs of erosion
Construction	Heavy machinery and vehicle movement	Vehicles and equipment traversing over soil surface, especially when soil is wet	Soil compaction and reduced water infiltration capacity	M	M	H	Restrict vehicle and equipment movement to surface footprint	Use deep ripping before vegetation establishment (rehabilitation) to alleviate compaction. Avoid vehicle and equipment moving outside of the demarcated footprint areas
Construction	Topsoil and overburden removal	Stripping of topsoil and overburden to access coal resources	Destruction of in situ soil profiles	M	M	H	Only remove topsoil where necessary and don't mix topsoil layers with overburden	Follow SMP and keep footprint as small as possible
Construction	Topsoil and overburden stockpiling	Stockpiling of topsoil	Destruction of soil nutrient cycles and hydropedological functioning	M	M	H	Re-establish vegetation on topsoil stockpiles and maintain vegetation cover until soil is used for rehabilitation	Manage stockpiles according to SMP
Construction	Hydrocarbon spills	Movement of vehicles and equipment on site	Soil chemical pollution	M	M	M	Regularly check vehicles and equipment for possible oil and fuel leaks	Follow SMP and conduct regular soil quality audits
Construction	Infrastructure	Establishment of infrastructure required for mining	Destruction of arable and grazing land capability	H	H	H	No mitigation possible	Establish agricultural projects with in the larger mining right area

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
	construction							
Operation	Heavy machinery and vehicle movement	Vehicles and equipment traversing over soil surface, especially when soil is wet	Soil compaction and reduced water infiltration capacity	M	M	H	Restrict vehicle and equipment movement to surface footprint	Use deep ripping before vegetation establishment (rehabilitation) to alleviate compaction. Avoid vehicle and equipment moving outside of the demarcated footprint areas
Operation	Hydrocarbon spills	Movement of vehicles and equipment on site	Soil chemical pollution	M	M	M	Regularly check vehicles and equipment for possible oil and fuel leaks	Follow SMP and conduct regular soil quality audits
Closure and decommissioning	Heavy machinery and vehicle movement	Movement of vehicles and equipment on site	Soil chemical pollution	M	M	M	Regularly check vehicles and equipment for possible oil and fuel leaks	Follow SMP and conduct regular soil quality audits
Rehabilitation	Area preparation, shaping and topsoil placement	Revegetation of mined areas	Soil compaction and reduced water infiltration capacity	M	M	M	Restrict vehicle and equipment movement to the areas that are revegetated	Use deep ripping before vegetation establishment (rehabilitation) to alleviate compaction. Avoid vehicle and equipment moving outside of the rehabilitation areas
Air Quality								
Construction	Surface clearing and preparation	Dust generation	Fugitive dust (containing TSP (total suspended particulate, will give rise to nuisance impacts as fallout dust), as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts	M	M	M	Dampen soil being moved to reduce dust. Avoid blasting during windy conditions. Hauling to take place on roads with dust suppression Cover load bins with tarpauling keep exposed soil surfaces to a minimum	Topsoil should not be removed during windy months (August to January). Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur. Topsoil should be re-vegetated to reduce exposure areas. During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as can be used for dust suppression Minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, - Successful trialing of broad acre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop Constricting the areas and time of exposure of pre-strip clearing
Construction	Infrastructure construction	Dust generation	fugitive dust emissions containing TSP (total suspended particulate, giving rise	M	M	M	Dampen soil being moved to reduce dust. Avoid blasting during windy conditions. Hauling to take place on roads with dust suppression	Topsoil should not be removed during windy months (August to January). Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur. Topsoil should be re-vegetated to reduce exposure areas.

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
			to nuisance impacts as fallout dust)				Cover load bins with tarpauling keep exposed soil surfaces to a minimum	During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as can be used for dust suppression Minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, - Successful trialing of broad acre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop Constricting the areas and time of exposure of pre-strip clearing
Construction	Heavy machinery and vehicle movement	Dust generation	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	M	M	M	Minimise dust entrainment on roads Minimise dust blown from load bins Prevent soil erosion on stockpiles	Dust suppression on roads. Install speed bumps. Cover load bins with tarpaulin. Implement a speed limit.
Closure and decommissioning	Infrastructure removal	Transportation of infrastructure and structures off site, and breaking	fugitive dust emissions	M	M	M	Minimise increased dust	Demolition should not be performed during windy periods Speed restrictions should be imposed and enforced. Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. Exhaust pipes of vehicles should be directed upwards. Engine cooling fans of vehicles should be shrouded. Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. Dust suppression of roads.
Rehabilitation	Area preparation, shaping and topsoil placement	Dust generation	fugitive dust emissions	M	M	M	Prevent long periods of bare soil. Prevent dust emissions	Revegetation of exposed areas. Plants with roots that bind the soil, and vegetation cover should be used. Spreading of soil must be performed on less windy days. Apply dust suppression. Speed restrictions should be imposed and enforced.
Visual Assessment								
Construction	Infrastructure construction	visual exposure	Change in sense of place	M	L	M	Minimise the visual exposure and change in sense of place	Create visual barriers.
Cumulative	Roll Over Mining	increased amount of vehicles, and mining infrastructure.	Change in sense of place	M	M	M	Minimise the visual exposure and change in sense of place	Create visual barriers.
Heritage								

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
Cumulative	Box cut opening	Excavation	Destruction of potential subsurface remains at POI 1	L	L	L	none	None - sufficient recording
Cumulative	Box cut opening	Excavation	Destruction of potential subsurface remains at POI 2	M	M	M	Limit destruction of potential heritage material	Monitor during surface clearance/excavation
Cumulative	Blasting	Blasting	Destruction of potential subsurface remains at POI 3	M	M	M	Prevent destruction of features	Monitoring/repairing of structures
Blasting								
Construction	Blasting	Opencast Mining	Ground Vibrations	M	M	M	Limit ground vibrations to an acceptable value with a proper blast design, measure and record, evaluate and improve.	Blast Designs and Codes of Practice
Construction	Blasting	Opencast Mining	Air blasts	M	M	M	Limit the decibels to an acceptable value with a proper blast design, measure and record, evaluate and improve.	Blast Designs and Codes of Practice
Aquatics								
Construction	Surface clearing and preparation	Removal of water sources	Water Quantity and Loss Of Water/Flow	M	L	M	Topsoil should be placed to avoid erosion and runoff. Attenuation of Stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP Do not allow surface water or Stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible
Construction	Surface clearing and preparation	Less available water	Habitat Loss/Fragmentation	M	L	M	Avoid wetland areas and their associated buffer zones.	Implement a wetland sensitive mine layout. Demarcate wetland areas and boundaries
Construction	Surface clearing and preparation	Wash-down of sediment and soil	Sedimentation and Erosion	H	M	M	Topsoil should be placed to avoid erosion and runoff. Attenuation of Stormwater to control the velocity	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP
Construction	Surface clearing and preparation	Spills and sedimentation	Water quality deterioration	H	M	M	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
								Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas; Surface water management plan. Biomonitoring plan
Operation	Topsoil and overburden stockpiling	Wash-down from stockpiles, spills and leaks	Sedimentation and Erosion. Water quality deterioration	H	M	M	Topsoil should be placed to avoid erosion and runoff. Attenuation of Stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP Do not allow surface water or Stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible
Operation	Roll Over Mining	Removal of surface growth	Loss of Indigenous Vegetation and Habitat	H	M	M	Avoid wetland areas and their associated buffer zones.	Implement a wetland sensitive mine layout. Demarcate wetland areas and boundaries
Hydrology								
Construction and Operation	Roll Over Mining	Reduction in catchment size	Reduced Peak Runoff and Discharge volumes	M	M	M	No Mitigation proposed	No Actions proposed
Construction and Operation	Topsoil and overburden stockpiling	Sediment Runoff	Increased Sediment Yield	M	L	L	Separate clean and dirty water areas; Avoid excessive dust fallout	Pollution control dams should be constructed to contain surface water runoff from all dirty areas; Dust mitigation should be implemented in accordance with the air quality impact assessment forming part of this EIA; The quality of runoff in watercourses should be monitored on a monthly basis
Construction and Operation	Hydrocarbon spills	Inadequate Stormwater Management	Water Quality Deterioration	M	L	L	A thorough, regular inspection and maintenance regime should be implemented by the operator of the proposed conservancy tank system. Implement clean and dirty water separation	Manholes and underground pipes inspected and cleaned every six months. An emergency response unit should be established to undertake urgent maintenance and repair work after hours; It is imperative that surface water runoff from the dirty areas (e.g. process plant, waste rock stockpiles, tailings dam) be captured and wherever possible, reused in the mining process; Dirty runoff should be directed towards pollution control dams. All areas where hydrocarbons, such as oils and petroleum fuels are

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
								handled (i.e. workshops should be bunded and strictly controlled. The quality of runoff in watercourses should be monitored on a monthly basis
Social								
Construction	Infrastructure construction	Employment of contractors for construction	Job creation (Positive Impact)	M	H	H	Establish targets for the employment and training; Adopt recruitment strategies that ensure local people are given employment preference; Effective implementation of training and skills development initiatives; The recruitment process has to be transparent and equitable; Prevent nepotism/corruption in local recruitment structures; Promote employment of women and youth;	Train workforce for longer term employment; Maximise and monitor local recruitment; Consult local labour recruitment offices; Women must be provided with access to types of work traditionally seen as male; Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force. Training of workforce for employment on other mines after mine closure; Unskilled workers are recruited from the local villages and should be developed (up-skilled) during operations.
Operation	Roll Over Mining	Active Mining Operation	Job creation (Positive Impact)	M	H	H	Establish targets for the employment and training; Adopt recruitment strategies that ensure local people are given employment preference; Effective implementation of training and skills development initiatives; The recruitment process has to be transparent and equitable; Prevent nepotism/corruption in local recruitment structures; Promote employment of women and youth;	Train workforce for longer term employment; Maximise and monitor local recruitment; Consult local labour recruitment offices; Women must be provided with access to types of work traditionally seen as male; Formulate a labour recruitment strategy that would minimise impact on other sectors (e.g. do not recruit unskilled labour at wage levels above the wages paid in the agricultural sector); and Establish a liaison point with the adjacent farming community to monitor the impact on their local labour force. Training of workforce for employment on other mines after mine closure; Unskilled workers are recruited from the local villages and should be developed (up-skilled) during operations.
Construction and Operation	Roll Over Mining	Establishment and operation of the mine	Increased Economic input (Positive Impact)	M	H	H	Linkages with skills development/ Small, Medium and Micro Enterprises (SMME) development institutions and other mining operations; Preference should be given to capable subcontractors who based within the	Development of a register of local SMMEs; SMME skills development as part of mine SLP/LED commitments

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
							local municipal area; Monitoring of sub-contractors procurement; Local procurement targets should be formalised in Opsirex's procurement policy.	
Construction and Operation	Roll Over Mining	LED Projects	Community Development and Social Upliftment (Positive Impact)	L	H	H	Ensure that there is stakeholder buy-in; Collaboration with other developmental role players (e.g. local and district municipalities, neighbouring mines and NGOs) during implementation of envisaged projects, and where possible aligning envisaged development projects with existing ones;	Liaison with beneficiaries to ensure needs are met; Expanding its skills development and capacity building programmes for non-employees; Monitoring system to regulate Historically Disadvantaged South African procurement; A record of training courses completed per individual should be kept.
Construction and Operation	Infrastructure construction	Influx of jobseekers	Health and Safety concern	M	M	M	The Applicant to incorporate as part of their risk management plan an in-migration management strategy that is prepared in collaboration with ELM; Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce and influx of people; Safety at and around the site should be ensured by limiting any fire risks, fencing off the site to avoid unauthorised access and employing security personnel; Notification of blasting schedules; Traffic calming measures to prevent speeding	Early Communications outlining opportunities and benefits associated with the proposed mine; Opsirex should discuss the safety and security issues, as well as construction schedule with the local community leaders and local police service. The mining area should be fenced and access to the area should be controlled to avoid animals or people entering the area without authorisation. Workers should make use of protective clothing and equipment that would effectively prevent bodily injuries. Workers should make use of formal approved access roads when travelling to work; The security must ensure that open fires on the site for heating, smoking or cooking are only allowed in designated areas; The security must be provided with adequate firefighting equipment on site and be provided with firefighting training; Blasting and storage of hazardous materials to adhere to prescribed regulation; build speed humps and set a prescribed speed limit.
Construction and Operation	Roll Over Mining	Fencing around mine site	Restriction of movement	M	M	M	Where possible ensure that access to fields and grazing areas are uninterrupted;	Provide alternative access routes and/or temporary access points during construction activities; Wildebeestfontein Coal Mine should ensure that residents are kept

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
							Measures to prevent deterioration of roads; Ensure that access to key services are uninterrupted	informed on a day-to-day basis of construction progress and of when access will be blocked; drivers to report road deterioration to the NW Province Department of Transport;
Construction and Operation	Roll Over Mining	Change from agriculture to mining land use	Loss of and/or Damage to Agricultural Land and Infrastructure	H	M	M	Ensure that the project design and associated layout seeks to minimise the project footprint, thus minimising the loss of agricultural land; engage with each directly affected landowner	Should Wildebeestfontein Coal Mine acquire the full farm and the project footprint only affects a portion of the land, the surrounding usable land should be utilised for agricultural purposes; Where damage is incurred, suitable compensation must be negotiated with the affected farmer; Prepare a site Rehabilitation Plan that will be implemented as part of the decommissioning phase
Construction and Operation	Roll Over Mining	Resettlement	Physical and Economical Displacement	H	M	M	A suitable Resettlement Action Plan must be drafted to minimise the adverse effects of displacement	Inform affected people of their options and rights concerning resettlement. A clear and coherent information and sensitisation campaign is a crucial component of the resettlement process; Provide technically and economically feasible options for resettlement based on consultation with affected people and assessment of resettlement alternatives; Whether physical relocation is required or not, provide affected people with prompt and effective compensation at full replacement value for loss of assets due to project activities; Where physical relocation is necessary, provide assistance with relocation expenses (moving allowances, transportation, special assistance and health care for vulnerable groups); Where physical relocation is necessary, provide temporary housing, permanent housing sites, and resources (in cash or in kind) for the construction of permanent housing, inclusive of all fees, taxes, customary tributes, and utility hook-up charges, or as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors are at least equivalent to the advantages of the old site; Provide affected people with transitional financial support (such as short-term employment, subsistence support, or salary maintenance);

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
								Where necessary, provide affected people with development assistance in addition to compensation for lost assets described above such as land preparation, agricultural inputs, and credit facilities and for training and employment opportunities; The payment of compensation should be monitored and verified by representatives of Opsirex as well as representatives of the affected communities; and Opsirex should establish a method for delivering compensation (either cash payments or in-kind allocations, as in the case of land-for-land compensation). Suitable mitigation measures should be defined that protect the surface dwellers and ensure that they are adequately provided for and supported should they be moved or lose their employment. Implement a Grievance Mechanism to ensure ongoing, proactive engagement and effective management of grievances.
Construction and Operation	Roll Over Mining	Increased pressure on municipal services	Poor / Failed service delivery for increasing population	H	M	M	To limit, as far as reasonably possible, additional pressure on existing infrastructure and services; To work in partnership with government, industry, and relevant organisations to enhance the existing infrastructure and services; To liaise openly and frequently with affected stakeholders to ensure they have information about the proposed Wildebeestfontein Mining Project;	Liaison with district and local municipalities well in advance to ensure needs are met; Ensure that municipalities take into account expected population influx; Promotion of mining methods to allow for surface development Influx management to make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders.
Construction and Operation	Roll Over Mining	Influx of workers and job seekers	Increased social pathologies	H	M	M	Limit, as far as reasonably possible, social ills caused by influx of workers and job-seekers; Discourage influx of job-seekers by prioritising employment of unemployed members of local communities; Implement measures to address potential conflict between locals and non-locals.	Provision of sufficient entertainment facilities in construction camps Control of access to construction camp; Cease construction activities before nightfall, if possible; Liaison with police, community policing forum and security stakeholders; Housing of construction workers in a construction camp site Maximisation of the proportion of job opportunities allocated to locals; Demolishing construction camp after construction activities have finished, or donating the construction camp to one of the local municipalities; Construction workers should be clearly identifiable by wearing proper

Impact description				Significance before mitigation	Significance after mitigation	Risk after prioritisation / Cumulative Impact	Mitigation measures	Action plan/management action
Phases	**Activity**	**Aspect**	**Impact**					
								construction uniforms; The appointed contractor should establish clear rules and regulations for access to the construction site and offices to control loitering. Consultation should occur with the local police branch to establish standard operating procedures for the control and/ or removal of loiterers. Extensive HIV/AIDS awareness and general health campaign; Liaise with ELM, and the Mahlangu family CPA to ensure that expected population influx is taken into account in infrastructure development and spatial development planning; Create synergies with local government IDP and other companies' SLP/CSR projects to promote infrastructure development.
Construction and Operation	Roll Over Mining	Increased Nuisance Factors	Changed Sense of Place	M	L	M	Minimise all nuisance factors such as noise, air quality, traffic, and visual;	Implement all mitigation measures as specified in the relevant specialist studies; Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders; Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors.
Closure and decommissioning	Infrastructure removal	Job losses	Dependency on mine for sustaining local Economy	H	M	M	Effect retrenchments according to procedures stipulated in approved SLP; The Mine's SLP should provide strategies and measures that prevent job loss; Support economic diversification through development of alternative markets;	Develop a Mine Closure Plan; Proactively and effectively implement mine closure plan; Collaborate with adjacent mining companies to develop and implement sustainable community; Develop alternative and sustainable livelihoods; Alternatives to save jobs/avoid downscaling should be investigated beforehand;

13.8 Summary Specific Specialist Recommendations

Following is a summary of recommendation specifically highlighted by certain specialists. Take note that not all specialists gave specific recommendations and recommendations for these studies are included in the mitigation measures.

13.8.1 Groundwater

- Operational phase:
  - Groundwater levels in the monitoring boreholes should be measured on at least a quarterly interval.
  - Should the water levels of surrounding users be influenced in terms of groundwater level or quality decline, the users should be compensated.
  - Monitor groundwater inflow rates on a monthly basis throughout the mining operation.
  - The groundwater quality in the monitoring boreholes should be analysed on a quarterly basis.
  - Annual reporting on the groundwater qualities and levels should be conducted and submitted to the DWA.
  - The numerical model should be updated once more time-series monitoring data (water levels and qualities) are available.
- Post-closure phase:
  - Groundwater flow to the streams in close proximity to the pits will occur if the hydraulic head within the pits is higher than the stream bed elevation. It is proposed that the heads in the final pit voids be kept lower than that of the river with the aid of dewatering.
  - Carbonaceous material should be placed at the base of the opencast pits to allow flooding with groundwater as soon as possible. This will reduce the redox reaction potential as oxygen is excluded from the system.
  - Rehabilitation should occur in such a manner that surface runoff is directed away from the rehabilitated pit and recharge to the pit minimized.
  - Flow paths which include fracture zones should be sealed to reduce inflow of fresh groundwater and outflow of contaminated groundwater.
  - Methods of handling the potential decant should be investigated and may include treatment of polluted water.
  - The groundwater quality in the monitoring boreholes should continue to be analysed on a quarterly interval basis.
  - boreholes should continue to be analysed on a quarterly interval basis.

13.8.2 Aquatics

The following recommendations and management actions should be taken in consideration for Weltevreden Colliery:

- It is recommended that bio-monitoring be done on a bi-annual basis to ensure more accurate results for season variability between dry and wet season conditions. Surface water monitoring and bio-monitoring should continue once the mining operations have started. This could successfully relate any potential direct impacts from Weltevreden Colliery on the water quality as well as the aquatic macro invertebrates.
- It is important to establish a baseline database which contains the monitoring and bio-monitoring data from the current and future assessments. This will allow to track any sudden or gradual changes in habitat conditions or water quality. This would help in identifying any potential external sources impacting the water quality and habitat conditions as well as direct impacts from the mine. The data basis will assist in providing long term trends in changes in environmental conditions.
- Determining the extent and duration of the mining activities it could beneficially assist to apply for a Water Use Licence once long term databases has been established for surface water. This would also ensure compliance regarding Governmental Environmental Legislations and would also assist the current environmental conditions on a more sustainable manor.
- During the bio-monitoring assessment it was determined that the Health class of the catchment and its associated tributaries was a class B/C this is to an extent more improved than the Health Class that is currently set for the catchment. It is thus of utmost importance that all activities aim to improve or maintain the PES to at least a class C once the mining activities have started within the area.

13.8.3 Wetland

The following recommendations are made in terms of the Grootspruit water resource and associated wetland cluster:

- All mitigation measures that was provided within the report should be implemented as stipulated in the EMP;
- Rehabilitation programme should include Wetland two (2), Wetland three (3), Wetland four (4) and Wetland five (5);
- Fragmentation of the landscape be avoided/limited at all costs during all phases of development on the Weltevreden farm;
- The rehabilitation programmes be implemented after the necessary authorisation is obtained;
- Key Performance Indicators (KPIs) should be incorporated into the EMP to ensure the Wetland integrity stays intact and the condition does not deteriorate due to long-term activity during the Operational phase of the proposed mining activities. This will mostly consist of monitoring results and visual inspections aiming to recognize new sedimentation areas and erosion points. Early identification is prudent;
- Storm water management should be civil designed and efficient with the main objective to prevent untreated storm water from entering the Grootspruit system;
- Shortly, the following broadly defined measures are recommended to prevent almost all impacts identified:
    - Access control and management to protect riparian vegetation zone and soils;
    - Erosion prevention and dust suppression measures (especially during the construction period);
    - Vehicle restriction and clear demarcated roads to prevent substrate changes and trampling;
    - Spill management and prevention (especially Carbon related and Hydro-carbon spills);
    - Early identification of problems and emergency response;
    - Alien vegetation control (especially in the riparian zone and during construction);
    - Concurrent rehabilitation of all wetlands impacted upon and possible rehabilitation of downstream wetland system (Wetland 1: Grootspruit confluence wetland); and
    - Off-set strategy should be designed in accordance to specialist recommendations.

13.8.4 Blasting

Once mining commences a proper operational blast design and code of practice must be compiled, implemented, monitored, evaluated and improved. Consultation with Highveld steel also has to be undertaken before blasting commences.

13.8.5 Heritage and Archaeology

The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the area demarcated for development:

- No materials of heritage importance were observed at POI 1. No further action is required.
- The recording of the angular depression at POI 2 is regarded as sufficient. Therefore, no further action is required. However, care must be exercised during construction and development phases in order to ensure the safeguarding of potential subsurface heritage resources.
- The settlement at POI 3 is of modern origin. From a heritage perspective, no further action is required.
- Although disturbed, the areas associated with structures visible on the 1943 aerial image date to historical times. Care must therefore be exercised during construction and development phases in order to ensure the safeguarding of potential subsurface heritage resources.
- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).
- Should the need arise to expand the proposed development beyond the surveyed area mentioned in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated area that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites.

13.8.6 Noise

Activity	Recommendations
Construction phase	• Equipment and/or machinery which will be used must comply with the manufacturer's specifications on acceptable noise levels and any noise sources above 85.0dBA to be acoustically screened off. • Construction activities to take place during daytime period only. • Environmental noise monitoring on a quarterly basis.
Operational phase	• Equipment and/or machinery which radiate noise levels between 85.0dBA and 90.0dBA to be acoustically screened off. • Emergency generators to be placed in such a manner that it is away from any residential area. • Noise monitoring to be carried out along the footprint boundaries at the opencast pit, crushers and screening, along haul roads, pit activities and at the rim of the open cast pit; • Noise monitoring at the residential areas and the mine boundaries to be done on a quarterly basis for a year after which the frequency can change to an annual basis; • Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the baseline noise levels.
Decommissioning phase	• Machinery with low noise levels which complies with the manufacturer's specifications to be used; and • Activities to take place during daytime period only.

14. ENVIRONMENTAL IMPACT STATEMENT

14.1 The Key Findings Of The Environmental Impact Assessment And Positive And Negative Impacts Identified

The impacts that have been rated as medium or high risk after prioritisation must be carefully managed throughout the LOM in order to ensure the project is sustainable from an economic, social and environmental point of view. The project will stimulate the local economy and contribute to the national GDP, which in the current economic climate, is a positive impact. The negative impact on natural resources (groundwater, surface water, air quality and soils) can however not be avoided, but only managed and mitigated to a certain extent. It is therefore of utmost importance that monitoring is undertaken as stipulated within the EMP.

Table 14.1: Negative Impacts of Medium to High Risk

Impact description			
Phases	**Impact**	**Significance after mitigation**	**Risk after prioritisation / Cumulative Impact**
Groundwater impacts			
Decommissioning	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	M	M
Construction	Decrease in water level should the pit floor be lower than the water level	M	M
Operation	Acid generation in the case of carbonaceous material placement.	M	M
Operation	Acid generation as a result of carbonaceous material.	M	M
Operation	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level of up to 55 m.	H	H
Residual	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur once the water level has recovered to the decanting elevation.	H	H
Fauna and Flora			
Operation	Loss of Indigenous Vegetation and Habitat	M	M
Construction	Habitat Loss/Fragmentation	L	M
Wetland Impacts			
Construction	Physical degradation of Wetland 3	L	M
Construction	Desiccation of certain areas in Wetland 2 and 3	M	M
Construction	Loss of aquatic ecosystem services, decrease in wetland functioning	L	M
Construction and Operation	Wetland degradation	L	M
Operation	Decreased wetland function	M	M
Operation	Accelerated erosion and changes in sediment entering the Grootspruit wetland	M	M
Operation	Pollution and degradation of wetland	M	M
Operation	Loss of species diversity and wetland functioning	L	M
Noise			
Construction	Noise disturbance	L	M
Soils			
Construction	Exposure of soil surface to erosion	M	H
Construction	Soil compaction and reduced water infiltration capacity	M	H
Construction	Destruction of in situ soil profiles	M	H
Construction	Destruction of soil nutrient cycles and hydropedological functioning	M	H
Construction	Soil chemical pollution	M	M
Construction	Destruction of arable and grazing land capability	H	H
Operation	Soil compaction and reduced water infiltration capacity	M	H
Operation	Soil chemical pollution	M	M
Closure and decommissioning	Soil chemical pollution	M	M
Rehabilitation	Soil compaction and reduced water infiltration capacity	M	M
Air Quality			
Construction	Fugitive dust (containing TSP (total suspended particulate, will give rise to nuisance impacts as fallout dust), as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts	M	M
Construction	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	M	M
Construction	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	M	M

Impact description			
Phases	**Impact**	**Significance after mitigation**	**Risk after prioritisation / Cumulative Impact**
Closure and decommissioning	fugitive dust emissions	M	M
Rehabilitation	fugitive dust emissions	M	M
Visual Assessment			
Construction	Change in sense of place	L	M
Cumulative	Change in sense of place	M	M
Heritage			
Cumulative	Destruction of potential subsurface remains at POI 2	M	M
Cumulative	Destruction of potential subsurface remains at POI 3	M	M
Blasting			
Construction	Ground Vibrations	M	M
Construction	Air blasts	M	M
Aquatics			
Construction	Water Quantity and Loss Of Water/Flow	L	M
Construction	Habitat Loss/Fragmentation	L	M
Construction	Sedimentation and Erosion	M	M
Construction	Water quality deterioration	M	M
Operation	Sedimentation and Erosion. Water quality deterioration	M	M
Operation	Loss of Indigenous Vegetation and Habitat	M	M
Hydrology			
Construction and Operation	Reduced Peak Runoff and Discharge volumes	M	M
Social			
Construction and Operation	Health and Safety concern	M	M
Construction and Operation	Restriction of movement	M	M
Construction and Operation	Loss of and/or Damage to Agricultural Land and Infrastructure	M	M
Construction and Operation	Physical and Economical Displacement	M	M
Construction and Operation	Poor / Failed service delivery for increasing population	M	M
Construction and Operation	Increased social pathologies	M	M
Construction and Operation	Changed Sense of Place	L	M
Closure and decommissioning	Dependency on mine for sustaining local Economy	M	M

14.2 Final Site Map

Refer to Appendix 4 for final site layouts (overlain with the sensitivity layer).

14.3 Summary Of Risks Of The Proposed Activity And Identified Alternatives

Description	Advantages	Disadvantages
Mining Method Alternatives		
Underground board-and-pillar.	• Smaller footprint associated with surface disturbance. • Alternative/current land uses can continue on areas not directly impacted by surface activities. • Reduced impact on dust, noise and air quality. • No blasting during operational phase. • Reduced rehabilitation costs.	• Not economically viable as large pillars will remain. • Risk of subsidence during operation. • Risk of subsidence post-closure. • Potential decrease in groundwater quantity and quality. • Potential decrease in groundwater interaction with wetland. • De-watering of the surrounding aquifer. • Potential AMD post mining and closure phase. • Potential undermining of aquifer. • Drawdown of water levels of privately owned boreholes. • Potential decrease in base flow to the streams and wetlands running through the MRA.

Description	Advantages	Disadvantages
Mining Method Alternatives		
Opencast mining (preferred method)	• Additional employment opportunities. • Economically viable as more coal will be efficiently extracted. • Increased LOM – extended employment opportunities. • No subsidence risk during operation. • No subsidence risk post-closure.	• Greater surface area disturbance. • Change in land use required for all farm portions in the MRA. • Decrease in agricultural area/cultivated land. • Decrease in surface water runoff to catchment. • Potential decrease in surface and ground water quantity and quality. • Potential decrease in groundwater interaction with wetland. • Increased dust generation. • Increased blast and vibration impacts. • Increased noise from the use of construction and mining machinery on surface during operations. • Higher rehabilitation costs.

15. IMPACT MANAGEMENT OBJECTIVES AND IMPACT MANAGEMENT OUTCOMES

The objectives of impact mitigation and management are to:

- Primarily pre-empt impacts, assess their significance and implement appropriate mitigation and management measures to either avoid, minimise and/or remediate the associated impacts where they cannot completely be avoided.
- Implement an adequate monitoring programme to:
    - Ensure that mitigation and management measure are effective.
    - Allow quick detection of potential impacts, which in turn will allow for quick response to issue/impacts.
    - Reduce duration of any potential negative impacts.

16. ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

16.1 CONDITIONS TO BE INCLUDED IN THE AUTHORISATION

- Adhere to all recommendation and management measures contained in the EMP.
- All relevant permits and authorisation must be obtained prior to construction commencing.
- Adhere to all monitoring requirements.
- A water use license must be obtained prior to any water uses undertaken on site.
- Methods of handling the potential decant should be investigated, approved and set in place prior to mine closure.
- All acoustic screening measures must be in place before commissioning the mining activities.
- No off-road driving, hunting, poaching, or fires should be permitted on the property.
- An Alien Invasive eradication plan should be compiled, approved and implemented.
- Once mining commences a proper operational blast design and code of practice must be compiled, implemented, monitored, evaluated and improved.
- Should the need arise to expand the proposed development beyond the surveyed area mentioned in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated area that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites.

16.2 REHABILITATION REQUIREMENTS

Rehabilitation of the project will aim to:

- Create a safe, physically stable rehabilitated landscape that limits long-term erosion potential and environmental degradation;
- Sustain the long term catchment water yield and ensure suitable water quality;
- Rehabilitation of the surface infrastructure where necessary to minimize infiltration into the underground water regime (the philosophy of concentration and containment);
- Rehabilitation to minimise contamination of surface water resources (the philosophy of dilution and dispersion);
- Focus on establishing a functional post-mining landscape that would ensure self-sustaining agricultural practices post mine closure where possible;
- Ensure interconnectivity between the rehabilitated landscapes with surrounding regionally biologically diverse areas;
- Encourage, if and where required, the re-instatement of terrestrial and aquatic wetland biodiversity over time; and
- Create opportunities for alternative post-mining livelihoods by aligning to the regional planning;
- Meet with prevailing environmental legal requirements outlined in this report; and
- Prevent / Minimise negative impacts and risks as identified in this report.

17. DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

17.1 Fauna and Flora

The narrow temporal scale of sampling (i.e. one full day) is the major limiting factor of the study. This study therefore cannot account for seasonal variation in presence of species. As the survey was conducted during the day, nocturnal species were not observed. Due to these constraints a cautious approach was taken and species of concern were identified in the QDG, and proxies of presence were actively searched for. Therefore, observed species list should be critically evaluated.

The desktop study was conducted with up to date resources and the site visit was conducted as thoroughly as possible. It might however be possible that additional information becomes available in time, as this type of study deals with dynamic natural ecosystems. It is therefore important that the report be viewed and acted upon with these limitations in mind. MENCO cannot be held responsible for conclusions and pro-active mitigation measures that are made in good faith based on the available resources and information provided at the time of the study.

17.2 Wetland

Whilst every care is taken to ensure that the data presented are qualitatively adequate, inevitably conditions are never such that it is possible. Under the circumstances it must be pointed out that the nature of the vegetation, the time of year, human intervention etc. limit the veracity of the material presented.

M2 Environmental Connections (Pty) Ltd cannot be held responsible for conclusions and pro-active mitigation measures that are made in good faith based on the available resources and information provided at the time of the assessment.

17.3 Heritage features

The western section of the study area is used for grazing. Several fences exist on this portion, but are broken in several places, allowing cattle to roam freely between the camps. Also, several sections of this area are indicated on historical topographical maps as cultivated land. The south-eastern section of the study area, and mostly Portion 6, consists of slightly denser vegetation. This section appears not be utilised at the moment. Several sections, however, were cultivated in the past. The general visibility of the study area was fairly good.

17.4 Noise Assessment

The following limitations forms part of the environmental noise measurements:

- The number of hauling vehicles which will be required to transport coal from Weltevreden Mine to Elandsfontein mine was not available and a number of 20 hauling vehicles per hour was used to calculate the traffic noise levels;
- It was assumed that the mining operations will take place on a 24-hour basis.
- The prevailing ambient noise levels for the study area was created by far and near noise sources associated with traffic, mining activities, domestic activities and seasonal agricultural activities with the result that the prevailing ambient noise level may change at times;
- Noise measurements in the presence of winds in excess of 3.0m/s may impact the outcome of the environmental noise results;
- The identification of noise measuring points may create a problem in terms of the prevailing noise levels should it not be done with outmost care and in a scientific manner;
- The influx of traffic into an area will have an influence on the prevailing ambient noise levels and should be considered during the noise impact assessment process
- There will be a difference between the summer and winter periods as the insect activities such as crickets raise the prevailing ambient noise levels during the summer period whereas the prevailing ambient noise levels will not be influenced by insects during the winter period.

17.5 Air Quality

Assumptions

- The core study area can be defined as an area with a radius of not more than 10 km from the structures and a total study area with a radius of 15 km from the structures. This is because the visual impact of structures beyond a distance of 10 km would be so reduced that it can be considered negligible even if there is direct line of sight.
- It is assumed that there are no alternative locations for the structures and that the visual assessment, therefore, assessed only the proposed site.
- Geographic location within the mining boundary of infrastructure.
- The assessment was undertaken during the planning stage of the project and is based on the information available at that time.

Limitations

- Visual perception is by nature a subjective experience, as it is influenced largely by personal values. For instance, what one-viewer experiences as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. In order to limit such subjectivity, a combination of quantitative and qualitative assessment methods was used. A high degree of reliance has been placed on GIS-based analysis view shed, visibility analysis, and on making transparent assumptions and value judgements, where such assumptions or judgements are necessary.
- The view shed generated in GIS cannot be guaranteed as 100% accurate. Some viewpoints, which are indicated on the viewshed as being inside of the viewshed, can be outside of the viewshed. This is due to the change of the natural environment by surrounding activities as well as natural vegetation that play a significant role and can have a positive or negative influence on the viewshed.

17.6 Social Assessment

- This report and assessment are dependent on the accuracy of the publicly available secondary information; such as Statistics South Africa (StatsSA, 2011 and community survey, 2016). Where possible, the information was verified during a site visit. The data was considered sufficient for the purpose of this study;
- The study is based on data obtained from the community survey, 2016, which may not reflect accurate information;
- Not every individual in the community could be interviewed therefore only key people in the community were approached for discussion;
- It should be noted that the social environment is a dynamic, constantly changing entity. It is therefore not always possible to predict all social impacts to a very high level of accuracy. Care has been taken to identify the most likely and significant impacts in the most appropriate way for the current local context;
- Social impacts can be experienced by affected communities on an actual or a perceptual level. It is therefore not always possible to quantify social impacts properly;
- It should be noted that predictions concerning the characteristics of the receiving socio-economic environment at the time of decommissioning are subject to a large margin of error, thus significantly reducing the accuracy of impact assessment- the specialist has attempted to assess (where possible) the impact during the decommissioning phase;
- Individuals view possible social impacts differently due to their association with the anticipated impact. Impacts could therefore be perceived and rated differently than those contained in the Health Assessment Report. Further public participation can be used to refine findings; and
- Socio-economic impacts associated with the eventual decommissioning of the mine at the end of its life are briefly discussed but are not subject to detailed assessment. This omission is motivated by the fact that predictions concerning the characteristics of the receiving socio-economic environment at the time of decommissioning (30 years in the future) are subject to a large margin of error, thus significantly reducing the accuracy of impact assessment.

17.7 Soils, Land Use and Land Capability

The following uncertainties, limitations and gaps exists with regards to the study methodology followed and conclusions derived from it:

- Soil profiles were observed at distances of 80m to 200m apart. While a denser sampling grid will provide even more detailed information on soil depth and the boundaries between different soil forms, the information gathered during the survey is considered sufficient to use in accordance with desktop data to provide accurate depiction of the in situ soil form distribution.
- No samples were collected to depict the baseline soil chemical conditions of the major modal soil profiles. To address this data gap, recommendations will be made for soil sample collection for analysis prior to commencement of mining and during the project cycle for monitoring purposes.
- The study does not include a land contamination assessment to determine pre-mining soil pollution levels (should there be any present).

18. REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

18.1 Reasons Why The Activity Should Be Authorized Or Not

Taking all specialist assessments into consideration and with the implementation of mitigation and management measures the EAP s of the opinion that the project can be recommended for approval with conditions contained in this report.

19. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The life of Mine is estimated at 5 years. The EA and Waste Management License (WML) are being sought for a period of 10 years.

20. FINANCIAL PROVISION

As per NEMA financial provision regulations, itemised costs must be provided within the financial provision. As the DMR's closure cost assessment provides itemised costs, this process was used to determine the quantum for financial provision.

Financial Provision will be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.

The Financial Mine Closure Quantum is determined in accordance with the requirements of the 'Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (2005)' - Official guideline as contemplated in Regulation 54(1) to the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

The Mineral and Petroleum Resources Development (Act 28 of 2002) places the financial provision into context with respect to relevant constitutional considerations and the overall government policy currently prevailing in South Africa, as well as within a broader environmental legal framework. This guideline serves as a guide to the interpretation and application of the provision of the MPRDA, 2002 (Act 28 of 2002) and its Regulations, specifically as they relate to financial provision for the mining industry. This document is an official guideline in terms of regulation 54(1) promulgated in terms of the MPRDA, 2002 (Act 28 of 2002) and serves the specific objectives to;

- Improve the understanding of the financial and legal aspects pertaining to the costing of remediation measures as a result of prospecting and / or mining operations;
- Enable the DMR to adequately evaluate/review the quantum for financial provision submitted by the mining industry. This review will cover the financial provision for premature closure at any time (the current environmental liability); and
- Provide the DMR Regional Office personnel with a comprehensive and useful guideline on the generally accepted closure methods.

In terms of the new Financial Provision Regulations, a holder will have 39 months to assess, review and adjust the sum of the financial provision in accordance with Regulation 9 and 11. Failure to do so will mean that the existing approved financial provision will lapse after 45 calendar days after the lapsing of the 39-month period.

The Calculated Mine Closure Quantum is presented overleaf:

	Mine Closure Costs 2019	
1	**Surface Infrastructure**	**R4 640 829.23**
1	Dismantling of processing plant and associated structures (including associated conveyors & power lines)	R1 601 284.48
2(A)	Demolition of steel buildings and structures (including floor slabs)	R47 158.50
2(B)	Demolition of reinforced concrete buildings and structures	R746 100.38
3	Rehabilitation of access roads	R1 206 530.81
4(A)	Demolition of electrified railway lines	R0.00
4(B)	Demolition and rehabilitation of non-electrified railway lines	R0.00
5	Demolition of housing and facilities (including floor slabs)	R940 008.79
12	Fencing	R99 746.26
2	**Mining Areas & Waste Sites**	**R1 274 580.00**
6	Opencast rehabilitation (including final voids and ramps)	R1 274 580.00
7	Sealing of shafts, adits and inclines (including concrete cap)	R0.00
3	**Mine Residue Sites**	**R1 756 386.75**
8(A)	Rehabilitation of overburden and spoils	R0.00
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R931 709.10
9	Rehabilitation of subsided areas	R0.00
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	R824 677.65
4	**General Rehabilitation**	**R1 455 718.19**
10	General surface rehabilitation, including of all denuded areas	R1 455 718.19
5	**Aftercare & Maintenance**	**R1 692 914.46**
13	Monitoring	R870 000.00
14	Maintenance	R822 914.46
15	Water Facility	R0.00
	Sub Total 1	**R10 820 428.63**
	Site establishment and project Management	**R1 298 451.44**
	Sub Total 2	**R12 118 880.06**
	Contingency (10% of subtotal 2)	**R1 211 888.01**
	Sub Total 3	**R13 330 768.07**
	VAT (14% of subtotal 3)	**R1 866 307.53**
	Total	**R15 197 075.60**

21. DEVIATIONS FROM THE APPROVED SCOPING REPORT

21.1 Deviations From The Methodology For Impact And Risk Assessment

No deviation has been made.

21.2 Motivation For The Deviation

Not applicable as no deviation has been made.

22. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

22.1 Compliance With The Provisions Of Sections 24(4) (A) And (B) Read With Section 24 (3) (A) And (7) Of NEMA, The EIA Report

22.1.1 Impact on the Socio-Economic Conditions of Any Directly Affected Person

Social			
Construction	Job creation (Positive Impact)	H	H
Operation	Job creation (Positive Impact)	H	H
Construction and Operation	Increased Economic input (Positive Impact)	H	H
Construction and Operation	Community Development and Social Upliftment (Positive Impact)	H	H
Construction and Operation	Health and Safety concern	M	M
Construction and Operation	Restriction of movement	M	M
Construction and Operation	Loss of and/or Damage to Agricultural Land and Infrastructure	M	M
Construction and Operation	Physical and Economical Displacement	M	M
Construction and Operation	Poor / Failed service delivery for increasing population	M	M
Construction and Operation	Increased social pathologies	M	M
Construction and Operation	Changed Sense of Place	L	M
Closure and decommissioning	Dependency on mine for sustaining local Economy	M	M

22.1.2 Impact on Any National Estate Referred to in Section 3(2) Of the National Heritage Resources Act

Refer to the Heritage Impact Assessment attached as Appendix 3 and Section 13.7

Heritage			
Cumulative	Destruction of potential subsurface remains at POI 1	L	L
Cumulative	Destruction of potential subsurface remains at POI 2	M	M
Cumulative	Destruction of potential subsurface remains at POI 3	M	M

23. OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4) (A) & (B) OF THE ACT

Section 24(4) (b) (i) of the Act specifies "investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity".

The alternatives assessed and the impacts associated with the alternatives assessed have been fully presented in Section 10 and Section 13.5

Description	Advantages	Disadvantages
Mining Method Alternatives		
Underground board-and-pillar.	• Smaller footprint associated with surface disturbance. • Alternative/current land uses can continue on areas not directly impacted by surface activities. • Reduced impact on dust, noise and air quality. • No blasting during operational phase. • Reduced rehabilitation costs.	• Not economically viable as large pillars will remain. • Risk of subsidence during operation. • Risk of subsidence post-closure. • Potential decrease in groundwater quantity and quality. • Potential decrease in groundwater interaction with wetland. • De-watering of the surrounding aquifer. • Potential AMD post mining and closure phase. • Potential undermining of aquifer. • Drawdown of water levels of privately owned boreholes. • Potential decrease in base flow to the streams and wetlands running through the MRA.
Opencast mining (preferred method)	• Additional employment opportunities. • Economically viable as more coal will be efficiently extracted. • Increased LOM – extended employment opportunities. • No subsidence risk during operation. • No subsidence risk post-closure.	• Greater surface area disturbance. • Change in land use required for all farm portions in the MRA. • Decrease in agricultural area/cultivated land. • Decrease in surface water runoff to catchment. • Potential decrease in surface and ground water quantity and quality. • Potential decrease in groundwater interaction with wetland. • Increased dust generation. • Increased blast and vibration impacts. • Increased noise from the use of construction and mining machinery on surface during operations. • Higher rehabilitation costs.

24. UNDERTAKING

The EAP herewith confirms

a. The correctness of the information provided in the reports ☒
b. The inclusion of comments and inputs from stakeholders and I&APs ; ☒
c. The inclusion of inputs and recommendations from the specialist reports where relevant; and ☒
d. The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed; ☒

Signed: _____ 2019

25. LIST OF APPENDICES

- **Appendix 1 – EMP**
- **Appendix 2 – Proof of Public Participation**
- **Appendix 3 – Specialist Reports**
- **Appendix 4 – Maps**
- **Appendix 5 – Site Layout and infrastructure**
- **Appendix 6 – EAP CV**
- **Appendix 7 – Closure and Rehabilitation**