



ENVIRONMENTAL & ENGINEERING

REPORT

OPSIREX (PTY) LTD - WILDEBEESTFONTEIN COLLIERY

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

REPORT REF: 19-724 AUTH DRAFT EIA EMP



DMR REF: MP 30/5/1/2/3/2/1 (10235) EM

15/9/2019

VERSION AA



DOCUMENT AND QUALITY CONTROL

Document No:	19-724 AUTH DRAFT EIA EMP			
AA – draft	11/09/2019	Riana Panaino		First draft for review / comments
BB – draft	11/09/2019	Henno Engelbrecht		Technical Review
CC– draft	12/09/2019	Leoni le Roux		Quality review
DD– draft				Final Review
Approved for Distribution:				
0.0	13/09/2019	Vernon Siemelink		Final report

QUALITY CONTROL BY:

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

DISCLAIMER

This is a legally binding document and many of the actions and recommendations remain the responsibility of the client (as the owner/lessee of the property).

Eco Elementum (Pty) Ltd and the authors of this report are protected from any legal action, possible loss, damage or liability resulting from the content of this report. This document is considered confidential and remains so unless requested by a court of law. Please consider the environment and only print this document if necessary.

The findings, results, observations, conclusions and recommendations given in this report are based on the author's best scientific and professional knowledge, as well as available information. Information utilised and contained in this report is based on data/information supplied to Eco Elementum (Pty) Ltd by the client and other external sources (including previous site investigation data and external specialist studies).

Eco Elementum (Pty) Ltd exercises due care and diligence in rendering services and preparing documents, however it has been assumed that the information provided to Eco Elementum (Pty) Ltd is correct and as such the accuracy of the conclusions made are reliant on the accuracy and completeness of the data supplied.

No responsibility is accepted by Eco Elementum (Pty) Ltd for incomplete or inaccurate data supplied by the client and/or other external sources. Opinions expressed in this report apply to the site conditions and features that existed at the time of the start of the investigations and the production of this document. For this reason, Eco Elementum (Pty) Ltd accepts no liability, and the client by receiving and therefore accepting this document, indemnifies Eco Elementum (Pty) Ltd and its directors against all actions, claims, demands, losses, liabilities, costs, damages and expenses arising from or in connection with the services rendered, directly or indirectly.



DECLARATION OF INDEPENDANCE

I, Henno Engelbrecht, declare that;

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



13/09/2019

Signature

Mr. Henno Engelbrecht

BSc Honn Environmental Management & Analysis (UP)

MSc Project Management

IAIA Memeber

Date



CONTENTS

REPORT REF: 19-724 AUTH DRAFT EIA EMP1

DMR REF: MP 30/5/1/2/3/2/1 (10235) EM1

DECLARATION OF INDEPENDANCE3

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT6

1. DETAILS OF THE EAP7

2. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY8

3. COMPOSITE MAP9

4. OBJECTIVES INCLUDING MANAGEMENT STATEMENTS10

4.1 DETERMINATION OF CLOSURE OBJECTIVES 10

4.2 THE PROCESS FOR MANAGING ANY ENVIRONMENTAL IMPACTS 10

4.3 POTENTIAL RISK OF ACID MINE DRAINAGE 10

4.3.1 *Steps Taken to Investigate, Assess and Evaluate the Impact of Acid Mine Drainage* 10

4.3.2 *Engineering or Mine Design Solutions to Be Implemented To Avoid or Remedy Acid Mine Drainage* 12

4.4 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE MINING OPERATION 12

4.4.1 *Has A Water Use Licence Been Applied For?* 12

4.5 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES, MANAGEMENT ACTIONS AND OUTCOMES 13

4.6 FINANCIAL PROVISION 22

4.6.1 *Determination of the Amount of Financial Provision* 22

4.7 IMPACT MANAGEMENT ACTIONS 25

5. MONITORING OF IMPACT MANAGEMENT ACTIONS26

6. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT27

7. ENVIRONMENTAL AWARENESS PLAN29

7.1 MANNER IN WHICH THE APPLICANT INTENDS TO INFORM EMPLOYEES OF ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK 29

8. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY33

9. UNDERTAKING34

List of Figures

Figure 4.1: Site Layout9

Figure 9.21: Wilbeestfontein - Wetland delineation map9



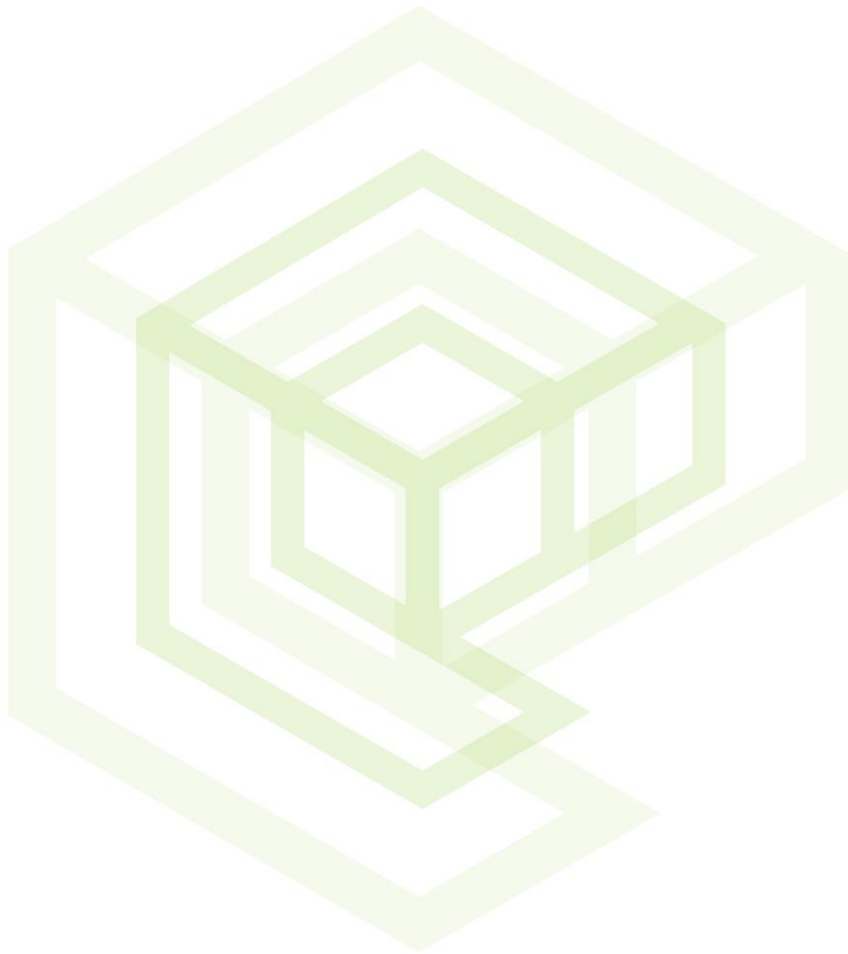
Updated- 15/9/2019

List of Tables

Table 23.1: Proposed Activity	8
Table 2: Results of the ABA for the proposed Weltevreden Colliery.	11
Table 26.1: Financial Provision Quantum.....	24
Table 27.1: Proposed Monitoring Requirements	26
Table 28.1: Mechanisms to Monitor Compliance	27
Table 29.1: Emergency Response and Preparedness Plan.....	31



PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT



1. DETAILS OF THE EAP

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



2. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Please refer to Section **Error! Reference source not found. Error! Reference source not found.**

Table 2.1: Proposed Activity

ITEM	DETAIL
Type of mineral	Coal
Mining method	Strip and Rollover Mining Techniques
Depth of the mineral below surface	Average depth 33 m
Geological formation	Located on the central part of the Witbank Coalfield, the Witbank Coalfield, primary economic seams are the 5, 4, 2 and 1 Seams. Numerous dolerite intrusions (dykes and sills) intrude the Vryheid Formation at various stratigraphic level that tend to influence stratigraphy and coal qualities.
Life of mine	7 Years.
Production rate	14 Million Tonnes Rates are set at 180,000 tpm
Saleable Product	No.1 and 4 seams will be presented to the export market as a RB1 quality, or separated as Nuts Peas and Duff. With an A-grade coal quality. The No. 2 seam will primarily be crushed and screened to a 0-50mm product, targeting the local domestic demand towards Eskom
Target Market	International (Export) and local market



3. COMPOSITE MAP

Please see Final Mine Plan, as well as the Environmental Sensitivity Plan. Copies of the plan have also been attached in A3 format - Appendix 2.

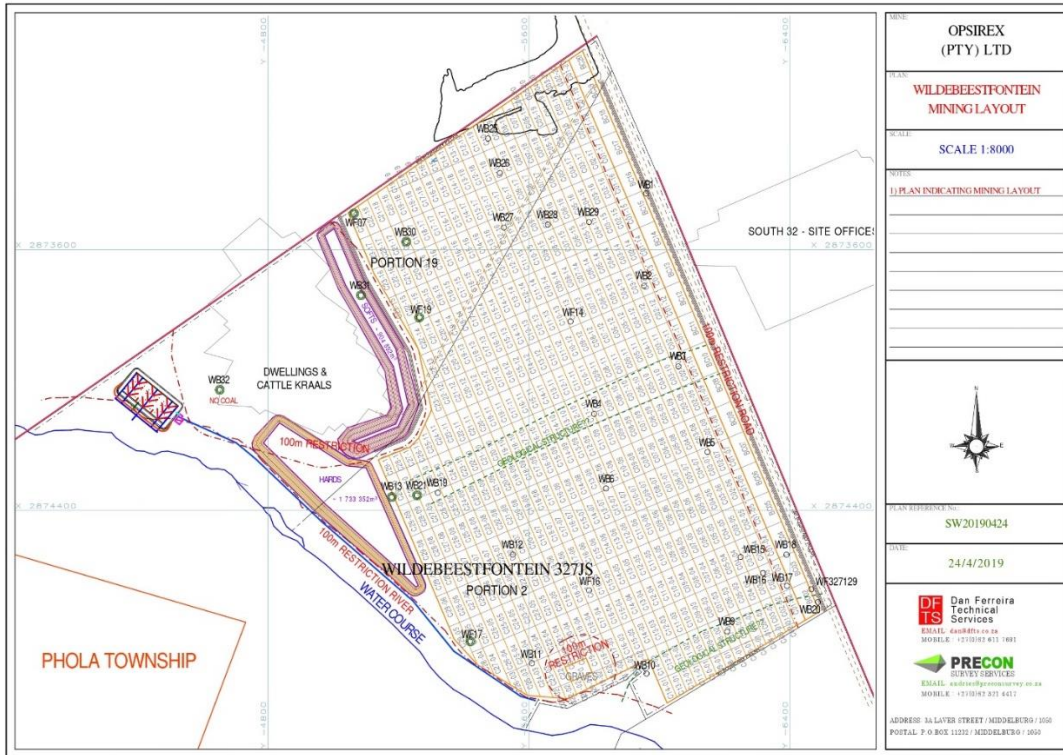


Figure 3.1: Site Layout

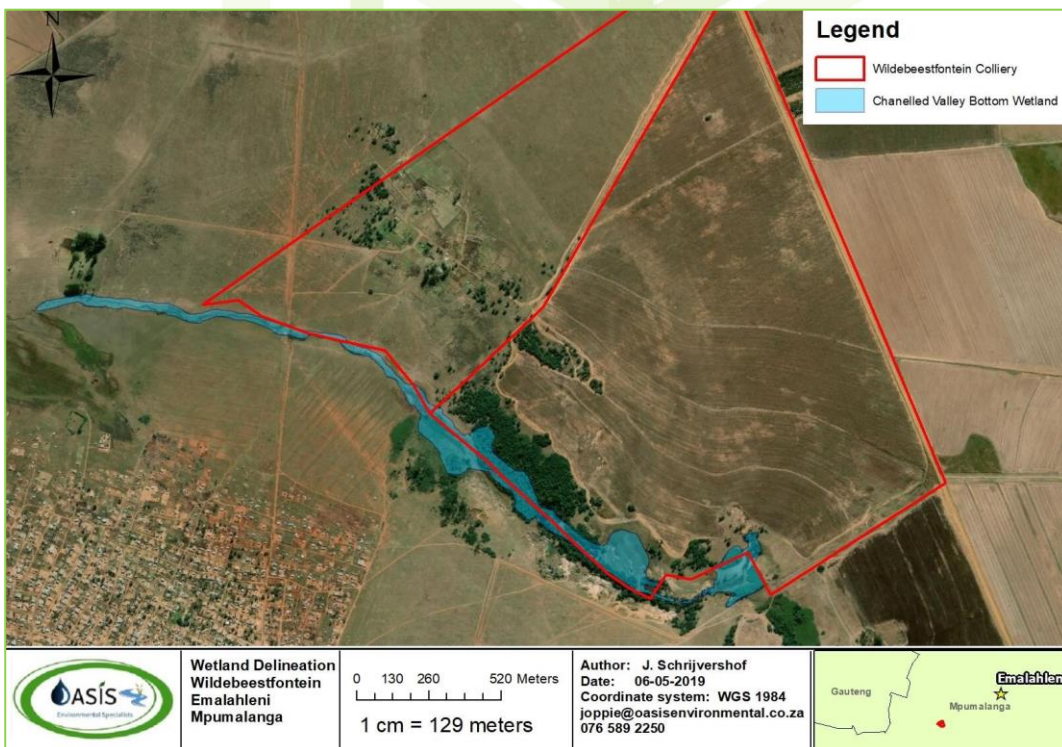


Figure 3.2: Wildebessfontein - Wetland delineation map



4. OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

4.1 DETERMINATION OF CLOSURE OBJECTIVES

The closure vision is supported by the objectives as listed below;

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

4.2 THE PROCESS FOR MANAGING ANY ENVIRONMENTAL IMPACTS

The management plan is detailed below for each aspect during each mining phase. Some measures are relevant to more than one aspect. These are not reiterated for each aspect.

The applicant shall ensure that employees and contractors are adequately trained with regard to the implementation of the EMP and environmental legal requirements and obligations. It is anticipated that Environmental awareness shall be targeted at all project involved personnel and also part time personnel shall be trained so that they are aware of environmental obligations by the time they visit the site. The environmental awareness practitioner will be appointed to conduct training during site establishment and will be responsible for how the site look like before the drilling and how it looks like after rehabilitation. This will be to ensure that the site has been restored to its original state or to an acceptable level.

The applicant is committed to identifying training needs and ensuring that all personnel whose work may create a significant impact upon the environment receive appropriate training. The Environmental Awareness Plan describes the training available and the manner in which environmental training needs are identified and continually reassessed.

4.3 POTENTIAL RISK OF ACID MINE DRAINAGE

During the operational phase and for a period after, until the water level has reached equilibrium, a contamination plume will not migrate away from the mining operation. This is due to the fact that opencast pit act as a groundwater sink. Contaminated groundwater, as a result of acid mine drainage will therefore also be contained within the pit area.

4.3.1 Steps Taken to Investigate, Assess and Evaluate the Impact of Acid Mine Drainage

ABA tests were conducted for Weltevreden Colliery (\pm 4.5 km north-east) on three samples collected from the borehole drill chippings. These samples consisted of a composition of all the potential carbonaceous material in each borehole. With the close proximity to Weltevreden Colliery and similar geology, it highly likely that the acid-generating capacity at the Wildebeestfontein mining operation will be matching. The results of the ABA tests at Weltevreden Colliery are indicated in Table 2 below.



Updated- 15/9/2019

Table 2: Results of the ABA for the proposed Weltevreden Colliery.

Acid – Base Accounting Modified Sobek (EPA-600)	Sample Identification			
	WBH01	WBH03	WBH04	WBH04
Sample Number	64386	64387	64388	64388 D
Paste pH	5.7	4.6	7.4	7.4
Total Sulphur (%) (LECO)	0.51	0.74	1.21	1.21
Acid Potential (AP) (kg/t)	16	23	38	38
Neutralization Potential (NP)	-0.500	-1.52	5.11	5.11
Nett Neutralization Potential (NNP)	-16	-25	-33	-33
Neutralising Potential Ratio (NPR) (NP : AP)	0.031	0.066	0.135	0.135
Rock Type	I	I	I	I

Classification According to Nett Neutralising Potential (Nnp)

If $NNP (NP - AP) < 0$, the sample has the potential to generate acid

If $NNP (NP - AP) > 0$, the sample has the potential to neutralise acid produced

Any sample with $NNP < 20$ is potential acid-generating, and any sample with $NNP > -20$ might not generate acid (Usher et al., 2003)

All the samples from the proposed Weltevreden Colliery had an $NNP < 0$, which indicates a potential to generate acid.

Rock Classification

TYPE I	Potentially Acid Forming	Total S(%) > 0.25% and NP:AP ratio 1:1 or less
TYPE II	Intermediate	Total S(%) > 0.25% and NP:AP ratio 1:3 or less
TYPE III	Non-Acid Forming	Total S(%) < 0.25% and NP:AP ratio 1:3 or greater

All the samples from the proposed Weltevreden Colliery was classified as a Type I rock, which indicates a potential to generate acid.

Classification According to Neutralising Potential Ratio (NPR)

Guidelines for screening criteria based on ABA (Price et al., 1997; Usher et al., 2003)

Potential for ARD	Initial NPR Screening Criteria	Comments
Likely	< 1:1	Likely AMD generating
Possibly	1:1 – 2:1	Possibly AMD generating if NP is insufficiently reactive or is depleted at a faster rate than sulphides
Low	2:1 – 4:1	Not potentially AMD generating unless significant preferential exposure of sulphides along fracture planes, or extremely reactive sulphides in combination with insufficiently reactive NP
None	>4:1	No further AMD testing required unless materials are to be used as a source of alkalinity

All the samples from the proposed Weltevreden Colliery had an NPR of < 1:1, which indicates a likelihood of AMD generating.



Updated- 15/9/2019

Classification According to Sulphur Content (%S) and Neutralising Potential Ratio (Npr)

For sustainable long-term acid generation, at least 0.3% Sulphide-S is needed. Values below this can yield acidity but it is likely to be only of short-term significance. From these facts, and using the NPR values, a number of rules can be derived:

- Samples with less than 0.3% Sulphide-S are regarded as having insufficient oxidisable Sulphide-S to sustain acid generation.
- NPR ratios of >4:1 are considered to have enough neutralising capacity.
- NPR ratios of 3:1 to 1:1 are considered inconclusive.
- NPR ratios below 1:1 with Sulphide-S above 3% are potentially acid-generating. (Soregaroli & Lawrence, 1998; Usher et al., 2003).

All the samples from the proposed Weltevreden Colliery has a Sulphur Content of more than 0.3% indicating the potential for long term acid generation.

4.3.2 Engineering or Mine Design Solutions to Be Implemented To Avoid or Remedy Acid Mine Drainage

- Groundwater flow to the stream in close proximity to the pit will occur if the hydraulic head within the pit is higher than the stream bed elevation. It is proposed that the heads in the final pit void be kept lower than that of the river with the aid of dewatering.
- Carbonaceous material should be placed at the deeper base of the opencast pits to allow flooding with groundwater as soon as possible. This will reduce the redox reaction potential as oxygen is excluded from the system.
- Rehabilitation should occur in such a manner that surface runoff is directed away from the rehabilitated pit and recharge to the pit minimized.
- Flow paths which include fracture zones should be sealed to reduce inflow of fresh groundwater and outflow of contaminated groundwater.
- Methods of handling the potential decant should be investigated and may include treatment of polluted water.
- The groundwater quality in the monitoring boreholes should continue to be analysed on a quarterly interval basis.

4.4 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE MINING OPERATION

A detailed mine water balance must still be undertaken.

4.4.1 Has A Water Use Licence Been Applied For?

A water use license application (IWULA) and associated Integrated Water and Waste Management Plan (IWWMP) is in the process of being completed and will be submitted to the DWS.



4.5 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES, MANAGEMENT ACTIONS AND OUTCOMES

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
Groundwater impacts					
Decomisioning	Adequate backfilling and rehabilitation will decrease aquifer recharge. The period to decant will therefore be prolonged.	Carbonaceous material at deeper base of pit. Rehabilitation to direct surface runoff away from pit and recharge to pit minimized. Flow paths including fracture zones sealed.	Refer to rehabilitation plan	Prolong period before decant and allow for decant to be of an acceptable quality	Site manager
Construction	Increase in surface run-off and therefore decrease in aquifer recharge	Re-vegetate	Rehabilitation plan	Minimised impact on aquifer recharge	Site manager
Construction	Decrease in water level should the pit floor be lower than the water level	No management can be incorporated to limit the impacts of dewatering should the box-cut floor be lower than the groundwater level.	Quarterly monitoring of monitoring boreholes. Compensate users should water levels decreases cause losses of groundwater availability.	Fair compensation for loss of groundwater	Environmental Manager
Operation	Acid generation in the case of carbonaceous material placement.	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes	Limit of the extent of contamination plume	Environmental Manager
Operation	Acid generation as a result of carbonaceous material.	Should a contamination plume be detected, groundwater abstraction to contain plume.	Quarterly monitoring of monitoring boreholes	Limit of the extent of contamination plume	Environmental Manager
Operation	Spills from mining vehicles can infiltrate to the aquifer and cause a downgradient plume migration.	Clean any hydrocarbon spills in the appropriate manner.	Report any hydrocarbon spillage.	Limit of the extent of contamination plume	Site manager
Operation	The water infiltrating the pit will be removed for safe mining, causing a decrease in the water level of up to 55 m.	No management can be incorporated to limit the impacts of dewatering.	Quarterly monitoring of monitoring boreholes. Compensate users should water levels decreases cause losses of groundwater availability.	Fair compensation for loss of groundwater	Environmental Manager
Closure and decomisioning	Carbonaceous material, if any in the overburden, will be placed at the bottom of the pit as to prevent or minimise the exposure to oxygen and potential acid generation.	Remove the top soil and overburden dumps during rehabilitation. Placement of carbonaceous material at bottom of pit.	Rehabilitation Plan- placement of topsoiland overburden in pit.	Prolong period before decant and allow for decant to be of an acceptable quality	Site manager
Rehabilitation	Increase surface runoff over the rehabilitated opencast, therefore decreasing aquifer recharge.	Remove the ROM stockpile. This will eliminate the ROM stockpile as a potential source.	Rehabilitation Plan	Minimised impact on aquifer recharge	Site manager
Residual	Recovery of the water level in the pit as dewatering ceases. In the case of acid generation, the plume will start to move away from the pit as the water level recovered. Decanting may occur	Keep water level in pit lower than level in nearby streams. Maintain water level below decant level (abstraction).	Abstracted/decant water to be treated or handled in appropriate manner and within legislation. Continue quarterly monitoring post-closure.	Prolong period before decant and allow for decant to be of an acceptable quality	Site manager & Environmental Manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
	once the water level has recovered to the decanting elevation.				
Wetland Impacts					
Construction	Flow alterations due to erosion and sedimentation	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP	Minimal sedimentation of watercourse	Site manager & Environmental Manager
Construction	Pollution of watercourse	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas; Surface water management plan. Biomonitoring plan	Maintennace and improvement of water quality	Site manager & Environmental Manager
Construction	Spread of alien vegetation	Remove Alien and invasive vegetation and prevent the spread of alien and invasive vegetation	An alien invasive management programme must be implemented	Eradication of alien invasive vegetation	Site manager & Environmental Manager
Operation	Flow alterations due to erosion and sedimentation	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible	Minimal sedimentation of watercourse	Site manager & Environmental Manager
Operation	Flow alterations due to erosion and sedimentation	Prevent sedimentation of watercourses	Install sediment barriers (silt catchers and Reno mattresses) along any drainage construction areas Monitor Bank erosion on a regular basis	Minimal sedimentation of watercourse	Site manager & Environmental Manager
Operation	Flow alterations	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP	Maintenance of flow to the watercourse	Site manager & Environmental Manager
Operation	Pollution of watercourse	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP	Minimal sedimentation of watercourse	Site manager & Environmental Manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
			Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible		
Operation	Pollution of watercourse	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible	Minimal sedimentation of watercourse	Site manager & Environmental Manager
Operation	Pollution of watercourse	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas; Surface water management plan. Biomonitoring plan	Maintennace and improvement of water quality	Site manager & Environmental Manager
Operation	Pollution of watercourse	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas;	Maintennace and improvement of water quality	Site manager & Environmental Manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
			Surface water management plan. Biomonitoring plan		
Operation	Pollution of watercourse	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas; Surface water management plan. Biomonitoring plan	Maintennace and improvement of water quality	Site manager & Environmental Manager
Operation	Pollution of watercourse	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas; Surface water management plan. Biomonitoring plan	Maintennace and improvement of water quality	Site manager & Environmental Manager
Operation	Spread of alien vegetation	Remove Alien and invasive vegetation and prevent the spread of alien and invasive vegetation	An alien invasive management programme must be implemented	Eradication of alien invasive vegtation	Site manager & Environmental Manager
Noise					
Construction	Noise disturbance	Cleaning and grubbing of the plant footprint and other areas to be done during daytime working hours unless there is no heavy duty machinery which may create a noise problem.	0	Limited noise disturbance.	Site manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
Construction	Noise disturbance	Construction of the infra-structure activities to be done during daytime working hours unless there is no heavy duty machinery which may create a noise problem.	0	Limited noise disturbance.	Site manager
Construction	Noise disturbance	Construction of the Dumps Hard/Softs to be done during daytime working hours unless there is no heavy duty machinery which may create a noise problem.	0	Limited noise disturbance.	Site manager
Operation	Noise disturbance	All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off	Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the footprint boundaries are in line with the 70.0dBA threshold value.	Limited noise disturbance.	Site manager & Environmental Manager
Operation	Noise disturbance	All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off.	Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the footprint boundaries are in line with the 70.0dBA threshold value.	Limited noise disturbance.	Site manager & Environmental Manager
Operation	Noise disturbance	All noise sources exceeding 85.0dBA to be identified and if practical to be acoustically screened off.	Noise survey to be done on a quarterly basis and after one year to change to an annual basis if the prevailing ambient noise levels at the footprint boundaries are in line with the 70.0dBA threshold value.	Limited noise disturbance.	Site manager & Environmental Manager
Operation	Noise disturbance	Road surfaces to be maintained in a good order without any pot holes	Speed limit of 40km/h to be adhered to at all times; road maintenance plan	Limited noise disturbance.	Site manager
Operation	Noise disturbance	Generator to be situated in an area away from any residential areas and the noise from the generator not to be audible at the residential areas.	Generator placement in a generator building with adequate mufflers.	Limited noise disturbance.	Site manager
Closure and decommissioning	Noise disturbance	Removal of infra-structure to be done during daytime only	0	Limited noise disturbance.	Site manager
Rehabilitation	Noise disturbance	Removal of infra-structure to be done during daytime only	0	Limited noise disturbance.	Site manager
Rehabilitation	Noise disturbance	Planting of grass and vegetation to be done during daytime only.	0	Limited noise disturbance.	Site manager
Soils					
Construction	Exposure of soil surface to erosion	Keep vegetation removal limited to footprint and use geo-textiles and other erosion control structures to limit soil erosion	Implement Soil Management Plan (SMP) and monitor site for signs of erosion	No soil erosion on site	Environmental Officer Site Manager
Construction	Soil compaction and reduced water infiltration capacity	Restrict vehicle and equipment movement to surface footprint	Use deep ripping before vegetation establishment (rehabilitation) to alleviate compaction. Avoid vehicle and equipment moving outside of the demarcated footprint areas	No soil compaction in areas outside of the construction / operation area.	Environmental Officer Site Manager
Construction	Destruction of in situ soil profiles	Only remove topsoil where necessary and don't mix topsoil layers with overburden	Follow SMP and keep footprint as small as possible	Preservation of topsoil	Environmental Officer Site Manager
Construction	Destruction of soil nutrient cycles and hydrogeological functioning	Re-establish vegetation on topsoil stockpiles and maintain vegetation cover until soil is used for rehabilitation	Manage stockpiles according to SMP	Preservation of topsoil and seed bank	Environmental Officer Site Manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
Construction	Soil chemical pollution	Regularly check vehicles and equipment for possible oil and fuel leaks	Follow SMP and conduct regular soil quality audits	No soils pollution occurrence	Environmental Officer Site Manager
Construction	Destruction of arable and grazing land capability	No mitigation possible	Establish agricultural projects with in the larger mining right area	Offset of agricultural areas for sustainable co-existence	Environmental Officer Site Manager
Operation	Soil compaction and reduced water infiltration capacity	Restrict vehicle and equipment movement to surface footprint	Use deep ripping before vegetation establishment (rehabilitation) to alleviate compaction. Avoid vehicle and equipment moving outside of the demarcated footprint areas	No soil compaction in areas outside of the construction / operation area.	Environmental Officer Site Manager
Operation	Soil chemical pollution	Regularly check vehicles and equipment for possible oil and fuel leaks	Follow SMP and conduct regular soil quality audits	Preservation of topsoil	Environmental Officer Site Manager
Closure and decomisioning	Soil chemical pollution	Regularly check vehicles and equipment for possible oil and fuel leaks	Follow SMP and conduct regular soil quality audits	Preservation of topsoil and seed bank	Environmental Officer Site Manager
Rehabilitation	Soil compaction and reduced water infiltration capacity	Restrict vehicle and equipment movement to the areas that are revegetated	Use deep ripping before vegetation establishment (rehabilitation) to alleviate compaction. Avoid vehicle and equipment moving outside of the rehabilitation areas	Rehabilitated soil characteristics for effective vegetation establishment and water infiltration	Environmental Officer Site Manager
Air Quality					
Construction	Fugitive dust (containing TSP (total suspended particulate, will give rise to nuisance impacts as fallout dust), as well as PM10 and PM2.5 (dust with a size less than 10 microns, and dust with a size less than 2.5 microns giving rise to health impacts	Dampen soil being moved to reduce dust. Avoid blasting during windy conditions. Hauling to take place on roads with dust suppression Cover load bins with tarpauling keep exposed soil surfaces to a minimum	Topsoil should not be removed during windy months (August to January). Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur. Topsoil should be re-vegetated to reduce exposure areas. During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as can be used for dust suppression Minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, - Successful trialling of broad acre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop Constricting the areas and time of exposure of pre-strip clearing	Minimal dust nuisance	Environmental Officer Site Manager
Construction	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	Damopen soil being moved to reduce dust. Avoid blasting during windy conditions. Hauling to take place on roads with dust suppression Cover load bins with tarpauling keep exposed soil surfaces to a minimum	Topsoil should not be removed during windy months (August to January). Area of disturbance to be kept to a minimum and no unnecessary clearing of vegetation to occur. Topsoil should be re-vegetated to reduce exposure areas.	Minimal dust nuisance	Environmental Officer Site Manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
			During the loading of topsoil onto trucks or stockpiles, the dropping heights should be minimised. Water or binding agents such as can be used for dust suppression Minimise travel speed and distance and volume of traffic on the roads. All stockpiles to be damped down, - Successful trialling of broad acre temporary rehabilitation of unshaped overburden emplacement areas by aerial sowing of a cover crop Constricting the areas and time of exposure of pre-strip clearing		
Construction	fugitive dust emissions containing TSP (total suspended particulate, giving rise to nuisance impacts as fallout dust)	Mionimise dust entrainment on roads Minimise dust blown from loadbins Prevent soil erosion on stockpiles	Dust suppression on roads. Install speed bumps. Cover load bins with tarpaulin. Implement a speed limit.	Minimal dust nusance	Environmental Officer Site Manager
Closure and decomisioning	fugitive dust emissions	Minimise increased dust	Demolition should not be performed during windy periods Speed restrictions should be imposed and enforced. Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. Exhaust pipes of vehicles should be directed upwards. Engine cooling fans of vehicles should be shrouded. Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. Dust suppression of roads.	Minimal dust nusance	Environmental Officer Site Manager
Rehabilitation	fugitive dust emissions	Prevent long periods of bare soil. Prevent dust emmissions	Revegetation of exposed areas. Plants with roots that bind the soil, and vegetation cover should be used. Spreading of soil must be performed on less windy days. Apply dust suppression. Speed restrictions should be imposed and enforced.	Minimal dust nuisance	Environmental Officer Site Manager
Visual Assessment					
Construction	Change in sense of place	Minimise the visual exposure and change in sense of place	Create visual barriers.	Minimise the cumulative impact on sense of place	Site engineer
Cumulative	Change in sense of place	Minimise the visual exposure and change in sense of place	Create visual barriers.	Minimise the cumulative impact on sense of place	Site engineer
Heritage					
Cumulative	Destruction of structures	none	None - sufficient recording	n/a	0
Cumulative	Destruction of structure and graveyard	Prevent impact on cemetery and structure	Conservation buffer & monitoring	Maintenance and conservation of heritage resources	ECO



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
Cumulative	Destruction of structures	Prevent destruction of features	Monitoring of structures	Maintenance and conservation of heritage resources	ECO
Operation	Impacting on settlements	Prevent destruction of features	Monitoring of structures	Maintenance and conservation of heritage resources	ECO
Blasting					
Construction	Ground Vibrations	Limit ground vibrations to an acceptable value with a proper blast design, measure and record, evaluate and improve.	Blast Designs and Codes of Practice	limited blasting disturbance	Blaster appointed by Mine Manager
Construction	Air blasts	Limit the desibles to an acceptable value with a proper blast design, measure and record, evaluate and improve.	Blast Designs and Codes of Practice	limited blasting disturbance	Blaster appointed by Mine Manager
Aquatics					
Construction	Water Quantity and Loss Of Water/Flow	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible	Minimal sedimentation of watercourse	Environmental Officer Site Manager
Construction	Habitat Loss/Fragmentation	Avoid wetland areas and their associated buffer zones.	Implement a wetland sensitive mine layout. Demarcate wetland areas and boundaries	maintenance of flow to the watercourse to sustain habitat.	Environmental Officer Site Manager
Construction	Sedimentation and Erosion	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP	Minimal sedimentation of watercourse	Environmental Officer Site Manager
Construction	Water quality deterioration	Prevent water quality deterioration	No washing of any construction equipment in close proximity to the channel or any wetlands No releases of any substances that could be toxic to fauna or faunal habitats Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately and contaminants properly drained and disposed of using proper solid/hazardous waste facilities (not to be disposed of within the natural environment). Any contaminated soil must be removed and the affected area rehabilitated immediately. Portable toilets must be placed on impervious level surfaces that are lipped to prevent spillage. Hazardous substances must be stored in bunded areas;	Maintennace and improvement of water quality	Environmental Officer Site Manager



Updated- 15/9/2019

Impact description		Mitigation measures	Action plan/management action	Outcome	Responsible person
Phases	Impact				
			Surface water management plan. Biomonitoring plan		
Operation	Sedimentation and Erosion. Water quality deterioration	Topsoil should be placed to avoid erosion and runoff. Attenuation of stormwater to control the velocity. Prevent erosion of stockpiles and bare soil areas	Avoid wetland areas and their associated buffer zones. Follow a soil management plan for topsoil placement. Implement SWMP Do not allow surface water or stormwater to be concentrated, or to flow down cut or fill slopes without erosion protection Exposed soils must be rehabilitated as soon as practically possible	Maintennace and improvement of water quality	Environmental Officer Site Manager
Operation	Loss of Indigenous Vegetation and Habitat	Avoid wetland areas and their associated buffer zones.	Implement a wetland sensitive mine layout. Demarcate wetland areas and boundaries	maintenance of flow to the watercourse to sustain habitat.	Environmental Officer Site Manager



4.6 FINANCIAL PROVISION

4.6.1 Determination of the Amount of Financial Provision

4.6.1.1 Describe the Closure Objectives and the Extent to Which These Are Aligned To the Baseline Environment

The closure vision is supported by the objectives as listed below;

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

4.6.1.2 Confirm That the Environmental Objectives In Relation To Closure Have Been Consulted With Landowner And I&APS

- A comprehensive Public Participation Process was undertaken and all aspects of the project were discussed with interested and affected Parties. Refer to Appendix 2c.

4.6.1.3 Rehabilitation Plan to Attain Closure Objectives Including Proposed Post-Mining Land Capability and Land Use

The scheduling of actions for final rehabilitation, decommissioning and closure which will ensure avoidance, rehabilitation and management of impacts is presented in the table below. As the disturbance after construction occurs on surface, linking the rehabilitation plan to the mine works program is not meaningful. Rather, the schedule is linked to applicant's intention to undertake rehabilitation activities over a five year closure period at the end of the Life of Mine. The perceived schedule drivers of this plan are also indicated in the table. This schedule is based on implementing the actions described in this report and relates to the aspects considered in this section.

Aspect	Scheduling	
	Year 1	Continuous
Opencast workings	Concurrent backfilling sequence and removal of salvageable equipment	Topsoil stripping, handling, stockpiling, preservation and replacement in line with the general surface rehabilitation and revegetation actions prescribed in this report as land becomes available for rehabilitation.
Surface Infrastructure related to mining operations (including plant)	Removal, decommissioning and demolition of infrastructure	
Final void	Backfilling and sealing	
Contaminated land remediation	Hydrocarbons – Removal of fuel storage and refuelling bays	



Aspect	Scheduling
	Chemical – contaminated plant & equipment removal
Year 2	
Pollution Control Dams	Management of stormwater in closure period, but capacity requirements can be assessed to remove upon closure
Waste Management Facilities	Removal, decommissioning and demolition of infrastructure
Roads and parking areas	Only roads required after closure to remain in place
Fencing and walling	Only fences required to remain after closure to stay in place
Year 3 - 5	
Water Management	Monitoring, measurement and management where required
Maintenance and aftercare	All rehabilitated areas


Appendix 4 requires that a spatial map or schedule, showing planned spatial progression throughout operations be included in the plan. However, as the spatial progression is limited to the mining footprint and the mine haul route, the inclusion of a plan showing the spatial progression will not add any further information than that included in the table above.

4.6.1.4 Quantum of the Financial Provision Required To Manage and Rehabilitate the Environment

Financial Provision, to the amount of **R 15 537 427.66** be made by way of a guarantee acceptable to the DMR, as per the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations.



Table 4.3: Financial Provision Quantum

CALCULATION OF THE MINE CLOSURE QUANTUM								Version 1.0: Proposed Mine Closure Quantum Update for FY2018
Mine: Opsirex (Pty) Ltd: Wildebessfontein Colliery					Province: Mpumalanga			
Evaluators: Eco Elementum (Pty) Ltd					Date: Sept 2019			
General Information	Risk Class	High (A)	OPSIREX (PTY) LTD WILDEBESSFONTEIN COLLIERY 					
	Environmental Sensitivity	Medium						
	WF 1: Nature of Terrain Weighting Factor	Flat 1.00						
	WF 2: Proximity to Urban Area Weighting Factor	Peri-Urban 1.05						
Component No	Main Activities Itemized Descriptions	[B] CPI Adjusted Master Rate	[A] Quantity	Units	[C] Multiplication Factor	[D] Weighting Factor 1: Nature of Terrain	Sub Totals [E = A*B*C*D]	NOTES & SUPPORTING EXPLANATIONS
		STEP 4.3	STEP 4.5		STEP 4.3	STEP 4.4		
1	Dismantling of processing plant and structures	R 14.53	0.00	m3	1.00	1.00	R 0.00	
2(A)	Demolition of steel buildings and structures	R 202.44	0.00	m2	1.00	1.00	R 0.00	
2(B)	Demolition of reinforced concrete buildings and structures	R 298.34	0.00	m2	1.00	1.00	R 0.00	
3	Rehabilitation of access roads	R 36.23	6000.00	m2	1.00	1.00	R 217 358.65	Gravel roads - 1000m length x 6m width
4(A)	Demolition and rehabilitation of electrified railway lines	R 351.61	0.00	m	1.00	1.00	R 0.00	
4(B)	Demolition and rehabilitation of non-electrified railway lines	R 191.79	0.00	m	1.00	1.00	R 0.00	
5	Demolition of housing and facilities	R 404.88	0.00	m2	1.00	1.00	R 0.00	
6	Opencast rehabilitation including final voids and ramps	R 206 064.52	2.50	ha	0.52	1.00	R 267 883.88	3x cuts open at once, rollover rehab
7	Sealing of shafts, adits and inclines	R 108.68	0.00	m3	1.00	1.00	R 0.00	
8(A)	Rehabilitation of overburden and spoils	R 141 496.22	17.50	ha	1.00	1.00	R 2 476 183.82	Hards 10ha + Softs 7.5 ha
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R 176 230.98	0.00	ha	1.00	1.00	R 0.00	
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R 511 858.31	3.86	ha	0.80	1.00	R 1 580 618.45	Carbenaceous material footprints to be rehabilitated PCD 2 ha + ROM 1.86 ha
9	Rehabilitation of subsided areas	R 118 481.77	0.00	ha	1.00	1.00	R 0.00	
10	General surface rehabilitation, including grassing of denuded areas	R 15 626.20	173.00	ha	1.00	1.00	R 2 703 332.60	Entire disturbed footprint
11	River diversions	R 112 088.87	0.00	ha	1.00	1.00	R 0.00	
12	Fencing	R 127.86	0.00	m	1.00	1.00	R 0.00	
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	R 42 619.34	20.00	ha	0.67	1.00	R 571 099.19	Dirty footprint around stockpiling, carbenaceous and PCD area
14	2 to 3 years of maintenance and after care	R 14 916.77	173.00	ha	1.00	1.00	R 2 580 601.21	Entire disturbed footprint
15	Specialist study	R 150 000.00	1.00	report	1.00	1.00	R 150 000.00	Final closure study: GNR1147 Format
Subtotal (1 to 15 above)							R 10 547 077.80	
Subtotal 1		Weighting Factor 2				1.05	R 11 074 431.69	
1	Preliminary and General	12% of Subtotal 1 if less than R100mil					R 1 328 931.80	
		6% of Sub Total 1 if more than R100mil						
2	Contingency	10% of Sub Total 1					R 1 107 443.17	
Subtotal 2 (Subtotal 1 plus sum of management and contingency)							R 2 436 374.97	
Subtotal 3							R 13 510 806.66	
GRAND TOTAL (Subtotal 3 plus 15% VAT)							R 15 537 427.66	



4.7 IMPACT MANAGEMENT ACTIONS

Please refer to Section 4.5 above



5. MONITORING OF IMPACT MANAGEMENT ACTIONS

The table below details the monitoring details, including: Monitoring and reporting frequency; Responsible persons; Time period for implementing impact management actions; and Mechanism for monitoring compliance: Also refer to Appendix 3 for detailed management and monitoring plans as contained in the specialist reports.

Table 5.1: Proposed Monitoring Requirements

Aspect	Requirement
Surface Water	Quality monitoring against parameters as required by the IWUL. Sampled monthly for a five-year post-closure period.
Groundwater	Quality and depth monitoring of both the shallow and deep aquifers against the parameters required by the IWUL. Sampled quarterly and continued for a five-year post-closure period.
Erosion	This will take the form of developing a representative reference site on the disturbed footprints and undertaking visual and topographic assessments to determine erosion rate, using standard erosion monitoring techniques. This will be undertaken twice a year during the wet and dry season for a five-year post-closure period.
Vegetation	Vegetation condition will be monitored using standard field techniques to determine whether the vegetation has been established with a species composition and density similar to that of a reference site established in a similar ecotype, conducted annually for a five-year post-closure period.
Bio-monitoring	Upstream and downstream of the mining activities. A long-term bio-monitoring programme will be implemented to monitor physico-chemical and biological components of the aquatic ecosystems within the mining area. Appropriate biological index will be included in order to quantify and classify the longer-term changes in biotic integrity, with monitoring being undertaken bi-annually to also consider seasonal variations.
Visual	Photographic records should be maintained together with findings, follow up actions and close out records as part of the Environmental Management System.

Annual reports will be prepared to document the results of the monitoring during the rehabilitation, decommissioning, closure and post-closure phases. These reports will provide important information required to manage the on-going closure activities, with the data and reports being used to:

- Provide recommendations for improving subsequent rehabilitation activities;
- Indicate where rehabilitation and closure activities have not been successful, requiring a potential change in design criteria or alternative interventions;
- Provide information where aftercare and maintenance is required during the post-closure period; and
- Indicate if relinquishment criteria have been met.



6. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT REPORT

All information as required by the various Government Departments should be captured and be readily available for submission when required and also for review by the external consultant conducting the performance assessment and audits.

As per NEMA EIA Regulations (GNR982 of 2014), a performance assessment/audit will be conducted by an external consultant throughout the life of mine at intervals stipulated in the EA. It is recommended to complete these audits annually. This is conducted to assess the adequacy and compliance to the EMP and the relevant legislation. As per NEMA, any amendments to the EMP that may be required due to the performance assessment findings will be completed if necessary.

The Quantum of the Financial Provision must be reviewed on an annual basis and submitted to the DMR.

In addition to the NEMA requirements, the IWUL will be audited as per conditions once this is obtained, at which time the site will also be audited against GN704. The IWWMP will be updated annually once approved.

Table 6.1: Mechanisms to Monitor Compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Construction, Operation and Decommissioning Activities	Water Quality	ISO 5667 Grab Samples	Independent Specialist	Monthly as per WUL
Construction, Operation and Decommissioning Activities	Water Quantity	Water Balance to be Updated Annually Flow Meter Reading and Update of Datasheet	SHEQ/ Engineering	Daily
Construction, Operation and Decommissioning Activities	Bio-Monitoring	SASS 5 and IHAS Sampling Sites are to be established upstream and downstream of all Potential Impact	Aquatic Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Storm Water Management	Visual Inspection Check the system for blockages and possible spillage areas	SHEQ/ Engineering	After heavy rainfall
Construction, Operation and Decommissioning Activities	Biodiversity Assessment	Align the Fauna & Flora Compare the annual findings with those of the Baseline Studies	Ecologist	Annually
Construction, Operation and Decommissioning Activities	Alien Invasive Control Program (AICP)	Implement an Alien Invasive Control Programme. During the Biodiversity Assessment a qualified ecologist must be contracted to ensure that the implementation of the AICP are adequately addressed.	Ecologist	Bi-Annually



Construction, Operation and Decommissioning Activities	Vegetation and Rehabilitation	RSIP to be adhered to As specified in EMP	Ecologist	Bi-Annually
Construction, Operation and Decommissioning Activities	Groundwater Quality	SANAS Standards As specified in Geo-Hydro Report	Independent Specialist	Quarterly
Construction, Operation and Decommissioning Activities	Groundwater Levels	Depth meters Determine the groundwater fluctuation over a LOM	Independent Specialist	Determine the groundwater fluctuation over a LOM
Construction, Operation and Decommissioning Activities	Dust Fallout	Implement a Monitoring Programme Gravimetric Dust Fallout	To be analysed by an Accredited Laboratory Independent Specialist	Monthly
Construction, Operation and Decommissioning Activities	Environmental Noise & Vibration	Implement a Monitoring Programme SANAS Standards Noise monitoring are to be done to determine the effect of mining, and associated activities, on the receptors	Independent Specialist (Noise Specialist)	Annually
Construction, Operation and Decommissioning Activities	Visual Inspection of receptors	Implement Monitoring Schedule in-house Physical Census Any incidents of cracking must be recorded and addressed.	SHEQ/ Engineering	Before and After each blasting event



7. ENVIRONMENTAL AWARENESS PLAN

7.1 MANNER IN WHICH THE APPLICANT INTENDS TO INFORM EMPLOYEES OF ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK

Objectives and Aims

The Objectives of the Environmental Awareness Plan are to ensure that: -

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training.
- Procedures are established and maintained to make appropriate employees aware of:
 - The importance of conformance with SHEQ policy and procedures and the requirements of the EMS;
 - The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance;
 - Their roles and responsibilities in achieving conformance with environmental policy, procedures and EMS; and
 - The potential consequences of departure from specified operating procedures.
 - Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and/ or experience.
- The Environmental Awareness Plan Aims at:
 - Informing all personnel of environmental policies, procedures and programmes applicable to the mining activities;
 - Providing job specific environmental training to ensure the protection of the environment;
 - Promoting general environmental awareness amongst all employees; and
 - Providing general training on the implementation of environmental actions.
- The Environmental Awareness Training Programme will include:
 - Training of the implementation of emergency procedures where necessary;
 - Environmental induction for new employees;
 - Code of conduct signed by all inducted employees; and
 - Identification of environmental risks associated with each job and job specific training on addressing these risks.

Responsibilities

The responsibilities in terms of environmental awareness training lie with the Applicant and Mine Manager.

Identification of training needs

- The identification of environmental training and development needs are derived from the analysis of role descriptions.
- The following general and specific training needs have been identified at Wildebessfontein Colliery.

General Training:

- Environmental awareness training;
- Awareness of the Wildebessfontein Colliery SHEQ policy; and
- Awareness of environmental legislation or any other requirements Wildebessfontein Colliery subscribes to.

Specific Training:

- Awareness of significant environmental aspects associated with work activities;
- Awareness of environmentally related operational procedures that need to be followed when conducting work activities;
- Awareness of the potential consequences of not following environmentally related operational procedures; and
- Environmental legislative requirements of work activities.

General Environmental Awareness

General environmental awareness training forms part of the induction at Wildebessfontein Colliery. An employee will attend induction training and all contractor employees are required to undergo the general induction training should their work at the mine exceed a period of 1 week on site.



Updated- 15/9/2019

The training material encompasses information regarding the Wildebessfontein Colliery SHE Policy, charter and visions, the description of environmental impacts, namely air pollution, waste management, water management, land management and energy conservation, the importance of environmental legislation, key roles and responsibilities in terms of environmental management and the reporting of non-conformances.

Evaluation of the Environmental Awareness Plan

The effectiveness and efficiency of this plan will be monitored by the performance of annual audits aimed at testing the environmental awareness of employees directly and the analysis of the root causes of environmental incidents, including non-conformance to legal requirements, to determine which incidents were caused by a lack of environmental awareness and training. The evaluation of the Environmental Awareness Plan will be conducted by the Environmental Department. This evaluation will entail the auditing of the operation during the construction and operation phase once the activity has commenced.

The Environmental Awareness Plan described above is sufficient to make all those involved with the project aware of those risks that may occur as well as the necessary mitigation required to minimise these risks. This awareness plan displays that the Wildebessfontein Colliery is serious about the environment's well-being, empowerment of the local people and returning the land to appropriate use once the reclamation activities have been completed. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Emergency Response Plan

The EMP and other management options are intended to minimise all environmental risks as far as possible. Should there for some reason is unforeseen circumstances that might lead to unacceptable risks, emergency systems and procedures have been especially designed for this operation and is to be adhered in the case of such emergencies. The environmental emergency contingency plan addresses any reasonably anticipated failure (most probable risk) for the entire mining area and focuses on incidents that could cause environmental emergencies. As with any system, the most important and critical component is the identification and communication with the Responsible personal. Consequently, the contact information for these role-players should be available around the facility and be updated on a regular basis. In addition to this, first-party employees (such as security, safety superintendents, mine overseers, environmental officers) will be trained to respond to the responsible personnel in the event of an emergency.



Table 7.1: Emergency Response and Preparedness Plan

POSSIBLE ENVIRONMENTAL RELATED EMERGENCY	ACTION PLANS / REMEDIATION	TIME / PERIOD	RESPONSIBLE PERSON / PARTY
Hydrocarbon Spill (diesel, oil, grease, etc.)	In the event of a small spill the soil will be treated in situ using a spill kit. In the event of a large spill a specialized crew will be called in to decontaminate the area and remove and rehabilitate the soil. The Environmental Management Representative will have the contact details of companies that provide this service.	Immediately	Immediate Supervisor
Veld Fires	The mine management team must ensure that trained personnel are appointed and that firefighting equipment is in serviceable order. The responsible person must ensure that fire breaks are maintained. The responsible person must undertake periodic inspections of firefighting equipment. In the event of a fire on site the fire master and firefighting crew must immediately respond and in instances where the mines firefighting team is unable to control the fire, the services of the local municipal fire brigade must be called in. The fire master is responsible for ensuring that adequate arrangements are made with the local municipal fire brigade to ensure timeous response to veld fires.	Ongoing	Fire Master / Safety Officer
Explosions	Alternative evacuation routes should be identified and used, should the exit to the mine be blocked. Alternative air supply routes should be identified and implemented. All relevant emergency response units must be notified and hospitals informed of potential incoming patients. The Environmental Management Representative will assess the situation from the information provided and set up an investigation team or relevant personnel. This team may include the Operations Manager, Chief Safety Officer, the employee who reported the incident and the individual responsible for the incident.	Immediately	Mine Manager
Pollution Control Dam Breach	Prevent overflow from the adjacent dam by sandbagging the overflow point. Stop all pumping from pits. Pump as much water as possible into the pit areas to increase the capacity of the surface dams to contain run-off water as evaporation is increased.	Immediately	Plant Manager
Berm Breach / Drain Overflow	Where there has been overflow due to a blockage, the drain must be cleaned as soon as possible. Where the overflow is the result of a lack of capacity the dimensions of the drain must be increased. A breached berm must be repaired as	Immediately	Manager / Plant Manager



Updated- 15/9/2019

	soon as possible. The dimensions of a breached berm must be increased to prevent a recurrence.		
Leakage or spill from the chemical toilets and associated infrastructure.	<p>The failure of the chemical toilets and associated infrastructure poses a threat to both groundwater and surface water resources. In the event of a failure, the following procedures must be followed:</p> <ul style="list-style-type: none"> • The incident must be reported to the Environmental Management Representative immediately. • An investigation team, set up by the Environmental Management Representative must investigate the cause of the failure. • Precautions must be taken to prevent the spread of any contaminants/material, especially into surface water courses. • Repairs must be commissioned as soon as possible, followed by an inspection to determine if repair work was efficient, and to detect any overlooked or future potential issues. • The failure must be recorded and inspected during the routine maintenance of the sewerage plant and associated infrastructure. <p>The affected environment must be suitably rehabilitated or cleaned up.</p>	Immediately	Environmental Management Representative
Subsidence and sinkholes	<p>Alternative evacuation and access routes should be identified and used.</p> <p>All relevant emergency response units must be notified and hospitals informed of incoming patients.</p>	Immediately	Operational Manager/SHE Coordinator



8. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

All information committed to in the scoping report and as requested by the DMR to date has been incorporated in the EIA/EMP.

- A3 size locality map is included in Appendix 4.



9. UNDERTAKING

The EAP herewith confirms

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

Signed: _____ 2019

