mineral resources
Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

Umsimbithi Mining (Pty) Ltd

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE PROPOSED ROAD DIVERSION AT WONDERFONTEIN MINE

March 2020

Project No.: A0946

Report No.: JKC_1071

Client:

Umsimbithi Mining (Pty) Limited

Suite MW 118

Private Bag X1838

Middelburg

1050

Cell no.: (073) 898 5822

E-mail address: Hulisani.Tshikondela@glencore.co.za

Compiled By:

Jaco-K Consulting

Registration # 2017/102604/07 ♦ VAT # 4720244591 ♦ 082 417 6901 ♦ 013 243 7110 ♦ 086 410 8267

Suite 445 MW, Private Bag X1838, Middelburg, 1050 ♦ Midlands Office Park, Building A, Unit 3, 2 Walter Sisulu Street, Middelburg, MP

www.jacokconsulting.co.za

Directors: AD Davis, EPJ Kleynhans; GS Nhlapo

PROJECT DETAILS

Client Details	
Name of Project:	Wonderfontein Road Diversion
DMR reference:	30/5/1/2/2/359 MR
Responsible person:	Phillip Venter
Physical address:	Farm Wonderfontein
Postal Address:	Suite MW 118, Private Bag X 1838, Middelburg, 1050
Tel:	(013) 244 8153
Cell:	(073) 898 5822
E-mail:	Hulisani.Tshikondela@glencore.co.za
EAP Details	
Environmental Consultant (EAP):	Jaco – K Consulting (Pty) Ltd
Responsible Person:	Jaco Kleynhans
Compiled by:	Angelique Francis
Reviewed by:	Jaco Kleynhans
Physical address:	2 Walter Sisulu Street, Unit 3, Midlands Office Park, Middelburg, Mpumalanga
Postal Address:	Suite 445 MW Private Bag X1838 Middelburg 1050
Telephone:	013 243 7110
Facsimile:	086 665 9703
E-mail:	angie@jacokconsulting.co.za
Expertise of EAP:	**Jaco Kleynhans** – Professional Environmental Engineer, registered with ECSA (Engineering Council of South Africa, No. 940108). Jaco Kleynhans is a professional engineer, ECSA number 940108, and conducted closure cost assessments and practised environmental management for more than 24 years. During that period, he worked as an environmental manager at two large mines for 10 years where after he has been an environmental consultant. As environmental consultant he compiles and reviews various closure cost assessments and also conducted various due diligence assessments. Refer to **Annexure 1** for the Expertise and Curriculum Vitae of Jaco Kleynhans.

EXECUTIVE SUMMARY

Umsimbithi Wonderfontein Mine is authorised to expand its mining area in order to utilise the coal reserve located in the north-eastern region of the mining boundary. The existing P15-1 road however currently crosses over the coal reserve resulting in the sterilisation of the reserve along the alignment of the road. The mine therefore plans to permanently divert a section of the P15-1 road around the reserve so that the coal can be utilised.

The planned road diversion is located within the boundaries of Wonderfontein Mine within the jurisdictional area of Emakhazeni Local Municipality (ELM). The farm portions relevant to the application includes Portions 3, 7, 19, 22, 26, 44 and the Remaining Extent of the Farm Wonderfontein 428 JS. It is expected that the proposed road diversion will be 4.349 km in length and 8 m in width and will have a road reserve of 40 m. The construction phase will last between six to nine months.

The road diversion will require a General Authorisation for water uses and it triggers listed activity 6 of Regulation GN 984 of NEMA, December 2014 as amended in April 2017. An application for Environmental Authorisation was submitted to the Department of Mineral Resources (DMR) on 30 August 2019. An application for a General Authorisation will be submitted to the Department of Water and Sanitation (DWS).

Mitigations measures focus specifically on the prevention of edge effect, such as erosion, compaction and sedimentation as well as on the impacts created through dust and noise. A monitoring network will also be implemented throughout the construction of the road. It should be noted that once the road has been constructed, it will be handed over to the Department of Public Works, Roads and Transport. The current financial provision for the project amounts to R 998 091.26, including VAT.

DOCUMENT STRUCTURE

Number	Appendix 4 Description	Report Reference
1 (1)	An EMPr must comply with section 24N of the Act and include—	
(a)	details of—	
(i)	the EAP who prepared the report; and	Project Details – EAP Details
(ii)	the expertise of the EAP, including a curriculum vitae;	
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 2
(c)	a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 3
(d)	a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including—	
(i)	planning and design;	Section 4
(ii)	pre-construction activities;	
(iii)	construction activities;	
(iv)	rehabilitation of the environment after construction and where applicable post closure; and	
(v)	where relevant, operation activities;	
(e)	*Item 1(1)(e) deleted by Government Notice 326 in Government Gazette 40772 dated 7 April 2017*	
(f)	a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to—	
(i)	avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 5 Section 6
(ii)	comply with any prescribed environmental management standards or practices;	
(iii)	comply with any applicable provisions of the Act regarding closure, where applicable; and	
(iv)	comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;	
(g)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.7
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 5.7
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Section 5
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 5

Number	Appendix 4 Description	Report Reference
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 5.7
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 7
(m)	an environmental awareness plan describing the manner in which—	
(i)	the applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 9
(ii)	risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(n)	any specific information that may be required by the competent authority.	Section 10

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LIST OF ABBREVIATIONS

AMD:	Acid Mine Drainage
AQSR:	Air Quality Sensitive Receptor
BID	Background Information Document
CBA	Critical Biodiversity Area
cm	Centimetre
CVB	Channel Valley-Bottom wetland
DAFF	Department of Agriculture, Forestry and Fisheries
dB:	Decibels
DEA	Department of Environmental Affairs
DMR:	Department of Mineral Resources
DPW	Department of Public Works
DWAF	Department of Water Affairs and Forestry
DWS:	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC	Electrical Conductivity
ECO	Environmental Control Officer
ECSA	Engineering Council of South Africa
EIA	Environmental Impact Assessment
EIAR:	Environmental Impact Assessment Report
EIS	Ecological Importance and Sensitivity
ELM	Emakhazeni Local Municipality
EMP	Environmental Management Programme
EMPr	Environmental Management Programme Report
ESA	Environmentally Sensitive Areas
FET:	Further Education and Training
GA	General Authorisation
GDP	Gross Domestic Product
GN:	Government Notice
GNR:	Government Notice Regulation
Ha	Hectares
HGM:	Hydrogeomorphic
HSS	Hillslope Seep wetland
I&APs:	Interested and Affected Parties
IDP:	Integrated Development Plans
IRR	Issue and Response Register
IUCMA	Inkomati-Usuthu Catchment Management Agency
IUCN	International Union for Conservation of Nature
IWWMP:	Integrated Water and Waste Management Plan

JKC	Jaco-K Consulting (Pty) Ltd
kg:	Kilogram
km:	Kilometre
km^2:	Square kilometre
m:	Metre
mg:	Milligram
mm:	Millimetre
m^2:	Square metre
m^3:	Cubic metre
MAE	Mean Annual Evaporation
mamsl	Metres above mean sea level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
ME	Mitigation Efficiency
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MTPA	Mpumalanga Tourism and Parks Agency
N/A	Not Applicable
NAAQS:	Nation Ambient Air Quality Standards
NDM	Nkangala District Municipality
NEMA:	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA:	National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)
NEMWA:	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NGO:	Non-government Organisation
NPD	National Development Plan
NHRA:	National Heritage Resources Act, 1999 (Act 25 of 1999)
NWA:	National Water Act, 1998 (Act 36 of 1998)
PCD	Pollution Control Dam
PES	Present Ecological State
PM:	Particulate matter
PM_{10}:	Thoracic particulate matter
$PM_{2.5}$:	Respirable particulate matter
POC	Probability of Occurrence
PPP:	Public Participation Process
RDL	Red Data Listed
RDSIS	Red Data Sensitivity Index Score
RE	Remaining Extent
REC	Recommended Ecological Category
RMO	Recommended Management Objective
S&EIR:	Scoping & Environmental Impact Reporting
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Road Agency Ltd

SANS:	South African National Standard
SAS	Scientific Aquatic Services cc
SCC	Species of Conservational Concern
SLP:	Social and Labour Plan
SO_4:	Sulphate
SR	Significance Rating
TDS	Total Dissolved Salts
TIA	Traffic Impact Assessment
TRAC	Trans African Concessions
WM	With Mitigation
WOM	Without Mitigation Measures
WMA:	Water Management Area
WSP	WSP Group Africa (Pty) Ltd
WUL:	Water Use Licence
WULA:	Water Use Licence Application

1. ENVIRONMENTAL ASSESSMENT PRACTITIONER

Refer to **Project Details** for the details of the EAP and to **Annexure 1** for the Curriculum Vitae which includes the qualifications of Jaco Kleynhans.

2. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Umsimbithi Wonderfontein Mine (hereinafter referred to as Wonderfontein Mine) is authorised to expand its mining area in order to utilise the coal reserve located in the north-eastern region of the mining boundary. However, the existing P15-1 road, which is a part of the R33 between Wonderfontein and Carolina, currently crosses over the coal reserve resulting in the sterilisation of the reserve along the alignment of the road.

The mine therefore plans to divert a section of the P15-1 road around the reserve so that the coal can be utilised. The planned road is expected to be 4.349 km in length and 8 m in width (two lanes that are 3.7 m wide each with 300 mm from the yellow to the edge). The road reserve will be 40 m. The construction phase is expected to last six to nine months.

The road diversion is going to be located within the boundaries of Wonderfontein Mine. The mine is situated within the jurisdictional area of Emakhazeni Local Municipality (ELM) and Albert Luthuli Local Municipality which occurs within the Nkangala District Municipality (NDM) and the Gert Sibande District Municipality, respectively. The road diversion, however, is located within ELM and NDM only.

The road diversion will traverse Portions 3, 19, 22, 26, 44 and the Remaining Extent (RE.) of the Farm Wonderfontein 428 JS near Belfast, Mpumalanga. The land uses of the affected and adjacent farm properties include agricultural and mining activities. The location of the preferred alternative occurs within 100 m of the surrounding wetlands and therefore proper mitigation measures need to be in place.

Activities discussed in this Environmental Management Programme Report (EMPr):

Activity 1: Construction of Road Diversion

The P15-1 road is going to be permanently diverted around the coal reserve onto a suitable path. The development footprint will be of minimal impact and the areas disturbed during the construction process will be rehabilitated

Activity 2: Water Management Infrastructure

Water management structures, such as minor and major drainage systems, will be constructed parallel to the diverted road in order to ensure adequate and effective drainage according to the

requirements of the Mpumalanga Department of Public Works, Roads and Transport.

Activity 3: Contractor yard

A contractor yard will be developed where the contractor's equipment can be stored and where some offices in the form of park homes will be located. It must be noted that no workshops will be located in this area and all repairs and maintenance will be conducted off-site. Chemical toilets will be located in this area and a JoJo Tank for the storage of potable water obtained from Wonderfontein mine will be present. Waste skips will also be located in this area. Small sheds and car ports will also be constructed and a diesel tank with a storage well below 80 m^3 will located at this site.

The activity will include the clearing of the area and after construction the area will be rehabilitated.

3. COMPOSITE MAP

Figure 1 below indicates the proposed development, associated activities and infrastructure in relation to environmental sensitivities present in the area. **Figure 1** further provides various buffers indicating potential influence zones. A large-scale map (A3) is attached as **Annexure 2**.

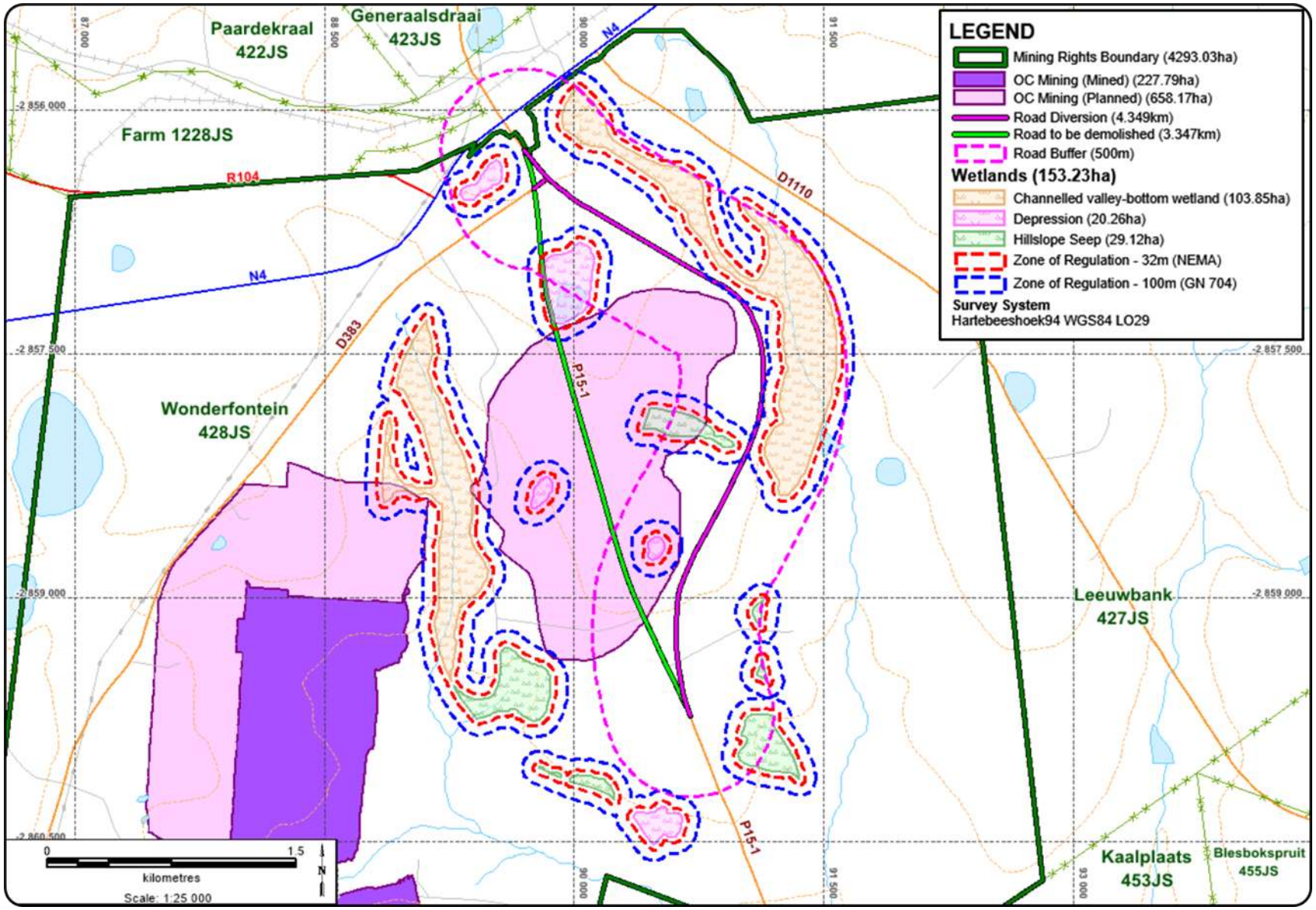

Figure 1: Composite map of the road diversion study area with buffer zones around the surrounding wetlands

4. DESCRIPTION OF IMPACT MANAGEMENT OUTCOMESINCLUDING MANAGEMENT STATEMENTS

4.1. Determination of Closure Objectives

There will be no closure or decommissioning objectives for this project, the road will be handed over to the Mpumalanga Department of Public Works and Roads once construction is completed. However, the construction area within the new road reserve, excluding the road itself, must be rehabilitated as well as the contractor yard and for those closure objectives will be set.

It should however be noted that once the road diversion has been constructed, the following objectives should be met:

- Remediate all environmental impacts;
- Everything that does not form part of the permanent road infrastructure (such as the contractor laydown area, equipment, rubble, construction material, litter, etc.) needs to be removed by the contractor ensuring that the site is cleared and cleaned;
- Ensure that nothing is left on site that could be a potential danger to road users and the surrounding communities; for example, loose rocks, steel, hazardous waste, etc;
- Ensure that the public health and safety are not compromised in the future;
- Any areas disturbed during the construction phase needs to be rehabilitated and re-vegetated by the contractor to the satisfaction of Wonderfontein Mine and the ECO; and
- A post-construction environmental audit needs to be carried out and submitted to the DMR. The objective of the Environmental Audit is to audit compliances considering the key components of the EMP. Areas that require attention will also be identified and the appropriate measures will be recommended.

4.2. Impact management objectives and management statements to apply to the activities of the development that are associated with and can reduce the identified impacts and risks that might result from the project

This section serves as an introduction to the EMP for the Wonderfontein Road Diversion Project. The EMP describes the measures that Wonderfontein Mine will implement to ensure that the project's impacts (as identified in *Sections 9* and *10* of the **EIAR**) are managed throughout the life of the project.

The EMP for the Wonderfontein Road Diversion was compiled in accordance with the Regulations (Appendix 4 of Regulation 982 of 2014, as amended) promulgated in terms of the National Environmental Management Act (NEMA) which require that a description of mitigation and management measures be provided to address all the expected and current impacts on various aspects of the environment. The management measures will be defined per activity, similar to the impact assessment.

In characterising the sensitivity of the proposed project area and the general environmental management requirements associated with the planned road diversion activities, the process for managing any environmental or socio-economic degradation have been categorised into the following sections:

- Soils, Land Capability and Land Use;
- Terrestrial Biodiversity (Flora and Fauna);
- Freshwater Resources;
- Air Quality;
- Noise;
- Sensitive Landscapes;
- Visual;
- Traffic; and
- Socio-economic.

These sections focus on the protection of the human, physical and biophysical resources and are consistent with local legislative requirements that are stipulated under the South African environmental legislation, mining legislation, relevant sectoral legislation and associated regulations (*Section 4* in the *EIAR*). Management objectives have been identified and converted into management statements that will lead the process of avoiding, minimising, managing and mitigating the identified impacts and risks.

Wonderfontein Mine will be responsible for the provision of adequate resources (human and financial) and will ensure that those resources are available for the implementation of the EMP. In managing the environmental and social impacts associated with the project, Wonderfontein Mine will ensure that the roles, responsibilities and accountabilities of all senior personnel working on site are clearly outlined and in line with the EMP.

The following sections outline the management objectives and measures to manage the project impacts identified and assessed in *Sections 9 and 10* of the *EIAR*. The measures that are described in this EMP may be implemented (and are applicable) throughout the construction and operational phase of the project.

4.2.1. Soils, Land Capability and Land Use

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the land use and capability of the soils that are identified in *Sections 9 and 10* of the *EIAR* for each activity. The plan has the following objectives:

- Land disturbance due to the project footprint should be minimised to that which is absolutely necessary;
- All topsoil which might be removed for the foundation of the road should be stored for later rehabilitation on the adjacent areas inside the road reserve;
- Manage stripping and stockpiling of topsoil, from the planning and construction phase, as it is the first step to successful rehabilitation;
- Prevent any spillages from occurring;
- Construction staff must utilise the chemical toilets provided. The waste from the toilets must be regularly removed by a registered waste contractor, ensuring that soils are not contaminated through waste spillages;
- Retain natural soil characteristics and fertility of un-impacted topsoil within the road reserve;
- Conduct proper soil amelioration prior to final re-vegetation as part of rehabilitation;
- Establish a soil cover that will sustainably support vegetation establishment and growth of the road reserve area outside of the actual road;
- All disturbed areas should be rehabilitated and re-vegetated with a grass seed mixture and the soil stability and erosion should be monitored; and
- Re-vegetation should be done as soon as possible

The General Manager and Project Manager of the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for soils and land use.

4.2.2. Terrestrial Biodiversity (Flora and Fauna)

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the terrestrial biodiversity that are identified in *Sections 9 and 10* of the *EIAR* for each activity. This will include the measures identified to minimise the impacts on the floral and faunal communities at the Wonderfontein Road Diversion project area. The plan has the following objectives:

- In order to minimise the ecological disturbance, the development footprint should be kept as small as possible;
- During excavation, the vegetation should be removed up to a depth of 150 mm and should be stockpiled outside the appropriate setback area;
- Sensitive areas should be avoided as far as possible;
- If any Species of Conservation Concern (SCC) are found within the study area, they should be preserved. They should be relocated by qualified specialist after permit is obtained from MTPA;
- Prevent the growth of alien invader species within the project area;
- Implement dust suppression measures;
- Edge effect, such as erosion, sedimentation and compaction, control measures need to implemented to ensure that no further degradation and potential loss of faunal and floral occurs;
- Snaring and hunting of wild animals is prohibited; and
- Vehicles and staff should be restricted to designated areas to limit the ecological footprint of the proposed development activities.

The General Manager and Environmental Superintendent for the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for terrestrial biodiversity.

4.2.3. Freshwater Resources

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the aquatic environment that are identified in*Sections 9 and 10* of the *EIAR* for each activity. The plan has the following objectives:

- Limit vehicle/construction equipment activity within the freshwater region to what is absolutely necessary;
- The wetlands and the applicable 32 m zone of regulation should be demarcated and marked as a “no-go” area where no construction activities are planned;

- Contractor laydown areas and material storage facilities are to remain outside the wetlands and the 100m GN704 Zone of Regulation;
- Construction employees shall be prohibited to utilise the freshwater resources for any purpose;
- Littering on site is forbidden. Any litter that is found should be removed at the end of each day;
- Prevent contamination of surface water runoff from site;
- Prevent contamination of surface water resources in the vicinity of the project area;
- Prevent contamination of the natural areas surrounding the site with polluted water;
- Prevent erosion/sedimentation and the possible impact thereof on aquatic systems;
- Minimise interference with natural drainage patterns;
- Ensure that the water management systems are constructed prior to the commencement of activities and that they are operational at all times;
- Ensure the availability of water for intended use in and around the project area;
- Prevent degradation of the surrounding wetlands by maintaining the Present Ecological State (PES) and Recommended Ecological Class (REC) of these habitats;
- Sustain the environmental and social functions of the surrounding wetlands; and
- Create awareness among employees involved in the project regarding the importance and conservation of these habitats.

The General Manager and Environmental Superintendent for the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for surface water.

4.2.4. Air Quality

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the air quality that are identified in *Sections 9 and 10* of the *EIAR* for each activity. The plan has the following objectives:

- Vehicles must stick to the speed limit to avoid producing excessive dust;
- In order to reduce excessive gas emissions and to meet the requirements for fuel consumption and safety, vehicles and machinery should be serviced on a regular basis.
- If excessive gas emissions are observed, the contractor should have the equipment fixed as soon as possible; and
- Access and other cleared surfaces should be dampened whenever possible, especially in dry and windy/conditions, to avoid the generation of excessive dust.

The General Manager and Environmental Superintendent for the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for air quality.

4.2.5. Noise

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts regarding noise pollution that are identified in *Sections 9 and 10* of the *EIAR* for each activity. The plan has the following objectives:

- Construction should be restricted to daylight hours; and
- Vehicles and machinery should be kept in good working condition and fitted with the correct and appropriated noise abatement measures.

The General Manager and Environmental Superintendent for the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for noise pollution.

4.2.6. Sensitive Landscapes

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the surrounding sensitive landscapes that are identified in *Sections 9* and *10* of the *EIAR*. The plan has the following objectives:

- The project footprint should be limited to the proposed road development;
- Ensure that proper stormwater management is in place and it is operational at all times throughout the project;
- Sensitive areas should be avoided as far as possible (refer to **Annexure 2** for the location of the surrounding wetland areas);
- Construction employees shall be prohibited to utilise the freshwater resources for any purpose;
- Littering on site is forbidden. Any litter that is found should be removed at the end of each day;
- The delineated watercourses and the applicable 32 m zone of regulation should be marked off and inspected ensuring that they have not been disturbed;
- Contractor laydown areas and stockpiles are to be established outside of the delineated watercourses and the applicable 100 m zone of regulation; and
- Prevent erosion/sedimentation and the possible impact thereof on aquatic systems.

The General Manager and Environmental Superintendent for the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for areas identified as sensitive landscapes.

4.2.7. Traffic Impact

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the road network surrounding the project area, as identified in *Sections 9* and *10* of the *EIAR*. Bear in mind that the new alignment will be constructed while the existing road will still be used. The plan has the following objectives:

- The intersections within the study area should be upgraded so to mitigate the anticipated increase in traffic;
- Construction vehicles should avoid travelling during peak hours;
- Temporary construction measures need to be in place, especially near Môrelig Combined School; for example, proper road signages indicating that construction is taking place and signages indicating speed limits that need to be adhered to within the construction zone.

The responsibility for implementing and upholding the management measures recommended in this EMP for will be issued to the Community Superintendent, under the supervision of the General Manager.

4.2.8. Socio-economic Impact Assessment

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the socio-economic environment, that are identified in *Sections 9 and 10* of the *EIAR* for each activity. The plan has the following objectives:

- Temporary construction measures need to be in place, especially near Môrelig Combined School; for example, proper road signages indicating that construction is taking place and signages indicating speed limits that need to be adhered to within the construction zone;
- A Traffic Management Plan should be discussed with Môrelig Combined School prior to the commencement of construction;
- Monitor the impact on neighbouring properties;
- Ongoing consultative forums with concerned groups;
- Illicit fires are prohibited;
- Promote good relationships between Wonderfontein Mine, the adjacent land owners and the local communities;
- Develop and maintain an ongoing process of communication with stakeholders;

- Protect the interests of all project affected parties through commitment to sound legal process;
- Promote employment, business and contracting opportunities, specifically focussing on local employment and optimizing local involvement in this project to maximize local economic growth;
- Implement skills and economic development programmes; and
- Promote education and awareness concerned with health, safety and risks.

The responsibility of implementing and upholding the management measures recommended in this EMP will be issued to the Community Manager and Health and Safety Manager for the project, under the supervision of the General Manager.

4.2.9 Visual Impacts

Section 5 describes the measures that will be implemented by Wonderfontein Mine to avoid, mitigate and manage the project's impacts on the socio-economic environment, that are identified in *Sections 9 and 10* of the *EIAR* for each activity. The plan has the following objectives:

- The construction site should be kept clean to minimise the visual impact;
- Chemical toilets are to be appropriately located to minimise visual disturbance;
- Once construction has been completed, the site should be inspected for areas that have been disturbed by erosion, sedimentation, runoff, etc. so that they can be properly rehabilitated and re-vegetated.
- Any litter observed should be removed at the end of every day;
- Stockpiled soil should be seeded until it can be reapplied to the disturbed areas;
- Disturbed areas should be re-vegetated using a mix of indigenous species; and
- Any encountered alien invasive species should be removed, carefully avoiding the spread of seeds.

The General Manager and Environmental Superintendent for the project will assume responsibility for implementing and upholding the management measures recommended in this EMP for the visual aspects.

4.3. Potential Risk of Acid Mine Drainage (AMD)

There is no risk of AMD since no mining will be conducted during this project.

4.4. Volumes and Rate of Water Use Applicable to this Road Diversion Application

Apart from the water that will be used during the construction of the road, no other water will be used. The road will be constructed within 500m of the wetland and an application for a general

authorisation as part of a Section 21(c)&(i) water use will be submitted to the Department of Water and Sanitation. A consultation meeting was held with IUCMA regarding the application process. A list of the water uses identified is provided below:

Table 1: Water Use Licence Table

Section 21 Water Uses Applied for	Proposed Water Uses	Reason/Motivation
21 (c) & (i)	Road Diversion	A section of the new road will occur within 500 m of Hillslope Seep Wetland 1, approximately 87 m away.
	Road Diversion	A section of the new road will occur within 500 m of Hillslope Seep Wetland 2, approximately 330 m away.
	Road Diversion	A section of the new road will occur within 500 m of Channelled Valley Bottom Wetland 1, approximately 84 m away.
	Road Diversion	A section of the new road will occur within 500 m of Depression Wetland 1, approximately 202 m away.
	Road Diversion	A section of the new road will occur within 500 m of Depression Wetland 2, approximately 176 m away.
	Road Diversion	A section of the new road will occur within 500 m of Depression Wetland 5, approximately 163 m away.

4.5. Water Use Licence Status

A pre-consultation meeting was held at the Inkomati-Usuthu Catchment Management Agency (IUCMA) on the 1st August 2019.No Water Use Licence will be applied for, only a General Authorisation in terms of Section (c) and (i).

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5. IMPACT MANAGEMENT ACTIONS AND OUTCOMES

5.1. Activity 1: Road Diversion

Bear in mind that once the road is constructed, it will be handed over to the Mpumalanga Department of Public Works and Roads and therefore these measures will only applicable until that transfer is concluded.

Table 2: Mitigation measures – Road Diversion

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
Impact management outcome: Site preparation prior to construction activities related to the road diversion.			
➢ Contractor laydown areas and stockpiles to be established outside of the delineated watercourses and the applicable 100 m zone of regulation; ➢ Construction should be initiated by first constructing stormwater management systems thus ensuring that as site clearing takes place, runoff is appropriately managed (refer to Activity 2); ➢ Vehicles are to be serviced at the contractor laydown area and all refuelling is to take place outside of the wetlands and the applicable 100 m zone of regulation; ➢ All development footprint areas are to remain as small as possible and vegetation clearing to be limited to what is essential; ➢ During excavation, topsoil and vegetation should be removed up to a depth of 150 mm and should be stockpiled outside the appropriate setback area; ➢ Ablution facilities with chemical toilets shall be provided and must not be within 100 m of any natural water resources. ➢ Retain as much indigenous wetland vegetation as possible; ➢ Access to the construction site must be controlled against unlawful entry for safety reasons. ➢ It should be feasible to utilise existing roads to gain access to the study area, and crossing the wetlands in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles; and ➢ The wetlands and the applicable 32 m zone of regulation should be clearly demarcated and marked as a "no-go" area where no construction activities are planned.	General Manager Environmental Manager	• Induction • Distribution of the EMPr to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Construction of Road Diversion			
➢ The road should be constructed as per civil engineer designs; ➢ The alignment of the road diversion must be optimised to remain outside of the delineated wetlands and ideally the associated 32 m zone of regulation as defined by NEMA; ➢ Through-flow structures should be sized to accommodate 1:100 year flood; ➢ Ensure that the creation of the diversion does not result in significant water level difference up-gradient or downgradient of the construction site or lead to excessive concentration of flow which will lead to erosion and incision of the watercourse; ➢ Silt traps should be installed at the construction area. This would limit the sediment load entering the wetland; ➢ Restrict construction activities to the drier months as far as possible to limit permanent changes to the system;	General Manager Environmental Manager	• Induction • Distribution of the EMPr to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
➢ No mixed concrete/grout/tar may be deposited outside the designated construction footprint, to limit it from entering the surrounding wetland areas; and ➢ Concrete/grout/tar spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site.			
Impact management outcome: Loss of species diversity and impact on ecology			
➢ No dumping of waste on site should take place. Place bins inside the contractor yard to manage general and hazardous waste. Construction rubble must be removed during the final clearing and cleaning; ➢ If any hydrocarbon and/or chemical spills occur, they should be immediately cleaned up. Spill kits should be kept on site. In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practised preventing the ingress of hydrocarbons into the topsoil. It should be ensured that no spills leak into the freshwater resource associated with the study area; ➢ Place topsoil on the demarcated topsoil stockpiles outside of sensitive areas; ➢ Minor and major drainage systems must be implemented according to the designs; ➢ Edge effects of all activities, such as erosion and alien plant species proliferation, need to be strictly managed adjacent to the project footprint areas; ➢ An effective dust management plan must be designed and implemented so to prevent an increase in sediment load within the surrounding wetlands; ➢ Alien and invasive vegetation monitoring and eradication should take place throughout construction of the road; ➢ The collection of firewood, floral SCC or medicinal floral species is not allowed by workers; ➢ Care should be taken not to remove or destroy any floral SCC that may be found during the construction phase of the development. A permit should be obtained from the MTPA if it becomes imperative for any floral SCC to be removed; ➢ No illicit fires are allowed during the construction phase of the proposed development; ➢ Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan complied by a suitable specialist. ➢ Should any other floral species protected under MNCA (Act 10 of 1998) or NEMBA (Act 10 of 2004) be encountered within the proposed development footprint areas, authorisation to relocate such species must be obtained from the MTPA or the Department of Environmental Affairs (DEA) respectively; ➢ Excavated topsoil must be stored with associated native vegetation debris for subsequent use in rehabilitation; ➢ Revegetation of disturbed areas should be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff; ➢ When rehabilitating topsoil stockpile footprint sites, it is crucial that as far as possible the habitat that was present prior to disturbances is recreated, so that faunal species that were displaced by vegetation clearing activities are able to recolonize the rehabilitated area; ➢ A suitable rescue and relocation plan should be developed and overseen by a suitably qualified specialist or nominated personnel in order to ensure that species loss during construction activities is kept to a minimum; and ➢ No hunting/trapping or collecting of faunal species is allowed.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Loss of topsoil due to negligent stripping and stockpiling procedures at the road diversion footprint			
➢ Topsoil, as well as vegetation (if present), should be stripped to a depth of 150 mm and be stockpiled outside of the appropriate setback area;	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions –	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
➢ Excavated materials should not be contaminated and it should be ensured that the minimum surface area is taken up; ➢ Ensure sediment control devices are in place prior to the start of the excavation activities. The sediment control devices should be maintained to minimise the risk of sedimentation of the downstream areas; and ➢ Rehabilitation of the road reserve should be conducted to the satisfaction of the Mpumalanga Department of Public Works and Roads		ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	
Impact management outcome: Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment			
➢ Limit vehicle/construction equipment activity within the wetlands to what is absolutely necessary; ➢ Vehicles are to be serviced at the contractor laydown area and all refuelling is to take place outside of the wetlands and the applicable 100 m zone of regulation; ➢ Chemical toilets are to be provided for site workers and contractors. Chemical waste must be regularly removed by a registered waste contractor, carefully avoiding spillages which could result in soil contamination; ➢ Excavated materials should not be contaminated and it should be ensured that the minimum surface area is taken up; ➢ Prevent any spills from occurring as far as possible; ➢ If a spill occurs it is to be cleaned up immediately and reported to the appropriate authorities; ➢ Contaminated soil should be disposed at a suitable disposal facility and remediated on site; ➢ Vehicles leaking hydrocarbons, will have drip trays placed under them, until repaired; ➢ All hydrocarbons must be stored within a bunded area; and ➢ If any vehicles or machinery break down on site and it cannot be transported to the workshop, the responsible person must have an emergency spill kit available when attending the breakdown to prevent soil contamination.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Loss of topsoil through erosion at stockpiles, road edges and rehabilitated areas			
➢ All stockpiles should be stored on a flat surface to minimise run-off if possible. ➢ Stockpiles must be located away from water courses. ➢ Ensure proper storm water management designs and systems are in place; ➢ If erosion occurs, corrective actions must be taken to minimize any further erosion from taking place; ➢ Stockpiled soils must be re-vegetated as soon as possible to reduce the risk of erosion; and ➢ All exposed soils must be protected for the duration of the construction period with a suitable geotextile in order to prevent erosion/sedimentation.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 month
Impact management outcome: Cease in current land use, land capability and agricultural production at road footprint during construction and operation phase			
➢ No mitigation for the loss in land use, land capability and agricultural production is possible as the development footprint is going to permanently change to a road.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
		measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	
Impact management outcome: Deterioration of air quality caused by emissions			
➢ Reduce unnecessary traffic; ➢ Strict speed control; ➢ Chemical toilets must be emptied frequently; ➢ No uncontrolled fires are permitted on-site; ➢ Minimise extent and frequency of disturbance; and ➢ Machinery and vehicles must be serviced on a regular basis.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Deterioration of air quality as a result of particulate matter and dust fallout			
➢ Haul trucks to be restricted to specified haul roads; ➢ Reduction of unnecessary traffic; ➢ Strict speed control; ➢ Illicit fires are prohibited; ➢ Minimise extent and frequency of disturbance; ➢ Machinery and vehicles must be serviced on a regular basis; ➢ Cover vehicles transporting any dust generating materials, such as topsoil, when travelling on public roads; and ➢ Access and other cleaned surfaces should be dampened whenever possible, especially in dry and windy conditions.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Generation of additional noise			
➢ Contractor lay-down areas should be located away from noise sensitive areas; ➢ All employees and contractors should receive Health and Safety induction that includes an environmental awareness component (noise). This is to allow employees and contractors to realize the potential noise risks that activities pose to the surrounding environment; ➢ Equipment should be turned off when not being used; ➢ Construction activities should be restricted to daylight hours; and ➢ Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
Impact management outcome: Encountering graves/archaeological artefacts unearthed during construction			
➢ If any graves or archaeological artefacts are exposed during construction, SAHRA must be notified. All development activities must be stopped and an archaeologist should be called in to determine proper mitigation measures.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Increase in traffic during the construction and operational phase			
➢ The intersections within the study area will be constructed as approved and designed and configurated so to mitigate the increase in traffic; and ➢ Construction vehicles should avoid travelling during the morning and afternoon peak hour traffic. ➢ Temporary construction measures need to be in place, especially near the Môrelig Combined School; for example, proper road signages indicating that construction is taking place and signages indicating the speed limits that need to be adhered to within the construction zone.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Creation of temporary employment during construction			
➢ Prioritize people residing in local area.	General Manager Community Manager /Environmental Manager	• Upholding SLP.	Construction – 6 to 9 months
Impact management outcome: Security of employment and maintaining household income			
➢ Prioritize people residing in local area.	Community Manager	• Upholding SLP.	Construction – 6 to 9 months
Impact management outcome: Socio-economic environment impacted through construction of road diversion			
➢ Temporary construction measures need to be in place, especially near Môrelig Combined School; for example, proper road signages indicating that construction is taking place and signages indicating speed limits that need to be adhered to within the construction zone; ➢ A Traffic Management Plan should be discussed with Môrelig Combined School on a weekly basis; ➢ Minimise project related negative socio-economic and health impacts in the study area; ➢ Monitor the impacts on neighbouring properties;	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented.	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
➢ Ongoing consultative forums with concerned groups; ➢ Illicit fires are prohibited by site workers and contractors; ➢ Ensure that waste is disposed of properly; ➢ Site workers and contractors are not allowed onto neighbouring properties without permission; ➢ Promote good relationships between Wonderfontein Mine, the adjacent land owners and local communities; ➢ Protect the interest and concerns of affected parties through commitment to sound legal process; ➢ Promote education and awareness concerned with health, safety and risks; ➢ Restrict construction activities to daylight hours; ➢ Promote employment, business and contracting opportunities, specifically focussing on local employment and optimising local involvement in this project to maximise local economic growth; and ➢ Develop and maintain an ongoing process of communication with the stakeholders.		• Implementation of mitigation measures and conditions during and after construction.	
Impact management outcome: Rehabilitation of the study area affected by the construction of the road diversion.			
➢ Revegetation of disturbed areas should be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff; ➢ Ensure the proper stripping and ripping of soil as it can be used to rehabilitate disturbed areas; ➢ Soils outside of the project footprint that have been disturbed through compaction, should be ripped and profiled. Special attention should be paid to alien and invasive control within these areas. ➢ Construction rubble must be collected and disposed of at a suitable site; ➢ All alien vegetation in the study area as well as in the immediate vicinity of the proposed development should be removed. Alien vegetation control should take place for a minimum period of two growing seasons after rehabilitation is completed; ➢ Wetlands impacted during the construction process should be rehabilitated; and ➢ Monitoring of the wetlands is recommended to be undertaken. This should be determined by an appropriately qualified freshwater ecologist.	General Manager Environmental Manager	• Induction • Distribution of EMP and IWWMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions until closure certificate is obtained.	Construction – 6 to 9 months
Impact management outcome: The visual impact caused by the construction of the proposed road diversion			
➢ The construction site should be kept clean to minimise the visual impact; ➢ All temporary structures erected during the construction phase should be removed upon completion of the project; ➢ Chemical toilets and waste bins are to be appropriately located to minimise visual disturbance; ➢ Once construction has been completed, the site should be inspected for areas that have been disturbed by erosion, sedimentation, runoff, etc. so that they can be properly rehabilitated and re-vegetated. ➢ Any litter observed should be removed at the end of each day; ➢ Stockpiled soil should be reapplied to the disturbed areas and the re-vegetated using a mix of indigenous species; and ➢ Any encountered alien invasive species should be removed, carefully avoiding the spread of seeds.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

5.2. Activity 2: Storm Water Management Structures

Table 3: Mitigation Measures – Storm Water Management

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
Impact management outcome: Development of storm water management structures			
➢ Develop minor and major drainage systems according to the requirements of the Mpumalanga Department of Public Works and Roads; ➢ Implement the Drainage Plan to adequate drainage of the road is possible and to limit impacts on the downstream water resources; ➢ During construction, the earthworks should be kept to a minimum. Stabilisation and erosion control measures should be implemented immediately where embankments are formed; ➢ The contractor must inspect the site throughout the construction phase for erosion, especially after rainfall events and if damage occurs, it should be rehabilitated immediately.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Operation and maintenance of the stormwater management system associated with the proposed road diversion			
➢ A minor and major drainage Plan should be developed prior to the onset of construction for both the construction and operational phase; ➢ The stormwater outlet should be constructed from energy dissipating structures (such as Armorflex or reno mattresses) to slow down the velocity of water inflow into the wetland. ➢ After construction of the outlet, the area surrounding the outlet should be re-seeded with indigenous wetland vegetation; and ➢ The contractor must inspect the site post-construction for erosion, especially after rainfall events and if damage occurs, it should be rehabilitated immediately.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

5.3. Activity 3: Contractor yard

Monitoring of the implementation of the impact management actions are defined in **Table 5**.

Table 4: Mitigation Measures – Contractor yard

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
Impact management outcome: Site preparation prior to construction activities related to the road diversion.			
➢ Contractor laydown areas to be established outside of the delineated watercourses and the applicable 100 m zone of regulation; ➢ Vehicles are to be serviced at the contractor laydown area and all refuelling is to take place outside of the wetlands and the applicable 100 m zone of regulation; ➢ Contractor yard footprint area is to remain as small as possible and vegetation clearing to be limited to what is essential; ➢ Ablution facilities with chemical toilets shall be provided and must not be within 100 m of any natural water resources. ➢ Retain as much indigenous wetland vegetation as possible; ➢ Access to the construction site must be controlled against unlawful entry for safety reasons. ➢ It should be feasible to utilise existing roads to gain access to the study area, and crossing the wetlands in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles; and ➢ The wetlands and the applicable 32 m zone of regulation should be clearly demarcated and marked as a "no-go" area where no construction activities are planned.	General Manager Environmental Manager	• Induction • Distribution of the EMPr to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Loss of species diversity and impact on ecology			
➢ No dumping of waste on site should take place. Place bins inside the contractor yard to manage general and hazardous waste. Construction rubble must be removed during the final clearing and cleaning; ➢ If any hydrocarbon and/or chemical spills occur, they should be immediately cleaned up. Spill kits should be kept on site. In the event of a breakdown, maintenance of vehicles must take place with care and the recollection of spillage should be practised preventing the ingress of hydrocarbons into the topsoil. It should be ensured that no spills leak into the freshwater resource associated with the study area; ➢ Place topsoil on the demarcated topsoil stockpiles outside of sensitive areas; ➢ Edge effects of all activities, such as erosion and alien plant species proliferation, need to be strictly managed adjacent to the project footprint areas; ➢ An effective dust management plan must be designed and implemented so to prevent an increase in sediment load within the surrounding wetlands; ➢ Alien and invasive vegetation monitoring and eradication should take place throughout construction of the road; ➢ The collection of firewood, floral SCC or medicinal floral species is not allowed by workers; ➢ Care should be taken not to remove or destroy any floral SCC that may be found during the construction phase of the development. A permit should be obtained from the MTPA if it becomes imperative for any floral SCC to be removed; ➢ No illicit fires are allowed during the construction phase of the proposed development;	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
➢ Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan complied by a suitable specialist. ➢ Should any other floral species protected under MNCA (Act 10 of 1998) or NEMBA (Act 10 of 2004) be encountered within the proposed development footprint areas, authorisation to relocate such species must be obtained from the MTPA or the Department of Environmental Affairs (DEA) respectively; ➢ Excavated topsoil must be stored with associated native vegetation debris for subsequent use in rehabilitation; ➢ Revegetation of disturbed areas should be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff; ➢ When rehabilitating topsoil stockpile footprint sites, it is crucial that as far as possible the habitat that was present prior to disturbances is recreated, so that faunal species that were displaced by vegetation clearing activities are able to recolonize the rehabilitated area; ➢ A suitable rescue and relocation plan should be developed and overseen by a suitably qualified specialist or nominated personnel in order to ensure that species loss during construction activities is kept to a minimum; and ➢ No hunting/trapping or collecting of faunal species is allowed.			
Impact management outcome: Topsoil contamination with hydrocarbons and chemical compounds from mechanical equipment			
➢ Limit vehicle/construction equipment activity within the wetlands to what is absolutely necessary; ➢ Vehicles are to be serviced at the contractor laydown area and all refuelling is to take place outside of the wetlands and the applicable 100 m zone of regulation; ➢ Chemical toilets are to be provided for site workers and contractors. Chemical waste must be regularly removed by a registered waste contractor, carefully avoiding spillages which could result in soil contamination; ➢ Excavated materials should not be contaminated and it should be ensured that the minimum surface area is taken up; ➢ Prevent any spills from occurring as far as possible; ➢ If a spill occurs it is to be cleaned up immediately and reported to the appropriate authorities; ➢ Contaminated soil should be disposed at a suitable disposal facility and remediated on site; ➢ Vehicles leaking hydrocarbons, will have drip trays placed under them, until repaired; ➢ All hydrocarbons must be stored within a bunded area; and ➢ If any vehicles or machinery break down on site and it cannot be transported to the workshop, the responsible person must have an emergency spill kit available when attending the breakdown to prevent soil contamination.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: compaction and erosion/sedimentation of topsoil			
➢ Once the road has been constructed, the contractor's yard should be removed and the cleaned footprint should be deep cross-ripped to alleviate compaction; ➢ All stockpiles should be stored on a flat surface to minimise run-off if possible. ➢ Stockpiles must be located away from water courses. ➢ Ensure proper storm water management designs and systems are in place; ➢ If erosion occurs, corrective actions must be taken to minimize any further erosion from taking place; ➢ Stockpiled soils must be re-vegetated as soon as possible to reduce the risk of erosion; and ➢ All exposed soils must be protected for the duration of the construction period with a suitable geotextile in order to prevent erosion/sedimentation.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 month

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
Impact management outcome: Cease in current land use, land capability and agricultural production at road footprint during construction phase			
➢ Remove contractor yard once the road has been constructed. Rehabilitate the disturbed area and re-seed with an indigenous plant species.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Deterioration of air quality caused by emissions			
➢ Reduce unnecessary traffic; ➢ Chemical toilets must be emptied frequently; ➢ No uncontrolled fires are permitted on-site; ➢ Minimise extent and frequency of disturbance; and ➢ Machinery and vehicles must be serviced on a regular basis.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: Deterioration of air quality as a result of particulate matter and dust fallout			
➢ Reduction of unnecessary traffic; ➢ Strict speed control; ➢ Illicit fires are prohibited; ➢ Minimise extent and frequency of disturbance; ➢ Machinery and vehicles must be serviced on a regular basis; ➢ Access and other cleaned surfaces should be dampened whenever possible, especially in dry and windy conditions.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

Impact management actions	Implementation		
	Responsible person	Method	Timeframe
Impact management outcome: Generation of additional noise			
➢ Contractor lay-down areas should be located away from noise sensitive areas; ➢ Equipment should be turned off when not being used; ➢ Construction activities should be restricted to daylight hours; and ➢ Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months
Impact management outcome: The visual impact caused by the construction of the proposed road diversion			
➢ The construction site should be kept clean to minimise the visual impact; ➢ All temporary structures erected during the construction phase should be removed upon completion of the project; ➢ Chemical toilets and waste bins are to be appropriately located to minimise visual disturbance; ➢ Once construction has been completed, the site should be inspected for areas that have been disturbed by erosion, sedimentation, runoff, etc. so that they can be properly rehabilitated and re-vegetated. ➢ Any litter observed should be removed at the end of each day; ➢ Stockpiled soil should be reapplied to the disturbed areas and the re-vegetated using a mix of indigenous species; and ➢ Any encountered alien invasive species should be removed, carefully avoiding the spread of seeds.	General Manager Environmental Manager	• Induction • Distribution of the EMP to all management positions – ensure that recommended measures/instructions are implemented. • Implementation of mitigation measures and conditions during and after construction.	Construction – 6 to 9 months

5.4. Monitoring of the implementation of the impact management actions

Table 5: Monitoring of the implementation of the impact management actions

Aspect	Monitoring		
	Responsible person	Frequency	Evidence of compliance
Soil, Land Use and Land Capability	Environmental Superintendent / Environmental Compliance Officer (ECO)	Weekly Inspections during Construction	Monthly Report.
	External Qualified Consultant	After construction, once off.	Final Report submitted to relevant state departments.
Flora	Environmental Superintendent / Environmental Compliance Officer (ECO)	Weekly Inspections during Construction	Monthly Report.
	External Qualified Consultant	After construction, once off.	Final Report submitted to relevant state departments.
Fauna	Environmental Superintendent / Environmental Compliance Officer (ECO)	Weekly Inspections during Construction	Monthly Report.
	External Qualified Consultant	After construction, once off.	Final Report submitted to relevant state departments.
Freshwater	Environmental Superintendent / Environmental Compliance Officer (ECO)	Weekly Inspections during Construction	Monthly Report.
	External Qualified Consultant	After construction, once off.	Final Report submitted to relevant state departments.
Air Quality	Environmental Superintendent / Environmental Compliance Officer (ECO)	Weekly Inspections during Construction	Monthly Report.
	External Qualified Consultant	After construction, once off.	Final Report submitted to relevant state departments.
Noise	Environmental Superintendent / Environmental Compliance Officer (ECO)	Weekly Inspections during Construction	Monthly Report.
Socio-economic	Community Superintendent Plant Management	Weekly Assessment of Complaint Register	Liaise with stakeholder that reported complaints and write internal report regarding the outcome

6. FINANCIAL PROVISION

This application is not for a mining activity, although the reason for the change in the alignment of the road is to facilitate mining. Therefore, the provision was made for the rehabilitation activities associated with the construction area as well as the contractor yard. Note that the road in its new position will be a permanent feature and will not have to be rehabilitated. Refer to **Table 6**.

Table 6: Closure and rehabilitation cost for Wonderfontein Road

No.	Description	Unit	A	B	E=A*B
			Quantity	Escalated Master rate	Amount (Rands)
3	Rehabilitation of **access roads**	m2	600,00	R 41,96	R 25 176,00
10a	**General surface rehabilitation (clearing debris)**	ha	8,70	R 25 500,00	R 221 850,00
10b	**General surface rehabilitation (seeding)**	ha	9,70	R 15 885,88	R 154 093,04
14	2 to 3 years of **maintenance and aftercare**	ha	9,70	R 15 671,72	R 152 015,68
	(Sum of items 1 to 15 above)			**Subtotal 1**	**R 553 134,72**
1	Preliminary and General	12,0%	of Subtotal 1		R 66 376,17
2	Administration and supervision costs	6%	of Subtotal 1		R 33 188,08
3	Closure plan				R 159 893,00
4	Contingency	10,0%	of Subtotal 1		R 55 313,47
				Subtotal 2	**R 867 905,44**
				Add Vat (15%)	R 130 185,82
				GRAND TOTAL	**R 998 091,26**

7. ENVIRONMENTAL MONITORING

7.1. Monitoring Introduction

This section outlines the monitoring and reporting program to be implemented during the construction phase of the project. Once the road is handed over to the Mpumalanga Department of Public Works, Roads and Transport, all maintenance and monitoring will form part of their overall maintenance and monitoring conducted at the P15-1 road. The monitoring and reporting program was developed based on the activities that will be carried out during the project. The potential impacts were identified and assessed in *Section 9* and *10* of the *EIAR* and the relevant legislation, standards and guidelines are described in *Section 4* of the *EIAR*.

The principal purpose of the monitoring and reporting program is to provide information necessary to determine the project's operational and environmental performance within and around the proposed study area. Regular monitoring serves as an indication of the efficiency of the mitigation and management measures, as well as compliance with applicable legislation, standards, guidelines and permit conditions imposed by DMR.

The monitoring and reporting program was designed to:

- Comply with applicable South African legislation, standards and guidelines;
- Adhere to internationally acceptable good environmental monitoring practices;
- Allow periodic reassessment of the project's effects and subsequent review of mitigation and management measures;
- Be simple to implement and report results; and
- Be auditable.

Wonderfontein Mine will be responsible for conducting the monitoring and reporting program as part of ongoing operations as well as ensuring that sufficient resources are available for effective program implementation. Where appropriate, Wonderfontein may establish agreements with others (i.e. external contractor) for provision of additional support in implementing the monitoring and reporting program.

The key aspects identified in this monitoring and reporting program are:

- Bio-monitoring;
- Surface water (quality and quantity);
- Air quality;
- Noise;
- Socio-economic; and

- Visual

Results from all environmental monitoring activities (including sampling and analysis) undertaken will be reported as per the reporting procedures outlined in **Section 7.7** (and as specified under each of the following sub-headings) of this document. A summary of the monitoring to be conducted is shown in **Table 13**.

7.2. Bio-monitoring

Stream 1 is a tributary of the Blesbokspruit River and is located on the eastern side of the road diversion. It is suggested that bio-monitoring be conducted on a bi-annual basis (once during the wet season and once during the dry season) at two monitoring points, one upstream and one downstream, at Stream 1.

The following standardised procedures will be used for the bio-monitoring:

- SASS5 – South African Scoring System Rapid bio-monitoring method, and
- Integrated Habitat Assessment System (IHAS).

7.3. Surface Water Monitoring

Wonderfontein Mine's current ongoing surface water monitoring programme is still adequate and will therefore be utilised to monitor the surface water quality and quantity during this project. However, two points will be added for the duration of the construction period of the road, one upstream and one downstream of Stream 1 located to the east of the planned road. It will ensure the timely identification of any potential impacts that may arise during this project.

Wonderfontein Mine will implement surface water management measures to mitigate potential impacts, as described in **Section 5** of this report. This section details the implementation of monitoring measured relating to surface water management.

Surface water quality monitoring is required to provide information necessary to determine potential project impacts on surface water, which can adversely affect human health, terrestrial life and wetland function.

The objectives of surface water quality monitoring are to ensure that:

- Measures to avoid, mitigate and manage impacts on surface water (see **Section 5**) are meeting set objectives;
- Surface water is maintained to an acceptable quality in compliance with all applicable legislation;
- Any potential changes to water quality is identified; and

- Changes in water resources are detected early to determine appropriate mitigation and management.

7.3.1. Surface Water Quality Monitoring

Surface water quality monitoring will be conducted on a weekly basis during the construction phase in order to ensure timely identification of any impacts from the project on downstream ecosystems. Surface water quality monitoring will focus on the following parameters: pH, TDS and EC.

7.3.2. Applicable Water Quality Guidelines and Standards

The surface water compliance is measured against the IUCMA Resource Quality Objectives (RQO). The South African Water Quality Guidelines (SAWQG) are used for parameters not listed in the RQO. Refer to **Table 7**.

Table 7: Surface water parameters

Determinants	Units	Resources Quality Objectives (IUCMA)	SAWQG
TDS	mg/l		≤ 450
pH at 25° C	pH units	≥ 5.9 to ≤ 8.8	≥ 6 to ≤ 9
Conductivity	mS/m	≤ 30	≤ 70
Sodium	mg/l Na		≤ 100
Cadmium	mg/l Cd		≤ 0.5
Chloride	mg/l Cl		≤ 100
Sulphate	mg/l SO_4	≤ 30	≤ 200
Nitrate	mg/l N		≤ 6
Fluoride	mg/l F		≤ 1
Ammonia	mg/l N		≤ 1
Iron	mg/l Fe		≤ 0.1
Manganese	mg/l Mn		≤ 0.05
Aluminium	mg/l Al		≤ 0.15
Alkalinity	mg/l $CaCO_3$		N/A
Zinc	mg/l Zn		≤ 3
Calcium	mg/l Ca		≤ 32
Magnesium	mg/l Mg		≤ 30
Potassium	mg/l K		≤ 50

If the WUL is issued, these requirements should be re-assessed, and the necessary changes made to ensure alignment.

7.3.3. Surface Water Monitoring Locations

Figure 2 below represents Wonderfontein Mine's surface water monitoring points as well as the location of the two newly added points (UW-S10 and UW-S11) which will be monitored during the construction phase of the road diversion. The new monitoring points are located upstream and downstream of Stream 1 on the eastern side of the road diversion. Refer to **Table 8** for the description and co-ordinates of Wonderfontein Mine's surface water monitoring points.

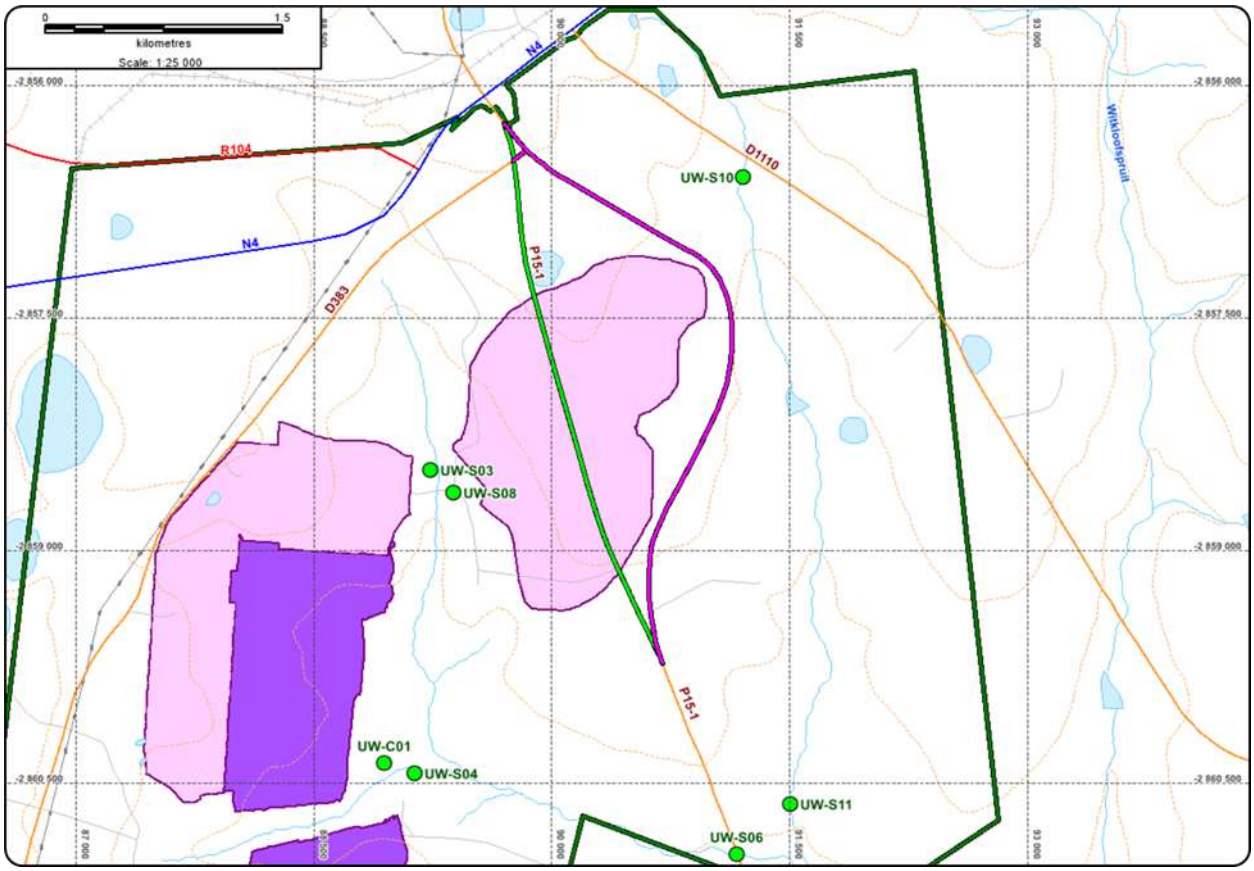


Figure 2: Wonderfontein Mine surface water monitoring point localities

Table 8: Location of the existing surface water monitoring points in close relation to the road diversion study area

Site name	Description	Latitude S	Longitude E
Existing surface Water Monitoring Points			
UW-C01	PCD at opencast area	25° 50' 55.00" S	29° 53' 14.00" E
UW- S03	Farm dam upstream from Blesbokspruit tributary next to Awie Farm House. Upstream of Pit B	25° 49' 53.45" S	29° 53' 24.06" E

UW-S04	Farm dam downstream from Bezuidenhout Dam	25° 50' 57.10" S	29° 53' 20.90" E
UW-S06	Tributary of Blesbokspruit at bridge # 2863 on the R33.	25° 51' 13.70" S	29° 54' 34.00" E
UW-S08	Upstream tributary of the Blesbokspruit out flow ofS03	25° 49' 58.11" S	29° 53' 29.40" E
New Surface Water Monitoring Points			
UW-S10	Upstream from Road Diversion	25° 51' 3.03" S	29° 54' 46.03" E
UW-S11	Downstream from Road Diversion	25° 48' 51.61" S	29° 54' 34.42" E

7.3.4. Surface Water Monitoring Data Reporting

Data should be collated in a well-structured formal database. One closure out report, after construction, containing all monitoring results should be compiled and submitted to management and to DWS as part of the compliance with the WUL.

Monitoring data should be reviewed in detail, specifically:

- Addressing any actions that could be undertaken to reduce impacts; and
- Motivation for additional monitoring localities, change in schedules etc.

If surface water qualities are found to exceed the limits or site-specific water quality objectives, action may be required to improve/mitigate the source of contamination. It might be prudent to assess current catchment water quality objectives in association with neighbouring mining, which take cognisance of the background surface water quality and feedback/discussions with upstream/downstream water users.

7.4. Air Quality Monitoring

The air monitoring during this project will form part of Wonderfontein Mine's existing and ongoing air monitoring programme, but two points in the north and south of the road construction area, (namely WD-14 and WD-15) will be added. These two points will only be monitored until construction is concluded and thereafter monitoring will cease. Air quality management measures will be implemented to mitigate potential impacts on air quality during construction. Ongoing monitoring is required to provide information necessary to determine potential project impacts on air quality, which can pose potential health and environmental risks.

The objectives of the air quality monitoring program are to ensure that:

- The measures to avoid, mitigate and manage impacts on air quality are achieving set objectives;
- Assessment of compliance with dust control regulations;

- Facilitate the measurement of progress against environmental targets;
- Temporal trend analysis to determine the potential for nuisance impacts;
- Tracking of progress due to pollution control measure implementation;
- Informing the public of the extent of localised dust nuisance impacts occurring in the vicinity of the operations; and
- Changes in air quality that may be directly related to project activities are detected early to allow implementation of appropriate mitigation measures.

It is of importance that the mitigation and monitoring recommendations contained within the air quality impact assessment be utilised as guidelines for the mitigation of all impacts on air quality and that monitoring should take place in accordance to the recommendations. An action plan should be developed utilising that document to ensure effective air quality management and monitoring thereof.

7.4.1. Applicable Air Quality Guidelines and Standards

The regulatory guidelines and standards relevant to air quality monitoring include:

- National Dust Control Regulations (NDCR); and
- South African National Ambient Air Quality Standards No. 1210.

The recommended guideline values under these standards are presented in **Table 9** and **Table 10**.

Table 9: Air quality standards for specific criteria pollutants (SA NAAQS)

Averaging period	Concentration	Allowed frequency of exceedance	Compliance date
Particulate Matter (PM_{10})			
24 hours	75 µg/m³	4	1 January 2015
1 year	40 µg/m³	0	1 January 2015
Particulate Matter ($PM_{2.5}$)			
24 hours	40 µg/m³	4	1 January 2016 – 31 December 2029
24 hours	25 µg/m³	4	1 January 2030
1 year	20 µg/m³	0	1 January 2016 – 31 December 2029
1 year	15 µg/m³	0	1 January 2030

Table 10: Acceptable dustfall rates

Restriction areas	Dustfall rate (D) in mg/m^2/day over a 30-day average	Permitted frequency of exceedance
Non-residential areas	600 < D < 1 200	Two within a year, not sequential months.

7.4.2. Proposed Air Quality Monitoring Locations

Wonderfontein Mine's existing dust monitoring programme consists of a total of 11 single bucket dust fallout monitoring locations and three multi bucket fallout monitoring locations. In addition to the dust fallout monitors, PM_{10} and $PM_{2.5}$ monitors were installed. As indicated previously two points (WD-14 and WD-15) will be added and will be monitored during the construction period. Monitoring at those two points will not be done post-construction and Wonderfontein will continue with the mine's current monitoring programme. Refer to **Table 11** and **Figure 3** for the location of Wonderfontein Mine's air quality monitoring points.

Table 11: Wonderfontein Mine's current air quality monitoring locations

Dust point	Co-Ordinate South	Co-Ordinate East
Existing Monitoring Points		
WD - 1	25° 50' 36.5" S	29° 52' 05.4" E
WD - 2	25° 51' 07.1" S	29° 52' 55.5" E
WD - 3	25° 51' 07.0" S	29° 52' 22.0" E
WD - 4	25° 50' 36.0" S	29° 52' 28.4" E
WD - 5	25° 51' 02.1" S	29° 51' 36.1" E
WD - 6	25° 50' 40.4" S	29° 53' 24.8" E
WD - 7	25° 51' 28.2" S	29° 52' 30.4" E
WD - 8	25° 50' 20.0" S	29° 51' 51.6" E
WD - 9	25° 49' 56.4" S	29° 53' 19.7" E
WD - 10	25° 50' 17.6" S	29° 53' 58.2" E
Multi 1 North	25° 50' 17.2" S	29° 51' 54.8" E
Multi 1 South	25° 50' 17.2" S	29° 51' 54.8" E
Multi 1 East	25° 50' 17.2" S	29° 51' 54.8" E
Multi 1 West	25° 50' 17.2" S	29° 51' 54.8" E
Multi 2 North	25° 50' 35.4" S	29° 52' 29.0" E
Multi 2 South	25° 50' 35.4" S	29° 52' 29.0" E
Multi 2 East	25° 50' 35.4" S	29° 52' 29.0" E
Multi 2 West	25° 50' 35.4" S	29° 52' 29.0" E
Multi 3 North	25° 50' 17.6" S	29° 53' 58.2" E
Multi 3 South	25° 50' 17.6" S	29° 53' 58.2" E
Multi 3 East	25° 50' 17.6" S	29° 53' 58.2" E
Multi 3 West	25° 50' 17.6" S	29° 53' 58.2" E
PM_{10} Monitor	25° 51' 04.3" S	29° 52' 03.8" E
Receptor 2	25° 51' 09.3" S	29° 51' 20.1" E
Receptor 13	25° 53' 38.7" S	29° 51' 26.4" E
New Monitoring Points		
WD-14	25° 51' 11.01" S	29° 54' 42.6" E
WD-15	25° 48' 50.24" S	29° 54' 32.4" E

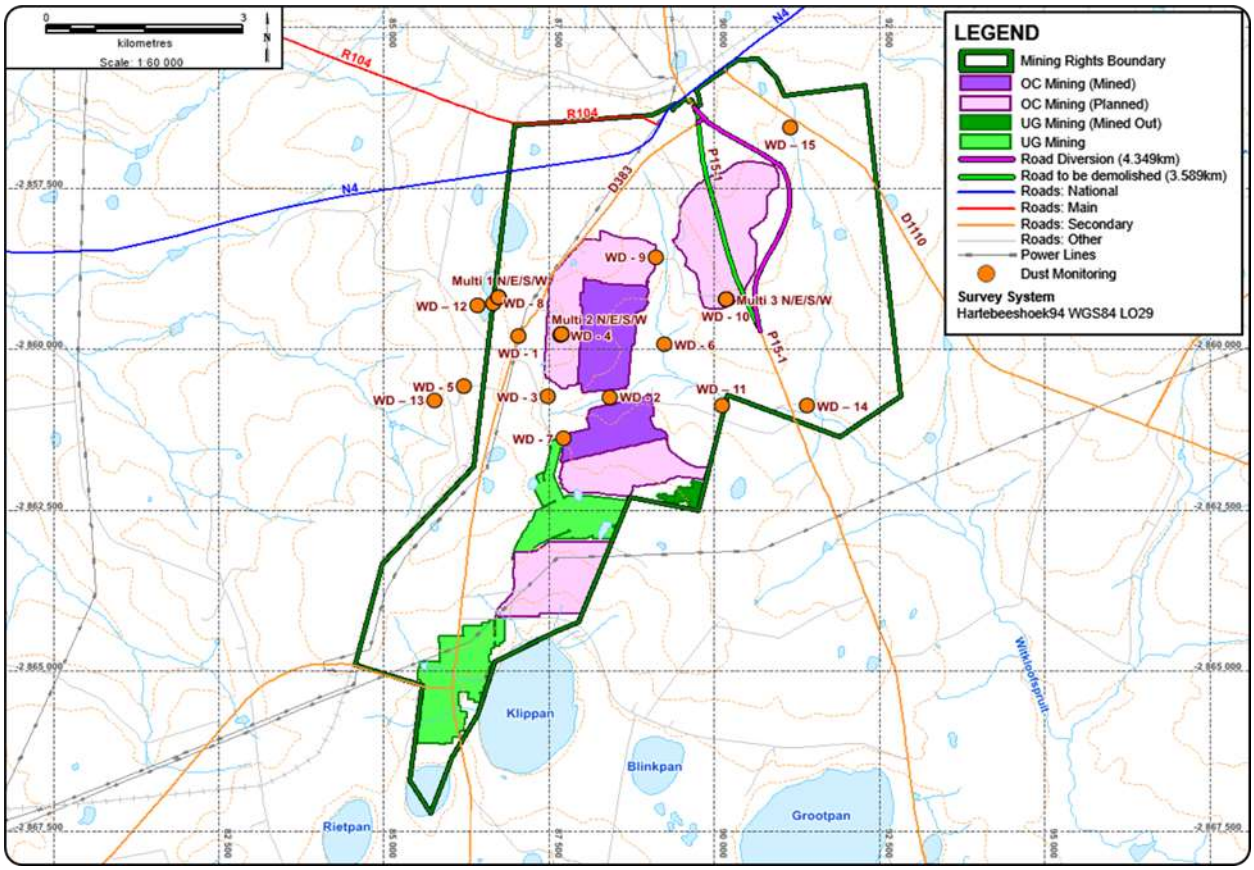


Figure 3: Dust monitoring points as part of Wonderfontein Mine's existing dust monitoring programme

7.4.3. Air Quality Monitoring Frequency

Dust fallout will be monitored on a monthly basis during the construction phase at the monitoring points suggested above. The monitoring should occur on a continuous basis for the duration of the project to determine daily and monthly averages.

7.5. Noise Monitoring

Wonderfontein will implement noise management measures to mitigate potential impacts during the construction phase of this project, as described in **Section 5**. This section details monitoring related to the noise management which is going to be implemented.

Noise monitoring is required to provide information necessary to determine potential noise impacts on sensitive receptors (i.e. nearby communities), as a result of the construction of the road.

The objectives of the noise monitoring program are to ensure that:

- Measures to avoid, mitigate and manage potential noise impacts (see **Section 5**) are achieving the set objectives;

- Noise is maintained at an acceptable level in compliance with all applicable legislation;
- Any potential noise impacts are identified; and
- Changes in noise levels that may be directly related to project activities are detected early to allow for appropriate mitigation measures to be implemented.

An action plan should be developed utilising those documents to ensure effective noise management and monitoring thereof.

7.5.1. Applicable Noise Guidelines and Standards

The regulatory standards and guidelines relevant to noise monitoring that were adopted are:

- South African National Standard: SANS 10103:2008 - The measurement and rating of environmental noise with respect to annoyance and to speech communication.

7.5.2. Proposed Noise Monitoring Points

Noise monitoring points will have to be established considering all the sensitive receptors prior to construction and will be rassessed on a regular basis during the construction phase of the project (see below for monitoring frequency). Noise monitroing points will be established in high risk noise areas within the project area (e.g. where heavy machinery is being used) to monitor potential impacts to employees and surrounding communities. Occupational noise monitoring will form part of the monitoring program for health, safety, community and visual monitoring.

7.5.3. Noise Guideline Values/Limits

Guideline values/limits for noise and vibration levels have been selected in order to meet legislative requirements and provide monitoring results relevant to the project.

Table 12 lists noise guideline values/limits for the project. Where a guideline value/limit is at different levels, the most stringent value will be adopted. Exceedance of guideline values/limits at any noise monitoring point will be identified and reported to management and relevant regulatory authorities and entered into the recording system described in **Section 7.7**. The following guideline values/limits will also apply to air over pressure monitoring, which is calculated by measuring the sound level pressure (dB(A)).

Table 12: Noise monitoring guideline values/limits

Area	SANS 10103:2008	
	Daytime dB(A)	Night time dB(A)
Rural districts	45	35
Industrial districts	70	70

7.5.4. Noise Monitoring Frequency

Noise monitoring will be undertaken on a monthly basis during the construction phase of the project. In addition, noise monitoring must be conducted at the location of the person that registered a valid and reasonable noise complaint. The measurement location should consider the direct surroundings to ensure that other sound sources cannot influence the reading.

7.6. Visual Monitoring

Visual monitoring should be undertaken monthly during the construction process.

7.7. Socio-economic Monitoring, including Health, Safety, Community and Visual Monitoring

Ongoing monitoring will be conducted in order to identify any impacts which the project may have on stakeholders. The socio-economic conditions, such as health and safety and visual impacts, within the local communities and on the surrounding farms will also be determined. This will involve monitoring of stakeholder and community sentiment and the socio-economic impacts as part of Wonderfontein Mine's ongoing commitment to promoting public and community health and safety.

7.7.1. Proposed Socio-economic Monitoring Procedure

Monitoring of stakeholder consultation will include the following:

- Records of attendance at public events and community meetings to gauge the success of stakeholder consultation and to improve ongoing stakeholder consultation; and
- Records of feedback including the person's name and contact details, method of consultation, information communicated, responses and outcomes of the consultation in the stakeholder database.

Monitoring of the socio-economic impacts will include ongoing monitoring of the following indicators:

- Workforce statistics, including the number of 'local' and South African nationals employed by the project;
- Number and nature of complaints documented through grievance procedures, including the person's name and contact details, communication, action taken to resolve the complaint, outcomes and feedback from complainant;
- Service and goods supply statistics. These will include details regarding:
    - Type and quantity of goods/service;
    - Value;

  - Location of supplier;
- Community engagement, attitudes and interaction;
- Number of new local business opportunities as a result of project activities;
- Delays and disruption to transport;
- Access to and attendance at, social services and facilities (e.g. hospitals, schools);
- Population and demography; and
- Health related statistics of local communities, such as the occurrence of diseases and other ailments. This can be conducted through routine surveys at local communities.

Ongoing socio-economic monitoring will be undertaken and reported as described in **Section 7.7**.

7.8. Quality Assurance and Quality Control

A quality assurance and quality control (QA/QC) system will be implemented to ensure consistency and quality of the proposed monitoring program. The QA/QC program will include the following:

- A clear statement regarding the objectives of the various aspects of the monitoring program;
- Clearly defined employee responsibilities for managing and conducting monitoring;
- Procedures for monitoring and sample collection (and filtering and preservation if required);
- The training of responsible personnel in the use of monitoring techniques, equipment and sample collection procedures;
- The regular maintenance and calibration of on-site monitoring equipment, as per the manufacturers' instructions;
- The use of appropriately qualified and regulated external laboratories to verify on-site monitoring results and to check for precision;
- The use of duplicate samples, field blanks, laboratory blanks, etc.; and
- Chain-of-custody procedures for sample handling and transportation for both internal and external samples.

7.9. Review of Monitoring Program

Due to the duration of the construction period and that after construction the road will become part of the provincial road network, the monitoring programme will not be reviewed.

The following table is a summary of the monitoring measures, which should be read in conjunction with **Section 7.2 - 7.6**.

Table 13: Summary of proposed monitoring measures

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling Method	Variables
Surface water	Water uses related to surface water use as per Section 21 of the NWA	To monitor compliance against the WUL conditions.	As per WUL conditions.	Once of after construction is concluded.	External WUL Audit Internal WUL Audit	-
	Surface water quality	Determine any deterioration in water quality as a result of the construction activities.	As shown in **Table** 8.	Weekly	Grab sampling	EC, pH, TDS. Weekly during construction phase, as description under **Section 7.4**.
				Monthly	Grab sampling	EC, pH, TDS. Monthly during post-construction till hand over, as description under **Section 7.4**.
	Water management infrastructure	Monitoring of condition of infrastructure. Identifying areas that require maintenance. Monitoring effectiveness of infrastructure.	Along minor and major drainage structures	Monthly/after a big rain event	Visual	Evidence of erosion, cracks, lack of capacity, subsidence, overgrowth, etc.
Biodiversity / Land use management	Bio-monitoring	Ongoing monitoring of the aquatic resources in the vicinity of the mining activities.	The project area (Site-Local)	Bi-annual	Field survey Wet and Dry Season	As per specialist advice
Air quality	Dust fallout	To determine the levels of dust fallout as a result of the project activities.	Refer to **Figure 3**.	Monthly	Single and multi-dust buckets	Settleable particles (mg/m^2/day)
	$PM_{2.5}$ and PM_{10}	To determine the particular matter levels for PM_{10} and $PM_{2.5}$	Refer to **Figure 3**.	Monthly	Air Quality monitor	µg/m^3
Environmental noise	Noise levels	To determine the noise levels within sensitive areas.	To be determined	Monthly – Construction phase Immediate monitoring if a valid noise complaint is received	To be determined	dB(A)
Visual	Visual impacts	To ensure that mitigation measures regarding visual	Site-Local	Weekly	Visual inspection	Visual mitigation measures recommended in the EMPr**, Section 5**.

Aspect	Issue	Purpose	Monitoring points	Frequency	Sampling Method	Variables
		impacts are implemented and maintained.				
Socio-Economic (including health, safety and visual)	Stakeholder consultation	Ongoing monitoring to allow identification of any impacts from the project on stakeholders and socio-economic conditions in the local communities and on the surrounding farms, including health and safety, as well as visual impacts	Site-Local	Continuously	Stakeholder forums and one-on-one consultations.	-
	Social management and monitoring strategies.		Site-Local-Regional	Monthly or as required	Review strategies and action plan.	-

8 COMPLIANCE AUDITING AND REPORTING

In order to ensure compliance with this EMP and to assess the continued appropriateness and adequacy of the EMP, Wonderfontein Mine commits to:

- Appoint an Environmental Control Officer (ECO) to ensure compliance with this EMP during the construction phase of the project. The ECO will ensure the following:
    - All conditions set in the various approvals be fully understood and measures implemented to ensure compliance with those authorisations and licences;
    - An ECO report be compiled and submitted to the regulator as defined in the approvals;
    - Internal and external audits be conducted as specified in all authorisations and licences;
    - Only infrastructure that was specified in this EMPr be constructed;
- Conduct the monitoring of the EMP on an on-going basis;
- Conduct the performance assessments of the EMP;
- Compile and submit a report on the compliance of the EMP to the DMR;
- The performance assessments / compliance audits of the EMP and the compilation and submission of the reports will occur annually from the date of approval of the EMP;
- Only one compliance audit of the EMP will be conducted as the construction period will not exceed 1 year and after construction the road will be handed over to the Mpumalanga Department of Public Works and Roads.

Refer to **Table 14** for the mechanisms and responsibilities for implementation of the Impact Management Actions to ensure compliance with the EMP.

Table 14: Mechanisms and responsibilities for implementation of Impact Management Actions

Source activity / Impacts	Functional Requirements for Monitoring	Time period for Implementation	Review / Monitoring Frequency	Roles & Responsibility
Impact on biophysical environment as a result of infrastructure development	Implementation of environmental monitoring programme	Construction Phase	No review planned, monitoring frequency as defined in section 7	Environmental Department, in line with the recommendations by the specialists
Impact on biophysical and social environment as a result of infrastructure development.	Implement internal environmental awareness programme	Construction Phase	No review planned, monitoring frequency as defined in section 7	Environmental Department.
Impact on biophysical and social environment as a result of mining and infrastructure development	Review and analyses of monitoring data for: • Soil and land use management • Terrestrial Ecology • Aquatic Environments • Groundwater • Air quality • Waste management	Construction throughout the life of the operation	Monthly	Environmental Department
Impact on soils & land use as a result of infrastructure development	Develop a Rehabilitation Plan. Report the following: • Road reserve area rehabilitated	Construction Phase	Monthly review or if major change in scheduling	Project Department/ Environmental Department
Encroaching / spreading of alien vegetation as a result of vegetation clearance and rehabilitation	Develop an alien vegetation management programme	Construction Phase	No review planned, monitoring frequency as defined in section 7	Environmental Department
Impact on aquatic systems and drainage lines as a result of infrastructure development	Development and implementation of a detail storm water management plan and infrastructure designs	Prior to construction as part of the IWULA	No review planned, monitoring frequency as defined in section 7	Project Department / Environmental Department
Consultation	Develop a Communication and Consultation Plan and Grievance Procedure	Prior to construction	Ongoing review	Community Department / Project Department

Source activity / Impacts	Functional Requirements for Monitoring	Time period for Implementation	Review / Monitoring Frequency	Roles & Responsibility
EMP compliance review	Internal review of EMP compliance, conformance to environmental objectives and strategies and the implementation thereof	Commencement of project	Once off	Environmental Officer HSEC Committee
EMP compliance review	EMP performance assessment and compliance audit to determine conformance with the EMP, including effectiveness and appropriateness of the EMP	At completion of the project	Once off	External appointment

9 ENVIRONMENTAL AWARENESS PLAN

9.1 Environmental Awareness

This section outlines the environmental awareness plan that will be implemented by Wonderfontein Mine to advise its employees of the environmental risks and potential impacts that may occur as a result of the project. The provision of the environmental awareness plan meets the requirements of Appendix 4 1(m) of the *National Environmental Management Act Regulations GNR 982*, which stipulates that an EMP must include a plan that describes:

"(m) an environmental awareness plan describing the manner in which—

(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and

(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; -

In general, the purpose of the environmental awareness plan is to educate site personnel regarding the potential environmental and social issues that are associated with the project with the aim of reducing the potential for their occurrence, and to provide site personnel with the knowledge and means to rectify these issues through direct responses, or through the appropriate communication pathways.

9.1.1. Approach to Environmental Awareness

The approach to the environmental awareness plan is to construct a multi-tiered induction, incidents and complaints strategy, whereby both site personnel that are directly related to the project (including contractors and staff) and the public can be educated in potential environmental issues as well as have an avenue to report environmental complaints and incidents. To achieve this, the environmental awareness plan will require the following steps:

- Develop an internal communication and awareness campaign to highlight environmental concerns and incidents;
- Develop an induction program, which details environmental management, that all site personnel will be required to participate in;
- Implement a communication pathway so that all employees can report environmental concerns/incidents and can make suggestions for improvement; and
- Provide means for external communication so that the public can highlight concerns and report incidents.

9.1.1.1. Internal Communication and Awareness Campaign

An internal communication and awareness campaign will be developed and implemented before commencement of the project. The objective of this campaign will be to identify environmental concerns and incidents that result from the development of the project and to identify ways to promote these to site personnel. Planning and updates to the campaign will be conducted as part of the Health, Safety and Environment meetings.

9.1.1.2. Induction Program

All site personnel will undergo environmental awareness training as part of their induction prior to working on site. The induction program will include a discussion of the following:

- Description of the existing environment;
- Identification of natural resources and their value (including habitats, specific species, wetlands, etc.);
- Applicable environmental legislation;
- Potential pollution sources, or project activities that may impair the environment;
- The steps that individuals can take to avoid, minimise and manage impairment to the environment (including direct, rectifying actions and communication pathways); and
- Outline the environmental management procedures and measures that have been developed as part of this project.

9.1.1.3. Communication Pathways

Incidents that create impacts and near miss incidents should be reported to a relevant supervisor or to the environmental manager. It must be reported as soon as possible or within a maximum of 24 hours after the incident. Lodging of all incidents and near misses will lead to improvements in standard operating procedures and the recognition of areas where improvements need to be made. The process will be as follows:

- Report all impacts to the relevant supervisor as soon as possible, or at least within 24 hours after the incident/near miss/observation;
- The relevant supervisor, or environmental manager will arrange for someone to investigate what caused the incident, what to do to fix it and to stop it from happening again; and
- All incidents/near misses/observations will be logged and will be discussed at each monthly Health, Safety and Environment Committee meeting.

9.1.1.4. External Communication

Avenues for the public to voice environmental concerns/incidents resulting from the project were made available. These concerns/incidents can be recorded in Health, Safety, Environmental and Community (HSEC) reports that will be made available to the public upon request. Public environmental concerns and incidents can be identified through the following pathways:

- Annual public meetings that will be held with major stakeholders to present and/or discuss HSEC issues regarding the project. Minutes will be recorded that will outline the discussion points of the proceedings. Feedback sheets will be handed to stakeholders upon registration and can be collected after the meeting. This will allow stakeholders to change their contact details and to comment or ask questions on HSEC. All feedback sheets that are submitted will be dealt with in accordance with fixed operating procedures;
- A HSEC external complaints register will be made available before the commencement of project activities. This register will be made available at the access gate to Wonderfontein Mine. If a complaint and/or concern is raised, a formal investigation must be opened as part of the Environmental Management System (EMS) and managed and investigated in accordance with a fixed operating procedure;
- A central complaints register is available at Security and complaints is recorded in an electronic register by the Environmental Officer and Community Liaison Officer. External complaints will be recorded within this register and follow-up investigations will be undertaken and feedback provided to the complainant. Regular contact must be maintained with the complainant until the complaint has been addressed satisfactorily.

9.2. Environmental Emergency Response Planning

An emergency response plan was prepared for the project to ensure that suitable procedures are in place in the event of an environmental emergency and to meet the requirements of NEMA. This section of the EMPr will come into effect if the avoidance, mitigation and management measures that are recommended in this EMP fail to prevent incidents/emergencies that lead to unacceptable risks to human health and the environment.

In the event of an environmental emergency, the response will follow the procedures set out in the emergency response plan. These procedures will assist in the mitigation, remediation and conservation of the environment and contribute to the safety of employees (including direct employees, contractors and sub-contractors) and any other I&APs.

9.2.1. Objective

The overall objective of the environmental emergency response plan is to ensure that environmental emergencies are mitigated and managed as per best practice and that where applicable, environmental emergencies are conducted to support the continuation of pre-activity.

9.2.2. Potential Environmental Emergencies

Potential environmental emergencies resulting from project activities include:

- Major spill of hydrocarbons (fuel or lubricating oils) outside of lined containment areas;
- Major spill of a hazardous waste substance outside a containment area;
- Offsite accident (along the roads) that leads to chemical or fuel spills;
- Instability of structures;
- Explosions or fire;
- Uncontrolled fire in or adjacent to the project area; and
- Extreme weather events that could result in flooding.

9.2.3. Environmental Responses

8.2.3.1. Roles and Responsibilities

Determination of the roles and responsibilities of all people working for the project is important so that each person is aware of the appropriate response that should be undertaken. The general roles and responsibilities are provided in the sections below.

Employees

Generally, all employees are responsible for:

- Preventing and managing any environmental incident;
- Minimising the impact of an environmental incident; and
- Reporting any environmental incident to the person responsible for the affected area as soon as possible.

Responsible Persons

Generally, all responsible persons are responsible for:

- Preventing environmental incidents by adhering to and adopting the relevant procedures and code of practices;
- Implementing corrective actions where appropriate (i.e. reactionary measures);

- Implementing preventative action to prevent a reoccurrence of the environmental incident (i.e. preventative measures); and
- Reporting environmental incidents and emergencies to the project's environmental manager.

Environmental Officer

Generally, the environmental officer is responsible for:

- Testing the effectiveness of emergency procedures through the development of mock drills;
- Investigating all reported environmental incidents, determining their causes and checking whether the correct procedures were undertaken. A review of their emergency response procedures can be undertaken if the current procedures are deemed inadequate to prevent the incident from occurring again;
- Reporting incidents of a significant nature to the operations manager; and
- Reporting and discussing incidents with the management team.

9.2.3.2. Procedures

The procedures that will be undertaken in the event of an environmental incident/emergency are described in the sections below.

Employees/Incident Reporter

The employee, contractor or sub-contractor responsible to report the incident should:

- Report the incident immediately to the Control Room, his/her supervisor, the responsible person for the area, or the environmental officer.

Responsible Persons

In the event of an environmental incident/emergency, the responsible persons should:

- Contain, clean up or cordon incidents (such as spills or unstable infrastructure) immediately and implement corrective measures according to the relevant procedure; and
- Detail how the incident occurred into a behaviour-based reporting form or directly into the environmental electronic database.

Environmental Officer

In the event of an environmental incident/emergency, the environmental superintendent should:

- Follow-up on environmental incident actions and report all moderate and major incidents to the Wonderfontein Project management as soon as possible;
- Create an external report that is submitted to the national and provincial departments if the incident/emergency is deemed to be serious (i.e. leading to death or sustaining significant impact on the environment). The external report will be submitted within 14 days of the incident and will include:
    - Details on the nature and extent of the environmental incident;
    - Specific information (e.g. on substances leaked) and the details on the initial impact on persons and the environment;
    - Initial remedial measures that have been implemented to minimise the impacts;
    - Causes of the incident;
    - A list of potential preventive and corrective measures; and
    - Evaluation of the success of remedial actions and reports to the manager representative no later than one month following the incident.

9.3. Remediation Procedures

Table 15 provides a description of the methods that the Wonderfontein Road Diversion Project will employ to manage environmental incidents/emergencies.

Table 15: Remediation procedures for environmental emergencies

Emergency	Monitoring	Potential Remediation
Major spill of hydrocarbons or chemicals outside of lined containment areas.	Inspections of equipment (prior to and after use) and containment and maintenance areas.	• Follow the recommendations in the EMP to avoid, mitigate and manage the contamination of soil and water by hydrocarbons; • Ensure that all storage facilities are placed within bunded, containment areas in the event of a spill or rupture; • Ensure that the containment of each bund is equivalent to 110% of the capacity of the largest vessel within the bund; • Remove and replace contaminated soils; • Ensure that bio-remediated soil is reapplied to the affected area rapidly after remediation to avoid permanent changes to soil profile or surface drainage; • Ensure that water management structures are functioning to avoid contamination of surface water bodies; • Notify downstream users that there has been a spill (if contamination spreads offsite) and advise them not to use water from wetlands/river/stream in the area until further notice.
Offsite accidents that lead to chemical, coal or fuel spills.	Inspections of the vehicles transporting the goods.	• Report any issues that are observed along offsite areas to supervisors; • Ensure that contractors appointed for the transportation of produce are aware of the emergency response procedure in place; • Raise awareness of communities and stakeholders along the transportation route on associated risks.
Instability of structures.	Inspections for structural integrity of project infrastructure and loose infrastructure such as the stockpiles	• Task engineers with inspections and the responsibility of formulating remedial measures to rectify structural integrity; • Re-profiling ‘loose’ infrastructure immediately, where practicable, to promote structural integrity; • Provide earthquake emergency response training to emergency response managers and teams.
Uncontrolled fire in or adjacent to the project area.	Inspections of firebreaks, as outlined in the fire break plan.	• Adhere to the fire break plan at all times; • Purchase fire extinguishers and keep these in designated areas for use where possible; • Evacuate the project area in line with the Wonderfontein Mine Emergency Response Plan to avoid loss of life; • Maintain dedicated fire water pumps to be used for fire related emergencies; • Maintain firefighting equipment in good working order and ensure adequate water supplies are available.
Extreme weather events resulting in flooding.	Daily inspections on the potential for extreme weather. Ensure that water management systems are functioning.	• All infrastructure to be constructed to function in accordance with the requirements of the Mpumalanga Department of Public Works and Roads.

Emergency	Monitoring	Potential Remediation
		• Check that no activities are located within flood-line areas and within the wetland zone buffer areas; • Ensure that stormwater drainage systems are designed, constructed, operated and maintained in such a way that it safely discharges to the environment via water management structures.

10 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No such information requirements were set by the competent authority

11 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☒.

Jaco-K Consulting (Pty) Ltd

Company

13 March 2020

Date

Signature of EAP

12 REFERENCES

Jaco-K Consulting, 2011. *Scoping Report for Wonderfontein Mine EMP Amendment, 30/5/1/2/2/359 MR.* Unpublished report done for Umsimbithi Mining (Pty) Ltd. Report No. JKC_0373, August 2014

Rehab Green, 2019. *Soil, land capability, land use and hydropedology assessment of the proposed Wonderfontein Road Diversion servitude*. Report No. RG/2018/08/07/1, July 2019.

Scientific Aquatic Services, 2019. *Freshwater ecological assessment as part of the environmental assessment and authorisation as well as Water Use Licence Application process for the proposed Wonderfontein Road Diversion, Mpumalanga Province*. Report No. SAS 219006, April 2019.

WSP. (2018). *Traffic Impact Assessment – Proposed realignment of road P15-1, Wonderfontein, Mpumalanga*. Report No. 22115, January 2018.

CV of EPJ Kleynhans

Personal Details

Name:	Evert Philippus Jacobus Kleynhans
Date of birth:	23 September 1963
Identify number:	630923 5073 086
Gender:	Male
Residential address:	15 A Frame Street Middelburg, 1050
Postal address:	Suite 445 MW, Private Bag X1838,
Middelburg, 1050	
Contact number:	082 417 6901
Email:	jaco@jacokconsulting.co.za

Academic qualification

B Eng (Hons): University of Pretoria, South Africa

Pr Eng 17 March 1994, registration number 940108

Jaco Kleynhans is a professional engineer, ECSA number 940108, and conducted environmental assessments over the past 15 years and were the environmental assessment practitioner (EAP) for more than 50 Environmental Impact Assessment (EIA) (including assessments done under the Mineral Petroleum Resources Development Act) projects and more than 40 Basic Assessment (BA) (or equivalent) projects during that period. A list of the projects is attached as Annexure 1 (EIAs) and Annexure 2 (BA)

His expertise include the following –

Project Management

Manage legal environmental authorisation processes for both green and brown coal mining projects. It includes initiating and managing all the environmental related specialist studies that need to be undertaken as well as the conceptual engineering requirements associated with such a project. Some 100 such projects were completed successfully over the last 15 years.

Mine Water Management

Assess water quality management strategy alternatives and recommend/motivate the preferred option to the decision makers and other I&APs. It includes activities related to water, water containing waste and waste.

Water Quality Management

Compile water use license applications for coal mines in the Mpumalanga Highveld. It includes the quantification and qualification of surface water impacts. This is then followed by integrating surface and groundwater impacts resulting in a qualitative and quantitative integrated water assessment. Outputs from such an assessment include integrated water and salt balances as well as an integrated water management plans. As part of these assessments water quality objectives are developed, set and motivated.

Environmental

Operational environmental management services are provided at a number of coal mines. It includes the implementation of the EMP commitments as well as conditions set in Water Use Licenses and Environmental authorisations. Monitoring and measurement of surface - , groundwater and dust are done, results interpreted and corrective actions proposed, implemented and monitored. EMP performance assessments and annual closure cost assessments are also conducted. Conducted 6 environmental due diligence assessments that include Optimum Colliery, Kleinkoppje Colliery, Ermelo, Springlake, Vuna Mining, Keaton Energy and Project Iniqua.

Environmental Impact Assessments

Since 2005 I was the appointed EAP for various environmental impact assessments and it includes mostly green field mining related projects. A number of basic assessments were also conducted during that period. Refer to Annexure 1 and 2.

Environmental Engineering

Develop conceptual design of pollution control measures, Mine Residue Deposit, and Water Supply Services.

Water related project the past 4 years

The following water related projects were conducted during the past four years: -

- Goedehoop water management system including detailed water balance determinations and management of the water use license requirements, client Muhanga Mines
- Vlaklaagte TNC water management and water balance determination, client Muhanga Mines
- KLX project water management and water balance calculations, client South32
- Pegasus Colliery water management and water balance calculations, client South32
- Welstand Colliery dewatering and mine optimization, client Mbuyelo Mining
- Vaalwater water management and water balance calculations, client Muhanga Mines
- VDDC Dewatering, client South32
- Elandspruit, client Wescoal

Current water related projects

- Langkloof water management measures to prevent impact on wetlands, client Muhanga Mines
- Welgemeend water management and water balance calculations, client Welgemeend Colliery
- Welstand water management, client Mbuyelo Mining
- Vlaklaagte water management and water balance calculations, client 2Seam
- Diversion of the Olifants River, client 2Seam
- OC6 water management and water balance calculations, client 2Seam
- Kebrafield water management and water balance calculations, client Mbuyelo Mining
- Ermelo Dump expansion water management and water balance, client Scinta Energy

- Project Z, water management and water balance, client Mwelase Mining.

Environmental liability assessments:

Environmental liability assessments to determine the financial provision of mines have been conducted since 1995. First for Douglas Colliery over a period of 7 years and then for Optimum Colliery for a period of 3 years.

Thereafter such assessments were made for BHP Billiton, South32, Glencore, Shanduka Coal, Umcebo Mining, Umsimbithi Mining, Muhanga Mines, Rietkuil, Mzimkhulu Mining, Rietvlei Mining and Wescoal Mining.

A development of a framework in terms of the new NEMA Financial Liability Assessment, Regulation No. R 1147 of 20 November 2015, was done for Glencore.

Annual rehabilitation plans, final rehabilitation and decommissioning and closure plans as well as risk reports were compiled for Glencore, Mwelase and Scinta Mining

Summary of Work Experience:

February 2008 – present	Jaco – K Consulting Middelburg South Africa
2005 – 2008	African EPA Consulting Engineers Pretoria, South Africa - Regional Engineer
1995 – 2005	Ingwe Collieries Environmental Manager at Douglas Colliery and Optimum Colliery
1987 – 1995	Department of Agriculture – Final position: Senior Engineer

Annexure 1: EIA's including EMPs compiled for mining rights applications

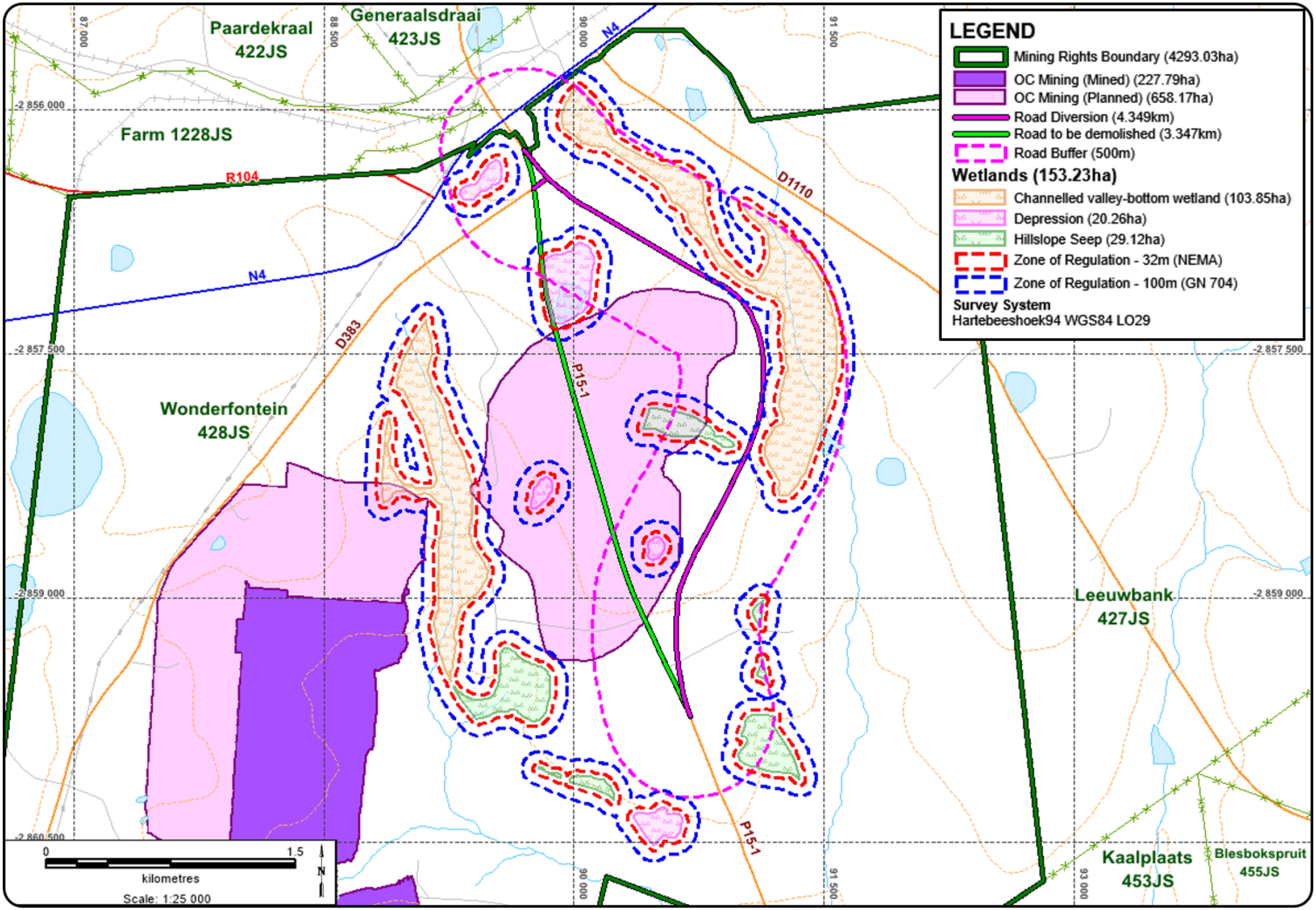
Proj No	Title	Role	Detail	Client
	African EPA			
A0467	Doornrug EMP	Writer	EMP for mining right application	Umcebo
A0678	Hendrina Power Station fines project	Writer	EIA for listed activities	M Blenkinsop
A0744	Khutala Colliery EMP amendment	Writer	Amendment of EMP for Section 102 application	South32
A1301	Klippan EMPR amendment	Writer	Amendment of EMP for Section 102 application	Umcebo
A1379	Koornfontein EMPR Amendment	Writer	Amendment of EMP for Section 102 application	Koornfontein Mines
A1169	Spitskop EMPR	Reviewer	EMP for mining right application	Msobo
	Jaco - K Consulting			
A0002	Wonderfontein EMPR	Writer	EMP for mining right application	Umsimbithi
A0003	Polmaise EMPR	Reviewer	EMP for mining right application	Carbon Development Corporation
A0005	Jikama EMPR	Writer	EMP for mining right application	Kleinfontein
A0009	Klippan EMPR	Writer	EMP for mining right application	Umcebo
A0012	Langkloof EMPR	Writer	EMP for mining right application	Muhanga
A0013	Naauwpoort EMPR	Writer	EMP for mining right application	Muhanga
A0035	Zonnebloem EIA	Reviewer	EMP for mining right application	Carbon Development Corporation
A0051	Goedehoop EIA	Writer	EMP for mining right application	Muhanga
A0057	Kleinfontein amendment	Writer	Amendment of EMP for Section 102 application	Kleinfontein
A0065	Klippan EMP Amendment	Writer	Amendment of EMP for Section 102 application	Umcebo
A0099	Emmerenthia	Writer	EMP for mining right application	Muhanga
A0134	Vlaklaagte EMP River	Writer	EMP for mining right application	Muhanga
A0155	OP Goedenhoop	Writer	EMP for mining right application	Muhanga
A0172	Khutala Block A EMP	Writer	Amendment of EMP for Section 102 application	South32
A0175	Springboklaagte EMP	Writer	EMP for mining right application	Shanduka
A0207	Wachtenbietjieskop EMP	Writer	EMP for mining right application	Muhanga
A0255	Moabsvelden EIA, EMP, WUL	Reviewer	EMP for mining right application	Neoshoe Trading
A0257	TNC Mine	Writer	EMP for mining right application	Koornfontein Mines
A0268	Vlaklaagte EMP Amendment	Writer	EMP for mining right application	Muhanga

Proj No	Title	Role	Detail	Client
A0271	KSA Extension	Writer	Amendment of EMP for Section 102 application	South32
A0318	Jikama NEMA	Writer	Environmental authorisation for mining right	Kleinfontein
A0322	Argent EIA EMP WUL	Reviewer	Environmental authorisation for mining right	Dialstat
A0352	OP Goedenhoop amendment	Reviewer	Amendment of EMP for Section 102 application	Muhanga
A0364	SBL EMP EIA	Writer	EMP for mining right application	Shanduka
A0377	Pegasus EIA and EMP	Writer	EMP for mining right application	South32
A0400	Spitzkop EIA NEMA	Reviewer	Environmental authorisation for mining right	Msobo
A0447	Wonderfontein EMP Amendment	Reviewer	Amendment of EMP for Section 102 application	Umsimbithi
A0451	Vaalwater EMP WUL	Writer	EMP for mining right application	Muhanga
A0471	Elandspruit EIA	Reviewer	Environmental authorisation for mining right	Wescoal
A0519	Pegasus EIA and EMP review	Writer	Environmental authorisation for mining right	South32
A0520	KLX EMP WULA	Reviewer	Environmental authorisation for mining right	South32
A0542	VDDC Dewatering	Writer	Environmental authorisation for mining right	South32
A0653	Khutala Water treatment EIA	Reviewer	Environmental authorisation for mining right	South32
A0655	Wildfontein EIA	Writer	EMP for mining right application	Shanduka
A0663	Townlands Amendment	Writer	Amendment of EMP for Section 102 application	Shanduka
A0727	Elandspruit Amendment	Reviewer	Amendment of EMP for Section 102 application	Wescoal
A0728	Welstand EMP Amendment WUL Designs	Reviewer	Amendment of EMP for Section 102 application	Mbuyelo
A0734	Wonderfontein EMP Amendment 2016	Writer	Amendment of EMP for Section 102 application	Umsimbithi
A0735	Langkloof EMP 2017 Amendment	Writer	Amendment of EMP for Section 102 application	Muhanga
A0752	Davel EA	Reviewer	Environmental authorisation for mining right	Scinta
A0832	WP Discard Dump	Reviewer	Environmental application EIAR and EMPr	Wescoal
A0835	Zondagsvlei EMP WUL	Reviewer	Environmental authorisation for mining right	Mwelase
A0843	Ermelo Dump EIA & WUL	Reviewer	Environmental application EIAR and EMPr	Scinta
A0917	2 Seam Block 6 WUL	Reviewer	Amendment of EA and EMP	Africoalsa
A0944	Kebrafield Area 1 WUL	Reviewer	Amendment of EA and EMP	Mbuyelo
A0946	Wonderfontein road EA	Reviewer	Environmental authorisation for road diversion	Umsimbithi
A0954	Lehlabile EMP & WUL	Reviewer	Environmental authorisation for mining right	Mwelase
A0961	Welgemeend EMP Amendment 2018	Reviewer	Amendment of EA and EMP	Mavungwani
A1015	Rietkuil	Reviewer	Amendment of EA and EMP	Mwelase

Annexure 2: BA including EMPs compiled for prospecting right applications

Proj No	Title	Role	Detail	Client
A0061	Baberton Paving	Reviewer	BA for listed activity	Leadal Property investments
A0071	Ermelo Basic assessment	Writer	BA for listed activity	South32
A0082	Koubad PP EMP	Writer	EMP for prospecting	Muhanga
A0086	Gemsbokfontein	Writer	EMP for prospecting	WERM Mining
A0087	Wildebeestfontein	Writer	EMP for prospecting	Amakhozi Mining and Engineering
A0088	Strehla	Writer	EMP for prospecting	Lehlabile Africa
A0089	Kaallaagte	Writer	EMP for prospecting	Amakhozi Mining and Engineering
A0090	Moderfotein	Writer	EMP for prospecting	Amakhozi Mining and Engineering
A0091	Goedehoop PP and EMP	Writer	EMP for prospecting	Amakhozi Mining and Engineering
A0092	Resurgam PP and EMP	Writer	EMP for prospecting	WERM Mining
A0097	Groenvlei PP	Writer	EMP for prospecting	Enolonkulu Investment
A0098	Enkeldoorn PP	Writer	EMP for prospecting	Muhanga
A0100	Moabsvelden	Writer	EMP for prospecting	Lehlabile Africa
A0102	Wildfontein PP	Writer	EMP for prospecting	Lehlabile Africa
A0105	Vlaklaagte PP	Writer	EMP for prospecting	WERM Mining
A0107	Brandkraal PP	Writer	EMP for prospecting	Belton Park
A0111	Klipfontein PP	Writer	EMP for prospecting	Belton Park
A0116	Tafelkoppies PP EMP	Writer	EMP for prospecting	New Order Investments
A0117	Uitkoms PP	Writer	EMP for prospecting	Exclusive Access Trading
A0118	Ploegschaar PP EMP	Writer	EMP for prospecting	Twin Cities Trading
A0121	Jakkalsdans PP EMP	Writer	EMP for prospecting	Muhanga
A0122	De Roodepoort EMP	Writer	EMP for prospecting	Muhanga
A0131	Bezuidenhoutshoek PP	Reviewer	EMP for prospecting	New Order Investments
A0146	Delmas Prospecting	Writer	EMP for prospecting	South32
A0165	G Strydom EMP	Writer	EMP for prospecting	Muhanga
A0166	Bankfontein EMP	Writer	EMP for prospecting	Muhanga
A0212	Leandra Prospecting EMP	Writer	EMP for prospecting	South32
A0225	Sheepmore PP EMP	Writer	EMP for prospecting	Optimum Mining and Exploration
A0290	Bankfontein & Roodepoort Exceed	Writer	EMP for prospecting	Exceed Resources

Proj No	Title	Role	Detail	Client
A0346	Leinster Prospecting EMP	Reviewer	EMP for prospecting	Shaking Earth
A0350	Kleinfontein crossing BA	Reviewer	BA for listed activity	Kleinfontein
A0365	Argent Power Line	Writer	BA for listed activity	Dialstat
A0382	TNC prospecting EMP	Writer	EMP for prospecting	Koornfotnein Mines
A0394	VDD road R575 NEMA	Reviewer	BA for listed activity	Shanduka
A0395	Argent water pipeline	Reviewer	BA for listed activity	Dialstat
A0440	Springlake EIA	Writer	BA for listed activity	Springlake
A0446	Wonderfontein BA	Writer	BA for listed activity	Umsimbithi
A0509	Emmerenthia Prospecting Ptn 1	Writer	EMP for prospecting	Muhanga
A0590	Mierhoop BA	Reviewer	EMP for prospecting	Genet Manganese
A0591	Lemoenkloof	Reviewer	EMP for prospecting	Genet Manganese
A0594	BA 559 Hay	Reviewer	EMP for prospecting	Genet Manganese
A0598	K Kop BA	Reviewer	EMP for prospecting	Genet Manganese
A0603	Zeekoebaart BA	Reviewer	EMP for prospecting	Genet Manganese
A0604	Sandham BA	Reviewer	EMP for prospecting	Genet Manganese
A0937	Heildelberg Prospecting BA	Reviewer	BA for listed activity	Mwelase
A0941	Wolvenbank PP BA	Reviewer	BA for listed activity	Mwelase


LEGEND
Mining Rights Boundary (4293.03ha)
OC Mining (Mined) (227.79ha)
OC Mining (Planned) (658.17ha)
Road Diversion (4.349km)
Road to be demolished (3.347km)
Road Buffer (500m)
Wetlands (153.23ha)
Channelled valley-bottom wetland (103.85ha)
Depression (20.26ha)
Hillslope Seep (29.12ha)
Zone of Regulation - 32m (NEMA)
Zone of Regulation - 100m (GN 704)
Survey System
Hartebeeshoek94 WGS84 LO29
Paardekraal 422JS
Generaalsdraai 423JS
Farm 1228JS
Wonderfontein 428JS
Leeuwbank 427JS
Kaalplaats 453JS
Blesbokspruit 455JS
R104
N4
D383
D1110
P15-1
87 000
88 500
90 000
91 500
93 000
-2 856 000
-2 857 500
-2 859 000
-2 860 500
0
1.5
kilometres
Scale: 1:25 000
N