

Draft for Commenting

**Environmental Impact Assessment
Report and Environmental
Management Programme**

**Mphahlele Community
Development Trust:
Mphahlele Mine**

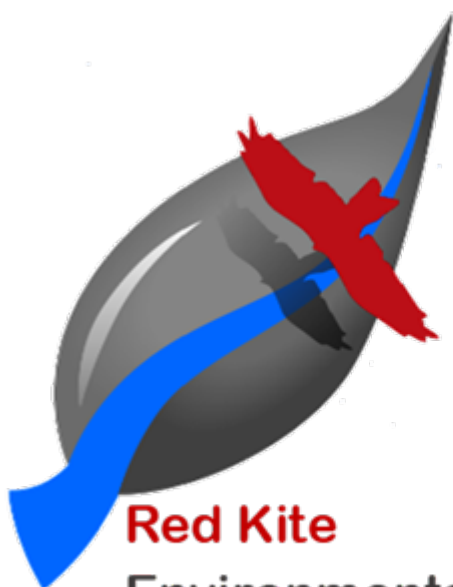
**On the farm
Locatie van M'phatlele 457 KS**

Limpopo Province

April 2021



Volume 1 of 2



Red Kite
Environmental Solutions

Red Kite Environmental Solutions (Pty) Ltd

Tel: 079 555 2433 | Email: nicole@redkiteconsulting.co.za | PostNet Suite 0111, Private Bag X37, Lynnwood Ridge, 0040



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND PROSPECTING.

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

Name of Applicant	Mphahlele Community Development Trust
Project	Mphahlele Mine
Tel No	0765485719
Fax No	086 750 3175
Postal Address	597 Alaska Street, Faerie Glen, Pretoria, 0081
Physical Address	597 Alaska Street, Faerie Glen, Pretoria, 0081
File Reference Numbers SAMRAD	LP 30/1/2/3/2/1(10184) EM

April 2021



IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

- (a) Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- (b) Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- (c) Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- (d) Determine the—
 - (i) Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
 - (ii) Degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources, and
 - (cc) can be avoided, managed or mitigated;
- (d) Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- (e) Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- (f) Identify suitable measures to manage, avoid or mitigate identified impacts; and
- (g) Identify residual risks that need to be managed and monitored.

Table of Contents

Page

PART A: ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1	CONTACT PERSON AND CORRESPONDENCE ADDRESS.....	1
1.1	DETAILS.....	1
1.1.1	<i>Details of the EAP.....</i>	1
1.1.2	<i>Expertise of the EAP.....</i>	1
1.1.1.1.	The Qualifications of the EAP (With Evidence).....	1
1.1.1.2.	Summary of the EAPs Past Experience (In Carrying Out the Environmental Impact Assessment Procedure).....	1
2	DESCRIPTION OF THE PROPERTY	3
2.1	SITE LOCATION	3
2.2	LOCALITY MAP (SHOW NEAREST TOWN, SCALE NOT SMALLER THAN 1:250 000).....	3
3	DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY	4
3.1	LISTED AND SPECIFIED ACTIVITIES.....	4
3.2	DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN	10
4	POLICY AND LEGISLATIVE CONTEXT	18
5	NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES	33
6	PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED	47
7	MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE	48
7.1	MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND ALTERNATIVES	48
7.2	DETAILS OF THE DEVELOPMENT FOOTPRINT ALTERNATIVES CONSIDERED	48
7.2.1	<i>Site Alternatives</i>	48
1.1.1.3.	The Property on Which or Location Where It Is Proposed to Undertake the Activity	48
7.2.2	<i>Design and Layout Alternatives</i>	49
1.1.1.4.	Waste Stockpiles and Opencast	49
1.1.1.5.	Storm water management and PCD's Layout	51
1.1.1.6.	Site Alternatives and requirements for a tailings dam.....	51
7.2.3	<i>Activity Alternatives</i>	52
1.1.1.7.	Obtaining water and process water options.....	52
1.1.1.8.	Land Use alternatives.....	52
7.2.4	<i>Process Alternatives</i>	53
7.2.5	<i>The No Go Option.....</i>	53
7.3	MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED	53
8	DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED	54
8.1	OBJECTIVES OF PUBLIC PARTICIPATION	54
8.2	IDENTIFICATION OF I&APs.....	54
8.3	NOTIFICATION OF I&APs.....	55
8.3.1	<i>Site Notices.....</i>	55
8.3.2	<i>Newspaper Advertisements</i>	56
8.3.3	<i>Written Notifications</i>	56
1.1.1.9.	Hand Delivery.....	56
1.1.1.10.	Email Notifications.....	56
1.1.1.11.	Text Message (SMS).....	56
8.4	NOTIFICATION OF I&APs OF REPORTS AVAILABILITY	57
8.4.1	<i>Draft Scoping Report.....</i>	57
8.4.2	<i>Draft EIA Report and Draft WULA.....</i>	57
8.5	ACCESS AND COMMENTING OPPORTUNITY.....	57
8.5.1	<i>Registration and Draft Scoping Report</i>	57
8.5.2	<i>Draft EIA Report and Draft WULA.....</i>	58
8.6	PUBLIC PARTICIPATION MEETINGS.....	58



8.7	REGULATORY CONSULTATION	58
8.7.1	Department of Mineral Resources (DMR).....	58
8.7.2	Department of Rural Development and Land Reform (DRDLR)	58
8.7.3	South African Heritage Resources Agency (SAHRA).....	59
8.7.4	Ward Councillor Communications.....	59
8.7.5	Other Departments to be communicated with	59
8.8	DISCLOSURE OF I&APs' INTERESTS	59
8.9	REGISTRATIONS AND COMMENTS RECEIVED	59
8.10	ADDRESSING COMMENTS AND CONCERNS	59
8.10.1	Summary of Issues Raised By I&APs From Public Participation.....	60
9	THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES.....	81
10	BASELINE ENVIRONMENT	81
10.1	REGIONAL LOCATION.....	81
10.2	CLIMATE.....	81
10.3	TOPOGRAPHY	83
10.4	GEOLOGY AND GEOCHEMISTRY	84
10.4.1	Waste Material Geochemical Characterisation.....	85
10.4.1.1	Acid Rock Drainage Potential.....	86
10.4.1.2	ABA Results	86
1.1.1.12.	Waste Classification	87
1.1.1.13.	Mineralogical Analysis	88
10.5	SOIL AND LAND CAPABILITY.....	88
10.5.1	Land Type.....	88
10.5.2	Land Capability	91
10.6	GROUNDWATER.....	92
10.6.1	Aquifer Description	92
1.1.1.14.	Shallow unconfined aquifer	92
1.1.1.15.	Deep unweathered aquifer.....	92
10.6.2	Groundwater levels.....	92
10.6.3	Groundwater recharge	94
10.6.4	Groundwater model.....	94
10.7	SURFACE WATER.....	98
10.7.1	National Freshwater Ecosystem Priority Areas (NFEPA).....	100
10.7.2	Surface Water Quality	101
10.8	TERRESTRIAL ECOLOGY	103
10.8.1	Flora.....	103
10.8.2	Fauna	106
10.9	AIR QUALITY	107
10.10	VISUAL.....	110
10.11	NOISE.....	111
10.12	ARCHAEOLOGY AND HERITAGE	112
10.13	SOCIO ECONOMIC.....	113
10.13.1	Population Profile	113
10.13.2	Education Levels	113
10.13.3	Employment Status.....	114
10.14	DESCRIPTION OF THE CURRENT LAND USES.....	115
10.15	DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE.....	117
10.15.1	Sensitive landscapes	117
10.15.2	Settlements.....	118
10.15.3	Business	118



10.15.4	Water Supply and Sanitation.....	118
10.15.5	Infrastructure, Electricity and Communication.....	119
10.15.6	Access Roads.....	119
11	LIMITATIONS AND ASSUMPTIONS.....	120
11.1	SOIL AND LAND CAPABILITY ASSESSMENT.....	120
11.2	SURFACE WATER AND AQUATIC ECOLOGY ASSESSMENT.....	120
11.3	GROUNDWATER STUDY.....	121
11.4	TERRESTRIAL ECOLOGY ASSESSMENT.....	121
11.5	AIR QUALITY ASSESSMENT.....	121
11.6	NOISE IMPACT ASSESSMENT.....	122
11.7	BLASTING AND VIBRATION ASSESSMENT.....	122
11.8	VISUAL ASSESSMENT.....	122
11.9	HERITAGE ASSESSMENT.....	123
11.10	PALAEONTOLOGICAL IMPACT ASSESSMENT.....	123
11.11	SOCIO-ECONOMIC IMPACT ASSESSMENT.....	123
12	FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY.....	124
13	THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY (IN TERMS OF THE INITIAL SITE LAYOUT) AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED.....	128
13.1	SOIL AND LAND CAPABILITY IMPACTS.....	128
13.1.1	Construction Phase.....	128
13.1.2	Operational Phase.....	130
13.1.3	Decommissioning Phase.....	132
13.2	SURFACE WATER AND AQUATIC ECOLOGY IMPACTS.....	134
13.3	GROUNDWATER IMPACTS.....	137
13.3.1	Construction Phase.....	137
13.3.2	Operational Phase.....	137
1.1.2.1.	Impacts on groundwater quantity.....	137
1.1.2.2.	Impacts on groundwater quality.....	137
13.3.3	Post-mining Phase.....	138
1.1.2.3.	Impacts on groundwater quantity.....	138
13.4	TERRESTRIAL ECOLOGY IMPACTS.....	140
13.4.1	Construction Phase and Operational Phase.....	140
13.4.2	Closure/Post-Closure Phase for activities.....	142
13.5	AIR QUALITY IMPACTS.....	142
13.5.1	Construction Phase.....	143
13.5.2	Operational Phases.....	143
1.1.2.4.	PM10.....	144
1.1.2.5.	Total Dust Fallout.....	144
13.6	NOISE IMPACT IMPACTS.....	145
13.6.1	Decommissioning and Closure Phase.....	145
13.7	BLASTING AND VIBRATION IMPACTS.....	147
13.7.1	Construction Phase: Impact Assessment and Mitigation Measures.....	147
13.7.2	Operational Phase: Impact Assessment and Mitigation Measures.....	147
1.1.2.6.	Ground Vibration and human perception.....	148
1.1.2.7.	Vibration impact on roads.....	148
1.1.2.8.	Potential that vibration will upset adjacent communities.....	148
1.1.2.9.	Cracking of houses and consequent devaluation.....	149
1.1.2.10.	Fly-rock unsafe zone.....	149



1.1.2.11. Noxious fumes	150
13.8 VISUAL IMPACTS	155
13.8.1 Construction Phase Impacts	155
13.8.2 Operational Phase Impacts.....	155
13.8.3 Mitigation Measures	156
13.9 HERITAGE IMPACTS.....	157
13.10 PALAEOLOGICAL IMPACTS	158
13.11 SOCIO-ECONOMIC IMPACTS	158
13.11.1 Noise.....	158
13.11.2 Air Pollution	160
13.11.3 Light and Visual Impacts.....	162
13.11.4 Cultural and Heritage Aspects	165
13.11.5 Crime and HIV.....	166
13.11.6 Economic Opportunities, Infrastructure Development and Employment.....	167
14 IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS.....	169
14.1 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK.....	174
14.2 SUMMARY OF SPECIALIST REPORTS.....	185
14.3 ENVIRONMENTAL IMPACT STATEMENT.....	202
14.3.1 Summary of the Key Findings of the Environmental Impact Assessment.....	202
14.4 FINAL SITE MAP.....	204
14.4.1 Summary of the Positive and Negative Implications and Risks of the Proposed Activity and Identified Alternatives.....	204
14.5 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR.....	204
14.6 FINAL PROPOSED ALTERNATIVES	206
15 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION.....	207
16 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE.	207
17 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED	208
17.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT.....	208
17.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION.....	208
17.2.1 Specific Conditions to Be Included Into the Compilation and Approval of EMPr	208
17.2.2 Rehabilitation Requirements	208
18 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED.....	209

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME

19 UNDERTAKING.....	209
20 FINANCIAL PROVISION.....	209
20.1 EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED.....	212
20.2 CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED	212
21 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY.....	212
21.1 DEVIATIONS FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS. 212	
21.1.1 Motivation For The Deviation.....	212
22 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY	213
22.1 COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) READ WITH SECTION 24 (3) (A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) THE EIA REPORT MUST INCLUDE THE:	213
22.1.1 Impact on the Socio-Economic Conditions of Any Directly Affected Person	213
22.1.2 Impact on Any National Estate Referred To In Section 3(2) of the National Heritage Resources Act	213



22.2	OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT.....	213
23	DETAILS OF THE EAP	214
24	DESCRIPTION OF THE ASPECTS OF THE ACTIVITY	214
25	COMPOSITE MAP.....	214
26	DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS.....	215
26.1	DETERMINATION OF CLOSURE OBJECTIVES	215
26.2	THE PROCESS FOR MANAGING ANY ENVIRONMENTAL DAMAGE, POLLUTION, PUMPING AND TREATMENT OF EXTRANEIOUS WATER OR ECOLOGICAL DEGRADATION AS A RESULT OF UNDERTAKING A LISTED ACTIVITY	215
26.2.1	<i>Roles and Responsibilities.....</i>	216
26.2.2	<i>Response to Environmental Emergencies.....</i>	216
26.2.2.1	Emergency Plan	216
26.2.2.2	Classification of Emergencies.....	216
26.2.2.3	Reporting Emergencies	216
26.2.2.4	Formalise Policies.....	217
26.2.2.5	Environmental Emergency Incidents	217
26.2.2.6	Water Pollution Emergency Incident	218
26.2.2.7	Air Pollution Emergency Incidents;	218
26.2.2.8	Environmental Impact Register.....	218
26.2.2.9	Records	218
27	ACID MINE DRAINAGE	219
27.1	POTENTIAL RISK OF ACID MINE DRAINAGE	219
27.1.1	<i>Steps Taken To Investigate, Assess, and Evaluate the Impact of Acid Mine Drainage</i>	223
27.1.2	<i>Engineering Or Mine Design Solutions To Be Implemented To Avoid Or Remedy Acid Mine Drainage .</i>	223
27.1.3	<i>Measures That Will Be Put In Place to Remedy Any Residual or Cumulative Impact That May Result From Acid Mine Drainage.....</i>	225
28	WATER.....	226
28.1	VOLUMES AND RATE OF WATER USE REQUIRED FOR THE MINING, TRENCHING OR BULK SAMPLING OPERATION	226
28.2	HAS A WATER USE LICENCE HAS BEEN APPLIED FOR?	226
29	IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES.....	226
30	FINANCIAL PROVISION.....	255
30.1	DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION	255
30.1.1	<i>Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein.....</i>	255
30.1.2	<i>Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.....</i>	255
30.1.3	<i>Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure</i>	255
30.1.4	<i>Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives</i>	256
30.1.5	<i>Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.....</i>	256
30.1.6	<i>Confirm that the financial provision will be provided as determined.....</i>	256
31	MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON	256
31.1	DETAILED MONITORING PROGRAMMES.....	262
31.1.1	<i>Soil and Land Capability Monitoring Plan.....</i>	262
31.1.2	<i>Blasring and Vibration Monitoring Plan</i>	262
31.1.3	<i>Groundwater Monitoring Plan</i>	263
1.1.2.12.	Monitoring Frequency	265
1.1.2.13.	Monitoring Parameters.....	265
31.1.4	<i>Surface Water and Aquatic Ecology</i>	266



31.1.5	Terrestrial Ecology Monitoring Plan	267
31.1.6	Air Quality Monitoring Plan	267
31.1.7	Environmental Noise Monitoring Plan.....	268
31.2	ENVIRONMENTAL MONITORING AND AUDITING.....	269
31.3	GENERAL MONITORING AND MANAGEMENT	269
31.3.1	Specific Monitoring Requirements.....	269
31.3.2	Monitoring Protocol	270
31.3.3	Monitoring Requirements and Record Keeping.....	270
31.3.3.1	Audit Protocol.....	270
31.3.3.2	Environmental Incidents	270
31.3.3.3	Penalties and Fines for Non-Compliance or Misconduct	271
31.3.4	Environmental Awareness Plan	272
31.3.5	Indicate the Frequency of the Submission of the Performance Assessment Report.....	273
31.4	ENVIRONMENTAL AWARENESS PLAN.....	273
31.4.1	Manner in Which the Applicant Intends to Inform Employees of Any Environmental Risk Which May Result From Their Work	273
31.5	MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT.....	273
31.5.1.1	Objectives	273
31.5.1.2	Identification of Environmental Risks	273
31.5.1.3	Risk Matrix	274
31.6	SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY	275
32	UNDERTAKINGS.....	276

List of Tables

	Page
Table 1: Details of EAP	1
Table 2: Property description and surveyor codes	3
Table 3: Proposed activities for the Mphahlele Mine.....	4
Table 4: Competent Authorities	18
Table 5 : Applicable Legislation and guidelines	18
Table 6: Need and desirability considerations	35
Table 7: Mine Infrastructure arrangement selection	50
Table 8: Mphahlele Site Notice Dates and Localities	55
Table 9: Summary of issues raised by I&APs	60
Table 10: Average monthly precipitation (WR2012)	82
Table 11: Evaporation Data relevant to the Property.....	82
Table 12: ABA, NAG, and S-speciation Results.....	86
Table 13: Major mineral composition of the Elders Colliery RoM samples in weight-% (XRD analysis).	88
Table 14: Agricultural potential for Soils	89
Table 15: Surface water chemical sampling points within the Chunies River (November 2020)	101
Table 16: Water quality results obtained from surface water samples.....	102
Table 17: Categorisation of Sensitive Receptors for the proposed mining area.	111
Table 18: Sensitive Landscapes within the Proposed Mining Site	117
Table 19: Impact Assessment Criteria	124
Table 20: Significance-Without Mitigation.....	126
Table 21: Significance- With Mitigation	126
Table 22: Description of assessment parameters with its respective weighting.....	127
Table 23: Summary of the Potential Impact for the Loss of Topsoil as a Resource	128
Table 24: Summary of the Potential Impact for the Loss of Land Capability and Land Use	129
Table 25: Summary of the Potential Impacts for the Loss of Stockpiled Topsoil.....	130
Table 26: Summary of the Potential Loss of Land Use and Land Capability.....	131
Table 27: Summary of the Potential Soil Contamination Impact Significance.....	131
Table 28: Loss of Topsoil as a Resource: Compaction and Erosion.....	132
Table 29: Loss of Land Capability.....	133
Table 30: Activities and possible impacts during the Establishment (Construction), Operation and Closure phase ...	134
Table 31: Surface Water and Aquatic Ecology Impact and Risk Assessment.....	135
Table 32: Groundwater quantity and quality impacts during the operational and post-closure phase	139
Table 33: Air Quality Impacts according to Development Phases	142
Table 34: PM Concentrations at sensitive receptors.....	144
Table 35: TSP Deposition rates at the sensitive receptors	145
Table 36: Fly rock concern POI's	150
Table 37: Potential Impacts Without And With Mitigation Measures Mitigation.....	152
Table 38: Summary of the Visual Impact Significance during the Construction Phase.....	155
Table 39: Summary of the Visual Impact Significance during the Operational Phase	156
Table 40: Palaeontological Impact Assessment.....	158
Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance).....	170
Table 42: Summary of potential environmental impacts and mitigation measures	174
Table 43: Summary of specialist reports	185
Table 44: Summary of Key findings in terms of Impact Significance	202
Table 45: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr	204
Table 46: Financial Provision Calculation.....	210



Table 47: ABA, NAG and S-Speciation results for the Mphahlele mine samples and calculated NP, NNP and NPR values (duplicate).....	219
Table 48: Mitigation Measures.....	227
Table 49: Impact Management Outcomes.....	251
Table 50: Mechanisms for monitoring (Including Time period, Functional requirements, Roles and responsibilities and Frequency).....	257
Table 51: List of possible monitoring positions.....	263
Table 52: Proposed monitoring boreholes list and monitoring target.....	264
Table 53: List of groundwater monitoring parameter.....	266
Table 54: Monitoring Localities	266

Table of Figures

	Page
Figure 1: Mining Right area locality	3
Figure 2: Mphahlele Mine layout (refer to Appendix 4).....	8
Figure 3: Plant and residue stockpile layout (refer to Appendix 4).....	9
Figure 4: Roll-over Mining Method	11
Figure 5: Near vertical stoping steep dip mining method	12
Figure 6: Flow diagram of the proposed plant	16
Figure 7: Alternative layout.....	52
Figure 8: Temperature and Precipitation (1985-current).....	82
Figure 9: Cross section from North to South illustrating elevation.....	83
Figure 10: Cross section from West to East illustrating elevation.....	83
Figure 11: Surface Topography.....	84
Figure 12: Regional Geology.....	85
Figure 13: Neutralising potential ratio versus total sulphur content.....	87
Figure 14: Land type map of the Project Area.....	89
Figure 15: Soil Forms of Project Area.....	90
Figure 16: Sensitivity analysis of the baseline environment of the development area.....	91
Figure 17: Topographical versus groundwater level elevations.....	93
Figure 18: Hydrocensus point positions.....	94
Figure 19: Simulated groundwater drawdown from 2020 water levels at the end of opencast LoM (Year 9).....	95
Figure 20: Simulated groundwater drawdown from 2020 water levels at the end of underground LoM (Year 16).....	96
Figure 21: Simulated water table and seepage plume emanating from the backfilled pits 50 years post closure.....	97
Figure 22: Simulated seepage plume emanating from the TSF 50 years post closure.....	98
Figure 23: Catchment	99
Figure 24: Rivers in the vicinity of the project site	100
Figure 25: River FEPAs applicable to the mining right area.....	101
Figure 26: Vegetation Group for the Mphahlele Mining Right Project	103
Figure 27: Limpopo Conservation Plan (Terrestrial Biodiversity Assessment)	104
Figure 28: Vegetation Units Delineated	105
Figure 29: Sensitivity delineated according to vegetation units, habitat remaining	106
Figure 30: NEMS 30 km simulation model wind rose for the proposed Lebogakgomo project area for the period 1985 to current.....	108
Figure 31: Wind Class Frequency Distribution per month.....	109
Figure 32: Air quality sensitive receptors.....	110
Figure 33: Surrounding Land Users and Sensitive Receptors (Viewpoints).....	111



Figure 34: Noise receptors.....	112
Figure 35: Land use in the Lepelle-Nkumpi LM.....	116
Figure 36: Land use in and around the project area.....	117
Figure 37: The effect of ground vibration with human perception and vibration limits.....	148
Figure 38: Predicted Fly Rock Exclusion Zone for the Pit area.....	150
Figure 39: Potential Social Change Paths due to Mphahlele Mine.....	169
Figure 40: Neutralising potential ratio versus total sulphur content	220
Figure 41: Sulphide neutralising potential ratio versus sulphide sulphur content (negative/absent NPR values visualised as 0.01).....	221
Figure 42: NAG pH versus neutralisation potential ratio.....	222
Figure 43: NAG pH versus sulphide sulphur neutralisation potential ratio.	223
Figure 44: Class D landfill (GNR 636).....	224
Figure 45: Class C landfill (GNR 636).....	225
Figure 46: Suggested monitoring positions	263
Figure 47: Proposed monitoring boreholes for the Mphahlele Mine.....	265
Figure 48: Surface water monitoring locations recommended.....	267
Figure 49: Proposed dust fallout monitoring locations	268

List of Appendices

Appendix 1:	Qualifications of EAP
Appendix 2:	EAP's Experience
Appendix 3:	Locality map
Appendix 4:	Site layout map
Appendix 5:	Sensitivity Maps
Appendix 6:	Public Participation Information
Appendix 7:	Soil and Land Capability Assessment
Appendix 8:	Surface Water and Aquatic Ecology Assessment
Appendix 9:	Groundwater Study
Appendix 10:	Terrestrial Ecology Assessment
Appendix 11:	Air Quality Assessment
Appendix 12:	Noise Impact Assessment
Appendix 13:	Blasting and Vibration Assessment
Appendix 14:	Visual Assessment
Appendix 15:	Heritage Assessment
Appendix 16:	Palaeontological Impact Assessment
Appendix 17:	Socio-economic Impact Assessment
Appendix 18:	Storm Water Management Plan and Residue Stockpile Designs
Appendix 19:	Rehabilitation and Closure Plan
Appendix 20:	DMRE NEMA and Scoping Report Acceptance



PART A: SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 CONTACT PERSON AND CORRESPONDENCE ADDRESS

1.1 DETAILS

1.1.1 Details of the EAP

Name of the Practitioner:	Nicole Upton
Tel No.:	079 555 2433
Fax No.:	N/A
Postal address:	PostNet Suite 0111, Private Bag X37, Lynnwood Ridge, 0040
E-mail address:	nicole@redkiteconsulting.co.za

1.1.2 Expertise of the EAP

1.1.1.1. The Qualifications of the EAP (With Evidence)

Please refer to Table 1 for a summary of the qualification and experience of the EAP. Refer to Appendix 1 and 2 for more details (CV).

1.1.1.2. Summary of the EAPs Past Experience (In Carrying Out the Environmental Impact Assessment Procedure)

Please refer to Table 1 for a summary of the qualification and experience of the EAP. Refer to Appendix 2 for more details (experience).

Table 1: Details of EAP

Name	Nicole
Surname	Upton
Company	Red Kite Environmental Solutions (Pty) Ltd
Position	Director – Environmental Assessment Practitioner (EAP)
Location	2055 Cura Avenue, Equestria, Pretoria
Email	nicole@redkiteconsulting.co.za
Telephone Number	079 555 24334
Education	BSc Honors Animal, Plant and Environmental Sciences
Professional affiliation(s):	<ul style="list-style-type: none"> • South African Council for Natural Scientific Professions (SACNASP) <ul style="list-style-type: none"> ○ (Registration Number: 121030) • Water Institute of Southern Africa (WISA) <ul style="list-style-type: none"> ○ (Membership No: 39243) • International Association for Impact Assessments (IAIAsa) <ul style="list-style-type: none"> ○ (No. 6185)
Professional summary	Ms. Upton has a qualification in B.Sc. (Hons) Animal, Plants and Environmental Science (Appendix 1) and has 9 years of applicable experience as a project manager on a number of

	<p>Environmental Impact Assessments (EIAs) and environmental authorisations for predominately industrial and mining clients in the South African market. Nicole has extensive integrated environmental management experience, including, EIAs, implementation of environmental management programmes, environmental monitoring, compliance auditing and monitoring, project management and general environmental support. Refer to Appendix 2 for further details.</p>
Skills	<ul style="list-style-type: none">• Mine Closure financial quantum determination, mine rehabilitation.• Management and coordination of environmental compliance aspects for opencast and underground mining.• Alien Invasive Plant monitoring, control and reporting.• Water quality monitoring, measurement, reporting and data analyses including surface water, ground water, process water, sewage water and biological indicators.• Legal compliance auditing and reporting in accordance with the National Environmental Management Acts and other associated environmental related legislation (NEMA listed activities, Water Use Licensing, Waste Licensing, etc.)• Environmental impact assessments and Integrated Water Use License Applications, including rehabilitations plans and IWWMPs.• Environmental Control Officer Site inspections and associated reporting and compliance.• Specialist impact assessments for surface water and ecology.• Conceptual and operational water balances and Water Conservation and Demand Management Plans



2 DESCRIPTION OF THE PROPERTY

2.1 SITE LOCATION

Table 2: Property description and surveyor codes

Farm Names:	Locatie van M'phatlele 457 - KS
Application area (Ha):	11725.0951
Magisterial district:	Lepelle-Nkumpi Magisterial District
Distance and direction from nearest town:	60 km south-east of Mokopane and 50 km south of Polokwane
21-digit Surveyor General Code for each farm portion:	TOKS00000000045700000

2.2 LOCALITY MAP (SHOW NEAREST TOWN, SCALE NOT SMALLER THAN 1:250 000)

Please refer to Appendix 3 for the Locality Maps for the project area.

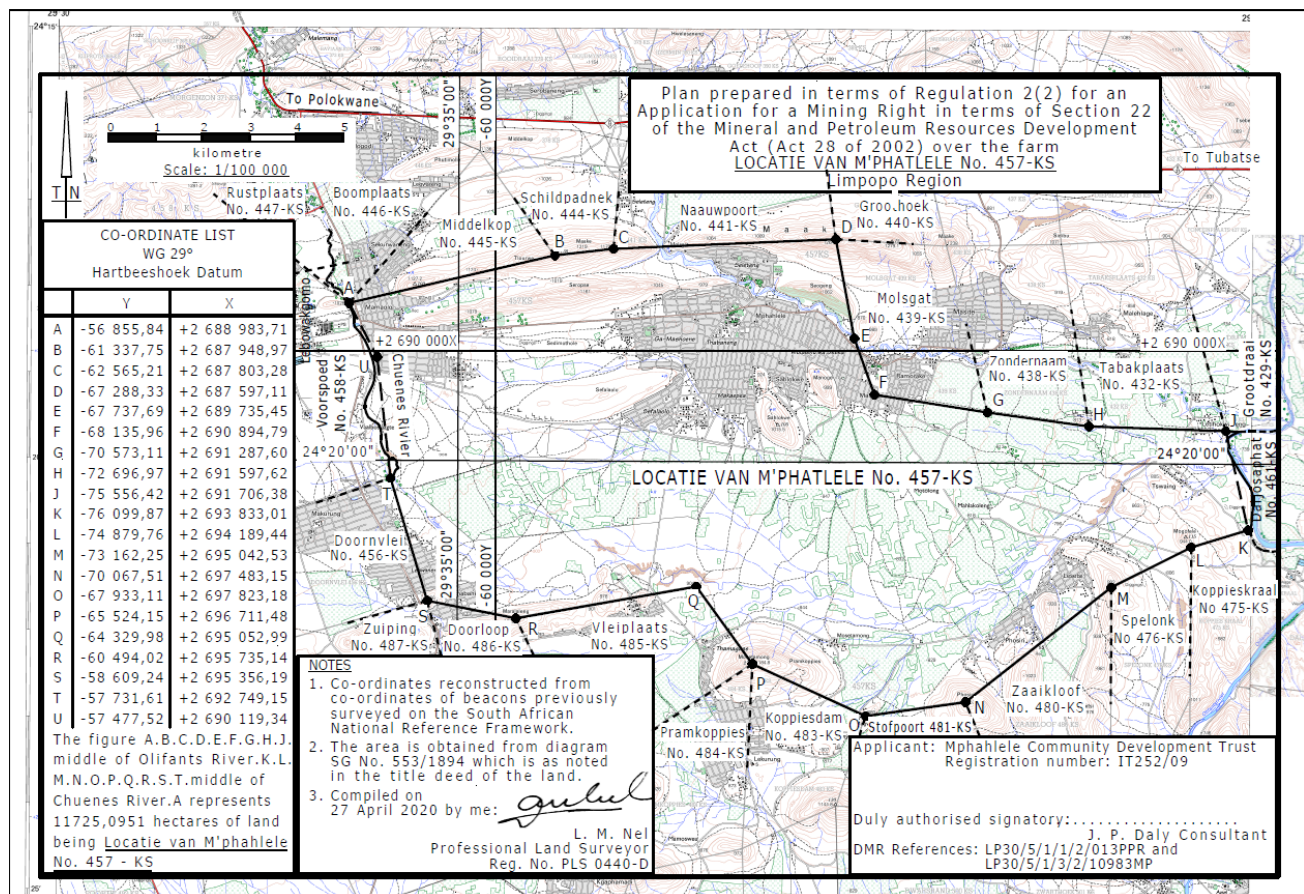


Figure 1: Mining Right area locality

3 DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

3.1 LISTED AND SPECIFIED ACTIVITIES

Table 3: Proposed activities for the Mphahlele Mine

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
GN325(17) Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Opencast mining	2 171 ha	X	GN325(17)	-
GN325(17) Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Underground mining	724 ha	X	GN325(17)	-
Blasting	-	-	Not listed	-
GN921 Category B (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Temporary waste rock stockpiling	5 ha	-	GN921 Category B (11)	X
GN325(6) The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent ROM stockpiling	0.3 ha	X	GN325(6)	-
Temporary topsoil storage/and removal	1 ha	-	Not listed	-
GN921 Category B (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require	5 ha	-	GN921 Category B (11)	X

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Temporary overburden stockpiles				
Hauling and transporting	-	-	Not listed	-
GN325(27) The development of a road – Road construction	12 ha	X	GN325(27)	-
Placement of fences	23 km	-	Not listed	-
GN325(6) The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent Dust suppression	25 ha	X	GN325(6)	-
GN325(15) The clearance of an area of 20 hectares or more of indigenous vegetation Removal of indigenous vegetation	2 400 ha	X	GN325(15)	-
Product stockpiling	1 ha	-	Not listed	-
GN921 Category B (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). GN325(6) The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent Backfilling of opencast areas with tailings,	2 171 ha	X	GN921 Category B (11) GN325(6)	X

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
overburden and waste rock material				
GN325(17) Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Wash plant	5 ha	X	GN325(17)	-
GN325(17) Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Crushing and screening	1 ha	X	GN325(17)	-
GN921 Category B (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). GN325(6) The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent Tailings drying facility	0.5 ha	X	GN921 Category B (11) GN325(6)	X
GN921 Category B (11) The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). GN325(6) The development of facilities or infrastructure for any process or activity	1.5 ha	X	GN921 Category B (11) GN325(6)	X

NAME OF ACTIVITY	AERIAL EXTENT OF THE ACTIVITY	LISTED ACTIVITY	APPLICABLE LISTING NOTICE	WASTE MANAGEMENT AUTHORISATION
which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent Tailings stockpile				
Workshop, administrative buildings and parking areas	1 ha	-	Not listed	-
Groundwater abstraction (boreholes)	-	-	Not listed	-
Storm water management infrastructure (channels, berms and pollution control dams)	3 ha	-	Not listed	-
Process and clean water storage	Included in applicable infrastructure areas	-	Not listed	-
Ablution facilities	Included in office areas	-	Not listed	-
Dewatering of opencast and underground mining areas	2 171 ha	-	Not listed	-
GN327(12) The development of— (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; Construction of mining related infrastructure, channels, pollution control dams and opencast mining within 32 m of various watercourses	Extent of mining operation	X	GN327(12)	-

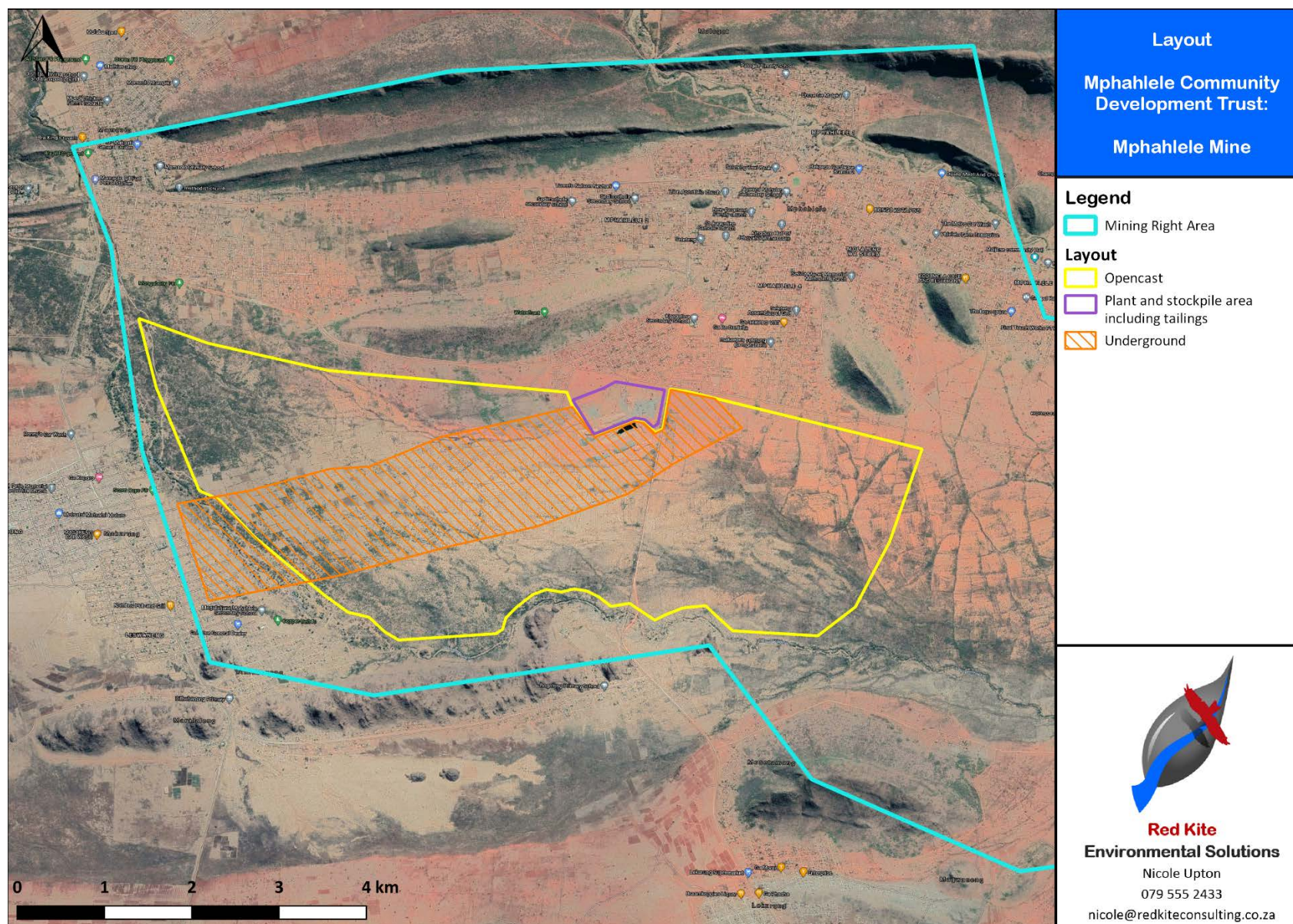


Figure 2: Mphahlele Mine layout (refer to Appendix 4)

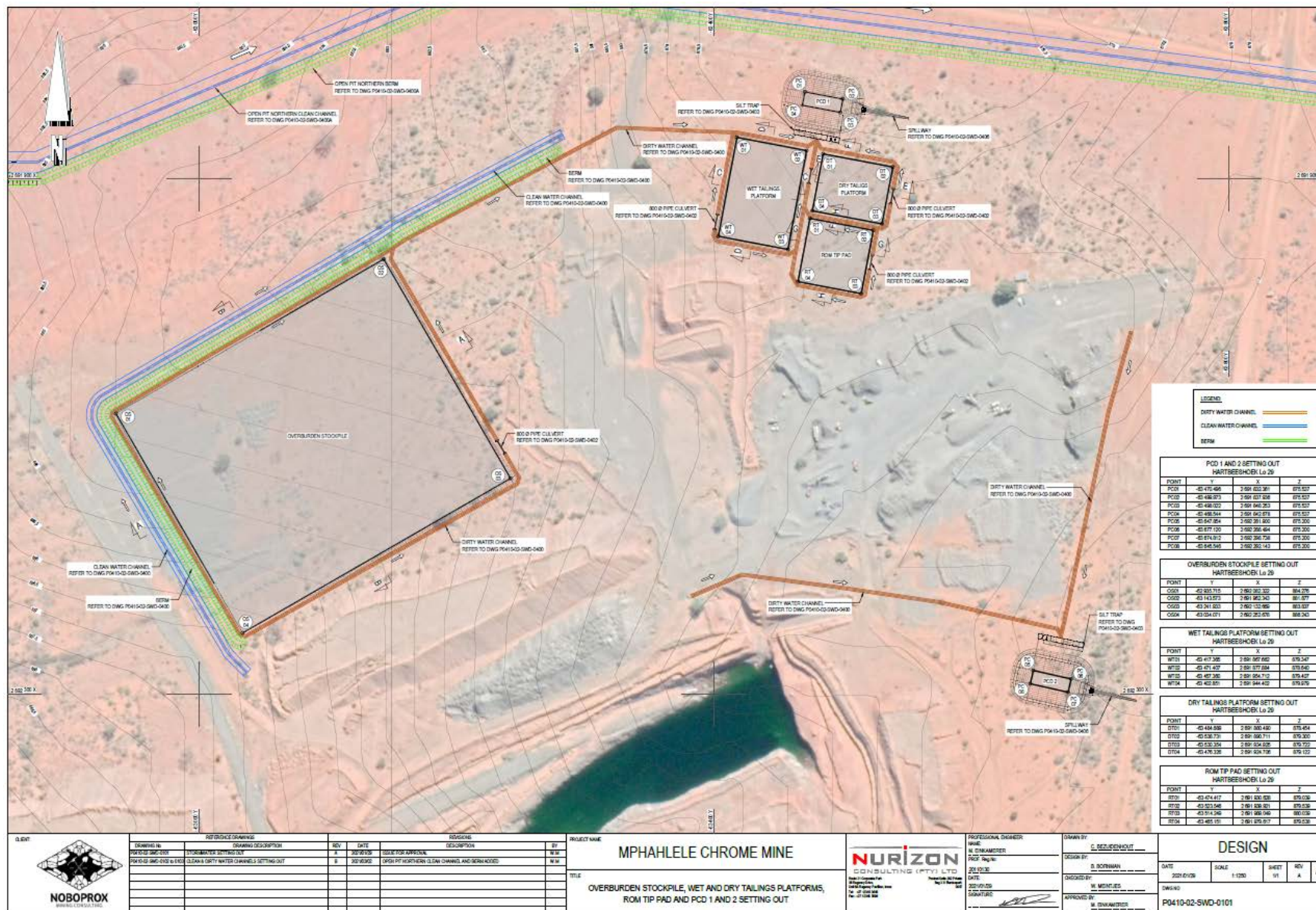


Figure 3: Plant and residue stockpile layout (refer to Appendix 4)

3.2 DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

The Mphahlele Community Development Trust holds a Mining Permit (LP30/5/1/3/2/10983MP) and Prospecting Right (LP30/5/1/1/2/013PPR) over the farm Locatie van M'phatlele 457 KS for their current small-scale opencast operations. The Mining Right area is situated 60 km south-east of Mokopane and 50 km south of Polokwane in the Limpopo Province.

Current mining operations consist of opencast mining (small-scale), overburden and ROM stockpiling and associated activities. Mining is currently restricted to the 5 ha mining permit issued for the operation. Thus, the applicant proposes to apply for a Mining Right on the same farm portion to extend the existing opencast operations and to establish underground mining. The mine also proposes to establish a wash plant and associated facilities such as residue stockpiles. The residue material from the wash plant will be allowed to dry, where after it will be stockpiled and used as backfill material for the opencast void, thus no tailings dam will be constructed for the project.

The mining project will include the following infrastructure and activities:

- Opencast and underground mining of chrome
- Backfilling of opencast void with waste rock/overburden and tailings
- Haul and access roads (including drainage line crossings)
- Workshop, administrative buildings and parking areas
- Processing plant (including crushing and screening)
- Stockpiles (topsoil, ROM, waste rock/overburden, product)
- Groundwater abstraction (boreholes)
- Storm water management infrastructure (channels, berms and pollution control dams)
- Tailings storage facilities – a tailings drying pad and dry stockpiling
- Ablution facilities
- Process and clean water storage

The open cast pit will be mined in a typical grid by grid truck and shovel method. Initially there will be topsoil stripping and stockpiling, then subsequent drilling and blasting of rock (interburden etc.) rock face thereafter. Handling of Run of Mine (ROM) with large front-end loaders and trucks will complete the open cast mining. Waste rock will be stockpiled until such time as there is sufficient space available inside the pit for storage of waste. Then waste rock will be placed in mined out areas as the face is advanced.

The method for tailings storage will be a wet tailings pad (likely concrete) and dry tailings stockpile with backfilling of the opencast void with tailings material. Wet tailings from the wash plant will be allowed to dry on cement drying slabs. This is done to facilitate the maximum recovery of water to be reused at the plant. Once tailings have dried sufficiently, they will be transferred to the dry tailings stockpile.

3.3 Mining Method

3.3.1 Opencast

Resources situated close to surface will be mined via open pit type mining. The mine will be established by opencast strip mining, being roll over truck and shovel operations that will culminate in an established high wall access for the underground. Initially there will be topsoil stripping and stockpiling, then subsequent drilling and blasting of rock (interburden etc.) rock face thereafter. Handling of Run of Mine (ROM) with large front-end loaders and trucks will complete the opencast mining.

Waste rock and overburden will be stockpiled until such time as there is sufficient space available inside the pit for storage of waste. Then the waste rock will be placed in mined out areas as the face is advanced.

The production methods to be used are typical of open pit operations and consist of the following steps:

- Strip the 70 cm of top soil and stockpile for future rehabilitation work
- Strip overburden until solid rock is encountered and stockpile this for future rehabilitation
- Drill and blast the solid overburden, remove for stockpiling and at a later stage, perform back filling of the pits
- On encountering the ore seams reduce bench height and drill and blast the ore
- Load the ore into trucks using hydraulic shovels or front-end loaders
- Transport the ore to the processing plant ROM for stockpiling
- Drill and blast the internal solid overburden and remove for stockpiling

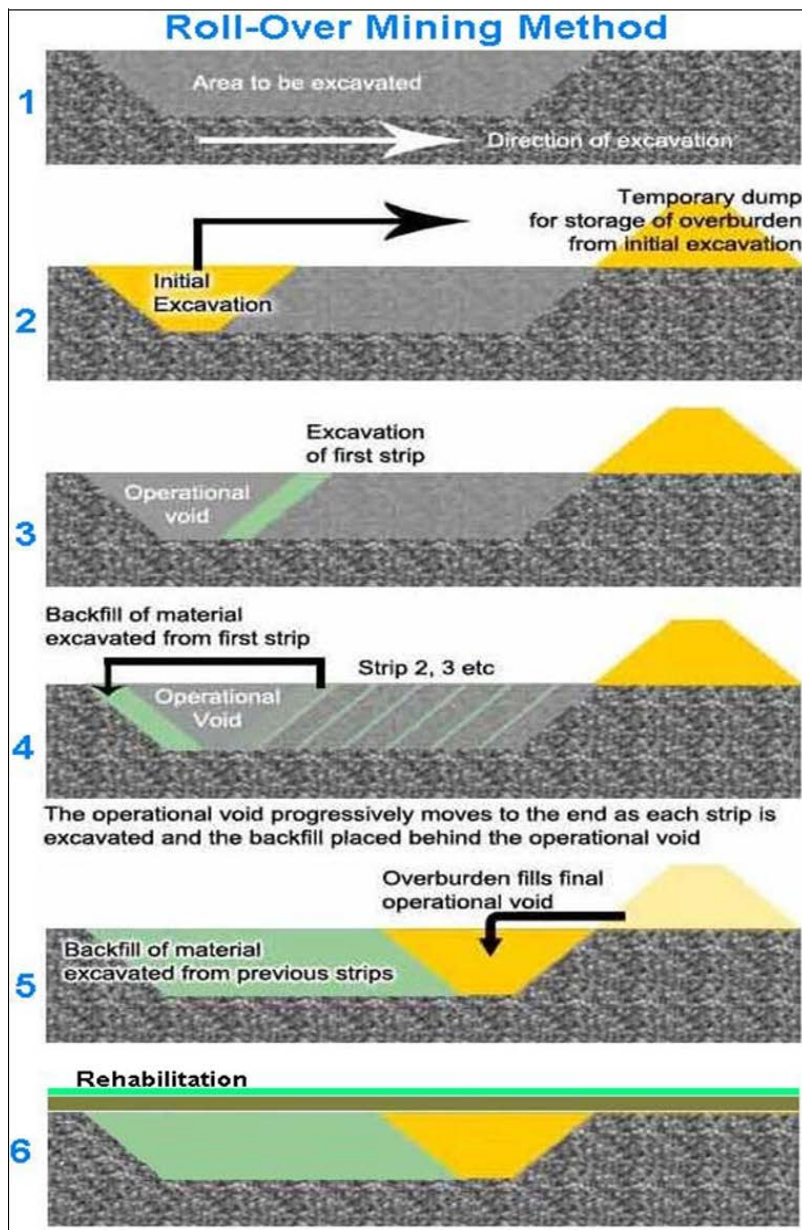


Figure 4: Roll-over Mining Method

3.3.2 **Underground**

The pit will be used to develop portals, which will allow the remainder of the ore to be exploited using underground mining methods.

Because the targeted chrome seams are steeply dipping, the mining method to be deployed would be block caving or near vertical stoping steep dip mining as the most suitable mining method for the mining resource under consideration and mechanical equipment will be utilised:

- Development rates are faster compared to conventional systems.
- It offers greater flexibility in terms of dealing with geological and quality anomalies compared to other mining methods.
- Safety is enhanced as few people are involved and most of the work is done by machinery.
- Personnel, equipment, and consumables can be moved efficiently and almost directly to the working faces.
- Shift change-over times are reduced with concomitant improvements in productivity.
- Supervision is also improved as all working places can be visited with less effort compared to conventional methods.

Mining extraction is achieved by developing a series of roadways on the seam on strike and connecting them by holdings or cut throughs to form pillars that provide support for the overlying strata. Mining extraction in this method is a function of the pillar sizes which in turn is a function of the depth from surface as well as the Chrome seams being targeted.

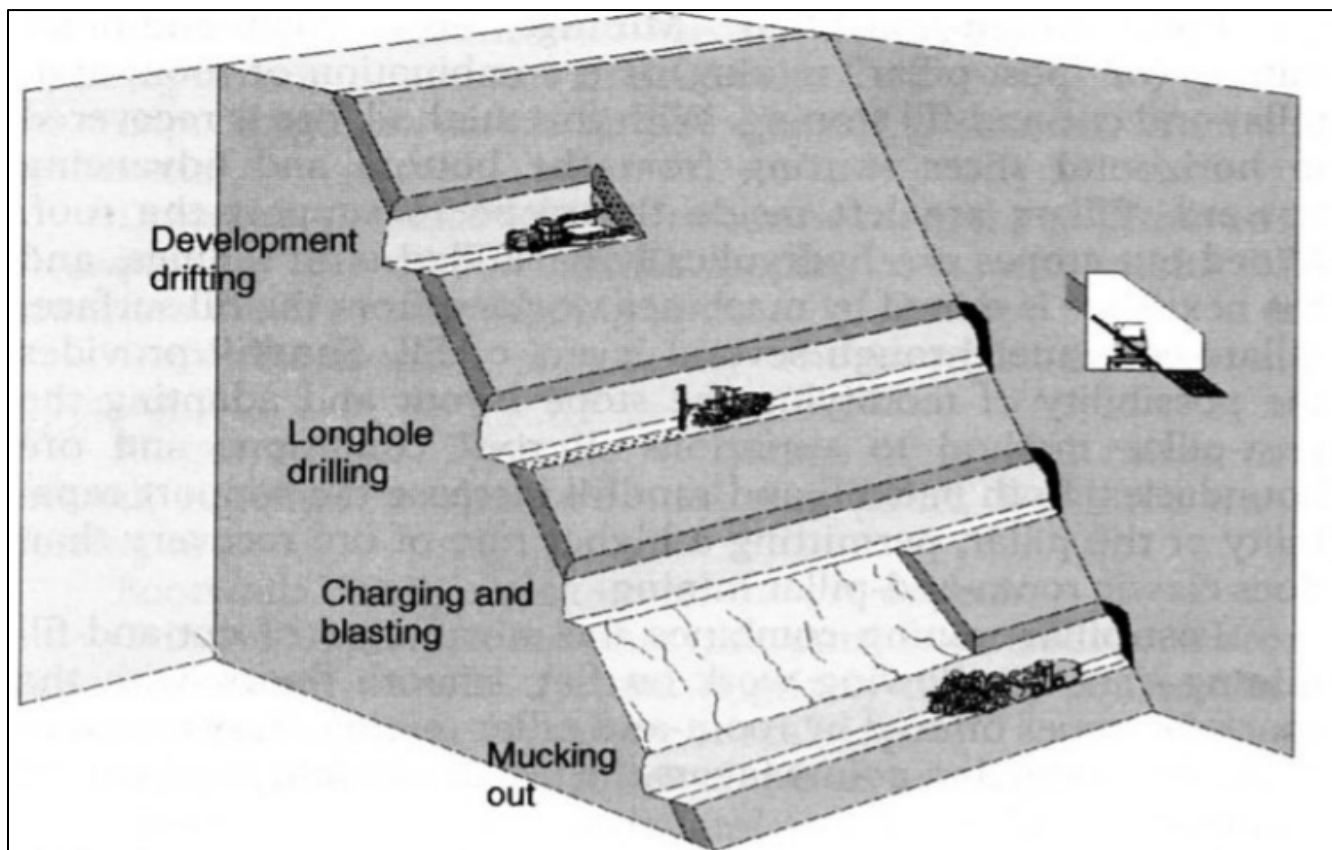


Figure 5: Near vertical stoping steep dip mining method

The methods used may vary throughout each mine, depending on the changing characteristics of the ore body and mine planning techniques. It is common to dig shafts vertically downwards to reach the ore body, however, in the case of Mphahlele, it is planned to establish steep inclines to reach the ore body at depths of 100 m and going down to 450 m. From these levels, horizontal drive levels will be developed on reef. Stopping then takes place from these levels.

3.4 Mine Infrastructure

- Roads: Access and haul roads will be constructed to service the mining operations.
- Waste Rock Dump: A waste rock dump will need to be established. Waste rock will be backfilled into the opencast void as part of the roll-over mining method. Refer to Appendix 18 for residue stockpile designs.
- Pollution Control Dams: Storm water infrastructure will need to be designed and constructed for the proposed mining operation. A pollution control dam/s (PCD) will be required for the storage of contaminated water originating from the mining activities. Water contained within the PCD will be utilised for dust suppression and when possible for the wash plant processes. The PCD has been designed by an engineer as part of the Storm Water Management Plan (Appendix 18).
- Clean and Dirty Water Systems: Storm water infrastructure will need to be constructed for the proposed mining operations. Clean and dirty water systems will need to be constructed in order to ensure clean and contaminated water is kept separated within the mine areas. A Storm Water Management Plan has been compiled as part of this application and included in Appendix 18.
- Boreholes: Boreholes will be required to be sunk at strategic locations within the mining area. The purpose of the boreholes includes the monitoring of groundwater quality and the abstraction of groundwater for potable and process water use.
- Offices, Storage areas, Ablution Facilities and Parking
- Diesel bays and refuelling areas
- Material loading areas
- Workshop
- Wastewater Treatment Plant: Sewage water will be treated for reuse in the onsite processes.
- Return Water Dams: Return water dam systems will be installed at the wash plant and underground operations to facilitate the storage and recycling of process water
- Topsoil stockpile: Topsoil will be stripped and stockpiled for later use in rehabilitation activities
- ROM stockpile and plant feed stockpile: Appendix 18 contains designs for the ROM stockpile.
- Product stockpile

3.4.1 Water supply

Both potable and service water will be needed for the operations throughout the life of mine. Potable water will be extracted from boreholes located on site. The water to be used at the mine will be sourced either from the local borehole on site, groundwater inflows into the opencast and underground workings, storm water dam or a combination of the above. Water management facilities for the control of storm water and for pollution prevention such as water supply dams, pollution control dams, clean and dirty storm water controls will be designed to meet the requirements of relevant legislation. Recycling dirty/process water will be prioritised.

Total estimated water consumption (usage) of 50 m³/Hr.

A geohydrological study has been undertaken during the EIA Phase to assess the groundwater regime. A WULA, accompanied by an Integrated Water and Waste Management Plan (IWWMP), is being applied for as part of the Environmental

Authorisations for the Mining Right.

3.4.2 Power supply

The total maximum demand of 10.55 MW is comprised of 3.55 MW for the plant and 7 MW for the underground and ancillary power requirements. The total average power requirement of the mine is estimated at some 8MW.

Power will be supplied from either generator or through Eskom.

3.4.3 Wash plant

As part of the proposed mining project a wash plant is proposed.

The plant is designed to treat 30 000 to 50 000 tons ROM per month, based on the following criteria:

- Running Time:
 - 22 Hrs per day (accounting 2 hours for unplanned stoppages, maintenance, and breakdowns)
 - 28 Days per month
 - 616 Hrs running time per month
- At a feed rate of approximately 70 to 100 tons/hr, 30,000 to 50,000 tons/month can be treated.

The material flow and processing sections are described in more detail below:

3.4.3.1 ROM to Classification Plant

The Run of Mine (ROM) ore, from the opencast or underground workings are stockpiled on the ROM stockpile (SP01) with a base not less than 40 m in diameter and a height of 18 m. The ROM stockpile should have a capacity of 7,000 tons and 4,000 ton live. The stockpile consists of a base and a concrete reclaim tunnel 3 m wide, 2.5 m high and ± 40 m long. The tunnel will be equipped with 4 brute force vibrating feeders (VF 01-04) with VSD control. Each feeder will have a capacity of 300 tons per hour. The ore from the stockpile will be fed via the vibrating feeders onto a 900 mm conveyor belt (CV01) feeding a scalping screen (SC01) in the crusting plant. CV01 will be equipped with a weight meter (WT01) with 6 in line idlers and range between 0 – 300 tons/hr.

The crushing and screening plant is designed to crush ore down to 100% < 80mm and stockpiled on the plant feed stockpile (SP02).

The plus 80 mm ore reports directly to a Jaw crusher. The Jaw crusher product reports to a 750 mm wide conveyor (CV02). CV02 discharges via a chute onto the crusher feed conveyor CV01.

The scalping screen undersize reports to a 900mm wide conveyor belt CV03 and discharge the ore onto to plant feed stockpile SP02.

The crushing and screening plant will be operated in isolation from the rest of the plant.

The plant is designed for a feed rate between 70 and 250 tons/hour and a recycling load of between 25 and 66 tons/hr.

The ore from the plant feed stockpile reports via CV04 to the lumpy classification screen (SC03). Water from the magnetic separators) or “magsep” (non-magnetic) underflow will be pumped to CV04 head chute feeding SC03. SC03 is also equipped with two spray bars. Clean process water from the process water dam will be used as spray water on the screen to wash off all fines from the lumpy ore prior to HMS.

3.4.3.2 Heavy Medium Separation

The objective of the heavy medium separation plant is to separate the chromite ore from the waste ore by using ferrosilicon as a medium. Due to the differences in SG of the chromite and the waste ore the chromite ore will sink, and the waste will float at a specific SG of the medium.

The lumpy ore (19 x 80mm) from the lumpy classification screen (SC03) reports to the H.M.S drum, together with ferrosilicon slurry (FeSi) from pump (PU02), where separation takes place.

The HMS drum discharges onto a split drain and rinse screen (1.83m x 4.88m horizontal vibrating screen) fitted with 0.85mm slotted polyurethane panes and spray bars fitted on the latter half of the screen.

The FeSi drains through the first quarter of the screen into a sump from where it is circulated back to the drum via pumps (PU02). Water from the spray bars, fitted to latter halve of the screen, washes all the FeSi from the ore and drains into a sump from where it is pumped by (PU03) to the magnetic separator (MS01) to recover the FeSi. The non-magnetics from the magnetic separators flow to pump PU06 and pumped to CV04 head chute as dilution water.

3.4.3.3 Milling

A ball mill with 250kw drive will be sufficient to mill 36 tons/hr chrome pebbles down to 100% -1mm. From the mill feed bin, the chromite chips will be fed to the mill with a weigh feeder (CV10) at a rate of 20 – 36 tons/hr. The weigh feeder discharges the chips into the mill feed hopper with dilution water. The mill discharges the slurry via a trammel screen in a pump sump from where it is pumped by the mill discharge pump PU07 to the spiral feed pump (PU01).

3.4.3.4 Spiral Plant

All the -0.85mm material from the fines classification screen (SC04) together with the mill effluent are pumped to a 3-way distributor on top of the spiral plant. Each stream will feed a bank of 10 twin start 3 turn rougher spirals (in total 30 twin start rougher) spiral.

The middling's and tailings of each rougher bank feed a bank of 8 twin start scavenger spirals via a launder and multi-distributor.

The tails of the scavenger spirals report to the tailings pump (PU13). The concentrate from the cleaner's report to the re-cleaner feed pump (PU08). The tailings from the cleaners together with the concentrate of the scavenger's report to the middling's pump PU09. The re-cleaner feed pump PU08 pump to 1 bank of 12 twin-start spirals. The concentrate of the re-cleaners reports via a launder to the Chemgrade product pump (PU11). The middlings of the re-cleaner's report via a launder and multi-distributor to 1 bank of 10 re-re-cleaner spirals. The concentrate of this spirals report via a launder to the Derrick Screen feed pump (PU12) and to a 3 deck Derrick screen stack-sizer to produce Foundry grade concentrate. The product from the Derrick Screen reports to the F/s product pump.

The middling's feed pump pumps to 1 bank of 10 twin-start Middling spirals via a 20-way multi- distributor. The concentrate of these spirals and the tailings of the re-cleaner's report to 1 bank of 10 mid-cleaner spirals and the tailings of the Middling spirals report to the tailings pump.

The re-re-cleaner middlings/tails and the mid-cleaner tails report to the Rougher feed pump (PU09). The concentrate and middlings from the Middling cleaners report via launders to the Met grade product pump.

The Met grade-, Chemgrade- and Foundry sand Products, are pumped to a concrete stockpile area via De-watering Cyclones. The water from these cyclones and the drain water from the concentrate stockpiles are collected and pumped via pump (PU14) to the spiral plant steady head tank to be used as launder dilution water. The steady head tank will have a level controller controlling an automatic valve on the make-up water pipeline from the process water dam.

3.4.3.5 Tailing Handling

The tailings pump (PU13) pumps to a guard cyclone (CY05). The cyclone underflow reports to a 1,220m x 3,050m dewatering screen (SC07) next to the waste conveyor CV06. The dewatering screen is a 1,220m x 3,660m. The dewatered tails (sand), from the screen reports to the lumpy waste conveyor and will be stock piled with the solid waste on the waste stockpile. The guard cyclone overflow reports to a 12m diameter conventional thickener.

Flocculent will be dosed into the tailings stream prior to the thickener. The thickened tailings, (thickener underflow) will be pumped to the slimes dam or to a PGM recovery plant (not part of this project now). The slimes dam should not be smaller than 100m x 100m. The return water from the slimes dam is pumped to the clean water tank at the plant area. The thickener overflow (clean water) reports to a steel process water dam ± 15m diameter and 3 m deep (530m³) from where it is pumped to the different sections of the plant.

A simplified process flow diagram of the plant is indicated in Figure below.

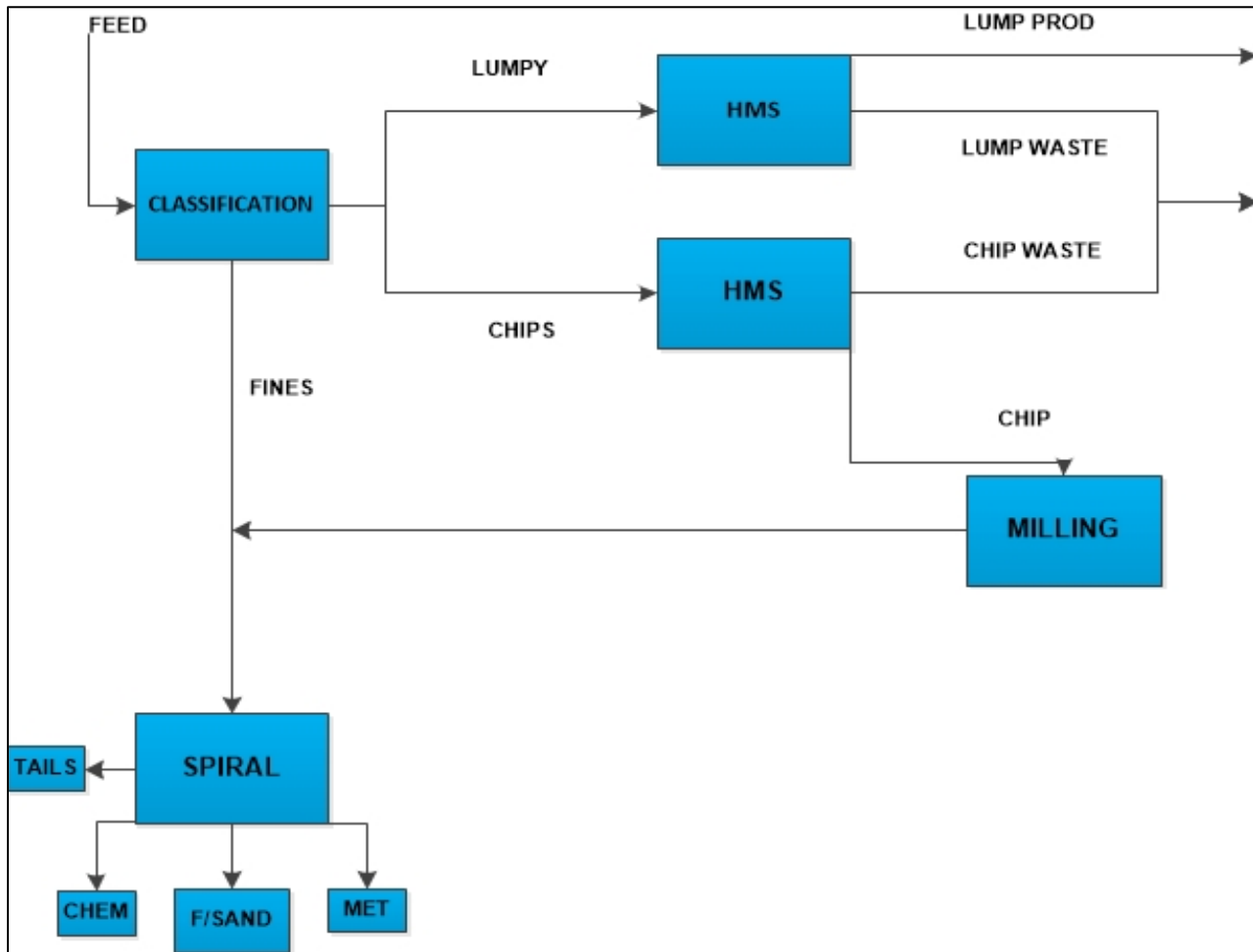


Figure 6: Flow diagram of the proposed plant

3.4.4 Waste management

The waste generated by the proposed activities are divided into 3 main categories, and are discussed below in summary.

3.4.4.1 General Waste

The identified general waste types to be generated on site are the following:

- Scrap metal & timber
- Cans, paper, plastic and cardboard
- Inert waste
- Garden waste

3.4.4.2 Tailings

Wet tailings from the wash plant will be allowed to dry on cement drying slabs. This is done to facilitate the maximum recovery of water to be reused at the plant. Once tailings have dried sufficiently, they will be transferred to the dry tailings stockpile. The facility will be constructed with the appropriate barrier as prescribed by the Competent Authority. The wash plant, and tailings facility are considered dirty areas and such all water emanating from this area will be contained in a PCD for reuse in the wash plant process.

As part of this application, it is proposed to use tailings for backfilling of the opencast voids as part of the rehabilitation efforts of the mine. In order to maximise recycling, and thereby reducing waste materials stockpiled on site.

When economically viable the mine also proposes to sell the tailings material to third parties for further reclamation at off-site operations.

3.4.4.3 Hazardous Waste

Potentially Hazardous waste types that may occur on site include:

- Any tar containing waste
- Any resin containing waste
- Fluorescent light tubes
- Oil (used and clean)
- Degreaser
- Explosives
- Brake fluid
- Transmission fluid
- Sewage

All the above-mentioned wastes will be handled to guidelines given by the competent authority.

4 POLICY AND LEGISLATIVE CONTEXT

Relevant South African legislation requires various authorisations prior to the commencement of the Proposed Project. Although cognisance of all applicable legislation is being taken, the following table details the relevant environmental authorisations, which are required:

Table 4: Competent Authorities

Authorisation	Responsible Department	Relevant Act
Mining Right Application	DMR	MPRDA
Environmental Authorisation		NEMA
Waste Management License		NWA
Water Use License	DWS	NEMWA

As part of the Environmental Impact Assessment Phase, and to ensure all relevant South African legislation was taken into consideration, the following legislation was considered relevant as part of the overall ESIA Process to ensure legal compliance and best practice.

Table 5 : Applicable Legislation and guidelines

Applicable legislation and guidelines use to compile the report	Application
<p>Constitution of the Republic of South Africa (No. 108 of 1996) Since 1994 South African legislation, including environmental legislation, has undergone a large transformation and various new laws and policies was promulgated with a strong emphasis on environmental concerns and the need for sustainable development. The Constitution of the Republic of South Africa (No. 108 of 1996) (the Constitution), the supreme law in South Africa, contains far reaching clauses relevant to the environment including the environmental right, the administrative justice clause, the access to information right as well as the liberalisation of <i>locus standi</i> rule.</p> <p>In terms of Section 24, a positive obligation is placed on the State to give effect to the environmental right. The environmental right states that: <i>“Everyone has the right - To an environment that is not harmful to their health or well-being; and To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</i></p> <ul style="list-style-type: none"> - <i>Prevent pollution and ecological degradation;</i> - <i>Promote conservation; and</i> - <i>Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</i> 	<p>The purpose of the ESIA Process is to identify activities that may cause environmental and socio-economic damage from the associated impacts occurring as a result of the proposed project. The impacts will be assessed, evaluated and mitigation measures developed to minimise the negative impacts and promote positive impacts associated with the proposed project, thereby ensuring that the project is undertaken in a sustainable manner. This also ensures that the applicant does not contravene Section 24 of the Constitution.</p> <p>The Constitution cannot manage environmental resources as a stand-alone piece of legislation hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an ongoing basis throughout South Africa. In terms of Section 7, a positive</p>

Applicable legislation and guidelines use to compile the report	Application
<p>Mineral and Petroleum Resources Development Act (No. 28 of 2002)</p> <p>The primary aim of the MPRDA is to recognise the sovereignty of the State over all the mineral and petroleum resources in South Africa and to promote equitable access to the Country’s resources. The MPRDA has a number of objectives, including to:</p> <p>Promote equitable access to the nation’s mineral and petroleum resources to all the people of South Africa;</p> <p>Substantially and meaningfully expand opportunities for historically disadvantaged persons, including women, to enter the mineral and petroleum industries and to benefit from the exploitation of the nation’s mineral and petroleum resources;</p> <p>Promote economic growth and mineral and petroleum resources development in the country;</p> <p>Provide for security of tenure in respect of prospecting, exploration, mining and production operations;</p> <p>Give effect to Section 24 of the Constitution of South Africa by ensuring that the nation’s mineral and petroleum resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development; and</p> <p>Ensure that holders of mining and production rights contribute towards the socio-economic development of the areas in which they are operating.</p> <p>The MPRDA concerns equitable access to, and sustainable development of, South Africa’s mineral and petroleum resources. The MPRDA makes provision for sustainable mining and requires:</p> <p>That every person who has applied for a mining right must conduct an EIA, determine the environmental baseline, and submit an EMPR to the DMR;</p> <p>That every holder of a mining reconnaissance permit, prospecting right, mining right, mining permit or retention permit must assess and communicate the impacts of the activity on the environment;</p> <p>The need to rehabilitate the environment affected by prospecting or mining operations to its natural or predetermined state; and</p> <p>That the directors of the mining company are liable for unacceptable impacts on the environment.</p>	<p>obligation is placed on the State to give effect to the environmental rights.</p> <p>In accordance with section 22 of the MPRDA, the applicant is required to conduct a Scoping and Environmental Impact Report Process and submit an EMPR for approval to the Limpopo DMR. Red Kite Environmental Solutions has compiled the Environmental Impact Assessment and Environmental Management Programme Report in accordance with the MPRDA and NEMA.</p>
<p>National Environmental Management Act (No. 107 of 1998)</p> <p>The NEMA is South Africa’s overarching environmental statute concerned with integrated environmental management (IEM) and the underlying principles by which environmental management must be undertaken. Its primary objective is to provide for co-operative</p>	<p>In terms of Section 24(2) and 24(D) of the NEMA, authorisation is required for the following listed activities identified in terms of</p>

Applicable legislation and guidelines use to compile the report	Application
<p>governance, thus binding all organs of State by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance, and procedures for co-ordinating environmental functions exercised by organs of State and to provide for matters connected therewith (Government Gazette, 1998).</p> <p>The NEMA provides for the Constitutional right to an environment that is not harmful to the health and well-being of South African citizens, the equitable distribution of natural resources, sustainable development, environmental protection, and the formulation of environmental management frameworks (Government Gazette, 1998). Section 2 of NEMA sets out principles for sustainable integrated environmental governance; the principles are further detailed in subsequent sections of NEMA.</p> <p>Section 24(5), 24M and 44 of the NEMA enables the Minister to publish regulations pertaining to environmental impact assessments. The current Environmental Impact Assessment Regulations, GNR.326 (EIA Regulations), were published on 7 April 2017. Sections 24(2) and 24D of the NEMA make provision for the Minister to publish listed activities that would require environmental authorisation prior to commencement of that activity. The Minister published the following three Regulations in terms of Sections 24(2) and 24D of the NEMA on 4 December 2014: Regulation GNR.327 of 2017 which sets out a list of identified activities which may not commence without environmental authorisation from the competent authority and which must follow the Basic Assessment (BA) procedure as provided for in Chapter 4, Part 2 of the EIA Regulations; Regulation GNR.325 of 2017 which sets out a list of identified activities which may not commence without environmental authorisation from the competent authority and which must follow the scoping and EIA procedure as provided for in Chapter 4, Part 3 of the EIA Regulations; and Regulation GNR.324 of 2017, which sets out a list of identified activities per geographical area, which may not commence without environmental authorisation from the competent authority and which must follow the BA procedure as, provided for in Chapter 4, Part 2 of the EIA Regulations.</p>	<p>the following, which is detailed in Section 2(d)(i):</p> <p>GN325(17) GN325(6) GN325(27) GN325(15) GN327(12)</p>
<p>National Environmental Management Waste Act (No. 59 of 2008)</p> <p>The National Environmental Management Waste Act (No. 59 of 2008) (NEMWA) serves to reform the law regulating waste management in order to protect human health and the environment. This is managed by providing reasonable measures for the prevention of pollution and ecological degradation. The Act aims to secure ecologically sustainable development while promoting justifiable economic and social development. The Act provides national norms and standards for</p>	<p>The following activity is considered applicable to the Proposed Project, as detailed in Section 2(d)(i):</p> <p>GNR.921, Category B, Activity 11</p>

Applicable legislation and guidelines use to compile the report	Application
<p>regulating the management of waste by all spheres of government, for specific waste management measures and for matters incidental thereto.</p> <p>In terms of the NEMWA, the Minister of the DEA may publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. Furthermore, the NEMWA prohibits any person to commence, undertake or conduct a waste management activity except in accordance with the requirements or standards determined in terms of the NEMWA for that activity or where a WML has been issued in respect of that activity.</p> <p>A list of waste management activities that require a WML was published in GNR.921 of 2013. GNR.921 details three categories of activities: Category A activities, which require a BA process in terms of GNR.327 to be undertaken, and Category B activities, which require a scoping and EIA process in terms of GNR.325 to be undertaken, and Category C activities require compliance with relevant Norms and Standards.</p>	
<p>National Water Act (No. 36 of 1998)</p> <p>The NWA provides for fundamental reformation of legislation relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation’s water resources in the interests of all water users. The purpose of the Act is stated, in Section 2 as, inter alia:</p> <p>Promoting the efficient, sustainable and beneficial use of water in the public interest; Facilitating social and economic development; Protecting aquatic and associated ecosystems and their biological diversity; Reducing and preventing pollution and degradation of water resources; and Meeting international obligations.</p> <p>The NWA presents strategies to facilitate sound management of water resources, provides for the protection of water resources, and regulates use of water by means of Catchment Management Agencies, Water User Associations, Advisory Committees and International Water Management.</p> <p>As this Act is founded on the principle that the government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the</p>	<p>As required by Section 40 of the NWA, the following water uses will require a WULA in terms of Section 21 the NWA, of which the Limpopo DWS will be responsible for granting. It is understood that no aspects of the project may commence prior to receipt of the relevant WUL:</p> <ul style="list-style-type: none"> • Section 21 (a) for the abstraction of groundwater; • Section 21(c) for impeding the flow in a water course; • Section 21(g) for the disposing of waste in a manner that may detrimentally impact on a water resource; • Section 21(i) for altering the bed, banks, course or natural characteristics of a watercourse; and • Section 21 (j) for removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

Applicable legislation and guidelines use to compile the report	Application
<p>public interest, an industry (including mines) is only entitled to use water if the use is permissible under the NWA.</p> <p>Section 21 of the NWA provides a list of water uses which require a WULA prior to commencement, unless listed in Schedule 1 (of the NWA) as an existing lawful use. Applying for a WULA triggers NEMA listed activities as contemplated in terms of GNR.984 and GNR.985 of 2014.</p> <p>Water use includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. A water use must be licensed unless it is listed in Schedule 1 (of the NWA), is an existing lawful use, is permissible under a general authorisation, or if a responsible authority waives the need for a license.</p> <p>In terms of the NWA, a watercourse is defined as follows: A river or spring; A natural channel in which water flows regularly or intermittently; A wetland, lake or dam into which the Minister may, by notice in the Gazette, declare to be a watercourse, and reference to a watercourse, which includes, where relevant, its beds and banks.</p> <p>Furthermore, in terms of the NWA, a wetland is defined as follows: Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.</p>	
<p>Government Notice Regulation 704 of 1999</p> <p>GNR.704 of 1999 under the NWA provides regulations on the use of water for mining and related activities aimed at the protection of water resources (requirements for clean and dirty water separation). GNR.704 requires inter alia the following: Separation of clean (unpolluted) water from dirty water; Collection and confinement of the water arising within any dirty area into a dirty water system; Design, construction, maintenance and operation of the clean water and dirty water management systems so that it is not likely for either system to spill into the other more than once in 50 years; Design, construction, maintenance and operation of any dam that forms part of a dirty water system to have a minimum freeboard of 0.8m above</p>	<p>Cognisance has also been taken with regards to Regulation 4, Regulation 6 and Regulation 7 of GNR.704. A storm water management plan will be developed for the proposed mining activities that identifies 'dirty' and 'clean' areas within the site. All 'dirty' areas will be constructed within a cut-off trench and routed to a pollution control dam (PCD). The water within the PCD may be used for processes, potable water and dust suppression.</p>

Applicable legislation and guidelines use to compile the report	Application
<p>full supply level, unless otherwise specified in terms of Chapter 12 of the Act; and</p> <p>Design, construction, and maintenance of all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years.</p> <p>GNR.704 also stipulates that no person in control of a mine or activity may:</p> <p>Locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood line or within a horizontal distance of 100 m from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked;</p> <p>Place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or</p> <p>Use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1:50 year flood line of any watercourse or estuary.</p>	
<p>National Environmental Management Air Quality Act (No. 39 of 2004)</p> <p>The National Environmental Management Air Quality Act (No. 39 of 2004) (NEMAQA) allows for national, provincial and local air quality standards to be established as well as the declaration of priority areas. In addition, the NEMAQA requires that Air Quality Management Plans (AQMP) form part of the environmental implementation plan or environmental management plans to be prepared by national departments or the Province as required by Chapter 3 of the NEMA. Furthermore, the NEMAQA requires municipalities to include an AQMP into its integrated development plan (IDP).</p> <p>The NEMAQA requires the Minister of the DEA to publish a list of activities which results in atmospheric emissions which may have a detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions, ecological conditions or cultural heritage. The NEMAQA requires that an atmospheric emissions licence (AEL) be obtained for such listed activities. Such a list of activities was published in GNR.248 of 2010.</p>	<p>No activities requiring authorisation in terms of GNR.248 of 2010 of NEMAQA will be undertaken.</p>
<p>National Environmental Management Biodiversity Act (No. 10 of 2004)</p>	

Applicable legislation and guidelines use to compile the report	Application
<p>In line with the Convention on Biological Diversity, the National Environmental Management Biodiversity Act (No. 10 of 2004) (NEMBA) aims to legally provide for biodiversity conservation, sustainable use and equitable access and benefit sharing. The Act establishes the South African National Biodiversity Institute (SANBI). The NEMBA creates a basic legal framework for the formation of a national biodiversity strategy and action plan and the identification of biodiversity hotspots and bio-regions which will then be given legal recognition. It imposes obligations on landowners (state or private) governing alien invasive species as well as regulates the introduction of genetically modified organisms. Furthermore, the Act serves to regulate bio-prospecting, making provision for communities to share the profits of any exploitation of natural materials involving indigenous knowledge.</p> <p>A restricted activity is defined by the NEMBA as, inter alia:</p> <p>In relation to a specimen of a listed threatened or protected species:</p> <ul style="list-style-type: none"> - Hunting, catching, capturing or killing any living specimen of a listed threatened or protected species by any means, method or device whatsoever, including searching, pursuing, driving, lying in wait, luring, alluring, discharging a missile or injuring with intent to hunt, catch, capture or kill any such specimen; - Gathering, collecting or plucking any specimen of a listed threatened or protected species; - Picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species; - Having in possession or exercising physical control over any specimen of a listed threatened or protected species; and - Conveying, moving or otherwise translocating any specimen of a listed threatened or protected species. <p>In relation to a specimen of an alien species or listed invasive species:</p> <ul style="list-style-type: none"> - Importing into the Republic, including introducing from the sea, any specimen of an alien or listed invasive species; - Having in possession or exercising physical control over any specimen of an alien or listed invasive species; - Growing, breeding or in any other way propagating any specimen of an alien or listed invasive species, or causing it to multiply; and - Conveying, moving or otherwise translocating any specimen of an alien or listed invasive species. <p>Sections 52(1)(a) and 56(1) of the NEMBA state that the Minister may publish national lists of species and ecosystems, respectively, that are threatened or are in need of protection. A list of species that are</p>	<p>One of the objectives of this Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and to ensure the sustainable use of indigenous biological resources. In addition to regulations on Threatened, Protected, Alien and Invasive Species in South Africa, the National Biodiversity Strategies and Action Plans (NBSAP) was formulated under the National Spatial Biodiversity Assessment (NSBA) and was used to identify Terrestrial and Aquatic Priority Areas and Threatened Ecosystems for biodiversity conservation.</p> <p>Chapter 4, Part 2 (Threatened and Protected Species Regulations) of NEMBA provides for listing of species that are threatened or in need of protection to ensure their survival in the wild, while regulating the activities, including trade, which may involve such listed threatened or protected species and activities which may have a potential impact on their long-term survival. In February 2007, this was achieved as the Minister of DEA published a list of Critically Endangered, Endangered, Vulnerable and Protected Species, according to Section 56(1) of the Act.</p>

Applicable legislation and guidelines use to compile the report	Application
<p>threatened or are in need of protection was published in 2013 in GNR.389, with GNR.388 detailing the regulations relating to such species. These regulations are imposed where restricted activities involve specimens of listed threatened or protected species. GNR.388 defines the requirements of permitting and the process related thereto.</p> <p>GNR.1002, published in 2011, contains the first national list of threatened terrestrial ecosystems and provides supporting information to accompany the list, including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed terrestrial ecosystems. It also includes individual maps and detailed information for each listed ecosystem.</p>	
<p>National Environmental Management Protected Areas Act (No. 57 of 2003)</p> <p>The National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) concerns the protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes, and includes inter alia:</p> <p>The establishment of a national register of all national, provincial and local protected areas;</p> <p>The management of those areas in accordance with national standards; and</p> <p>Inter-governmental co-operation and public consultation in matters concerning protected areas.</p> <p>The ESIA will take cognisance of the NEMPAA in order to ensure compliance with South African legislation.</p> <p>The NEMPAA defines various kinds of protected areas, namely: special nature reserves, national parks, nature reserves (including wilderness areas) and protected environments, world heritage sites, marine protected areas, especially protected forest areas, forest nature reserves and forest wilderness areas declared in terms of the National Forests Act (No. 84 of 1998), and mountain catchment areas declared in terms of the Mountain Catchment Areas Act (No. 63 of 1970).</p> <p>Part 4 of Chapter 4 of the NEMPAA (Sections 48 to 53) lists restrictions of activities that may not be conducted in a protected area (as described above). Activities that are restricted include:</p> <p>Prospecting and mining activities;</p> <ul style="list-style-type: none"> - Activities that are restricted by: 	<p>Cognisance will be taken of existing and proposed protected environments.</p>

Applicable legislation and guidelines use to compile the report	Application
<p>Regulations made by the Minister; Regulations made by the MEC, in the case of provincial and local protected areas; By-laws of the relevant municipality, in the case of local protected areas; and Internal rules made by the managing authority of the area;</p> <ul style="list-style-type: none"> - Commercial and community activities where the survival of any species is negatively affected, or the integrity of an ecosystem is significantly disrupted; and - Any development or other activity that is inappropriate for the area given the purpose for which the area was declared. 	
<p>National Heritage Resources Act (No. 25 of 1999) The National Heritage Resources Act (No. 25 of 1999) (NHRA) established the South African Heritage Resources Agency (SAHRA) in 1999. SAHRA is tasked with protecting heritage resources of national significance. With regard to heritage sites, sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, dolomitic land and ridges, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure. A heritage site means a place declared to be a national heritage site by SAHRA or a place declared to be a provincial heritage site by a provincial heritage resources authority.</p>	<p>Section 34 and 38 of the NHRA details specific activities that require a heritage impact assessment to be undertaken.</p> <p>This application triggers section 38(8) of the NHRA due to it requiring an environmental authorisation in terms of the NEMA, thus making SAHRA a commenting authority.</p> <p>Furthermore, section 48(2) requires a permit from a heritage resources authority to perform such actions at such time and subject to such terms, conditions and restrictions or directions as may be specified in the permit. This would include any development of the site where “development” means any physical intervention, excavation, or actions, other than those caused by natural forces, which results in a change to the nature, appearance or physical nature of a place, or influences its stability and future well-being, including: Construction, alteration, demolition, removal or change of use of a place or a structure at a place; Carrying out any works on or over or under a place; Any change to the natural or existing condition or topography of land; and Any removal or destruction of trees, or removal of vegetation or topsoil.</p>

Applicable legislation and guidelines use to compile the report	Application
	<p>No cultural heritage sites (archaeological and/or historical) were identified in the study area focused on in the January 2021 assessment.</p> <p>There is always a possibility that some might have been missed as a result of grass cover and other factors. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.</p>
<p>National Forest Act (No. 84 of 1998) The purpose of the NFA is as follows: Promotion of the sustainable management and development of forests for the benefit of all; Creation of the conditions necessary to restructure forestry in the State’s forests; Provision of special measures for the protection of certain forests and trees; Promotion of the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes; Promotion of community forestry; and Promotion of greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.</p> <p>One of the objectives of this Act is to provide special measures for the protection of certain forests and tree species and to promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. Section 15(1) – No protected tree may be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold; except under license granted by the DWS/ DEA (or a delegated authority). GNR.767 of 2005 and GNR.716 of 2012 comprise lists of protected tree species under the National Forests Act (No. 84 Of 1998). The criteria used to select tree species for inclusion in the protected tree list are: Red List Status (rare or threatened species); Keystone Species Value (whether species play a dominant role in an ecosystem’s functioning); Sustainability of Use (whether a species is threatened by heavy use of its products such as timber, bark etc.);</p>	<p>One of the objectives of this Act is to provide special measures for the protection of certain forests and tree species and to promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes. In terms of Section 15(1) of the National Forests Act (no.84 of 1998), protected tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by the relevant authority.</p> <p>The potential for specific protected forests and tree species may occur within the project area and cognisance needs to be taken of the NFA.</p>

Applicable legislation and guidelines use to compile the report	Application
<p>Cultural or Spiritual Importance (outstanding landscape value or spiritual meaning attached to certain tree species); and Other legislation (whether a species is already adequately protected by other legislation).</p>	
<p>Fencing Act (No. 31 of 1963) The aim of the Fencing Act (No. 31 of 1963) is to consolidate the laws relating to fences and the fencing of farms and other holdings. When a landowner erects a fence in a designated area, he/ she may insist that the adjacent owner contribute towards the erection or maintenance costs. In areas where contributions are not mandatory/ have not been published in the Government Gazette, a contribution can be claimed from the adjacent owner if the fence offers beneficial use for such a person. The Act also makes provision for a mechanism to deal with disputes between adjacent owners regarding a contribution towards erecting or repairing a fence.</p>	<p>Of specific importance, section 17 requires that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora.</p>
<p>Hazardous Substances Act (No. 15 of 1979) The object of the Act is inter alia to ‘provide for the control of substances which may cause injury or ill health to, or death of, human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances; for the control of electronic products; for the division of such substances or products into groups in relation to the degree of danger; for the prohibition and control of such substances.’ In terms of the Act, substances are divided into schedules, based on their relative degree of toxicity, and the Act provides for the control of importation, manufacture, sale, use, operation, application, modification, disposal and dumping of substances in each schedule.</p>	<p>Dangerous substances contained onsite during the construction, operation and closure phases of the Proposed Project will need to be management in accordance with the Act and safety data sheets (SDS) will need to accompany all dangerous goods (hydrocarbons, cleaning chemicals, paints, etc.).</p>
<p>Mine Health and Safety Act (No. 29 of 1996) The Mine Health and Safety Act (No. 29 of 1996) (MHSA) aims to protect and promote the health and safety of employees and persons that may be affected by the activities at a mine and outlines both the rights and responsibilities of an employer, as well as the obligations of employees working thereat. The MHSA was developed “to provide for protection of the health and safety of employees and other persons at mines”. That said the Act also provides and/ or promotes the following: A culture of health and safety; The enforcement of health and safety measures;</p>	<p>The following principles are considered applicable to the Proposed Project and are detailed below:</p> <ul style="list-style-type: none"> • The primary responsibility for ensuring a health and safe working environment in the mining site is placed on the mine owner. The Act sets out in detail the steps that employers must take to identify, assess records and control health and safety hazards in the mine; • The right of workers to participate in health and safety decisions, the right to

Applicable legislation and guidelines use to compile the report	Application
<p>For appropriate systems of employee, employer and State participation in health and safety matters;</p> <p>The establishment of representative tripartite institutions to review legislation, promote health and enhance properly targeted research;</p> <p>For effective monitoring systems and inspections, investigations and inquiries to improve health and safety;</p> <p>Promotion of training and human resources development;</p> <p>Regulation of employers' and employees' duties to identify hazards and eliminate, control and minimise the risk to health and safety;</p> <p>Entrenchment of the right to refuse to work in dangerous conditions;</p> <p>To give effect to the public international law obligations of the Republic relating to mining health and safety; and</p> <p>To provide for matters connected therewith.</p>	<p>receive health and safety information, the right to training and the right to withdraw from the workplace in face of danger;</p> <ul style="list-style-type: none"> • The Act requires the establishment of institutions to promote a culture of health and safety and develop policy, legislation and regulations; and • The responsibility for enforcing MHSA lies with the Mine Health and Safety Inspectorate. The Inspectorate's powers are recast and include the power to impose administrative fines upon employers who contravene the MHSA. The Act also contains innovative approaches to the investigation of accidents, diseases and other occurrences that threaten health and safety. <p>The applicant will be required to comply with all obligations contained in the MSHA.</p>
<p>Occupational Health and Safety Act (No. 85 of 1993)</p> <p>The Occupational Health and Safety Act (No. 85 of 1993) (OHSA) provides a legislative framework for the provision of reasonably healthy and safe conditions in the workplace. It also places extensive legal duties on employees and users of machinery and makes major inroads on employers' and employees' common law rights.</p> <p>OHSA contains provisions that impose general obligations with regard to health and safety. More detailed and specific obligations can be found in the regulations published in terms of OHSA. These include environmental, general safety, electrical machinery, driven machinery, electrical installation, construction, asbestos, hazardous chemicals substances and noise.</p> <p>The OHSA addresses, amongst others:</p> <p>Safety requirements for the operation of plant machinery;</p> <p>Protection of persons other than persons at work against hazards to health and safety, arising out of, or in connection with, the activities of persons at work;</p> <p>Establishment of an advisory council for occupational health and safety; and</p> <p>Provisions for matters connected herewith.</p>	<p>The OHSA is applicable and states that any person involved with construction, upgrades or developments for use at work or on any premises shall ensure as far as reasonably practicable that nothing about the manner in which it is installed, erected or constructed makes it unsafe or creates a risk to health when properly used.</p>
<p>Subdivision of Agricultural Land Act (No. 70 of 1970)</p>	



Applicable legislation and guidelines use to compile the report	Application
<p>This Act regulates the subdivision of agricultural land and its use for purposes other than agriculture. The Directorate of Resource Conservation is responsible for the enforcement thereof. Investigations are done by the Provincial Department in support of the execution of the Act. The Act also deals with aspects associated with rezoning land.</p>	<p>If agricultural land, that is productive in terms of food and/ or fibre production, becomes subdivided in some way as to make the reduced land parcel(s) uneconomic or unsustainable, then agricultural production is diminished. Such actions should be resisted wherever possible, especially where the prevailing agricultural potential is high.</p>
<p>Promotion of Access to Information Act (No. 2 of 2000) The Promotion of Access to Information Act (No. 2 of 2000) (PAIA) recognises that everyone has a right of access to any information held by the state and by another person when that information is required to exercise or protect any right. The purpose of the Act is to promote transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their right.</p>	<p>Cognisance will be made of the PAIA.</p>
<p>Promotion of Administrative Justice Act (No. 3 of 2000) The purpose of the Promotion of Administrative Justice Act (No. 3 of 2000) (PAJA) is to govern the actions of the administration and to ensure good administrative practice, by laying down the minimum procedural requirements related to decision-making. As such, PAJA applies to all actions of the administrators, in particular environmental administrators.</p> <p>Section 1 of PAJA deals with procedures to be followed in the granting, suspending or revoking of permissions (licences, grants, permits). Sections 3 and 4 of PAJA deal with fair procedure, which requires the administrator to act in a fair manner when making a decision. Section 5 of PAJA governs the provision of reasons by the administrator and determines that an administrator provide reasons after a decision has been made (or whilst taking it), in order to justify the decision.</p>	<p>Cognisance will be made of the PAJA.</p>
<p>Provincial Ordinances and Municipal By-laws In addition to national legislation, some of South Africa's nine provinces have their own provincial biodiversity legislation, as nature conservation is a concurrent function of national and provincial government in terms of the Constitution of South Africa.</p>	<p><u>Limpopo Environmental Management Act (No. 7 of 2003):</u> The Act aims to manage and protect the environment in the Province; to secure ecologically sustainable development and responsible use of natural resources in the Province; generally, to contribute to the progressive realisation of the fundamental rights contained in Section 24 of the Constitution of the Republic of South Africa;</p>



Applicable legislation and guidelines use to compile the report	Application
	and to give effect to international agreements effecting environmental management which are binding on the Province.
<p>Applicable Guidelines and Forums</p> <p>Relevant guidelines have been developed in order to assist in sustainable development within South Africa. The following guidelines are considered applicable to the Proposed Project.</p>	<ul style="list-style-type: none"> • Department of Water Affairs: Best Practice Guideline Series <ul style="list-style-type: none"> - DWAF: Best Practice Guideline G1: Storm Water Management; - DWAF: Best Practice Guideline G2: Water and Salt Balances; August 2006; - DWAF: Best Practice Guideline A4: Pollution Control Dams (PCDs); - DWAF: Best Practice Guideline GH: Water Reuse and Reclamation, June 2006; - DWAF: Minimum Requirements Guideline for the Handling, Classification and Disposal of Hazardous Waste, 1998; - DWAF: Minimum Requirements Guideline for the Water Monitoring at Waste Management Facilities; - SA Water Quality Guidelines – Aquatic Ecosystems, 1996, and - SA Water Quality Guidelines – Domestic Water Use, 1996. • The Mining and Biodiversity Forum of South Africa • Mining and Biodiversity Guideline • Mining and Biodiversity Forum of South Africa • Mining and Biodiversity Guideline • National Spatial Biodiversity Assessment • South Africa’s National Biodiversity Strategy and Action Plan • Threatened, Protected, Alien and Invasive Species Regulation • National Aquatic Ecosystem Health Monitoring Programme and River Health Programme • Limpopo Conservation Plan

Applicable legislation and guidelines use to compile the report	Application
<p>Principles of Sustainability</p> <p>According to the DMR (formerly known as the Department of Minerals and Energy) (Swart, 2007), the mining sector in South Africa aims to promote its vision of ‘sustainable development’ by enabling South Africans to make balanced and informed decisions regarding the extraction and utilisation of mineral resource, by measuring and assessing progress towards sustainable development objectives and by minimising negative impacts and optimising environmental management in the mining sector.</p> <p>The most widely accepted definition of sustainable development is provided in the World Commission of Environment and Development in its landmark report Our Common Future (the Brundtland Report) ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’ A core principle in sustainable development is the ‘precautionary principle’ which implies that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p> <p>According to the Australian Centre for Sustainable Mining Practices (2011), sustainable development in the mining sector suggests that investments in mining projects should be financially profitable, technically appropriate, environmentally sound and socially responsible (i.e., balance economic, environmental and social aspects and guarantee the advantage for humanity at present and in the future).</p> <p>Businesses involved in extracting non-renewable resources should embrace the concept of sustainability into strategic decision-making processes and operations. In addition, responsible corporations can theoretically move towards sustainability by developing a range of appropriate socio-economic initiatives. Economic development, environmental impact and social responsibilities should be well managed, and productive relationships should exist between governments, industry and stakeholders.</p>	<p>It is understood that the definition of sustainability may not necessarily encompass the underlying factor that a non-renewable resource will be extracted. However, principles of sustainability should be incorporated into the applicant’s corporate philosophy, including: aspects such as economy (e.g., chrome export, etc.), social (e.g. long-term job employment, skills development, implementation of the Social and Labour Plan, etc.) and environmental programmes (e.g. adequate implementation of mitigation measures, environmental offsets, etc.) in order to benefit future generations whilst meeting the needs of present citizens.</p>

5 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

Limpopo has rich mineral resources, making mining a critical sector of the economy of the province, contributing 22% to its GDP. Lepelle-Nkumpi LM is the second largest contributor to the district Gross Geographic Product at 13.86%; and it is the first largest contributor to mining. However, the economy's strongest sector of mining recorded a negative growth, probably due to temporary closure of the local mines. The unemployment rate of Lepelle-Nkumpi is close to half of the total economically active population (45.7 in 2017) and is higher than those of the District, Provincial and National unemployment rate.

Although there are several mines in the area, the existing resources remain unexploited. Investment in this sector is important as it brings with it investment in infrastructure, results in creation of job opportunities and generates many other economic spin-offs. The lack of economic growth in the region warrants special attention and support to optimize the available opportunities. However, cognizance should be taken of the outflow of money from the mines in in the municipality to other regions.

LNLN has the slowest growth in the mining industry amongst the regional LMs and low annual employment growth rate in the mining industry. Based on GVA, LNLN has the second largest mining industry among the regional LMs. LNLN has the second largest workforce. Proportionately, it does have skilled and semi-skilled workforce. LNLN has the most competitive industry based on GVA LQ and the employment LQ amongst the region's LMs. Beneficiation of raw mineral resources and mining materials has the potential to contribute significantly to expanding the manufacturing sector.

Reduction in the unemployment rate will depend on effective intervention by public sector institutions to facilitate economic sector diversification through competitive cluster value-chain development. This implies upstream development in the manufacturing and trade sector to provide essential items in the mining supply chain by local entrepreneurs. It also implies side-stream development in the form of construction and urban renewal. This approach is consistent with the Limpopo Employment Growth and Development Plan.

The economy of the Capricorn District is a mixture of very negative features and very positive opportunities (like the enormous mining potential within the area). The region is also characterised by a high level of male absenteeism, a weak economic base, poor infrastructure, major service backlogs, dispersed human settlements and high poverty levels.

The Mphahlele Mine will be a contributor to the South African Chrome industry.

Since the world recession the market prices for ferrochrome have declined to low levels (even below cost of production at times) which have in turn caused many producers to cut back their production.

In the past South Africa was the world's biggest Ferrochrome producing country; however, this title has now been handed over to China as their cost of production is lower than the South African producers.

China is the major market for ferrochrome consumption (Stainless Steel production) although India will soon also be a prominent market. Chinese production capacity is still expanding and will require more chrome ore in the short to medium term. China has forecasted good economic growth and with new projects, expansions and urbanisation programs in place the demand for Stainless steel production in China will increase in the coming years. With increase in Stainless Steel demand and lack of domestic Chrome Ore reserves China relies heavily on Chrome Ore imports.

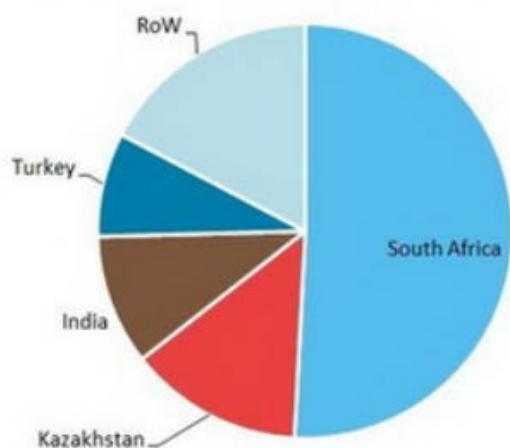
China accounts for 38% of the total global stainless-steel production.

China relies on South Africa for between 50%-60% of their chrome ore requirements with the balance (40%) being sourced from other countries (with higher grade chrome ore) namely Turkey, Oman, Pakistan, Sudan, India, Iran, and Zimbabwe.

The chrome and ferrochrome markets were forecast to rebalance in 2020, following closures and cutbacks in production from key producers as low prices persisted throughout 2019. The outbreak of COVID-19 over Q1 2020 has already begun to ripple through the chromium industry.

With the Chinese steel industry returning its furnaces into operation, available chromite stocks will only account for three months of demand, should supply be limited from South Africa and other producers moving into lockdown in order to curb the spread of COVID-19. Even if the lockdown period can be limited, the impacts of COVID-19 will likely accelerate the rebalancing expected for the chromium industry in 2020.

World Mine Production of Chromium



Chrome metal is mainly used in the production of specialty alloys, nickel and cobalt -based alloys (super alloys) where low iron is required. Due to their unique high temperature and corrosion resistance properties, these high-performance alloys are used in the most critical environments, such as aeronautic, oil & gas production, land-based turbines, petrochemical and chemical processing.

In addition, chromium metal powder is used in the production of welding electrodes and cored wires, aluminum briquettes and master alloys. (ICDACR 2015).

The proposed development of the Mphahlele Mine will entail the following positive impacts:

- Social upliftment;
- Job Creation with area;
- Growth of economy;
- Increased health services and medical assistance;
- Contribution of infrastructure within in area; and
- Educational upliftment.

Thus, from all the information given above the proposed Mphahlele Mine, if executed according to environmental guidelines

and legislation should benefit the economy of SA as a whole, the people living in proximation to the mine, and all other industries dependent on mining for their income.

The proposed expansion of the Sefateng Chrome Mine operations will entail the following positive impacts:

- Social upliftment;
- Job Creation with area;
- Growth of economy;
- Increased health services and medical assistance;
- Contribution of infrastructure within in area; and
- Educational upliftment.

Thus, from all the information given above the expansion activities proposed by Sefateng Chrome Mine (Pty) Ltd, if executed according to environmental guidelines, and laws should benefit the economy of SA as a whole, the people living in proximation to the mine, and all other industries dependent on mining for their income.

According to DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs, to describe the need for a development, it must be determined whether it is the right time for locating the type of land use and/or activity being proposed. To describe the desirability for a development, it must be determined, whether it is the right place for locating the type of land use and/or activity being proposed. Need and desirability can be equated to the concept of wise use of land which can be determined through asking the question: “what is the most sustainable use of land?” Considering the above, the need and desirability of an application must be addressed separately and in detail answering inter alia the following questions:

Table 6: Need and desirability considerations

1. Securing ecological sustainable development and use of natural resources	
1.1	<p>How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?</p> <p>How were the following ecological integrity considerations taken into account?</p> <p>1.1.1 Threatened Ecosystems,</p> <p>1.1.2 Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure,</p> <p>1.1.3 Critical Biodiversity Areas (“CBAs”) and Ecological Support Areas (“ESAs”),</p> <p>1.1.4 Conservation targets,</p> <p>1.1.5 Ecological drivers of the ecosystem,</p> <p>1.1.6 Environmental Management Framework,</p> <p>1.1.7 Spatial Development Framework, and</p>
	<p>The baseline information provided within the document described all the ecological aspects as assessed for the construction and operation of the proposed mining and associated activities.</p> <p>Sensitive landscapes and features have been assessed and described within the section regarding Sensitive Landscapes (Table 18).</p>

	<p>1.1.8 Global and international responsibilities relating to the environment (e.g., RAMSAR sites, Climate Change, etc.).</p>	
<p>1.2</p>	<p>How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>The ecological systems have been assessed and ecologically sensitive areas and species have been pointed out and mitigation and management measures have been described within the Impact Management Tables in Section B: Environmental Management Programme.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p> <p>The proposed infrastructure and residue stockpile areas were designed to be as compact as possible and were placed, as far as possible, on areas that are already disturbed by current and historic activities. Proposed infrastructure and residue stockpiles were also placed so as to not be located within drainage lines. As per the specialist recommendations, the opencast pit has also been reduced in order to avoid the Chunies River.</p> <p>By considering the negative impact of tailings deposition this project has been specifically developed to avoid, where possible, negative environmental impacts while taking into account the need to reduce and recycle wastes produced by the operation. The following positive impacts and measures to reduce impacts are applicable to the tailings deposition method:</p> <ul style="list-style-type: none"> • Backfilling of the pit with tailings material provides the opportunity to reduce the footprint of mining operations, e.g., precluding the need to construct additional tailings storage facilities. • A smaller footprint at closure since areas already disturbed are used for the deposition of the tailings. • Maximised reuse and recycling of waste materials through use of the tailings for backfilling, brick-making and concrete mixing. • Maximising economical value of the tailings material through selling to third parties for reclamation off-site. This also ties in with aspects such as reduction of mining footprint and avoidance of a final tailings stockpile at the end of LoM.
<p>1.3</p>	<p>How will this development pollute and/or degrade the biophysical environment? What measures were explored</p>	<p>Impacts to the biophysical environment associated with the proposed project have been assessed and</p>

	<p>to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>mitigation and management measures have been described within the Impact Management Tables in Section B: Environmental Management Programme.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
1.4	<p>What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?</p>	<p>Refer to section 3.2 for a description of the activities to be undertaken as well as waste that will be generated.</p> <p>Potential impacts that may be as a result of the new sections have been mitigated and will be subjected to a monitoring framework as prescribed within the Environmental Management Programme. All waste removed, such as tailings, waste rock, etc., will be deposited on Waste facilities forming part of this application.</p> <p>Refer to Table 48: Mitigation Measures.</p> <p>By considering the negative impact of tailings deposition this project has been specifically developed to avoid, where possible, negative environmental impacts while taking into account the need to reduce and recycle wastes produced by the operation. The following positive impacts and measures to reduce impacts are applicable to the tailings deposition method:</p> <ul style="list-style-type: none"> • Backfilling of the pit with tailings material provides the opportunity to reduce the footprint of mining operations, e.g., precluding the need to construct additional tailings storage facilities. • A smaller footprint at closure since areas already disturbed are used for the deposition of the tailings. • Maximised reuse and recycling of waste materials through use of the tailings for backfilling, brick-making and concrete mixing. • Maximising economical value of the tailings material through selling to third parties for reclamation off-site. This also ties in with aspects such as reduction of mining footprint and avoidance of a final tailings stockpile at the end of LoM.

1.5	<p>How will this development disturb or enhance landscapes and/or sites that constitute the nation’s cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>A Heritage assessment has been conducted and the findings of the assessment described in this report. Management and monitoring measures are included within this report.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
1.6	<p>How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</p>	<p>Non-renewable resources will be the ore and geology removed from the opencast and underground workings during the mining process. Within this document the No-Go alternative was included for assessment. No mitigation is applicable to the removal of the resource as it is the nature of mining to exploit minerals for the sale and usage in various industries and within the economy of South Africa.</p>
1.7	<p>How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</p> <p>1.7.1. Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e., de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life).</p> <p>1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e., what are the opportunity costs of using these resources within the proposed development alternative?)</p>	<p>The proposed mining operations will use and consume water abstracted from groundwater sources. Water will be used as process water for mining and associated activities, wash plant processes, potable water and dust suppression.</p> <p>Water recycling will be optimised through various methods such as water recovery from tailings material, reuse of water removed from opencast and underground workings for process use, usage of water use reduction technology and reuse of water wherever possible.</p> <p>The mine will update its water balance on an annual basis and will investigate further water conservation measures throughout the LoM.</p> <p>The method for storage and disposal of the tailings material is also expected to greatly increase water reuse at the operation.</p> <p>The Integrated Water and Waste Management Plan will assist in managing and reducing impacts to the water environment.</p>

	1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources?	
1.8	<p>How were a risk-averse and cautious approach applied in terms of ecological impacts?</p> <p>1.8.1 What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>1.8.2 What is the level of risk associated with the limits of current knowledge?</p> <p>1.8.3 Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>Ecological aspects have been assessed as part of this application, however, other indirect impacts such as incidental water pollution and thereby polluting the natural environment and ecology may occur and risk will be managed and mitigated to prevent this from happening.</p> <p>Ecological aspects were included in the Impact Assessment, which is a quantifying tool to calculate risk for environmental aspects. Gaps in knowledge have been included in the Limitations section of the report.</p>
1.9	<p>How will the ecological impacts resulting from this development impact on people’s environmental right in terms following.</p> <p>1.9.1 Negative impacts: e.g., access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>1.9.2 Positive impacts: e.g., improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</p>	<p>Impacts such as land capability, noise, dust and other health and safety aspects were assessed within this document. Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance). The mine will compile and implement Environmental Policies and Standard Operating Procedures (SOPs) to avert impacts of the proposed operations. This will ensure that negative impacts associated with mining are not adverse and managed to the best level possible.</p> <p>Monitoring of impacts related to dust, noise and water (monitoring frameworks) will be implemented as described in the EMPr. Table 50: Mechanisms for monitoring (Including Time period, Functional requirements, Roles and responsibilities and Frequency).</p> <p>The mine will also be required to compile and implement a Social and Labour Plan with the intention of off-setting some of the social impacts of the proposed project and to maximise the social benefits of the project.</p> <p>Positive impacts will be those associated with the extension of the Life of Mine (LoM), which is increased work security, social development and local economic growth.</p>
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development’s ecological impacts will result in socio-economic impacts	It is assumed that community members use the natural areas for livestock, grazing, wood gathering, medicinal plant gather, hunting and subsistence farming.

	<p>(e.g., on livelihoods, loss of heritage site, opportunity costs, etc.)?</p>	<p>The proposed project will most likely impact on the availability of natural resources for use by nearby residents.</p> <p>The mine will also be required to compile and implement a Social and Labour Plan with the intention of off-setting some of the social impacts of the proposed project and to maximise the social benefits of the project.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
<p>1.11</p>	<p>Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?</p>	<p>Refer to all the comments made above as positive and negative aspects have been addressed.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
<p>1.12</p>	<p>Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the “best practicable environmental option” in terms of ecological considerations?</p>	<p>Alternatives have been assessed within Section 7 below. No other feasible alternatives exist and the best suited alternatives are the ones included within this application.</p> <p>The proposed infrastructure and residue stockpile areas were designed to be as compact as possible and were placed, as far as possible, on areas that are already disturbed by current and historic activities. Proposed infrastructure and residue stockpiles were also placed so as to not be located within drainage lines. As per the specialist recommendations, the opencast pit has also been reduced in order to avoid the Chunies River.</p> <p>By considering the negative impact of tailings deposition this project has been specifically developed to avoid, where possible, negative environmental impacts while taking into account the need to reduce and recycle wastes produced by the operation. The following positive impacts and measures to reduce impacts are applicable to the tailings deposition method:</p> <ul style="list-style-type: none"> • Backfilling of the pit with tailings material provides the opportunity to reduce the footprint of mining operations, e.g., precluding the need to construct additional tailings storage facilities.

		<ul style="list-style-type: none"> • A smaller footprint at closure since areas already disturbed are used for the deposition of the tailings. • Maximised reuse and recycling of waste materials through use of the tailings for backfilling, brick-making and concrete mixing. • Maximising economical value of the tailings material through selling to third parties for reclamation off-site. This also ties in with aspects such as reduction of mining footprint and avoidance of a final tailings stockpile at the end of LoM.
1.13	Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	<p>Cumulative impacts will be those associated with the existing mining operations and developments in the area.</p> <p>Cumulative impacts will be similar to those described and assessed in Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance), with the exception that the impact rating will be higher when considering other developments in the area.</p>
2. Promoting justifiable economic and social development"		
2.1	<p>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?</p> <p>2.1.1 The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</p> <p>2.1.2 Spatial priorities and desired spatial patterns (e.g., need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</p> <p>2.1.3 Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</p> <p>2.1.4 Municipal Economic Development Strategy ("LED Strategy").</p>	<p>The project is aligned with the objectives of the municipal Spatial Development Framework (SDF) and Integrated Development Plan (IDP) and will not compromise the integrity of these respective forward planning documents.</p>
2.2	<p>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</p> <p>2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</p>	<p>A Socio-economic assessment has been conducted and the findings of the assessment described in this report. Impact and management measures are included within this report.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>

		<p>Considering the key sectors identified in Lepelle-Nkumpi Municipality LED Strategy advocates five key goals. This comprises (1) Local business support and stimulus, (2) Restructuring and diversifying the informal economy, (3) Sustainable agricultural expansion and value adding development, (4) Mining sector growth and maximisation along value chains and (5) Tourism development, and sustainable town revitalisation.</p> <p>The projects that have been identified in the LED are aimed at economic development by ensuring job opportunities are created, jobs security is created, skills development takes place and that opportunities are created for SMME development.</p> <p>Mining plays an important part in the sector development of the LED strategy. The mine will also contribute towards the socio-economic development of the region through social-upliftment and job creation as primary agents.</p>
2.3	<p>How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?</p>	<p>Refer to comments made above.</p> <p>The mine will also be required to compile and implement a Social and Labour Plan with the intention of off-setting some of the social impacts of the proposed project and to maximise the social benefits of the project.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
2.4	<p>Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?</p>	<p>The mine will be required to compile and implement a Social and Labour Plan with the intention of off-setting some of the social impacts of the proposed project and to maximise the social benefits of the project.</p> <p>Mining plays an important part in the sector development of the LED strategy. The mine will also contribute towards the socio-economic development of the region through social-upliftment and job creation as primary agents.</p>

		<p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
<p>2.5</p>	<p>In terms of location, describe how the placement of the proposed development will;</p> <p>2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</p> <p>2.5.2. reduce the need for transport of people and goods,</p> <p>2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</p> <p>2.5.4. compliment other uses in the area,</p> <p>2.5.5. be in line with the planning for the area,</p> <p>2.5.6. for urban related development, make use of underutilised land available with the urban edge,</p> <p>2.5.7. optimise the use of existing resources and infrastructure,</p> <p>2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</p> <p>2.5.9. discourage "urban sprawl" and contribute to compaction/densification,</p> <p>2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p> <p>2.5.11. encourage environmentally sustainable land development practices and processes</p> <p>2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</p> <p>2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</p> <p>2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</p> <p>2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</p>	<p>Alternatives have been assessed within Section 7 below.</p> <p>Local workers and services will be utilised as per the requirements of the Social and Labour Plan to ensure local development and contribution to the correction of the historically distorted spatial patterns and optimum use of existing infrastructure etc. Investment will be in the local settlement area to generate the highest socio-economic returns.</p> <p>In terms of the location of a strategic mineral resource, the preferred alternative is restricted by this factor, as minerals can only be mined where existing and verified. Therefore, this factor has been incorporated in the application.</p> <p>No impacts on the sense of history, sense of place and heritage are expected and an impact assessment has been conducted by a Heritage specialist to confirm this. If at any stage during the development artefacts or historical aspects are uncovered, a specialist will be consulted immediately to ensure that possible heritage aspects remain conserved.</p>

2.6	<p>How were a risk-averse and cautious approach applied in terms of socio-economic impacts</p> <p>2.6.1. What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</p> <p>2.6.2. What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</p> <p>2.6.3. Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</p>	<p>A Socio-Economic Impact Assessment was compiled and integrated into the EIA and EMPr Report. Socio-economic aspects have been adequately assessed and addressed within this document and the Environmental Management Programme.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p> <p>The mine will also be required to compile and implement a Social and Labour Plan with the intention of off-setting some of the social impacts of the proposed project and to maximise the social benefits of the project.</p> <p>Gaps in knowledge have been included in the Limitations section of the report.</p> <p>Also refer to the comments below</p>
2.7	<p>How will the socio-economic impacts resulting from this development impact on people’s environmental right in terms following:</p> <p>2.7.1. Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</p> <p>2.7.2. Positive impacts. What measures were taken to enhance positive impacts?</p>	<p>A Socio-Economic Impact Assessment was compiled and integrated into the EIA and EMPr Report. Socio-economic aspects have been adequately assessed and addressed within this document and the Environmental Management Programme.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
2.8	<p>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development’s socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</p>	<p>It is assumed that community members use the natural areas for livestock, grazing, wood gathering, medicinal plant gather, hunting and subsistence farming.</p> <p>The proposed project will most likely impact on the availability of natural resources for use by nearby residents. Thereby potentially increase pressures on the remaining natural areas adjacent to the proposed mining activities.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
2.9	<p>What measures were taken to pursue the selection of the “best practicable environmental option” in terms of socio-economic considerations?</p>	<p>Refer to comments made above.</p>

2.10	<p>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the “best practicable environmental option” to be selected, or is there a need for other alternatives to be considered?</p>	<p>Refer to comments made above.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p> <p>The mine will compile and implement Environmental Policies and Standard Operating Procedures (SOPs) to avert impacts of the proposed operations. This will ensure that negative impacts associated with mining are not adverse and managed to the best level possible.</p> <p>The mine will also be required to compile and implement a Social and Labour Plan with the intention of off-setting some of the social impacts of the proposed project and to maximise the social benefits of the project.</p>
2.11	<p>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</p>	<p>Refer to all the comments made within this section of the report as it has already been addressed. Workers sources by the mine will be in accordance with the Social and Labour Plan. Skills development and socio-economic upliftment forms part of the legal obligations as per the Social and Labour Plan.</p>
2.12	<p>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development’s life cycle?</p>	<p>Refer to comments made above.</p> <p>Refer to Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance) and Table 48: Mitigation Measures.</p>
2.13	<p>What measures were taken to:</p> <ul style="list-style-type: none"> 2.13.1. ensure the participation of all interested and affected parties, 2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, 2.13.3. ensure participation by vulnerable and disadvantaged persons, 2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means, 2.13.5. ensure openness and transparency, and access to information in terms of the process, 2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of 	<p>Refer to comments made above.</p> <p>The public participation process has been followed as prescribed and has been described in Section 8. All Interested and Affected parties will be provided a chance to register and comment on the project. All comments received during the Public Participation Phase will be included within the final documentation as to be submitted to DMRE for decision.</p>

	knowledge, including traditional and ordinary knowledge, and 2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were being promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to comments made above regarding the Public participation process. Traditional communities have been involved and community meetings have already been conducted during the Scoping phase and will be initiated again as part of the EIA phase public consultation process.
2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	The mine will comply with all Health and Safety legislation as well as compiling their own policies in this regard.
2.17	What measures were taken to ensure: 2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and 2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	Since the Public Participation Process involves all the relevant departments, no conflicts of interests are foreseen and none was recorded during the Scoping phase of the project.
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	Refer to all comments made above regarding socio-economic benefits that may result from the project as well as impacts to the biophysical environment.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Yes. Mitigation measures as well as long term monitoring are included in the EMPR, which will ensure that impacts remained managed and monitored (to prevent both short and long term impacts). Refer to the Rehabilitation and Closure Plan in Appendix 19.
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	Financial Provisioning forms part of the DMR EIA/EMPR requirements and is to be provided either by Financial Guarantee/ Bank Security before the operation may commence. These funds are to be used for Closure and Rehabilitation costs, to restore the natural environment. The "Polluter Pays principle" also

		describes the concept which will ensure that the Sefateng mine restores and control pollution in the event that it becomes necessary.
2.21	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	<p>Alternatives have been assessed within Section 7 below. No feasible alternatives are present and the best suited alternative is the one included within this application. This is the preferred option and location and it is favourable in terms of the existing infrastructure and services currently present within the site and local vicinity (transport etc.).</p> <p>Local workers and services will be utilised to ensure local development and contribution to the correction of the historically distorted spatial patterns and optimum use of existing infrastructure etc. Investment will be in the local settlement area to generate the highest socio-economic returns.</p> <p>In terms of the location of a strategic mineral resource, the preferred alternative is restricted by this factor, as minerals can only be mined where existing and verified. Therefore, this factor has been incorporated in the application.</p> <p>No impacts on the sense of history, sense of place and heritage are expected. If at any stage during the development artefacts or historical aspects are uncovered, a specialist will be consulted immediately to ensure that possible heritage aspects remain conserved.</p>
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to comments made above, specifically those made for point 2.7. within this table.

6 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Life of Mine is described as 16 years in the Mining Works Programme, followed by 3-5 years of rehabilitation. There for the Environmental Authorisation will be required for a period of 21 years.

7 MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

7.1 MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND ALTERNATIVES

The sites for the proposed opencast mining operations were selected based on availability of the chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.

The sites for the infrastructure related to the proposed mining operations are located at the various points which are practical for the mining and would have the least impact on the surrounding environment. The areas used for infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered.

As mining is currently taking place on a section of the Mining Right area, there is existing infrastructure on site which will be used for the proposed mining activities listed in Table 3, thus reducing the impacts on the environment.

The areas used for above ground infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered “secondary alternatives”. These areas have been determined from a preliminary evaluation of how they are most optimally configured, outside of the 1:100 flood line and away from potentially sensitive areas, in favour of proposed positioning on previously disturbed farming and agricultural land.

7.2 DETAILS OF THE DEVELOPMENT FOOTPRINT ALTERNATIVES CONSIDERED

7.2.1 Site Alternatives

1.1.1.3. The Property on Which or Location Where It Is Proposed to Undertake the Activity

The sites for the proposed opencast and underground mining operations were selected based on availability of the chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.

Existing small scale mining is currently taking place on the areas proposed for the infrastructure location. Therefore, the benefits of using alternative land/properties will not be the best suited. It is the best suited environmental and process option of using the existing footprint as far as possible to reduce the need for clearance of vegetation and other environmental impacts.

The opencast pit layout has been altered at the recommendation of specialists to avoid the Chunies River. A 100 m buffer has been placed along the Chunies River in which no mining activities will be undertaken.

The infrastructure layout has been optimised to be as compact as possible and to be placed, as far as possible, on areas already disturbed by mining activities.

7.2.2 Design and Layout Alternatives

1.1.1.4. Waste Stockpiles and Opencast

The proposed site layout was selected using the following guidelines, as well as the criteria set in Table 6:

- taking the position of the chromitite ore body into account;
- taking areas that have been previously disturbed into account;
- to suit the mine process flow. The process flow requires that the run of mine (ROM) is fed from the opencast area to the ROM stockpile. The selected site location prevents unnecessary material handling and ensures a compact arrangement; and
- The specific ecological sensitivities of the site in question (e.g. site biodiversity, proximity to water resources, presence/absence of elements of cultural or historic significance and/or the presence/absence of high agricultural potential soils).

The consideration of layout alternatives must also, however, ensure that such alternatives are also indeed reasonable and feasible in respect of the logistical, engineering and financial constraints applicable to the project. With this in mind, layout alternatives were considered for the placement of what were deemed to be the major surface structures and infrastructure associated with the project; where the greatest opportunity to minimise environmental impacts was identified.

Consideration was given to the placement of the various new activities in relation to –

- The extent to which the placement thereof fragments soils with high agricultural potential;
- The extent to which the placement of the mine stockpiles can be consolidated with respect to
 - i) the potential, collective, visual intrusion thereof on the landscape, as well as
 - ii) the collective pollution generating potential thereof.

Mine stockpiles include the following:

- Waste rock and overburden stockpiling;
- Tailings stockpiling;
- ROM stockpiling; and
- Temporary topsoil storage.

The layout of the existing and proposed infrastructure, relating to the mining activities, was also based on the location of watercourses in the vicinity of the mining area. The existing infrastructure on site is located, as far as possible, 100 m from the watercourses and the layout of the proposed infrastructure will also be located outside the 100 m buffer, where feasible.

The opencast footprint is located where the reserves are known to occur, these have limited options in terms of alternatives.

The layout of the infrastructure also takes into account sensitive areas, such as the ridge and Chunies River to the south of the proposed mining area. All sensitive areas were taken into account and, as far as possible, avoided during the planning of the mine layout. The opencast pit layout has been altered at the recommendation of specialists to avoid the Chunies River. A 100 m buffer has been placed along the Chunies River in which no mining activities will be undertaken.

Table 7: Mine Infrastructure arrangement selection

Aspect	Description
Proposed project site	<p>In generating alternatives, consideration was taken of available space, as well as the areas already disturbed by the current mining operations.</p> <p>The sites for the proposed opencast and underground mining operations were selected based on availability of the chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.</p>
Undermining	<p>The sites for the proposed opencast and underground mining operations were selected based on availability of the chromite seams/reserves to be mined. Minerals can only be mined where identified and verified, therefore it was not practical to select any other sites.</p>
Material transport and process flow	<p>Material will be transported by truck. Waste rock, ROM and tailings storage has been located on areas currently or previously disturbed by mining activities and in close proximity to the opencast. This facilitates the minimisation of transporting of material, limiting further disturbance of ecology.</p>
Soils	<p>Material will be transported by truck. Waste rock, ROM and tailings storage has been located on areas currently or previously disturbed by mining activities and in close proximity to the opencast. This facilitates the minimisation of transporting of material, limiting further disturbances and loss of soil.</p>
Potential dust nuisance to residence	<p>The Mining Right area is surrounded by residential areas. Therefore, alteration of the layout is unlikely to have a significant effect on dust nuisance. Infrastructure and stockpiles have been placed close together to reduce handling and transportation which generates dust.</p>
Required footprint areas	<p>The infrastructure layout has been optimised to be as compact as possible and to be placed, as far as possible, on areas already disturbed by mining activities.</p>
Potential for contamination of surface water.	<p>All waste facilities and mine infrastructure will be located at least 100 m from any streams, or outside the 1:50 year flood lines of any water course, as far as possible. The opencast pit layout has been altered at the recommendation of specialists to avoid the Chunies River. A 100 m buffer has been placed along the Chunies River in which no mining activities will be undertaken.</p>
Geology and fracture/fault intensity	<p>Waste disposal sites and to the extent practically possible, the mine infrastructure, has not been placed on areas considered as a major aquifer.</p>
Potential exposure to spills and seepage	<p>Facilities that could release contaminants to the groundwater have as far as possible been placed on areas way from major fractures and aquifers.</p>
Safety	<p>Safety considerations include haul road distances and proximity of blasting to residences and community facilities.</p>
Integration with the process	<p>The layout of the infrastructure and waste facilities have been configured to optimise the process flow.</p>
Relative Pollution potential of each facility	<p>The relative pollution potential of each waste type and the plant were considered in assessing the relative risk posed by waste material to surface and groundwater contamination.</p>
Potential ecological harm due to spill	<p>All waste facilities and mine infrastructure will be located at least 100 m from any streams, or outside the 1:50 year flood lines of any water course as far as possible. The opencast pit layout has been altered at the recommendation of specialists to avoid the Chunies River. A 100 m buffer has been placed along the Chunies River in which no mining activities will be undertaken. The infrastructure layout has been optimised to be as compact as possible and to be placed, as far as possible, on areas already disturbed by mining activities.</p>

Aspect	Description
Visual intrusion	The Mining Right area is surrounded by residential areas. Therefore, alteration of the layout is unlikely to have a significant effect on visual impacts. Infrastructure and stockpiles have been placed close together to reduce the footprint of the activities.

1.1.1.5. Storm water management and PCD's Layout

Pollution control dams (PCD) will be required for the storage of contaminated water originating from the mining activities. Water contained within the PCD will be utilised for dust suppression and process water. The PCDs have been designed by an engineer as part of the Storm Water Management Plan and will be lined and constructed in accordance with the Department of Water and Sanitations Best Practice Guidelines and NEMWA. The proposed storm water management infrastructure will be placed so as to ensure compliance with GN704 to separate clean and dirty storm water thus no alternatives were investigated and the final layout plan as proposed by the Engineers will be constructed.

1.1.1.6. Site Alternatives and requirements for a tailings dam

No Tailings dam design or construction form part of the application and as mentioned under Section 3.2, the residue material from the wash plant will be allowed to dry on cement slabs, where after it will be stockpiled and backfilled into the opencast pits, thus no tailings dam will be constructed for the project. Therefore, no site selection alternatives will be applicable for a possible tailings facility. The wet tailings area and the dry residue stockpile will be located next to the Plant where the process flow will be optimal.

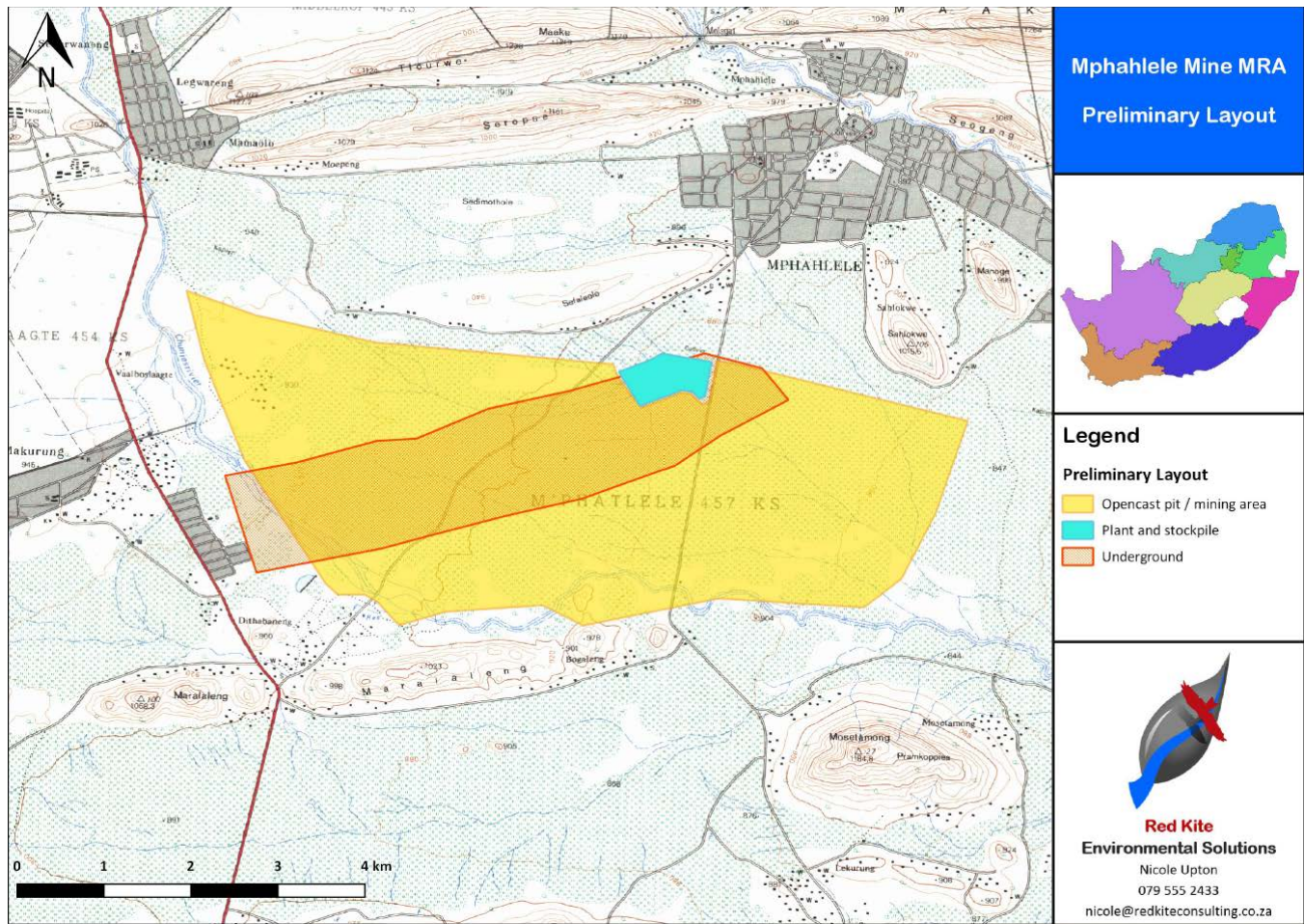


Figure 7: Alternative layout

7.2.3 Activity Alternatives

1.1.1.7. Obtaining water and process water options

Both potable and service water will be needed for the operations throughout the life of mine. Potable water will be extracted from a borehole located on site. The water to be used at the mine will be sourced either from the local borehole on site, groundwater inflows into the opencast and underground workings, storm water dam or a combination of the above.

Water management facilities for the control of storm water and for pollution prevention such as water supply dams, pollution control dams, clean and dirty storm water controls will be designed to meet the requirements of relevant legislation. Recycling dirty/process water will be priority.

Dry tailings stockpiling will be implemented at the operations to facilitate increased water conservation. Wet tailings will be allowed to dry on concrete pads at which time water from the wet tailings will be captured and reused in the wash plant process.

1.1.1.8. Land Use alternatives

An alternative to the mining currently taking place is grazing for livestock, wilderness, residential developments or agriculture. This will not utilise the mineral resources and reduce potential income in the area in terms of salaries and the GDP for the economy.

7.2.4 Process Alternatives

As mentioned above, the process producing dry tailings were investigated and will be implemented on-site. The benefit of this process implementation will be that no tailings facility and the associated risks will need to be constructed on-site, which in turn will also reduce the footprint and the requirement for water. Dry tailings will also be used to backfill the opencast pit, thereby further reducing the required footprint of the operation.

7.2.5 The No Go Option

The no-go option refers to the alternative of the proposed development not going ahead at all. This alternative will avoid potentially positive and negative impacts on the environment and the status quo of the area would remain which is subsistence agriculture and livestock grazing.

The environmental conditions associated with the No-Go Activity will be the same as described for the baseline information (current Environmental Condition) within Section 10 below. No deviation from the baseline is expected if the No-Go option is facilitated.

Possible negative impacts that may be the result of not implementing the activity, it the loss of a known economic resource and limiting socio-economic benefits associated with an economic activity.

7.3 MOTIVATION WHERE NO ALTERNATIVE SITES WERE CONSIDERED

Not applicable as alternatives where considered. Refer to sections above.

8 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

The Public Participation Process (PPP) Report inclusive of all appendices and proofs of communication can be found in Appendix 6.

8.1 OBJECTIVES OF PUBLIC PARTICIPATION

The purpose of this Public Participation Process is:

- To provide Background Information to the proposed activity;
- To provide a locality map indicating the locality of the proposed activity;
- To notify potential Interested and Affected Parties of the Environmental Process to be followed in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- To notify potential Interested and Affected Parties of the Environmental Process to be followed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended;
- To notify potential Interested and Affected Parties of the Environmental Process to be followed in terms of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008);
- To notify potential Interested and Affected Parties of the Environmental Process to be followed in terms of the National Water Act, 1998 (Act No. 36 of 1998);
- To notify potential Interested and Affected Parties that a Heritage Assessment will be compiled in terms of the National Heritage Resources Act, 1999 (Act No. 25 of 1999); and
- To obtain issues and concerns from potential Interested and Affected Parties regarding the Environmental Processes to be followed and the proposed activity, which will be addressed as part of the Public Participation Process.

Public Participation is important for the following reasons:

- It provides an opportunity for Interested & Affected Parties (I&APs), Environmental Assessment Practitioners (EAPs) and the competent authority (CA) to obtain clear, accurate and understandable information about the environmental impacts of the proposed activity or implications of a decision;
- It provides I&APs with an opportunity to voice their support, concerns and questions regarding the project application or decision;
- It provides I&APs with the opportunity of suggesting ways for reducing or mitigating any negative impacts of the project and for enhancing its positive impacts;
- It enables an applicant to incorporate the needs, preferences and values of affected parties into its application;
- It provides opportunities for clearing up misunderstandings about technical issues, resolving disputes and reconciling conflicting interests;
- It is an important aspect of securing transparency and accountability in decision-making; and
- It contributes toward maintaining a healthy, vibrant democracy.

8.2 IDENTIFICATION OF I&APS

The following groups were identified as potential Interested and Affected Parties (I&APs):

- Community Representatives and Members;
- Relevant Government Departments;
- Relevant Institutional/Organisational Representatives;
- Relevant Municipal Representatives, including the relevant Ward Councillors;
- Landowners/Occupiers;
- Directly affected Surrounding Landowners/Occupiers;

- Land Claimants; and
- Non-Government Organisations and Agencies.

It should be noted that following the project initiation period no further public advertisements (i.e. in newspapers) will be undertaken. Accordingly, to ensure that all potential I&APs were made aware of the project and had the opportunity to register and comment, the notification process was as thorough as possible. Registration will remain open throughout the Public Participation Process, so as to allow affected parties to register and submit their input throughout. For the list of identified I&APs refer to Appendix 1 of the PPP Report.

8.3 NOTIFICATION OF I&APS

8.3.1 Site Notices

To inform surrounding and immediate communities, landowners, mine workers and passers-by of the proposed project, fourteen (14) A2 notices were erected at visible and accessible localities throughout the study area on 16 September 2020. These notices were erected at public places regularly utilised by the communities in the greater surroundings and are summarised in the table below. To ensure complete inclusion, however, a further four (4) A2 notices were erected on 29 September 2020 to ensure that communities residing south of the proposed mining right area, which might not have visited the above-mentioned public places for some time, are also informed. Photographic evidence of the site notices erected on 16 September 2020 and 29 September 2020 are attached as Appendix 2 of the PPP Report.

Table 8: Mphahlele Site Notice Dates and Localities

Notice	Language	Date	Locality	Coordinates
Site Notice 01	Sepedi	16 September 2020	Solly Colman Hall (Front Door)	24°18'5.13"S
Site Notice 02	English	16 September 2020		29°38'34.43"E
Site Notice 03	Sepedi	16 September 2020	Solly Colman Hall (Gate)	24°18'4.96"S
Site Notice 04	English	16 September 2020		29°38'34.35"E
Site Notice 05	Sepedi	16 September 2020	Post Office	24°18'14.16"S
Site Notice 06	English	16 September 2020		29°38'26.66"E
Site Notice 07	Sepedi	16 September 2020	Mphahlele Clinic	24°18'30.40"S
Site Notice 08	English	16 September 2020		29°38'15.58"E
Site Notice 09	Sepedi	16 September 2020	Mphahlele Mine Entrance	24°19'48.44"S
Site Notice 10	English	16 September 2020		29°37'36.98"E
Site Notice 11	Sepedi	16 September 2020	Kgagatlou Secondary School	24°19'17.69"S
Site Notice 12	English	16 September 2020		29°37'49.64"E
Site Notice 13	Sepedi	16 September 2020	Matsepeng General Dealer	24°18'29.76"S 29°34'13.77"E
Site Notice 14	Sepedi	16 September 2020	Mamaolo Q4 Filling Station	24°18'24.81"S 29°33'49.93"E
Site Notice 15	English	29 September 2020	Rockface	24°21'34.05"S
Site Notice 16	Sepedi	29 September 2020		29°37'31.89"E
Site Notice 17	English	29 September 2020	Bus stop	24°20'13.49"S 29°33'46.16"E
Site Notice 18	Sepedi	29 September 2020	Road south of Study Area	24°21'46.50"S 29°37'17.88"E



8.3.2 Newspaper Advertisements

To inform a broad base of individuals who might want to register as I&APs, newspaper advertisements were placed in one local newspaper and one regional newspaper. For proof of advertisements placed, refer to Appendix 3 of the PPP Report.

Advertisements were placed in the following newspapers:

- Wednesday, 16 September 2020: The Citizen (Regional), published in English.
- Wednesday, 16 September 2020: The Weekend Review (Local), published in Sepedi.

8.3.3 Written Notifications

Identified I&APs were directly informed of the application processes by means of email and hand delivery, as well as by Text Message (SMS). All notifications invited potential I&APs to a 30-day commenting period on the Draft Scoping Report and encouraged potential I&APs to register as I&APs to receive further information on the process, including information on the succeeding commenting periods for the Draft Environmental Impact Assessment (EIA) and the Draft Water Use License Application (WULA). Proof of written notifications sent is provided in the relevant Appendices as described in the sections to follow.

1.1.1.9. Hand Delivery

The local community residing within the study area was notified via hand delivery of Background Information Documents (BIDs) and a hard copy of the Draft Scoping Report to both the Mphahlele Community Development Trust and the Mphahlele Royal Council, for distribution within the community on 16 September 2020. The Background Information Document (BID) has been attached to this report as Appendix 4 of the PPP Report.

Further to the above, notification letters and copies of the Draft Scoping Report were hand delivered to the Limpopo Department of Economic Development, Environment and Tourism (LEDET) (16 September 2020), the Department of Rural Development and Land Reform (DRDLR) (16 September 2020), the Department of Water and Sanitation (DWS) (16 September 2020), the Department of Mineral Resources (DMR) (16 September 2020), the Limpopo Department of Roads and Transport (15 September 2020), the Lepelle-Nkumpi Local Municipality (16 September 2020) and the Capricorn District Municipality (17 September 2020). Proof of notifications and the Draft Scoping Report had delivered are attached as Appendix 5 of the PPP Report.

1.1.1.10. Email Notifications

I&APs were notified of the proposed project by means of email on 15 September 2020. Additional email addresses found for the Capricorn District Municipality were furthermore informed on 17 September 2020. The Background Information Document (BID) was attached to the emails and all email notifications sent, provided a link to an electronic copy of the Draft Scoping Report (via Dropbox). Proof of notifications and the Draft Scoping Report sent via email is attached as Appendix 6 of the PPP Report.

1.1.1.11. Text Message (SMS)

Where mobile numbers were available, I&APs were notified of the proposed project by means of Text Message. Refer to Appendix 7 of the PPP Report for proof of Text Message notifications sent on 15 September 2020. The Text Message notification highlighted the following information:

- Notice of the Public Commenting Period for the Mphahlele Community Development Trust Mining Right Integrated Environmental Authorisation and Water Use License Application.
- The availability of the Draft Scoping Report for the Integrated Environmental Authorisation Application and the Background Information Document providing detail on the Water Use License Application.

- The study area, the commenting period and a request to distribute the information as far as possible.
- Where the relevant documentation for Public Commenting could be obtained from and an invitation to send comments on the Draft Scoping Report or a Dropbox link request to the details provided.

8.4 NOTIFICATION OF I&APS OF REPORTS AVAILABILITY

8.4.1 Draft Scoping Report

Potential I&APs were informed of the availability of the Draft Scoping Report for Public Commenting between 15 September 2020 and 17 September 2020. I&APs were encouraged to submit any comments or questions on or before the relevant commenting closing date (19 October 2020). Notifications were sent by means of advertisements, site notices, hand delivery, email and Text Message (SMS). It was indicated that hard copies of the document listed above for Public Commenting was available at the Mphahlele Community Development Trust and at the Mphahlele Royal Council. Acknowledgement of receipt for the hand delivered documents for Public Commenting have been attached as Appendix 5 of the PPP Report. Further to the hard copies distributed to the relevant Community Representatives, electronic copies were distributed by means of hand delivered CDs and a Dropbox link to an electronic copy was furthermore provided in email notifications. All other notifications (Text Message, Site Notices and Advertisements) specified that the Dropbox link could be provided upon request from the Environmental Assessment Practitioner (EAP).

8.4.2 Draft EIA Report and Draft WULA

Registered I&APs will be informed of the availability of the following documents for Public Commenting once applicable:

- 1) Draft Environmental Impact Assessment (EIA) Report for the Mphahlele Mining Right Application; and
- 2) Draft Water Use License Application (WULA) Report for the Mphahlele Mining Right Application.

I&APs will be encouraged to submit any comments or questions on or before the relevant closing date (to be specified). Notifications will be sent by means of hand delivery, email and Text Message (SMS). It will be indicated that hard copies of the documents listed above for Public Commenting will be available at the Mphahlele Community Development Trust and at the Mphahlele Royal Council. Further to the hard copies to be distributed to the relevant Community Representatives, electronic copies will be distributed by means of hand delivered CDs and a Dropbox link to an electronic copy will furthermore be provided in email notifications. All Text Messages will specify that the Dropbox link could be provided upon request from the Environmental Assessment Practitioner (EAP).

8.5 ACCESS AND COMMENTING OPPORTUNITY

8.5.1 Registration and Draft Scoping Report

A 30-day commenting period has been provided for as part of the Registration and Draft Scoping phase of this Public Participation Process. This has been conducted in line with Section 41(4)(ii) of the National Water Act (NWA), 1998 (Act No. 36 of 1998) which indicates that a commenting period of no less than 60 days (first 30 days) should be provided for and in accordance with Clause 3(8) of the NEMA EIA Regulations (GN No. 326 of 07 April 2017) which indicates that any public participation process must be conducted for a period of at least 30 days. However, note that the entire process will remain transparent and allow for I&APs to register and comment throughout.

The local community has been taken into consideration by distributing hard copies of the relevant documents for Public Commenting to the Representatives for the Mphahlele Community Development Trust and the Mphahlele Royal Council. Furthermore, as mentioned earlier in this report to ensure easy access to the documents for Public Commenting, a Dropbox link to an electronic copy has also been provided.

8.5.2 Draft EIA Report and Draft WULA

A 30-day commenting period will be provided for as part of the Draft EIA and Draft WULA phase of this Public Participation Process. This will be conducted in line with Section 41(4)(ii) of the National Water Act (NWA), 1998 (Act No. 36 of 1998) which indicates that a commenting period of no less than 60 days (second 30 days) should be provided for and in accordance with Clause 3(8) of the NEMA EIA Regulations (GN No. 326 of 07 April 2017) which indicates that any public participation process must be conducted for a period of at least 30 days. However, note that the entire process will remain transparent and allow for I&APs to register and comment throughout.

The local community will be taken into consideration by distributing hard copies of the relevant documents for Public Commenting to the Representatives for the Mphahlele Community Development Trust and the Mphahlele Royal Council. Furthermore, as mentioned earlier in this report a Dropbox link to an electronic copy will also be provided to ensure easy access to the documents available for public commenting.

8.6 PUBLIC PARTICIPATION MEETINGS

A Public Participation Meeting was held on 22 November 2020 at the Solly Colman Hall with the Mphahlele Community at 10h00 am. As part of the Public Participation Meeting, opportunity was granted for I&APs to raise any comments/issues and questions they may have. These have been captured in the minutes of the meetings.

Information pertaining to the Public Participation Meeting is attached as Appendix 13 of the PPP Report and includes the following information:

- Public Participation Meeting Minutes;
- Public Participation Meeting Presentation;
- Public Participation Meeting Attendance Register; and
- Public Participation Meeting Photographs.

8.7 REGULATORY CONSULTATION

8.7.1 Department of Mineral Resources (DMR)

On 08 September 2020, the DMR was requested to provide the EAP with contact information for any I&APs in the mining industry, which should form part of the NEMA/NEMWA/NWA Public Participation Process underway for the Farm Locatie van M'phatlele 457 KS. These include:

- Parties with interests in prospecting, mining, exploration or production in the area and surrounding area; and
- Holders of prospecting, mining, exploration or production rights within a 2 km radius of the application area.

The EAP is awaiting response from the Department of Mineral Resources in this regard. Refer to Appendix 8 of the PPP Report for communications with the DMR.

8.7.2 Department of Rural Development and Land Reform (DRDLR)

A request for the property land claim status was forwarded to the DRDLR on 08 September 2020 to which the DRDLR responded with an official letter indicating the land claim status. Refer to Appendix 9 of the PPP Report for communications with the DRDLR.

The DRDLR office is not allowed to disclose Land Claimants' information to the EAP as per the Protection of Personal

Information Act, 2013 (Act No. 4 of 2013). Since the claimant lodged their claim against the state and not the landowners, the Commission on Restitution of Land Rights may be included as an I&AP, but not the claimant themselves.

8.7.3 South African Heritage Resources Agency (SAHRA)

The documentation for Public Commenting has been uploaded onto the South African Heritage Resources Information System (SAHRIS) to enable the South African Heritage Resources (SAHRA) to provide comments in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) or for a decision in terms of a Section 38(1) Application in terms of the above-mentioned Act. The interim comments received from SAHRA is attached as Appendix 11 of the PPP Report.

8.7.4 Ward Councillor Communications

The Ward Councillors for Ward 19, 21, 22 and 24 were informed of the proposed project. Refer to Appendix 10 of the PPP Report for all communications with the Ward Councillors.

8.7.5 Other Departments to be communicated with

All Departments and State-Owned Entities listed in the I&AP Register have been and will continue to be included in the Public Participation Process. However, direct consultations will be conducted with the Regulatory Authorities relevant to this Public Participation Process.

8.8 DISCLOSURE OF I&APS' INTERESTS

All registrations, comments, questions, etc. by all means received will be made available to the public and Departments to view. No discussions will be kept private.

8.9 REGISTRATIONS AND COMMENTS RECEIVED

Identified I&APs were encouraged to submit their registrations and comments to Red Kite Environmental Solutions (Pty) Ltd, via any of the avenues provided for, for them to receive further correspondence regarding the Mphahlele Mining Right project currently underway. All registrations and comments received is attached as Appendix 12 of the PPP Report.

8.10 ADDRESSING COMMENTS AND CONCERNS

An Issues and Response Report has been compiled as part of the Public Participation Process for the Mphahlele Mining Right project currently underway. This document records the issues of concern, questions and suggestions contributed by stakeholders during the Integrated Environmental Authorisation Process and the Water Use License Application Process. This report also includes the responses provided by the relevant parties. The Issues and Response Report (I&RR) is attached as Appendix 14 of the PPP Report.

It should be noted that the Issues and Response Report is an active document which will be updated throughout the process as comments and concerns are received. However, following submission of all final documents to the relevant Competent Authorities (CAs), all additional comments should be directed directly to the relevant CAs.

8.10.1 Summary of Issues Raised By I&APs From Public Participation

For details of all communication between Red Kite and the AIPs refer to the Comments and Response Report of the PPP Report (Appendix 6 of the EIA and EMPr Report).

Refer to Appendix 1 of the PP Report for a full list of I&APs included in the PPP. The table below contains only the I&AP who provided comments.

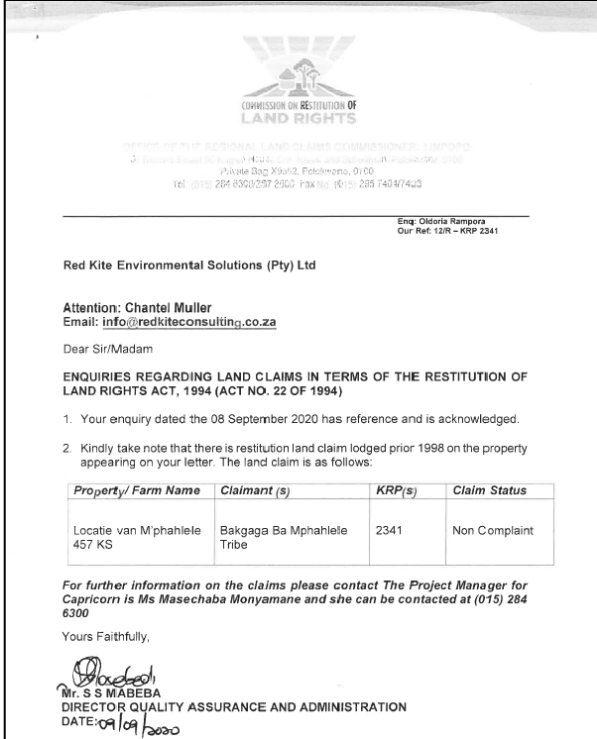
Table 9: Summary of issues raised by I&APs

SECTION A: MATTERS DISCUSSED WITH REGULATORY AUTHORITIES

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
Date: 2020/09/08 Format: Email Name: Chantel Muller (Red Kite Environmental Solutions)	Good day Mr. Kolani, RE: MPHAHLELE MINING RIGHT APPLICATION (LP 30/1/2/3/2/1(10184) EM) The above subject matter has relevance. Kindly provide us with contact information for any Interested and Affected Parties in the mining industry, which should form part of the NEMA/NEMWA/NWA Public Participation Process underway for the Farm Locatie van M'phatlele 457 KS, Limpopo Province. These include: <ul style="list-style-type: none"> • Parties with interests in prospecting, mining, exploration or production in the area and surrounding area; and • Holders of prospecting, mining, exploration or production rights within a 2 km radius of the application area. Your assistance in this regard is greatly appreciated.	N/A	Awaiting Response.

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
<p>Date: 2020/09/08 Format: Email Name: Chantel Muller (Red Kite Environmental Solutions)</p>	<p>Regards</p> <p>Good day, Could the Department please assist us with whether any land claims has been lodged against the following property situated within the Limpopo Province:</p> <ul style="list-style-type: none"> • Farm Locatie van M’phatlele 457 KS <p>(Sometimes also spelt M’phahlele)</p> <p>We trust that we will here from you soon.</p> <p>Thanks in advance.</p> <p>Regards</p>	<p>Date: 2020/09/11 Format: Email Name: Reratiloë Mothapo (DRDLR)</p>	<p>Good Morning Kindly receive the attached and acknowledge the receipts.</p> <div> <p style="text-align: center;">COMMISSION ON RESTITUTION OF LAND RIGHTS</p> <p style="text-align: center;">Tel: (011) 564 3502/27 3900 Fax No: (011) 291 742/7403</p> <p style="text-align: center;">Eng: Ramapora Olorisa Our Ref: R/12/462/159748</p> <p>Red Kite Environmental Solutions (Pty) Ltd</p> <p>Attention: Chantel Muller Email: info@redkiteconsulting.co.za</p> <p>LAND CLAIMS ENQUIRY – LOCATIE VAN M’PHAHLELE 457 KS</p> <p>We refer to your letter dated 08 September 2020.</p> <p>We confirm that there is an existing land claim against the Property. The claim was lodged by Seota MD with Ref: R/5/120/462/159748 on the 01/07/2016.</p> <p>The claim was lodged in terms of the Restitution of Land Rights Amendment Act, 2014 (Act No 15 of 2014) ("the Amendment Act") which, amongst others, reopened the lodgement of claims for a period of five years.</p> <p>The validity of the Amendment Act was challenged in the Constitutional Court. The Constitutional Court found the Amendment Act to be invalid because of the failure of Parliament to facilitate public involvement as required by the Constitution. The Amendment Act ceased to be law on 28 July 2016.</p> <p>The Constitutional Court ordered that the claims that were lodged between 1 July 2014 and 27 July 2016 are validly lodged, but it interdicted the Commission from processing those claims until the Commission has finalised the claims lodged by 31 December 1998 or until Parliament passes a new law providing for the re-opening of lodgement of land claims.</p> <p>The Commission will therefore not be processing the above claim until it finishes claims lodged by 31 December 1998 or until Parliament passes a new law providing for re-opening of lodgement of claims.</p> </div> <div> <p>It is important to note that the provisions of section 11 (7) of the Restitution of Land Rights Act, 1994 do not apply until after the Commission has accepted the claim for investigation and published its details in the Government Gazette. That will only be done on the happening of either event in the previous paragraph.</p> <p>Yours faithfully</p> <p> Mr. S S MABEBA DIRECTOR QUALITY ASSURANCE AND ADMINISTRATION DATE: 11/09/2020</p> </div>



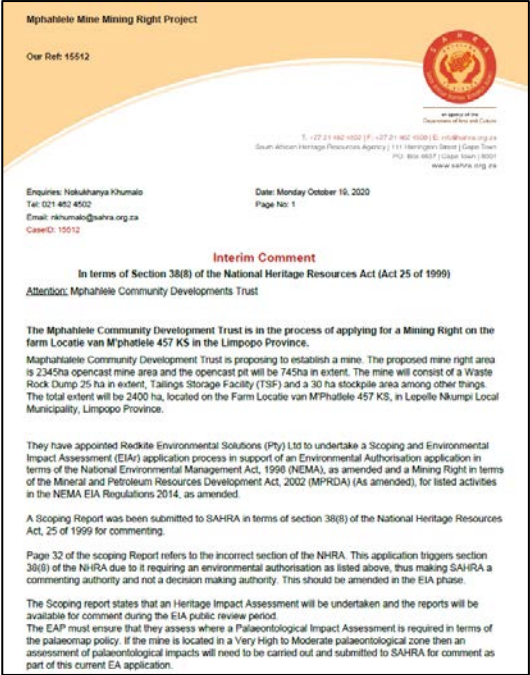
COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER								
			 <p>The image shows an email response from the Commission on Restitution of Land Rights. The header includes the commission's name and contact information. The recipient is Red Kite Environmental Solutions (Pty) Ltd, with attention to Chantel Muller. The email discusses enquiries regarding land claims in terms of the Restitution of Land Rights Act, 1994. It lists two points: 1. The enquiry dated 08 September 2020 is acknowledged. 2. A restitution land claim was lodged prior to 1996 on the property. A table follows with the following data:</p> <table border="1"> <thead> <tr> <th>Property/ Farm Name</th> <th>Claimant (s)</th> <th>KRP(s)</th> <th>Claim Status</th> </tr> </thead> <tbody> <tr> <td>Locatie van M'phahlele 457 KS</td> <td>Bakgaga Ba Mphahlele Tribe</td> <td>2341</td> <td>Non Complaint</td> </tr> </tbody> </table> <p>The email concludes with a signature from Mr. S S MABEBA, Director Quality Assurance and Administration, dated 09/09/2020.</p>	Property/ Farm Name	Claimant (s)	KRP(s)	Claim Status	Locatie van M'phahlele 457 KS	Bakgaga Ba Mphahlele Tribe	2341	Non Complaint
Property/ Farm Name	Claimant (s)	KRP(s)	Claim Status								
Locatie van M'phahlele 457 KS	Bakgaga Ba Mphahlele Tribe	2341	Non Complaint								
Date:	Many thanks Reratiloe,	Date: 2020/09/08 Format: Email Name: Julius Mashaphu (DRDLR)	Automatic reply: Dear All Please take note that I am out of office unit further notice. Kind regards								
Date:		N/A	Awaiting Response.								

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
2020/09/11 Format: Email Name: Chantel Muller (Red Kite Environmental Solutions)	Could you kindly forward the contact information for the person (Seota MD) that lodged the land claim against the Farm Locatie van M'pahlele 457 KS in terms of the Restitution of Land Rights Amendment Act, 2014 (Act No. 15 of 2014)? Since the claim is still seen as valid we would nonetheless like to include the relevant person(s) in our Public Participation Process. Regards	Date: 2020/09/08 Format: Email Name: Mpoboryane Rampora (DRDLR)	Automatic reply: Kindly note that I am out of office , send all work related enquiries to Tshilidzi. Ratshisusu@drdlr.gov.za or Lorraine.Mosebedi@drdlr.gov.za Thanks
Date: 2020/09/15 Format: Email Name: Julius Mashaphu (DRDLR)	Dear all Please take note that I am booked off until further notice. Kind regards	N/A	This was an automatic reply to the notification of the Draft Scoping Report. No response required.
Date: 2020/09/15 Format: Email Name: Webmaster (Department of Labour)	Dear Client, thank you for sending your message to webmaster@labour.gov.za , we would like to make you aware that the address is only for reporting website (www.labour.gov.za) technical issues such as broken links and not for general enquiries. If you want assistance with UIF, CF, Inspections and other Departmental issues, please contact your nearest labour centre for assistance (http://www.labour.gov.za/DOL/contacts)	N/A	This was an automatic reply to the notification of the Draft Scoping Report. No response required.
Date: 2020/09/15 Format: Email Name:	Good Morning Thank you for notifying SAHRA of the proposed development, SAHRA does not accepted mailed or emailed applications for	Date: 2020/09/15 Format: Email Name: Chantel	Good day Nokukhanya, Many thanks. We will upload the documents to the SAHRIS online platform.


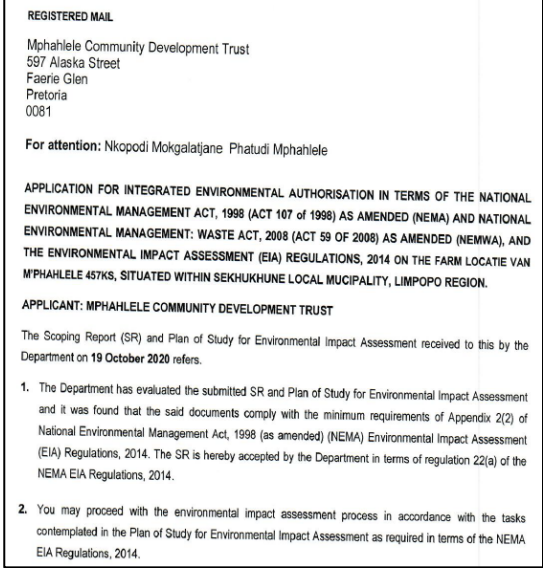


COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
Nokukhanya Khumalo (SAHRA)	comment or decision making since 2013. In order to receive comments from SAHRA, please create a case on our online platform called SAHRIS: https://sahris.sahra.org.za/ . Here, you can then submit all relevant documentation, related to an EA application (for comments in terms of section 38(8)) or for decision in terms of section 38(1) application. Kind Regards,	Muller (Red Kite Environmental Solutions)	Regards
Date: 2020/09/15 Format: Telephone Call Name: Cllr Ntswane Maria (Ward Councillor for Ward 24)	Not verbatim: Cllr. Ntswane indicated that the Mphahlele Mining Right Project does not fall within her Ward and that the Councillor for Ward 19 should be communicated with.	Date: 2020/09/15 Format: Telephone Call Name: Chantel Muller (Red Kite Environmental Solutions)	Not verbatim: Ms. Muller thanked the Ward Councillor for the information and indicated that the Ward Councillor for Ward 24 will subsequently be removed from the I&AP Register.
Date: 2020/09/28 Format: Email Name: Cllr Ntswane Maria (Ward Councillor for Ward 24)	Part of my ward fall under the proposed mphahlele mining project (matime village and makaung village) My apology	Date: 2020/09/28 Format: Telephone Call Name: Chantel Muller (Red Kite Environmental Solutions)	Dear Cllr. Ntswane, Many thanks for informing us. Much appreciated. Regards



COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
<p>Date: 2020/10/19 Format: SAHRIS Letter Name: Nokukhanya Khumalo (SAHRA)</p>		<p>Date: 2021/03/30 Format: Email Name: Chantel Muller (Red Kite Environmental Solutions)</p>	<p>Good day Nokukhanya,</p> <p>This email serves as response to your interm comments received on the Mphahlele Mining Right Project under reference 15512.</p> <ul style="list-style-type: none"> It is confirmed that the EIA has been amended to stipulate SAHRA as a commenting authority rather than a decision-making authority since the application triggers Section 38(8) of the NHRA. It is confirmed that a Heritage Impact Assessment has been undertaken by a suitably qualified heritage professional. This report will be submitted to SAHRA for commenting purposes during the Draft EIA/EMPr public review period. It is confirmed that a Desktop (Phase 1) Palaeontological Impact Assessment has been conducted by a suitably qualified palaeontological professional. The report noted it very unlikely that any fossils would be preserved in the shales of the Magaliesberg Formation (Pretoria Group, Transvaal Supergroup) because none has been recorded from here, and other records are rare. This report will be submitted to SAHRA for commenting purposes during the Draft EIA/EMPr public review period. It is confirmed that all relevant reports will be uploaded to the relevant SAHRIS Case ID and that SAHRA will be provided the relevant commenting opportunity.



COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
	 <p>Mphahlele Mine Mining Right Project</p> <p>Our Ref: 15512</p> <p>at request of the Department of Arts and Culture</p> <p>T: +27 21 462 4000 F: +27 21 462 4000 E: info@sahra.org.za South African Heritage Resources Agency 111 Waterlooplein Street Cape Town P.O. Box 4607 Upper Town 8001 www.sahra.org.za</p> <p>Enquiries: Nkukhanya Khumalo Tel: 021 402 4002 Email: nkhumalo@sahra.org.za CaseID: 15512</p> <p>Date: Monday October 19, 2020 Page No: 2</p> <p>These specialist studies must be undertaken by suitably qualified heritage professionals in the fields of archaeology and palaeontology respectively. These studies must assess all impacts related to the proposed activities as well.</p> <p>Although this Interim Comment is issued outside the Scoping Report public review period, SAHRA accepts that the heritage reports will be submitted in the EIA phase, and requests that they are uploaded on the first day of the public review period.</p> <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p> <p>Yours faithfully</p>		<p>We trust that you find the above in order.</p> <p>Regards</p>
<p>Date: 2021/01/18 Format: Email Name: Emily Mulaudzi (DMRE)</p>	 <p>REGISTERED MAIL</p> <p>Mphahlele Community Development Trust 597 Alaska Street Faerie Glen Pretoria 0081</p> <p>For attention: Nkopodi Mokgalatjane Phatudi Mphahlele</p> <p>APPLICATION FOR INTEGRATED ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) AS AMENDED (NEMA) AND NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT 59 OF 2008) AS AMENDED (NEMWA), AND THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REGULATIONS, 2014 ON THE FARM LOCATIE VAN MPHAHLELE 457KS, SITUATED WITHIN SEKHUKHUNE LOCAL MUNICIPALITY, LIMPOPO REGION.</p> <p>APPLICANT: MPHAHLELE COMMUNITY DEVELOPMENT TRUST</p> <p>The Scoping Report (SR) and Plan of Study for Environmental Impact Assessment received to this by the Department on 19 October 2020 refers.</p> <ol style="list-style-type: none"> The Department has evaluated the submitted SR and Plan of Study for Environmental Impact Assessment and it was found that the said documents comply with the minimum requirements of Appendix 2(2) of National Environmental Management Act, 1998 (as amended) (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014. The SR is hereby accepted by the Department in terms of regulation 22(a) of the NEMA EIA Regulations, 2014. You may proceed with the environmental impact assessment process in accordance with the tasks contemplated in the Plan of Study for Environmental Impact Assessment as required in terms of the NEMA EIA Regulations, 2014. 	<p>Date: 2021/03/30 Format: Email Name: Chantel Muller (Red Kite Environmental Solutions)</p>	<p>Good day Emily,</p> <p>This email serves as response to the Scoping Report acceptance letter from the DMRE, dated 18 January 2021, under reference LP30/5/1/2/3/2/1/10184EM, for the Mphahlele Mining Right Project.</p> <ol style="list-style-type: none"> The DMRE's acceptance of the Scoping Report in terms of regulation 22(a) of the NEMA EIA Regulations (2014, as amended) is noted. As instructed the Environmental Impact Assessment Process has been proceeded with. As part of the Public Participation Process for the proposed project, a comprehensive Issues & Response Report (I&RR) has been compiled which includes all comments received from I&APs to date. This report forms an appendix of the Public




COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
	<p>3. Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Assessment Report (EIAR). This includes, but is not limited to the Provincial Heritage Resources Authority, Provincial Environmental Department, Department of Agriculture, Forestry and Fisheries (DAFF), Department of Water and Sanitation (DWS) and the local municipality. Proof of correspondence with the various stakeholders must be included in the EIAR. Should you be unable to obtain comments, proof of the attempts that were made to obtain comments should be submitted to the Department.</p> <p>4. In addition, the following amendments and additional information are required for the EIR and EMPr which needs to be submitted to this office as proscribed:</p> <p>a) Consult the draft EIA/EMP document with all interested and affected parties and provide proof that the concerns have been raised, addressed and incorporated into the EIA and EMP. Include the proof of detailed participation and the results thereof. Notwithstanding the geographical location (i.e. in relation to town and communities/farmlands) and ownership of the area applied for, please note that as part of the results of Public Participation the following details must be indicated:</p> <ul style="list-style-type: none"> > Date of public meetings, > Minutes of the meetings, > Attendance register with name of the organisation, contact number and the signature thereof, > Views and concerns of the interested and affected parties , etc <p>b) You are requested to submit all specialist studies report related to the proposed activities and you are advised to also undertake any studies which may be relevance during the impact analysis.</p> <p>5. The applicant is hereby reminded to comply with the requirements of regulation 3 of the EIA Regulations, 2014 with regards to the time period allowed for complying with the requirements of the Regulations.</p> <p>Please ensure that the EIAR includes the A3 size locality maps of the area and illustrates the exact location of the proposed development.</p> <p>7. Further, it must be reiterated that, should an application for Environmental Authorisation be subjected to any permits or authorisations in terms of the provisions of any Specific Environmental Management Acts (SEMAs), proof of such application will be required.</p> <p>8. You are requested to submit three (3) hard copies of the EIAR and EMPr on proscribed time frames in terms of Regulation with at least one electronic copy (CD/DVD) of the complete EIAR and EMPr to this Regional Office. Please note that such copies are not including the hardcopies which to be forwarded to organs of state administering a law relating to matters affecting the environment. You are therefore requested to consult with every organ of state that administers a law relating to a matter affecting the environment relevant to this application of environmental authorisation and submit the comments to this department.</p> <p>9. Your attention is brought to Section 24F of the NEMA which stipulates "that no activity may commence prior to an environmental authorisation being granted by the competent authority".</p> <p>Yours faithfully</p>		<p>Participation Report which has been included in the Draft EIA/EMPr for commenting and will furthermore be included in the Final EIA/EMPr to be submitted to DMRE.</p> <p>The Public Participation Report furthermore contains all notifications sent to the I&APs/Stakeholders listed in the I&AP Register. Proof of notification to, amongst others, the Limpopo Heritage Resources Authority, the Limpopo Department of Economic Development, Environment and Tourism (LEDET), the Department of Environment, Forestry and Fisheries (DEFF), the Department of Agriculture, Land Reform and Rural Development, the Department of Water and Sanitation (DWS) and the Lepelle-Nkumpi Local Municipality is provided.</p> <p>Where comments from Departments have not yet been received, a follow-up email as part of the Draft EIA/EMPr Commenting Process notification will be sent.</p> <p>4.</p> <p>(a) A comprehensive Public Participation exercise has been undertaken in terms of both the Environmental Impact Assessment Regulations, 2014 (Government Notice No. R. 982 of 04 December 2014, as amended by Government Notice No. 326 of 07 April 2017) and the Regulations regarding the procedural requirements for Water Use License Applications and Appeals (Government Notice No. R. 267 of 24 March 2017). The comprehensive Public Participation Report details the process followed in terms of the</p>




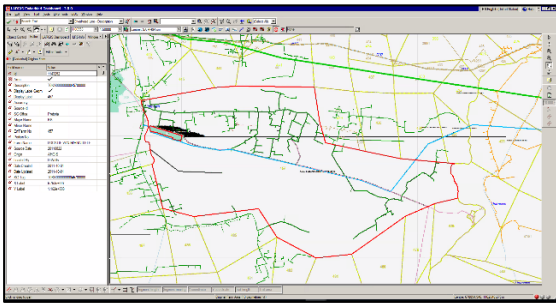
COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>above-mentioned regulations and contains all relevant proofs and details.</p> <p>(b) All relevant specialist studies will be included in the Final EIA/EMPr for submission.</p> <p>5. The instruction to comply with the requirements of Regulation 3 of the EIA Regulations, 2014, is noted and executed.</p> <p>6. It is confirmed that the final EIA/EMPr will include the A3 size locality maps of the area and will illustrate the exact location of the proposed project/development.</p> <p>7. It is noted that a combined application for a NEMA S&EIR under the National Environmental Management Act, 1998 (Act No. 107 of 1998) and a NEMWA S&EIR under the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) has been submitted.</p> <p>8. The instruction is noted. Refer to the response under item 3 above.</p> <p>9. The instruction is noted.</p> <p>Regards</p>

SECTION B: COMMENTS FROM REGISTERED I&APS

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER																		
Date: 2020/09/16 Format: Email Name: Thomas Mavunda (Eskom)	Good day Sir / Madam, Kindly receive our comments. Warm Regards <div style="border: 1px solid black; padding: 5px;">  <p style="text-align: center;">Red Kite Environmental Solutions (Pty) Ltd</p> <p style="text-align: center;">REGISTRATION AND COMMENT SHEET</p> <p style="text-align: center;">PROPOSED NEW MINING ACTIVITIES PLANNED FOR THE FARM LOCATIE VAN M'PHATLELE 457 KS, CAPRICORN DISTRICT, LIMPOPO PROVINCE</p> <p style="text-align: center;">Please complete and return no later than 19 October 2020 to: Ms. C. Muller / Ms. N. Upton PostNet Suit 0111, Private Bag X37, Lynwood Ridge, 0040 Cell: 084 444 2414 / 079 555 2433 Email: info@redkiteconsulting.co.za</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 20%;">DATE:</td><td>15 SEPTEMBER 2020</td></tr> <tr><td>TITLE:</td><td>MR</td></tr> <tr><td>NAME:</td><td>THOMAS</td></tr> <tr><td>SURNAME:</td><td>MAVUNDA</td></tr> <tr><td>TELEPHONE NUMBER:</td><td>015 230 1672</td></tr> <tr><td>CELL NUMBER:</td><td>072 354 4166</td></tr> <tr><td>FAX NUMBER:</td><td></td></tr> <tr><td>EMAIL:</td><td>MAVUNDA@ESKOM.CO.ZA</td></tr> <tr><td>POSTAL/PHYSICAL ADDRESS:</td><td>P O Box 3499 POLKWANE 0700</td></tr> </table> <p>ORGANISATION/FIRM/POSITION/NATURE OF INVOLVEMENT E.G. PROPERTY OWNER: <u>ESKOM</u></p> <p>COMMENTS OR QUESTIONS: <u>WE HAVE OUR SERVICES IN THE AFFECTED FARM C LOCATIE VAN M'PHATLELE 457 KS</u></p> <p style="text-align: center; font-size: small;">Red Kite Environmental Solutions (Pty) Ltd Tel. 084 444 2414 Email: info@redkiteconsulting.co.za PostNet Suit 0111, Private Bag X37, Lynwood Ridge, 0040</p> </div>	DATE:	15 SEPTEMBER 2020	TITLE:	MR	NAME:	THOMAS	SURNAME:	MAVUNDA	TELEPHONE NUMBER:	015 230 1672	CELL NUMBER:	072 354 4166	FAX NUMBER:		EMAIL:	MAVUNDA@ESKOM.CO.ZA	POSTAL/PHYSICAL ADDRESS:	P O Box 3499 POLKWANE 0700	Date: 2020/09/27 Format: Email	Good day Mr. Mavunda, We hereby acknowledge receipt of your registration as I&AP and we thank Eskom for the comments provided. The relevant aspects will be included in the EIA and EMPr Report for submission to the Competent Authority. Note that the Applicant is aware of the distribution lines and restriction that apply to their servitudes. Kindly provide us with the shp or kml files of the distribution lines illustrated in the "Services Map". Regards
DATE:	15 SEPTEMBER 2020																				
TITLE:	MR																				
NAME:	THOMAS																				
SURNAME:	MAVUNDA																				
TELEPHONE NUMBER:	015 230 1672																				
CELL NUMBER:	072 354 4166																				
FAX NUMBER:																					
EMAIL:	MAVUNDA@ESKOM.CO.ZA																				
POSTAL/PHYSICAL ADDRESS:	P O Box 3499 POLKWANE 0700																				

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
	<p> Eskom</p> <p>Red Kite Environmental Solutions (PTY)LTD Private Bag X37 Lynwood Ridge 0040 PER E MAIL Attention: C Muller / N Upton</p> <p>Date: 15 September 2020</p> <p>Enquiries: T. Mavunda Tel +27 15 230 1672</p> <p>RE: PROPOSED NEW MINING ACTIVITIES PLANNED FOR THE FARM LOCATIE VAN M'PHATLELE 457 KS, CAPRICORN DISTRICT, LIMPOPO PROVINCE</p> <p>This application affects our Eskom Distribution services. The following services are affected:</p> <ul style="list-style-type: none"> ❖ Mphahlele-Lesetsi 11kV line ❖ Middelpunt / Dithabaneng 132kV line ❖ Mphahlele-Mphahlele 11kV line <p>Eskom Distribution has no objection in principle of the above mentioned application, on the following conditions:</p> <ol style="list-style-type: none"> 1. There is a 9 and 18 meters building and tree restriction on either side of the 11kV and 132kV centre line of the power lines respectively, which must be adhered to in all future development. 2. Eskom Distribution's services and equipments must be acknowledged at all times and may not be tampered or interfered with. 3. All work within Eskom Distribution reserve area must be done in accordance with the requirements of the Occupational Health and Safety Act No.85 of 1993 as amended. 4. Special attention must be given to the clearances between Eskom's conductors, structures, cables and electrical apparatus and the proposed work as stipulated by Regulation R15 of the Electrical Installations Regulations of the aforementioned Act or any other legal requirements. 5. No construction work may be executed closer than 9 metres from any of Eskom's structures from the middle of the power line and no squatting to be allowed in the restriction area 6. No tree shall be planted within the restriction area or be allowed to grow to a height in excess of the horizontal distance of that tree from the nearest conductor of any power line or to grow in such a manner as to endanger that line should it fall or be cut down. 7. Natural ground level must be maintained within Eskom Distribution restriction area. <p><small>Limpopo Operating Unit 92 Hans Van Rensburg PO Box 3469 Polokwane 0700 SA MavundhT@eskom.co.za Eskom Holdings SOC Ltd Reg No 20020/15527/08</small></p>		



COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
	<p>8. Eskom Distribution shall not be liable for the death of or injury to any person or for the loss of or damage to any property whether as a result of the encroachment or of the use of the area where Eskom Distribution has its services, by the applicant, his/her agent, contractors, employees, successors in title and assigns.</p> <p>9. The applicant indemnifies Eskom against loss, claims or damages including claims pertaining to interference with Eskom Distribution services or apparatus or otherwise. The applicant's attention is drawn to section 27(3) of the Electricity Act 1987, as amended in 1994, which stipulates that the applicant can be fined and/or imprisoned as a result of damage to Eskom's apparatus.</p> <p>10. Eskom Distribution shall at all times have unobstructed access to and egress from its services.</p> <p>11. The ineffective management and handling of waste is of crucial importance. No dumping shall be allowed within Eskom Distribution restriction areas. All unwanted waste (gaseous, liquid or solids) should be disposed of at a registered waste disposal site as stipulated under Section 20 of the Environmental Conservation Act (Act 73 of 1989).</p> <p>12. Any relocation of Eskom's services, due to this development, will be for the account of the Developer. The Developer will also be responsible for granting Eskom an alternative route for the power line. Please contact Eskom Customer Contact Centre, 08600 37566 in connection with cost.</p> <p>13. The Eskom's authorised area representative for Zebediela Technical Service Area, Nthabiseng Mamabolo Telephone Number: 015 633 5485 / 073 732 6442, MamaboND@eskom.co.za.</p> <p>Yours sincerely</p>  <p>For T. Maphangula Manager: Land Development & Environmental Management CC: Nthabiseng Mamabolo, Senior Supervisor Zebediela CNC</p> 		
<p>Date: 2020/09/15 Format: Telephone Call Name: Gladly Reuben (Dithabeng Mining)</p>	<p>Not verbatim: Mr. Reuben strongly objected to the current Mining Right Application process.</p>	<p>Date: 2020/09/15 Format: Email Name: Chantel Muller (Red Kite Environmental)</p>	<p>Dear Interested and Affected Party (I&AP),</p> <p>RE: DRAFT SCOPING REPORT FOR THE MPHAHLELE COMMUNITY DEVELOPMENT TRUST: APPLICATION FOR AN INTEGRATED ENVIRONMENTAL AUTHORISATION FOR A MINING RIGHT AND RELATED INFRASTRUCTURAL ACTIVITIES ON THE FARM LOCATIE VAN M'PHATLELE 457 KS AND</p>

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>BACKGROUND INFORMATION DOCUMENT FOR THE PURPOSE OF I&AP REGISTRATION AND COMMENTING RELATING TO THE INTEGRATED ENVIRONMENTAL AUTHORISATION APPLICATION AND THE WATER USE LICENSE APPLICATION</p> <p>This email serves as notification that the following documents and relevant appendices for the Mphahlele Community Development Trust is available for public commenting:</p> <ul style="list-style-type: none"> • Draft Scoping Report for the Mphahlele Community Development Trust: Application for an Integrated Environmental Authorisation for a Mining Right and Related Infrastructural Activities on the Farm Locatie van M’phatlele 457 KS, Limpopo Province; and • Background Information Document relating to the Integrated Environmental Authorisation Application and the Water Use License Application on the Farm Locatie van M’phatlele 457 KS, Limpopo Province. <p>I&APs are hereby invited to a 30-day commenting period from 17 September 2020 to 19 October 2020 (as the last day for commenting).</p> <p>The above-mentioned documentation will be available for Public Viewing and Commenting in hard copy format at the Mphahlele Community Development Trust (Contact: Mr. Sunnyboy Matabane at 081 326 6236) and the Mphahlele Royal Council (Contact: Mr Thomas Matabane at 065 710 1290).</p>

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>Further to the above a Dropbox link to an electronic copy of the documents is provided below:</p> <p>https://www.dropbox.com/sh/cquixmb8unghud/AAA40CSqN-XyXBdgBryP2SYNa?dl=0</p> <p>Kindly direct any comments or queries regarding the documents in writing to Red Kite Environmental Solutions (Pty) Ltd at:</p> <p>Email: info@redkiteconsulting.co.za Address: PostNet Suit 0111, Private Bag X37, Lynnwood Ridge, 0040 Mobile Numbers: Ms. C. Muller at 084 444 2414 or Ms. N. Upton at 079 555 2433</p> <p>Please distribute the information as far as possible within the community and provide Red Kite Environmental Solutions (Pty) Ltd with any additional contact information for any other potential I&APs that might be interested in receiving the documents for public commenting.</p> <p>Regards</p>
<p>Date: 2020/09/28 Format: Email Name: Naka Hlagala</p>	<p>Hi Nicole</p> <p>reference to the subject line above. I want to register as an interested person. What is the process?</p> <p>Regards</p>	<p>Date: 2020/09/28 Format: Email Name: Chantel Muller (Red Kite Environmental)</p>	<p>Dear Naka,</p> <p>RE: DRAFT SCOPING REPORT FOR THE MPHAHLELE COMMUNITY DEVELOPMENT TRUST: APPLICATION FOR AN INTEGRATED ENVIRONMENTAL AUTHORISATION FOR A MINING RIGHT AND RELATED INFRASTRUCTURAL ACTIVITIES ON THE FARM LOCATIE VAN M'PHATLELE 457 KS AND</p>



COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>BACKGROUND INFORMATION DOCUMENT FOR THE PURPOSE OF I&AP REGISTRATION AND COMMENTING RELATING TO THE INTEGRATED ENVIRONMENTAL AUTHORISATION APPLICATION AND THE WATER USE LICENSE APPLICATION</p> <p>We hereby confirm that you have been registered as an Interested and Affected Party for the above-mentioned project. You will therefore receive all relevant future communications regarding the project throughout the Public Participation Process, including information on the succeeding commenting periods for the Draft Environmental Impact Assessment and Draft Water Use License Application.</p> <p>Note that the following documents and relevant appendices for the Mphahlele Community Development Trust are available for public commenting:</p> <ul style="list-style-type: none"> • Draft Scoping Report for the Mphahlele Community Development Trust: Application for an Integrated Environmental Authorisation for a Mining Right and Related Infrastructural Activities on the Farm Locatie van M’phatlele 457 KS, Limpopo Province; and • Background Information Document relating to the Integrated Environmental Authorisation Application and the Water Use License Application on the Farm Locatie van M’phatlele 457 KS, Limpopo Province. <p>I&APs have been invited to a 30-day commenting period from 17 September 2020 to 19 October 2020 (as the last day for</p>

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>commenting).</p> <p>The above-mentioned documentation is available for Public Viewing and Commenting in hard copy format at the Mphahlele Community Development Trust (Contact: Mr. Sunnyboy Matabane at 081 326 6236) and the Mphahlele Royal Council (Contact: Mr Thomas Matabane at 065 710 1290).</p> <p>Further to the above a Dropbox link to an electronic copy of the documents is provided below:</p> <p>https://www.dropbox.com/sh/cquixmb8unghud/AAA40CSqN-XyXBdgBryP2SYNa?dl=0</p> <p>Kindly direct any comments or queries regarding the documents in writing to Red Kite Environmental Solutions (Pty) Ltd at:</p> <p>Email: info@redkiteconsulting.co.za Address: PostNet Suit 0111, Private Bag X37, Lynnwood Ridge, 0040 Mobile Numbers: Ms. C. Muller at 084 444 2414 or Ms. N. Upton at 079 555 2433</p> <p>Please distribute the information as far as possible within the community and provide Red Kite Environmental Solutions (Pty) Ltd with any additional contact information for any other potential I&APs that might be interested in receiving the documents for public commenting.</p>

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			Regards
Date: 2020/10/02 Format: Telephone Call Name: To whom it may concern	Not verbatim: It was asked whether the EAP would provide the names of the relevant nearby towns.	Date: 2020/10/18 Format: Text Name: Chantel Muller (Red Kite Environmental)	Good day, Note that the towns surrounding the proposed Mphahlele Mining Right Study Area include Mphahlele, Mamaolo, Lebowakgomo, Makurung, Leswaneng, Maralaleng and Ditabeng. Regards
Date: 2020/12/08 Format: Telephone Call Name: Charlotte van der Merwe	Not verbatim: The I&AP requested to be included on the I&AP Register and to receive the Scoping Report for the proposed project.	Date: 2020/12/08 Format: Email Name: Chantel Muller (Red Kite Environmental)	Good day Charlotte, Many thanks for your registration as an Interested and Affected Party pertaining to the Mphahlele Mining Right Application and associated Environmental Authorisation Application and Water Use License Application. As requested kindly find herewith a Dropbox link to the Final Scoping Report and relevant appendices: https://www.dropbox.com/sh/6c4l26ft35tq9nm/AAC8njNdfsDvJuoWRkrTsgH1a?dl=0 Please be assured that, as a registered I&AP, you will receive all future communication regarding the mentioned processes. Kindly direct any comments or queries regarding the documents in writing to Red Kite Environmental Solutions (Pty) Ltd at: Email: info@redkiteconsulting.co.za Address: PostNet Suit 0111, Private Bag X37, Lynnwood Ridge,

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>0040</p> <p>Mobile Numbers: Ms. C. Muller at 084 444 2414 or Mrs. N. Upton at 079 555 2433</p> <p>Regards</p>
<p>Date: 2020/12/08 Format: Email Name: Mashego Maleka</p>	<p>Greetings Nicole</p> <p>Pursuing the meeting above and our tele-communications this morning, I confirm that I am Head of Land Affairs of Mphahlele Traditional Authority.</p> <p>My scope involves auditing all the farms to clarify the boundaries, Spatial and town planning, Vision 2070, etc. for meaningful Socio-Economic development of Mphahlele to create resilient and sustainable solution.</p> <p>The EIA process is very critical for my responsibilities. We humbly request copy of your scoping and any reports available. We are ready to comment and be included in any consultation process.</p> <p>Best regards</p>	<p>Date: 2020/12/08 Format: Email Name: Chantel Muller (Red Kite Environmental)</p>	<p>Good day Mashego,</p> <p>Many thanks for your registration as an Interested and Affected Party pertaining to the Mphahlele Mining Right Application and associated Environmental Authorisation Application and Water Use License Application.</p> <p>As requested kindly find herewith a Dropbox link to the Final Scoping Report and relevant appendices: https://www.dropbox.com/sh/6c4l26ft35tq9nm/AAC8njNdfsDvJuoWRkrTsg1a?dl=0</p> <p>Please be assured that, as a registered I&AP, you will receive all future communication regarding the mentioned processes.</p> <p>Kindly direct any comments or queries regarding the documents in writing to Red Kite Environmental Solutions (Pty) Ltd at:</p> <p>Email: info@redkiteconsulting.co.za Address: PostNet Suit 0111, Private Bag X37, Lynnwood Ridge, 0040 Mobile Numbers: Ms. C. Muller at 084 444 2414 or Mrs. N. Upton at 079 555 2433</p>

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
<p>Date: 2020/12/08 Format: Email Name: Mashego Maleka</p>	<p>Greetings</p> <p>I acknowledge receipt with thanks your email below... will check and revert.</p> <p>Just for record attached please find the Mphahlele Farms that will be impacted by the mining activities...</p> <p>I humbly request that they be included in all reports, roads, water, town planning and design, traffic, transport, socio-economic assessments, ... to enable the Mphahlele Integrated Development Plan and Vision 2070 processes.</p> <p>I am prepared to meet in your offices to discuss...</p> <p>Kind regards</p>	<p>Date: 2020/12/10 Format: Email Name: Chantel Muller (Red Kite Environmental)</p>	<p>Regards</p> <p>Good day Mashego,</p> <p>Kindly note that the Environmental Impact Assessment will be undertaken for the properties directly affected by the Mining Right Application (and proposed associated activities), as per the Scope of Work for the Water Use License Application and the Environmental Authorisation Application Processes.</p> <p>Please be assured that a formal Socio-economic Assessment will be conducted as part of the above-mentioned processes which will assess the potential socio-economic impact of the proposed mining activity on the greater region.</p> <p>As a registered I&AP, all information in this regard will be made available to you as part of the Public Participation Commenting Periods for your perusal.</p> <p>We trust that you find the above in order and look forward to your comments.</p> <p>Regards</p>
<p>Date: 2020/12/10 Format: Email Name: Mashego Maleka</p>	<p>Greetings Chantel</p> <p>Thank you very much for the prompt response... let's get the social compact Beyond covid19 for resilient Mphahlele communities.</p> <p>Kind regards</p>	<p>N/A</p>	<p>No response required.</p>



COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
<p>Date: 2021/03/11 Format: Email Name: Willem Hagen</p>	<p>Dear Nicole,</p> <p>We would like to formally register as an interested and affected party in relation to the Mphahlele Community Development Trust's interests in the farm Locatie van M'phatlele 457 KS in the Limpopo Province.</p> <p>Please note that as holders of a mining right granted for PGMs on the said property, we have not been informed and/or recognised as an interested and affected party.</p> <p>Please provide us with a detailed update in relation to the progress made thus far in terms of the Scoping Report and/or any other studies which are in progress.</p> <p>We look forward to hearing from you.</p> <p>Kind regards,</p>	<p>Date: 2021/03/12 Format: Email Name: Chantel Muller (Red Kite Environmental)</p>	<p>Good day Willem,</p> <p>Many thanks for the information provided.</p> <p>We hereby confirm your registration as an I&AP on the Mphahlele Mining Right Application and associated environmental/water applications.</p> <p>Please be assured that you will receive all future communication regarding the proposed project.</p> <p>The Final Scoping Report has been submitted to the DMRE following the 30-day commenting period on the Draft Scoping Report, which ended on 19 October 2020. We would like to nonetheless provide you with the dropbox link to the Draft Scoping Report in preparation for the Draft EIA commenting phase.</p> <p>https://www.dropbox.com/sh/cquixmb8unghud/AAA40CSqN-XyXBdgBryP2SYNa?dl=0</p> <p>You will be informed of the availability of the Draft EIA for public commenting once applicable.</p> <p>In the meantime, please feel free to provide any comments and questions regarding the currently available information.</p> <p>Kindly direct any comments or queries regarding the documents in writing to Red Kite Environmental Solutions (Pty) Ltd at:</p>

COMMENT DATE, NAME OF I&AP	COMMENT (VERBATIM)	RESPONSE DATE	RESPONSE FROM EAP/APPLICANT/SPECIALIST/OTHER
			<p>Email: info@redkiteconsulting.co.za Address: PostNet Suit 0111, Private Bag X37, Lynnwood Ridge, 0040 Mobile Numbers: Ms. C. Muller at 084 444 2414 or Ms. N. Upton at 079 555 2433</p> <p>Please distribute the information as far as possible and provide Red Kite Environmental Solutions (Pty) Ltd with any additional contact information for any other potential I&APs that might be interested in receiving the documents for public commenting.</p> <p>Regards</p>

9 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES

This is not applicable as several alternatives are applicable and were discussed in details within Section 7 regarding the motivation for the overall preferred site, activities and technology. Therefore, the anticipated impacts and the current environmental situation is described below.

10 BASELINE ENVIRONMENT

This Section provides a brief description of the existing biophysical and built/social environment within the immediate vicinity of the proposed activities. It draws on existing knowledge from previous investigations, discussions with various role-players, site visits and the project team's knowledge. It serves to present the context against which the potential positive and negative impacts associated with the various aspects of the proposed project can be identified.

Refer to Appendix 7 to 17 for the specialist studies which were compiled for the project and used in this report to provide baseline information and guide the impact process.

10.1 Regional Location

The proposed Mphahlele Mine is situated on the farm Locatie van M'phatlele 457 KS. The operation falls in the Limpopo Province under the jurisdiction of the Lepelle-Nkumpi Local Municipality, situated within the Capricorn District Municipality.

The Mining Right area is situated 60 km south-east of Mokopane and 50 km south of Polokwane. The towns / villages of Mphahlele, Phosiri, Dithabaneng and Mamaolo are located on the Mining Right area.

Refer to Appendix 3 for locality maps.

10.2 Climate

The study area is in the summer rainfall region, with arid winters and annual precipitation averages of about 460 mm. When considering the dry northern parts of the Sekhukhune Plains Bushveld, the rainfall pattern is strongly influenced by the area's topography, varying from 416 mm in the east to 499 mm per annum in the west, and 522mm in the south to 478mm per annum in the north. Daily average temperatures range from a minimum of 8°C in winter to a maximum of 38°C in summer, with an average annual temperature of 20°C. Minimum temperatures of the below freezing point are extremely rare, even in the high-lying areas (Siebert et al. 2002).

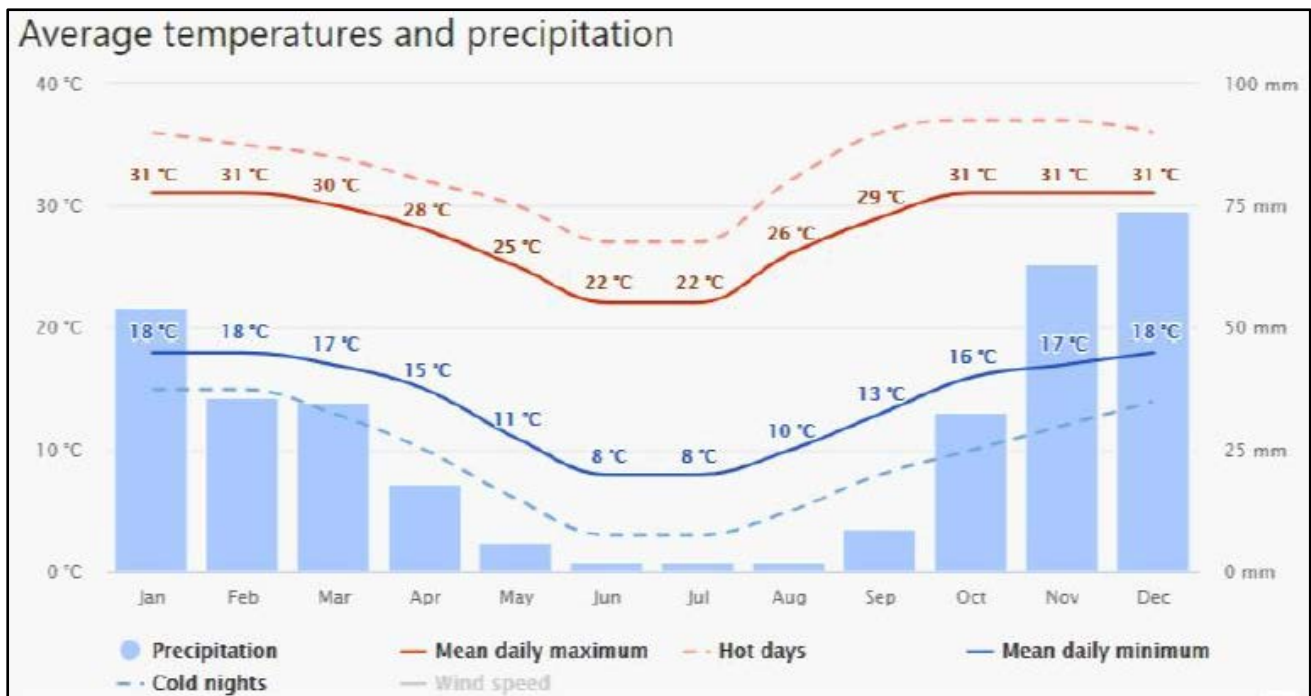


Figure 8: Temperature and Precipitation (1985-current)

Table 10: Average monthly precipitation (WR2012)

Month	Distribution % of MAP	Monthly Rain (mm)
Jan	17.7	84.3
Feb	14.3	68.0
Mar	11.2	53.1
Apr	6.15	29.2
May	2.07	9.8
June	1.01	4.8
July	0.75	3.6
August	0.87	4.1
September	2.67	12.7
October	8.63	41.0
November	17.1	81.3
December	17.5	83.1
Total (MAP)	100.0	475

Symons pan (S-Pan) evaporation data is based on the Water Research Council 2012 derived Mean annual Evaporation for quaternary catchment B52A of 1900 mm and the monthly distribution of the MAE for the evaporation zone 1A. S-Pan evaporation was converted to open water evaporation using evaporation coefficients from WR1990.

Table 11: Evaporation Data relevant to the Property

Month	S-Pan Evaporation (mm)	Conversion Factors	Lake Evaporation (mm)
January	195	0.84	164
February	167	0.9	147
March	164	0.9	145
April	132	0.9	116
May	114	0.87	100
June	92	0.85	78

Month	S-Pan Evaporation (mm)	Conversion Factors	Lake Evaporation (mm)
July	102	0.83	85
August	139	0.81	113
September	180	0.81	145
October	211	0.81	171
November	199	0.82	163
December	203	0.83	169
Total	1900		1596

10.3 Topography

The Mining Right area is situated in an area characterised by rugged mountains and broad flat-bottomed valleys. There is a downward slope across the proposed project from west to east. The elevation on the western portion of the proposed project area is approximately 940 mamsl and the elevation at the banks of the Olifants River at the eastern portion of the proposed project area is approximately 740 mamsl. The area where the proposed mining activities will be located is relatively flat with a gentle undulating topography.

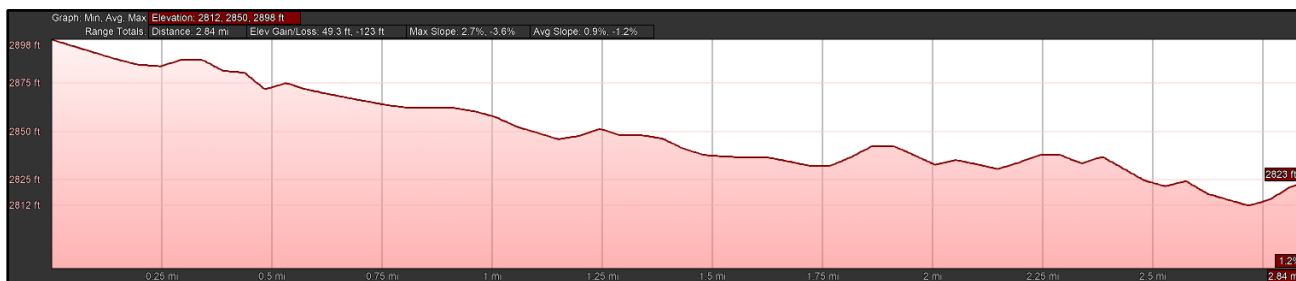


Figure 9: Cross section from North to South illustrating elevation

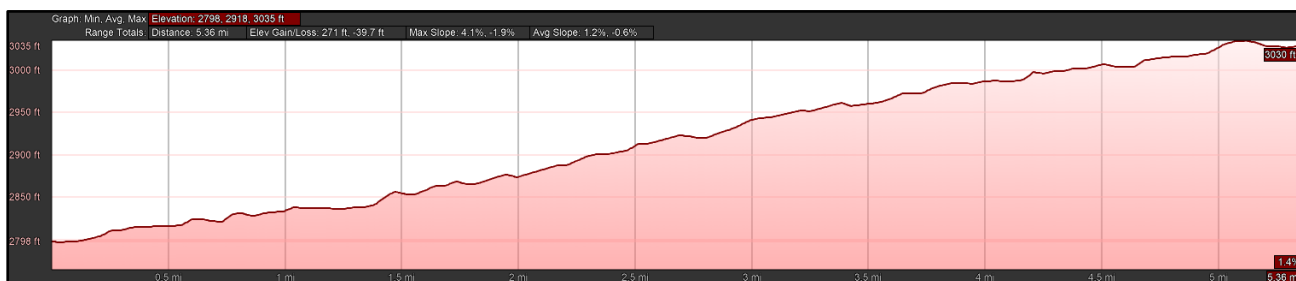


Figure 10: Cross section from West to East illustrating elevation

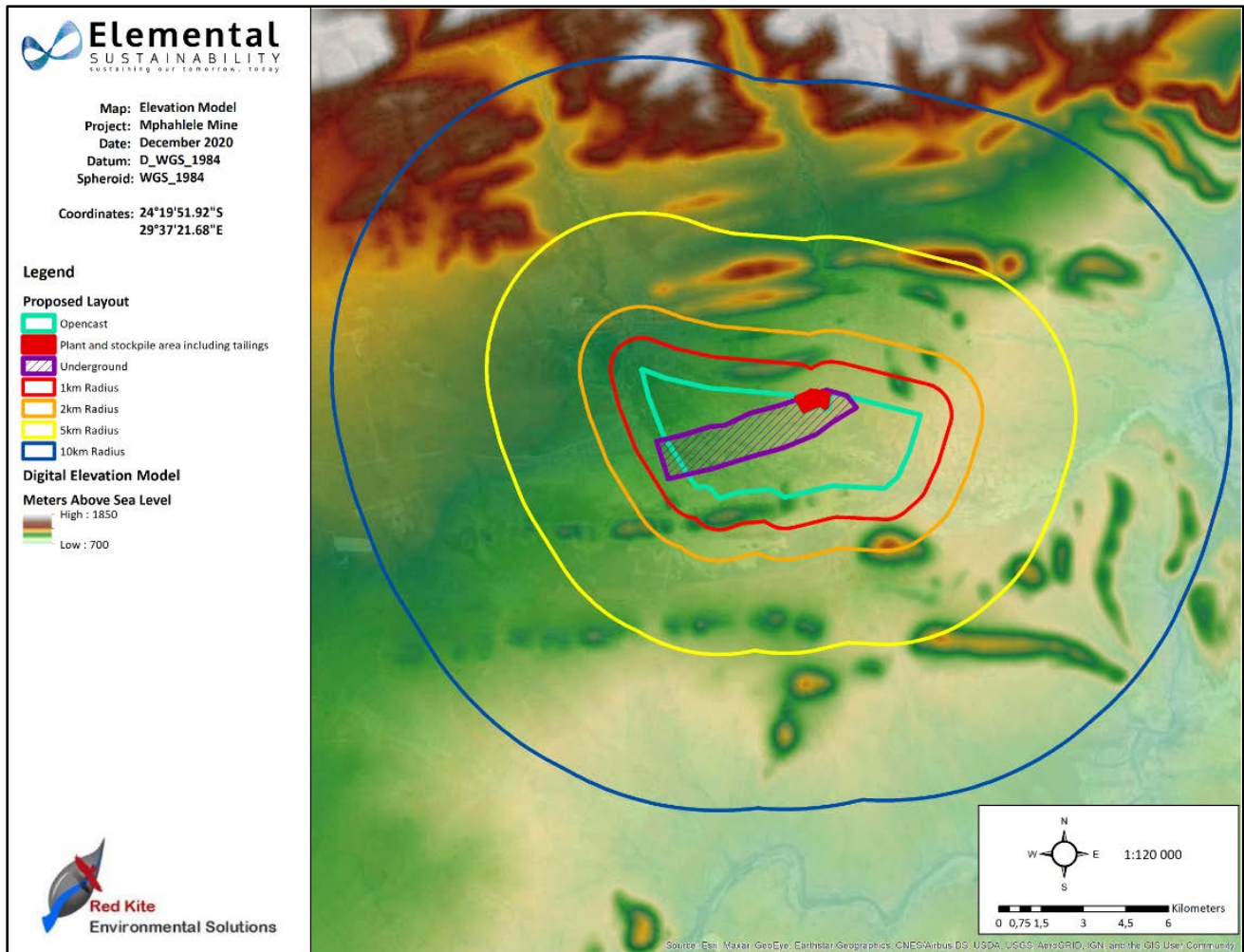


Figure 11: Surface Topography

10.4 GEOLOGY AND GEOCHEMISTRY

The farm is located in the very northern end of the eastern Bushveld Complex that is sub-divided into the western, central, and southern sectors. These sectors are separated by boundary areas, in which the Lower, Critical, and Main zones are either partially absent or structurally disturbed.

The Critical Zone, divided into Upper and Lower Zones, is characterized by rhythmic layering of cumulus chromite within a harzburgite, pyroxenite, norite and anorthosite sequence with a general upward reduction in mafic content. Chromitite layers formed at the bases of these cycles are categorized into three sections the Lower Group (LG), Middle Group (MG) and Upper Group (UG).

The Middle Group chromitites mark the boundary between the Upper and Lower Critical Zones. Seven LG chromitites (LG1 to LG7), four MG chromitites (MG1 to MG4) and two UG chromitites (UG1 to UG2) can be found with varying degrees of lateral variation around the Bushveld Complex.

The Western Sector of the Eastern Limb lies to the west of the Wonderkop fault and the Critical Zone trends east west and dips increase to 51deg at M'Phatlele Locatie 457KS becoming near vertical some 20km further to the west.

The most economically exploitable chromitite is LG6, which varies in thickness across the eastern Bushveld Complex from 0,92 to 2.5m. The MG2 consists of three distinct fine-granular chromitite layers with intercalated pyroxenite and is developed approximately 55m above the LG6 chromitite layer. The MG4 occurs as a composite package of approximately 3,5m.

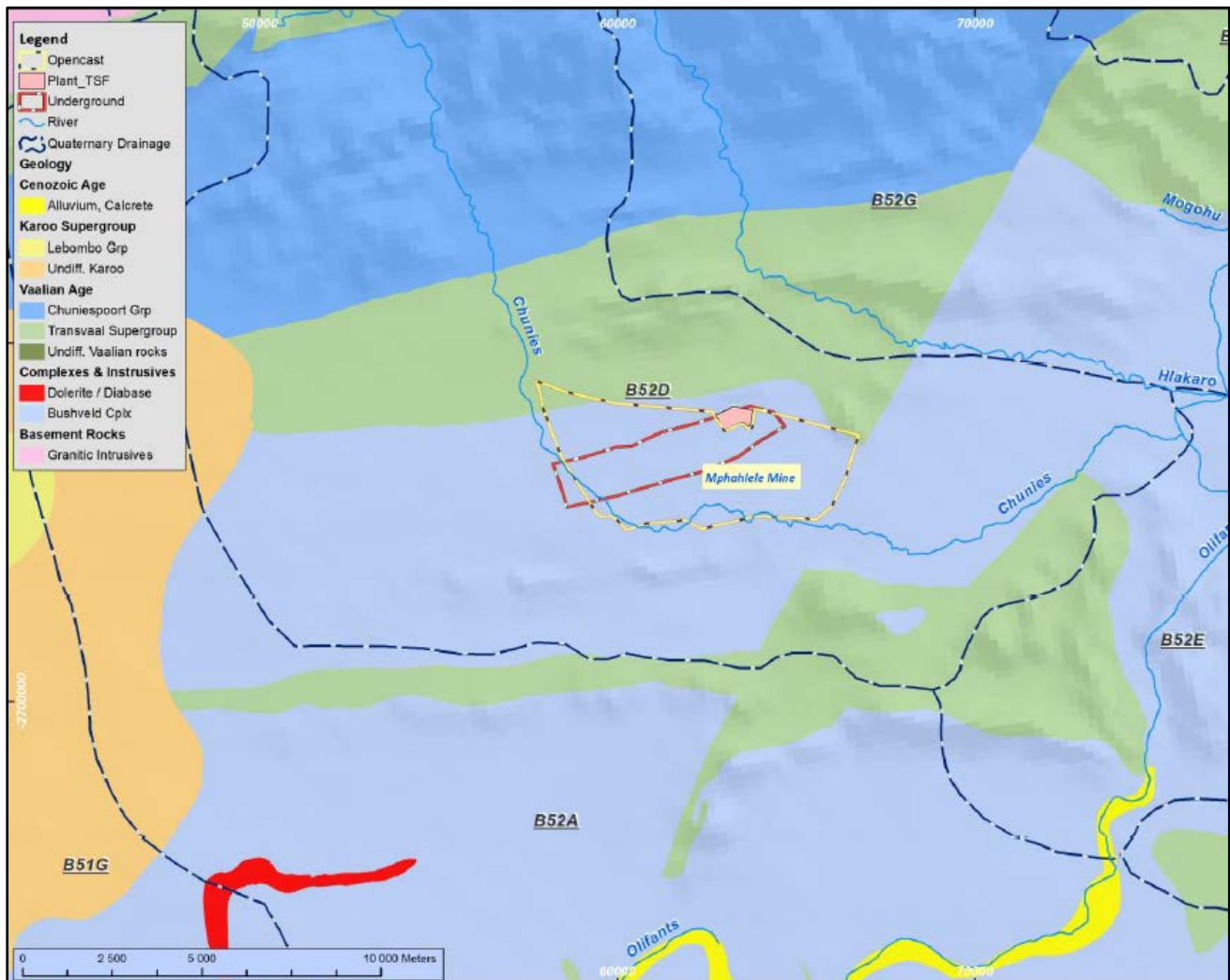


Figure 12: Regional Geology

10.4.1 Waste Material Geochemical Characterisation

Geochemical Characterisation was undertaken by Delta-h (2021) for the project and can be found in Appendix 9.

The geochemical test work was carried out by Waterlab (Pty) Ltd, a SANAS (South African National Accreditation System) accredited laboratory and included the following:

- Acid-Base Accounting (ABA), Net Acid Generation (NAG), Sulphur (S)-speciation and Paste pH.
- Determination of total concentrations on solids using Aqua regia digestion with analysis for 15 metals, Hg, F and CrVI.
- Determination of leachable concentrations using distilled water extraction (for waste to be disposed of with nonputrescible waste) at a liquid-to-solid ratio of 1:20 with analysis for 15 metals, Hg, F, CrVI, TDS, Cl, SO₄, NO₃ to enable a formal waste classification.
- Determination of leachable concentrations using distilled water extraction at a liquid-to-solid ratio of 1:4 with full ICP-EOS scan to facilitate a more realistic estimation of source terms for the solute transport model (NB: The

waste classification requires a liquid-to-solid ratio of 1:20, which accounts for dilution in the aquifer but is unrealistic for a transport model source term derivation).

- XRD mineralogy.

10.4.1.1 Acid Rock Drainage Potential

The ABA, sulphur speciation and calculated SAP, NNP and NPR values for the different Mphahlele Mine samples are summarised in the table below.

Table 12: ABA, NAG, and S-speciation Results

Sample ID		RoM stockpile	Tailings	Mixed waste rock and overburden	Mixed waste rock and overburden D	RPD
Lab ID		112022	112023	112024	112024D	112024D
SULPHUR	Total Sulphur (%)	<0.01	<0.01	<0.01	<0.01	0%
	Sulphate Sulphur as S (%)	<0.01	<0.01	<0.01	<0.01	0%
	Sulphide Sulphur (%)	<0.01	<0.01	<0.01	<0.01	0%
NAG	NAG pH 4.5	6.80	6.90	7.60	7.50	1.3%
	pH 4.5 NAG (kg H ₂ SO ₄ /t)	<0.01	<0.01	<0.01	<0.01	0.0%
	NAG pH 7	6.80	6.90	7.60	7.50	1.3%
	pH 7 NAG (kg H ₂ SO ₄ /t)	1.37	<0.01	<0.01	<0.01	0.0%
ACID BASE ACCOUNTING	Paste pH	8.60	8.10	8.20	8.20	0.0%
	Acid Potential (AP) (kg/t)	0.31	0.31	0.31	0.31	0.0%
	S ²⁻ Acid Potential (SAP) (kg/t)	<0.31	<0.31	<0.31	<0.31	
	Neut Potential (NP)	12.00	12.00	25.00	26.00	3.9%
	Net Neut Potential (NNP)	11.00	12.00	25.00	25.00	0.0%
	Neut Potential Ratio (NPR)	37.00	38.00	80.00	82.00	2.5%
	NNP-S ²⁻	<11.69	<11.69	<11.69	<11.69	
	NPR-S ²⁻	<38.71	<38.71	<38.71	<38.71	

10.4.1.2 ABA Results

All three samples showed total sulphur contents below the detection limit (<0.01%). As a result, the derived Acid Potential (AP) was low with 0.31 kg/t H₂SO₄ for all samples (Table 4.1). Additionally, the actual acid generating sulphide sulphur contents were also below the detection limit (<0.01%), providing similar Sulphide Acid Potential (SAP) results of less than 0.31 kg/t H₂SO₄. The Neutralisation Potential (NP) exceeded the limited Acid Potentials in all samples, ranging from 12 kg/t H₂SO₄ (RoM stockpile and Tailings) to 25 kg/t H₂SO₄ (Mixed waste rock and overburden). The differences of the NP and AP, the Net Neutralisation Potentials (NNP), ranged from 11 kg/t H₂SO₄ (RoM stockpile) to 25 kg/t H₂SO₄ (Mixed waste rock and overburden), and the Neutralisation Potential Ratios (NPR = NP/AP) from 37 (RoM stockpile) to 80 (Mixed waste rock and overburden). Based on the ABA test results (Figure 4-1), all three samples including the duplicate sample were classified as non-acid generating due to high NPR values (>4), positive NNP values and very limited Acid Potentials (0.31 kg/t H₂SO₄).

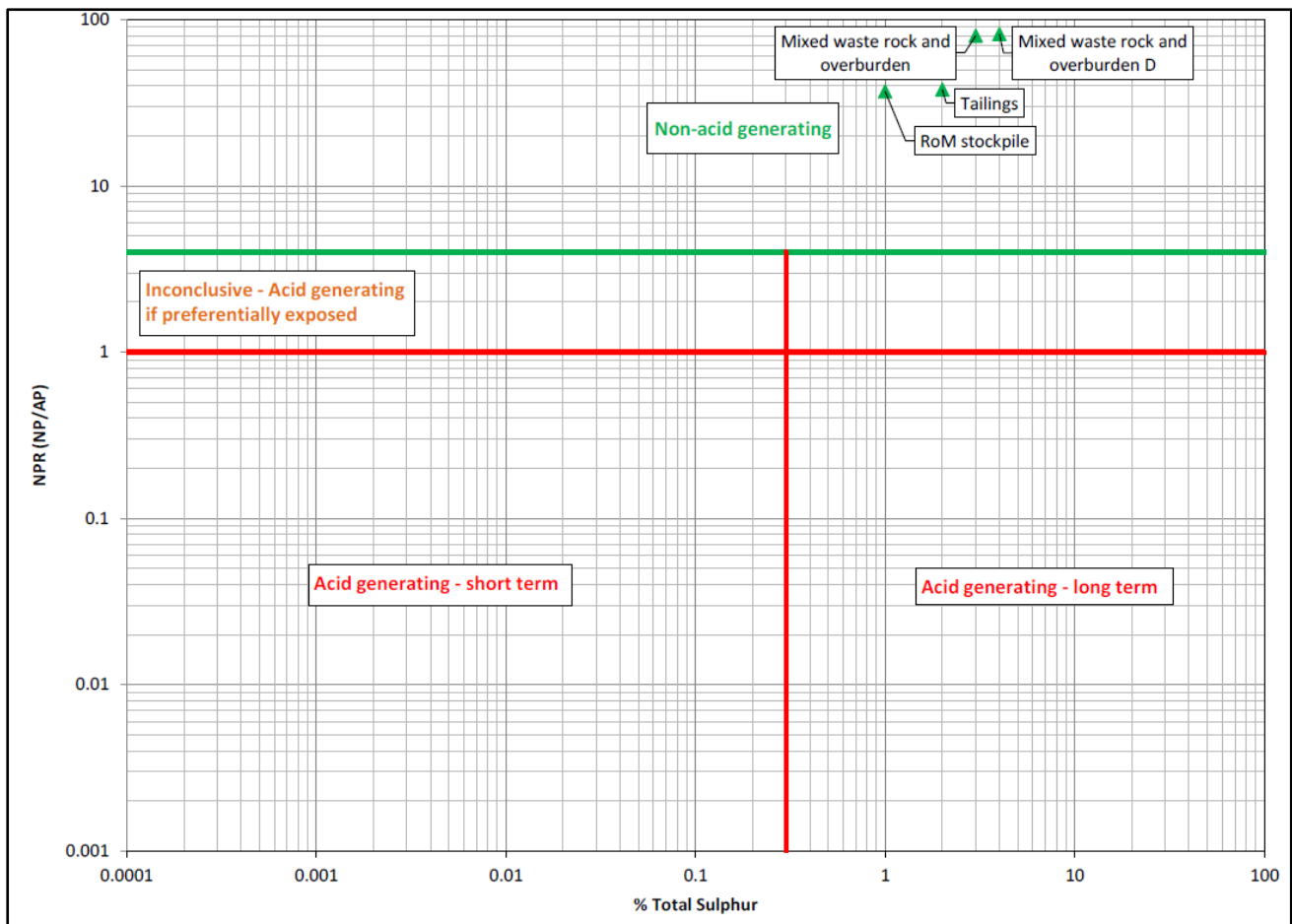


Figure 13: Neutralising potential ratio versus total sulphur content.

Based on a combined evaluation of the analysis above, the three (3) tested material samples (including one duplicate analysis) were classified as non-acid generating. All samples are unlikely to generate acidity due to low total sulphate and acid generating sulphide sulphur values below their detection limits. Additionally, the neutralisation potential in the Mphahlele samples clearly outweighed their acid generation capacity.

1.1.1.12. Waste Classification

RoM Stockpile – The TCT0 (<TCT1) threshold exceedance is observed for only cobalt, nickel and vanadium. Due to the low concentrations of leachable constituents and non-acid generating classification, the environmental risk associated with drainage from the stockpile is like that of a Type 4 waste.

Mixed waste rock and overburden – The TCT0 (<TCT1) threshold exceedance is observed for only cobalt, manganese and nickel. Due to the low concentrations of leachable constituents and non-acid generating classification, the environmental risk associated with drainage from the stockpile is like that of a Type 4 waste. The mixed waste rock and overburden is part of the open pit mining process and remains within the footprint (as the pit acts as a “sink of groundwater”). Any leachate caused by opencast mining, will be managed as part of the dirty water management system. Refer to the main report for contamination plume modelling and risk assessment.

TSF material – The TCT0 (<TCT1) threshold exceedance is observed for only cobalt, manganese and nickel. The only LCT0 (<LCT1) threshold exceedance of the leachable concentrations is nitrate. Due to the low concentrations of leachable constituents and non-acid generating classification, the environmental risk associated with drainage from the TSF may fall in between a Type 3 and Type 4 waste. Therefore, it is recommended that, source-pathway-receptor modelling should be considered to identify the most appropriate barrier system for the TSF. Refer to the main report for contamination

plume modelling and risk assessment.

1.1.1.13. Mineralogical Analysis

The Mphahlele chrome mine samples underwent additional analysis to gain a better understanding of their mineralogical make-up. The relative phase amounts or mineral groups in weight-% of the samples were determined using XRD analysis (Table 8). The following observations were made:

- Overall, the three Mphahlele RoM derived samples comprise similar mineral phases, but to varying degrees.
- The mineral composition is generally dominated by the pyroxene group mineral enstatite. Samples RoM stockpile and Tailings also contain chromite as a major mineral with 23 and 29 weight-%, respectively. No chromite was detected in the Mixed waste rock and overburden sample.
- Minor and trace minerals included plagioclase of the feldspar group and the phyllosilicates smectite and biotite. No biotite was however detected in sample Mixed waste rock and overburden, whereas plagioclase was a major mineral phase in this sample. Small amounts of talc, a hydrated magnesium silicate, were also identified in all three analysed samples.

Results of the mineralogical analysis correspond well with the geological origin of the materials. The operations of the Mphahlele mine are situated in the Rustenburg Layered Suite of the Bushveld complex targeting the Middle Group (MG) and Lower Group (LG) chromite seams. The mined chromitite layers contain between 50 and 85% chromite and the remainder comprising pyroxene and plagioclase (Cawthorn et al., 20061). Smectite may occur naturally in the geological sequences but might also be utilised as a clay additive to pelletise the chromite concentrate.

Table 13: Major mineral composition of the Elders Colliery RoM samples in weight-% (XRD analysis).

Compound name	Ideal Chemical Formula	ROM Stockpile	Tailings	Mixed waste rock and overburden
Chromite	$\text{Fe}^{2+}\text{Cr}_2\text{O}_4$	23.2	29	-
Enstatite	$(\text{Mg},\text{Fe})\text{SiO}_3$	61.2	43	57.5
Plagioclase	$(\text{Na},\text{Ca})(\text{Si},\text{Al})_4\text{O}_8$	8.1	9.2	31.4
Biotite	$\text{K}(\text{Mg},\text{Fe})_3((\text{OH})_2\text{AlSi}_3\text{O}_{10})$	0.3	0.7	-
Talc	$\text{Mg}_3\text{Si}_4\text{O}_{10}(\text{OH})_2$	1.8	2.8	0.3
Smectite	$(\text{Na},\text{Ca})_{0,3}(\text{Al},\text{Mg})_2\text{Si}_4\text{O}_{10}(\text{OH})_2 \cdot n(\text{H}_2\text{O})$	5.5	15.3	10.8

Three samples comprising material from the RoM stockpile, Tailings and Mixed waste rock and overburden from the current small scale mine underwent static geochemical testing. Acid Base Accounting and Net Acid Generation test results classified all three RoM material samples as non-acid generating due to very low total sulphur and acid generating sulphide sulphur contents measured below the detection limit. It is unlikely that the Mphahlele samples will generate net acidity over time since the available neutralisation potential outweighs by far the very limited acid potential.

Potential constituent of concern included cobalt, nickel, vanadium and manganese which exceeded the TCT0 but not the TCT1 threshold. Nitrate was identified as a constituent of concern in the leachable concentrations of the sample Tailings using distilled water at both ratios 1:20 and 1:4, exceeding the LCT0 but not the LCT1 threshold. Overall, a generally low leachability of metals was observed since most metals were measured below the detection limit in the leachate under prevailing alkaline conditions.

10.5 SOIL AND LAND CAPABILITY

A Soil and Land Capability Assessment was compiled by Elemental Sustainability (2021) and can be found in Appendix 7.

10.5.1 Land Type

The proposed Mphahlele Mine traverses through three land types i.e., Land Type Ae348, Land Type Ia176 and Land Type Ic175 (Figure 10). The largest section of the proposed underground mining area consists of Land Type Ia176 and the

proposed plant and stockpile area is underlain by Land Type Ae348.

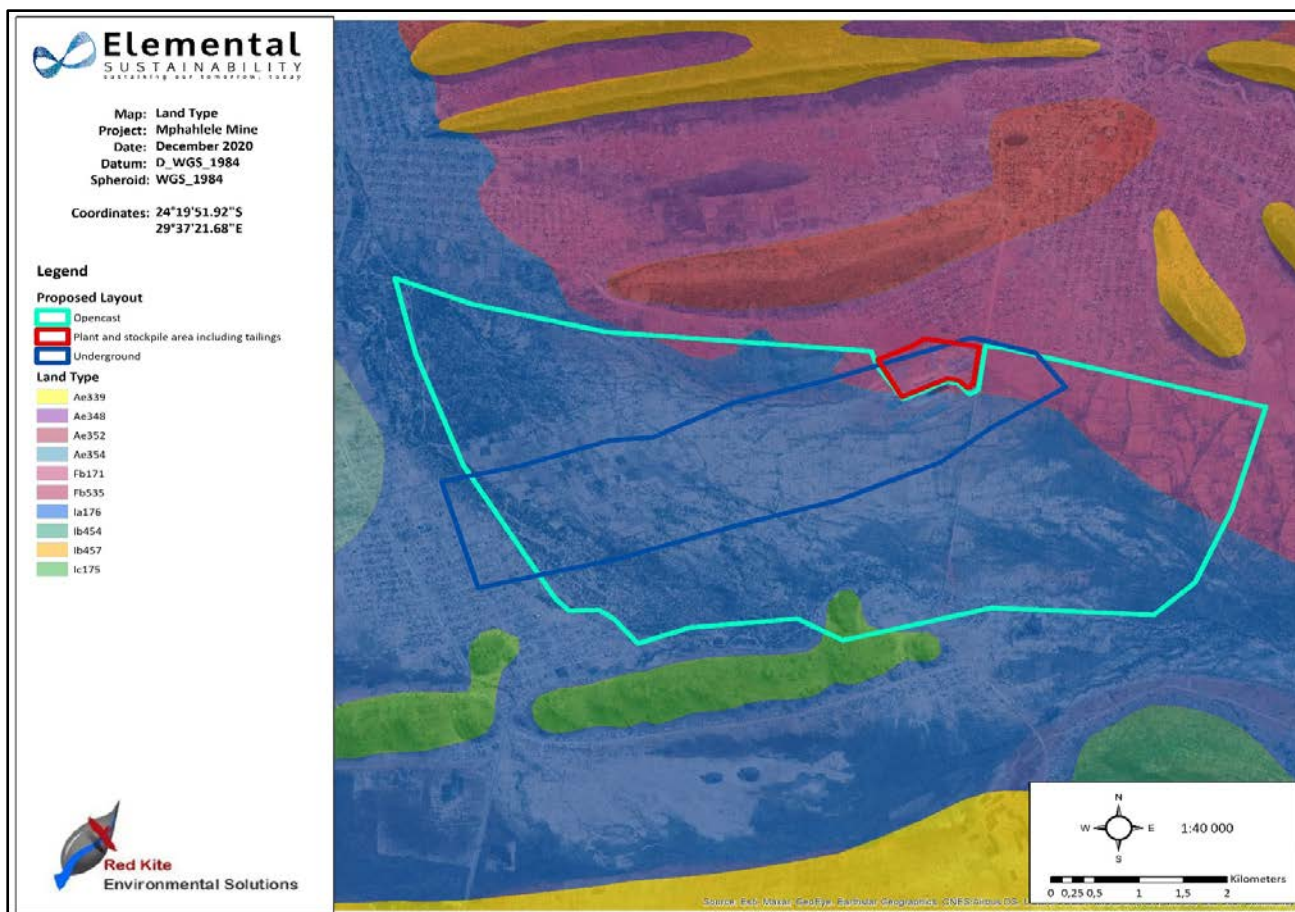


Figure 14: Land type map of the Project Area

Among the dominant soils in the table below, the Hu1000 and Cv1000 is regarded as high potential, however, the soils have a number of limitations associated with chemical and physical composition. Taken these limitations and the climatic limitation into consideration the agricultural potential for the Hutton soil is moderate to low and the Clovelly is moderate.

Table 14: Agricultural potential for Soils

Soil Form	Depth	Hectares	Percentage	Agricultural Potential
Clovelly (CV1000)	0-1.2	2086.92 Ha	72.8%	Moderate
Hutton (Hu1000)	0-1.2	688.86 Ha	24.0%	Moderate
Askham/Plooyburg	0-0.5	69.44 Ha	2.4%	Low
Mountainous	None	22.83 Ha	0.8%	Very Low

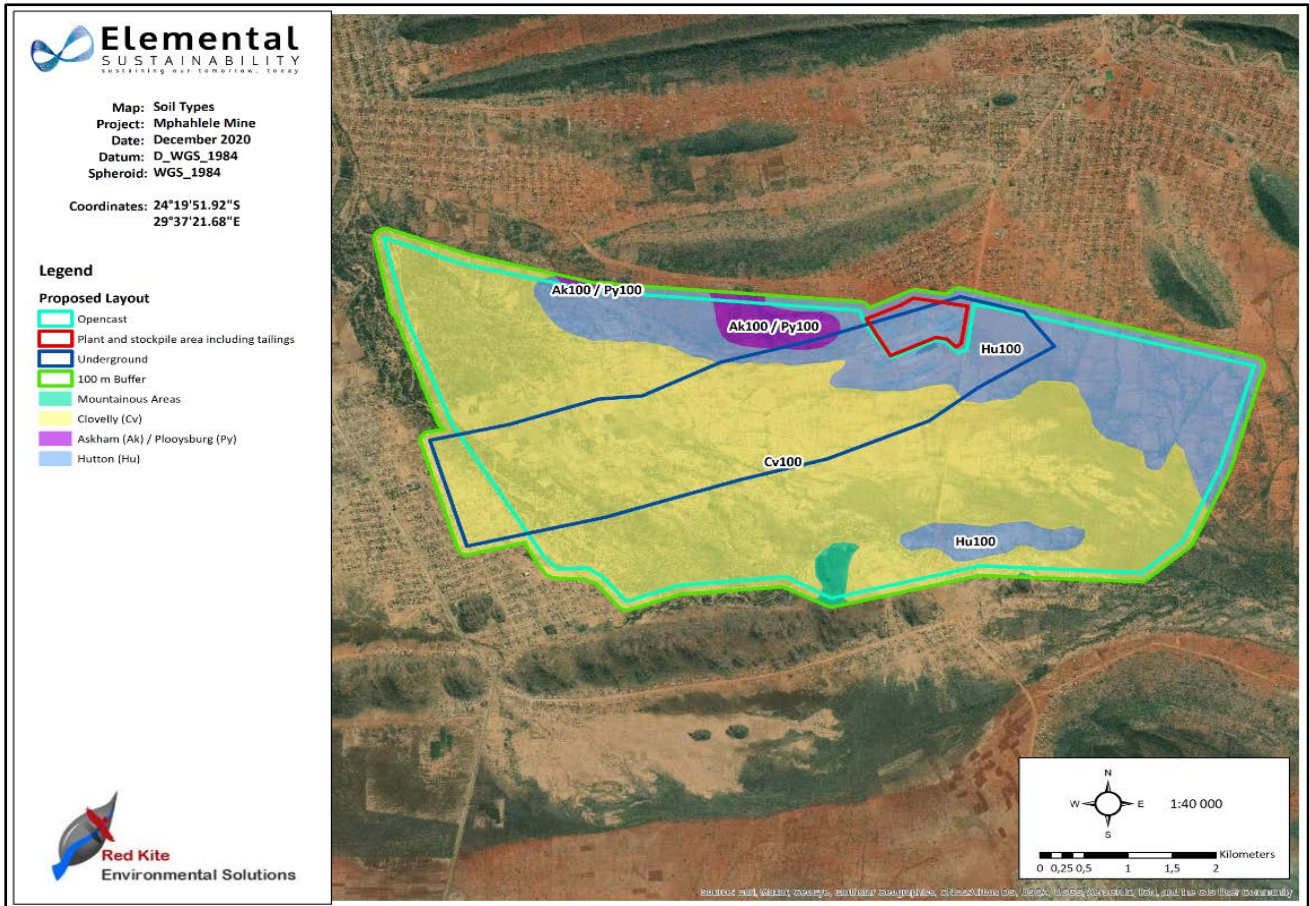


Figure 15: Soil Forms of Project Area

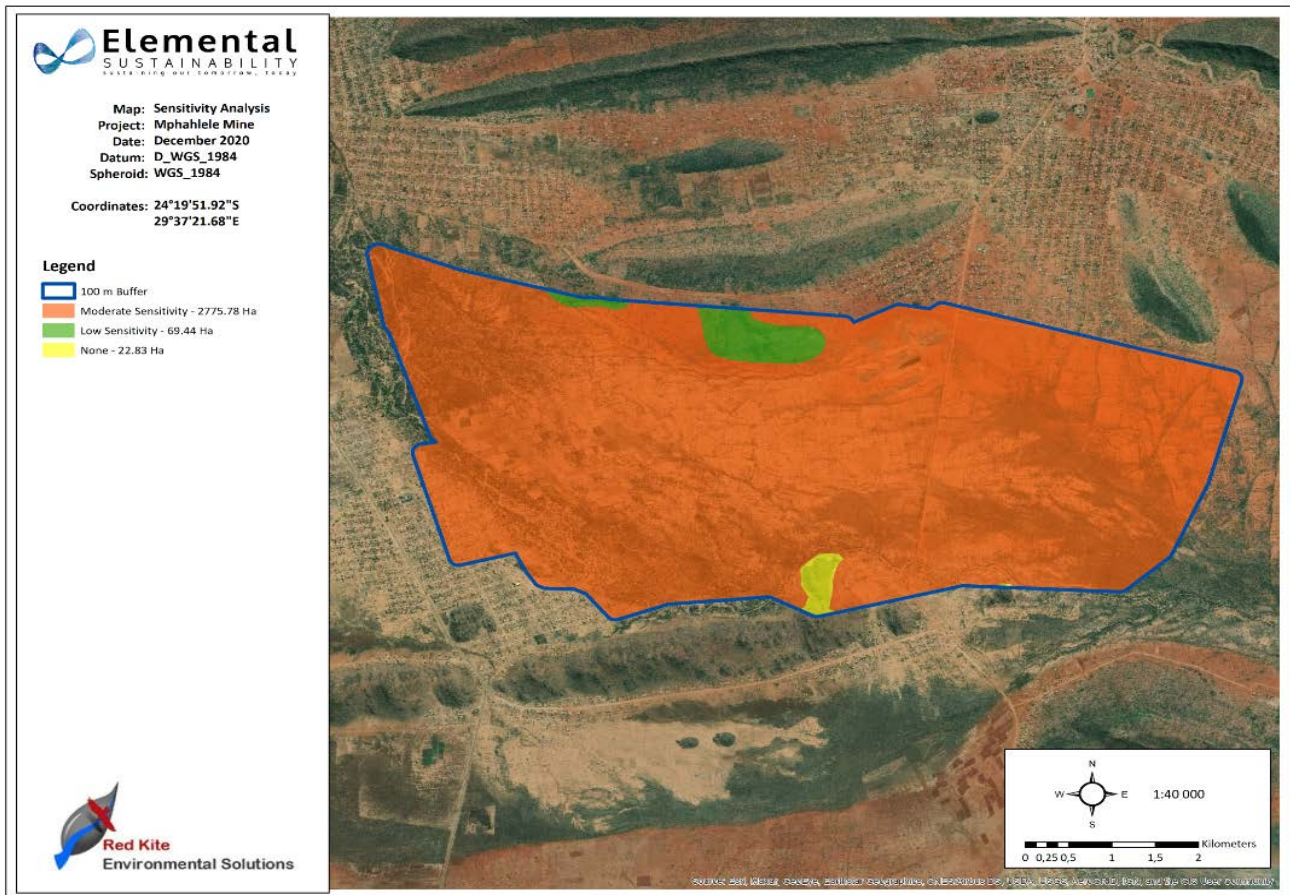


Figure 16: Sensitivity analysis of the baseline environment of the development area

10.5.2 Land Capability

Sections of the project area is currently used for subsistence crop production. Soils of Hutton and Clovelly are suitable for crop production and according to the Department of Agriculture in co-operation with ARC-Grain Crops Institute; 350 to 450 mm of rain per annum is required for successful maize production. The area is marginal for dry land crop production with rainfall of around 450mm annually. No production figures for the area could be obtained from the substance farmers and no commercial framers are located in the area.

The Clovelly soils are more suitable for dry land crop production in the area than the Hutton soils. The higher clay and silt content of the Clovelly soils will result in high water holding capacity than the Hutton soils. In the area the Hutton soils will be more suitable for grazing than dry land crop production.

Rehabilitation of the area should be focussed to create areas where dry land crop production can take place, however, the main focus should be to restore the area as a grazing area. With the correct grazing program, the soil profiles can be improved and organic matter can be restored in the top soil layers.

The grazing capacity of a specified area for domestic herbivores is given either in large animal unit per hectare or in hectares per large animal unit. One large animal unit is regarded as a steer of 450 kg whose weight increases by 500 g per day on veld with a mean energy digestibility of 55%. Large animal units can again be converted to small animal units or small stock units (Morgenthal et al., 2005).

The conversion factor is 4 small stock units that equates one large stock unit. The grazing capacity of the veld in the proposed development area is 8 to 15 hectares per large animal unit or large stock unit. When this is converted to small stock units (2 to 4 hectares per small stock unit). Post project land use can aim to re-establish grazing with a capacity of

between 8 to 15 ha per large animal or 2 to 4 ha for small stock units.

10.6 GROUNDWATER

A Groundwater Assessment was undertaken by Delta-h (2021) for the project and can be found in Appendix 9.

10.6.1 Aquifer Description

The following two-layer aquifer model is proposed to conceptualise the Bushveld Ingenious Complex (BIC) aquifers at a regional scale.

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

1.1.1.14. Shallow unconfined aquifer

The shallow unconfined, phreatic (or water table) aquifer comprises saprolite (that formed because of intensive and insitu weathering processes) and saprock (differentially weathered and fractured upper bedrock underlying the saprolite) zones. The soil and saprolite are collectively termed the regolith. The saprolite and saprock (classified as part of the bedrock) are generally treated as a single weathered aquifer unit, referred to as the weathered overburden, which varies in thickness and is derived from the in-situ decomposition of the underlying noritic rocks. Based on geophysical results and drilling of boreholes it is evident that the weathered zone is shallow (typically less than 10m). Literature values and pumping test results from similar geological formations indicate that the average permeability in the weathered zone is likely to be in the order of 8.6 m/d (10⁻⁴ m/s) and 0.86 m/d (10⁻⁶ m/s) in the unweathered rocks (Freeze and Cherry, 1979).

The degree/intensity of chemical weathering or more specifically the spatial and depth variations thereof, control the geometry of the shallow weathered aquifer profile. The weathered overburden is considered to have low to moderate transmissivity but high storativity. Generally, crystalline/basement weathered aquifers have very low transmissivity (T) values (i.e., geometric mean) of about 1 to 5 m²/day with a possible range one order of magnitude lower and/or higher than these values. Crystalline/basement weathered aquifers are further characterized by poor connectivity of bedrock fractures and regions of low permeability resulting in significant local variations in yield and response to abstraction. Extreme variations in transmissivity (T) values characterise typical BIC rocks.

1.1.1.15. Deep unweathered aquifer

The deeper, unweathered and fractured bedrock aquifer underlies the upper weathered aquifer. It is semi-confined and consists of fractured norites, anorthosites and pyroxenites. The intact bedrock has a very low matrix hydraulic conductivity, and its effective hydraulic conductivity is determined by fractures and mine voids. Water is generally stored and transmitted in fractures and fissures within a relatively impermeable matrix.

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

10.6.2 Groundwater levels

A combined 129 groundwater levels were obtained from the hydrocensus and from the Limpopo GRIP database. The groundwater level ranges from approx. 2.4 metre below ground level [m bgl] to 79.7 m bgl with an average groundwater level of 17 m bgl. The groundwater level plot of the groundwater table against surface elevation data for all boreholes is shown in Figure 19. The figure shows a scattering of data points around a linear regression line with an average correlation

coefficient of 98% ($R^2 = 0.98$). This is indicative of an aquifer system reflecting shallow groundwater conditions following topography.

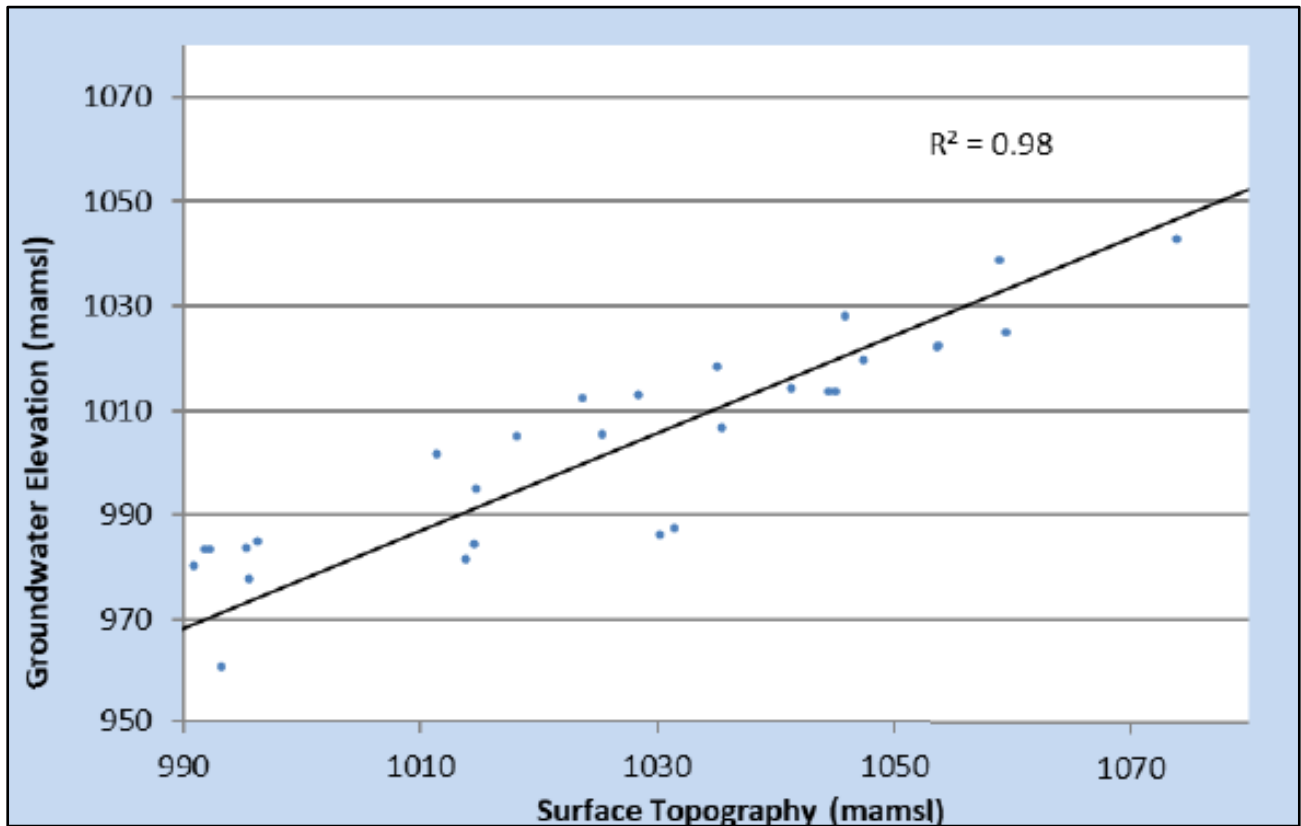


Figure 17: Topographical versus groundwater level elevations

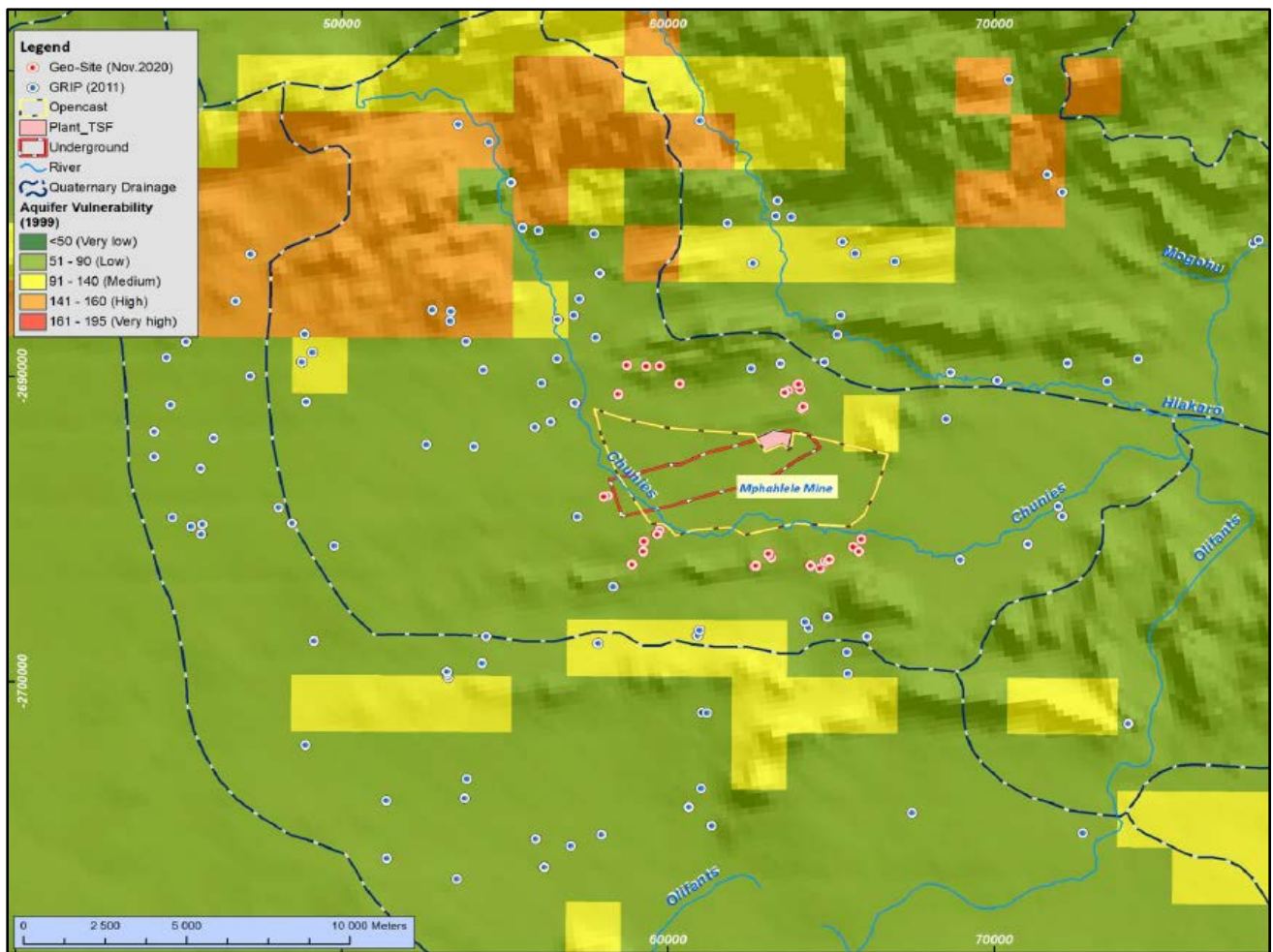


Figure 18: Hydrocensus point positions

10.6.3 Groundwater recharge

Groundwater enters the model domains as direct recharge from rainfall. Recharge from precipitation seeps into the unsaturated, permeable topsoil and weathered/fractured bedrock. 3% of precipitation becomes net recharge to the groundwater system.

10.6.4 Groundwater model

At the time of the study a detailed Life of Mine plan (and target reef elevation) was not available. As a result, the pit layout was inferred on the expected depth of the mineral bearing reef which outcrops at surface and dips at 55 degrees to the vertical in a southerly direction to minable depth of 450 m. Based on information provided by the client, the project will be ramped up to steady state production in year 9 through open cast mining. Underground mining will continue to year 16.

The drawdowns from the simulated 2020 groundwater levels for the open cast and underground mining period at full opencast production (year 9) and the end of life of mine (year 16) are shown in Figure 22 and Figure 23, respectively. A cut-off value of 2 m was used for the visualisation of the drawdown to account for the perceived model uncertainty and natural seasonal fluctuations. The cone of dewatering for the operational open cast mine year (9) spreads radially from to within the mine boundary up to 1 750 m from the pit area. While the cone of dewatering for the underground LoM extends further up to 2 400 m from the footprint.

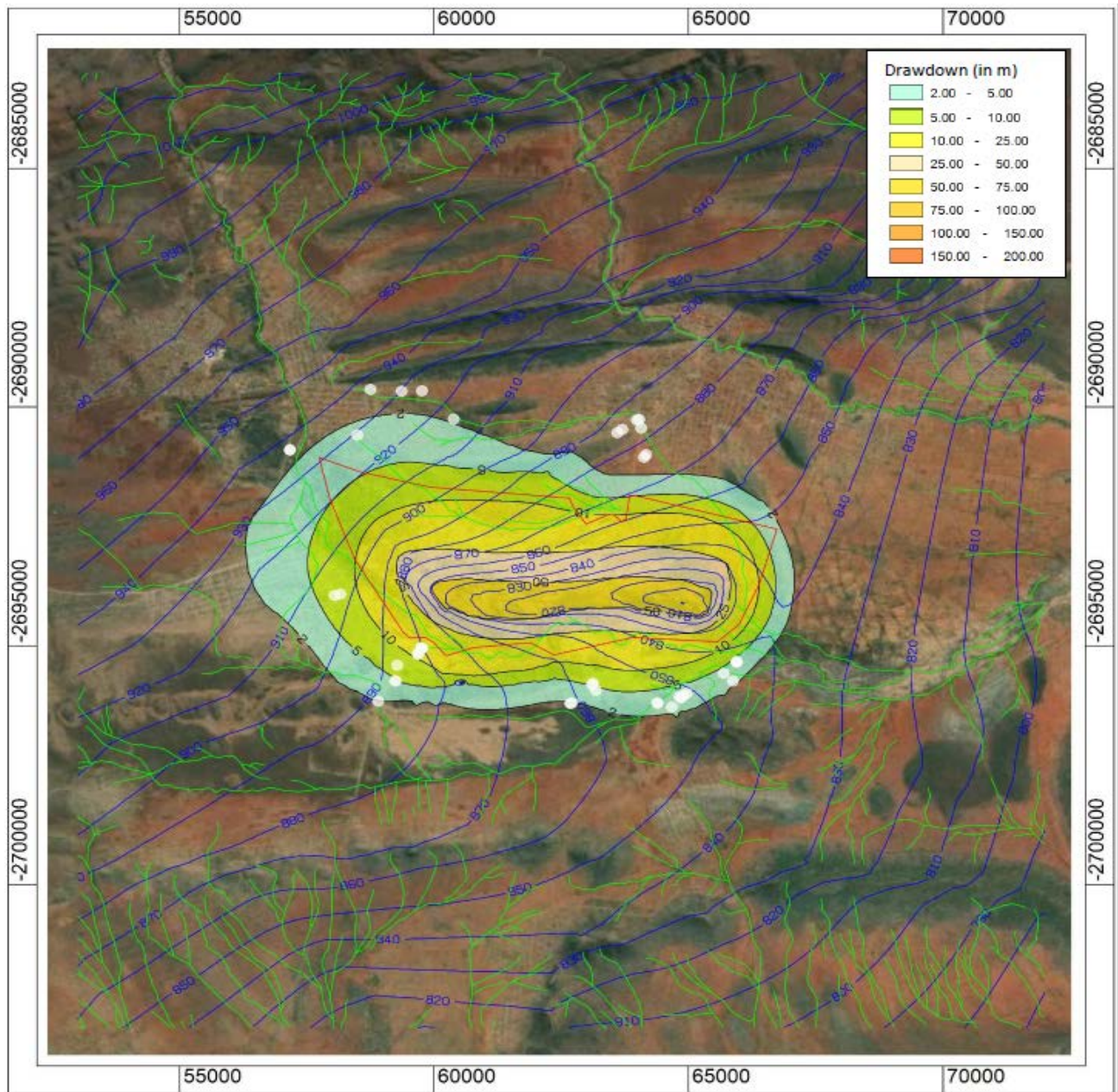


Figure 19: Simulated groundwater drawdown from 2020 water levels at the end of opencast LoM (Year 9)

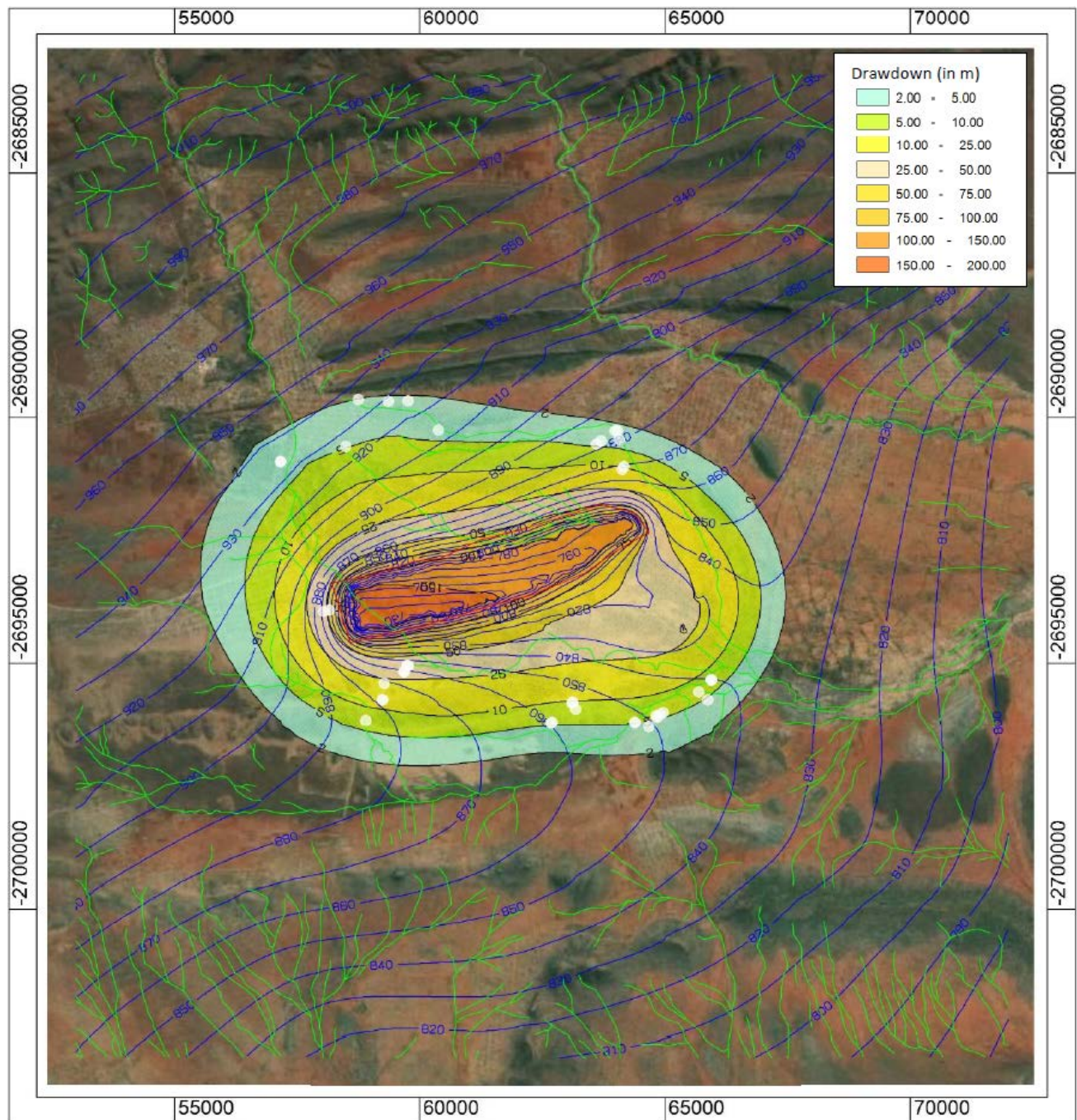


Figure 20: Simulated groundwater drawdown from 2020 water levels at the end of underground LoM (Year 16)

Once mining and mine dewatering stops, the groundwater levels will start to rebound in and around the pits. The rate at which this will take place, will depend on the transmissivities of the aquifers and rehabilitated backfill of the pits, as well as their recharge rates. In the absence of any post closure topography model provided by the client, it was assumed that the pre-mining topography will be re-established.

To investigate the impacts and risks associated with potential diffuse decant (i.e., decant into the weathered aquifer, from the backfilled pit), a post closure transport simulation was performed. Because no element specific retardation or transformation was simulated, concentrations for individual elements of concern can be easily derived by multiplying given percentages with their respective actual source concentration at mine closure.

The predicted plumes extend 50 years post closure (with a cut-off value of 10%) around 500 m south and 700 m east

from the mined-out areas. A limited spreading of leachate from the backfilled pit into the weathered aquifer is expected for its western and northern edges due to the prevailing groundwater gradient.

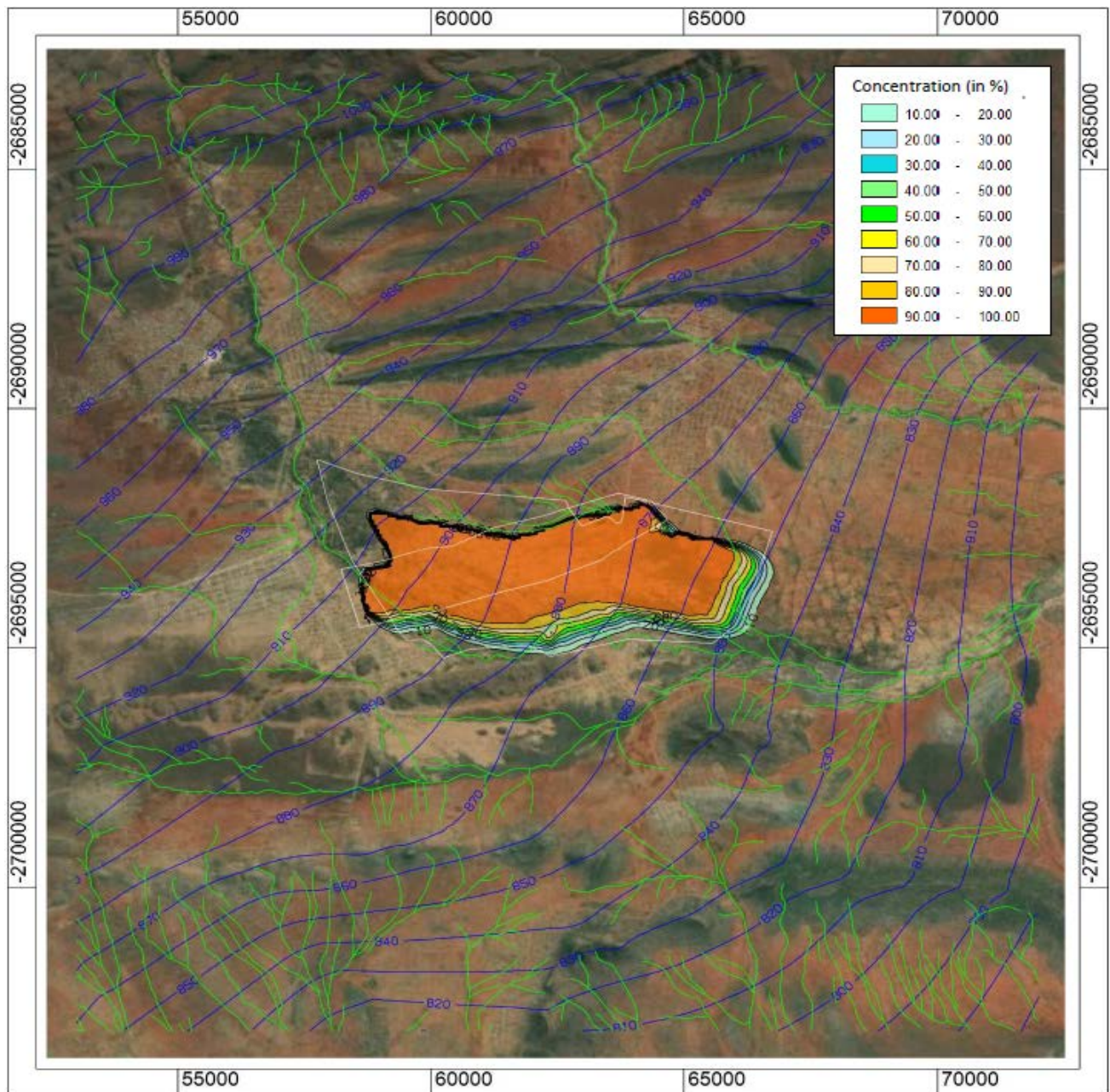


Figure 21: Simulated water table and seepage plume emanating from the backfilled pits 50 years post closure.

To simulate the post closure seepage plume development from the TSFs, seepage rates and concentrations for the footprint reduced to 30 mm/a and 50% source concentration to reflect the cessation of tailings deposition and the rehabilitation of the dump at closure. The simulated concentrations for the LoM were assigned as initial concentrations and the model was then run for fifty years with a monthly time step. The simulated extent of the seepage plume 50 years post closure is shown in Figure 24. While the plume extent continues to increase spatially due to dispersion, the plume concentrations decrease over time due to the reduced source strength (concentrations and seepage rate). The seepage plumes are predicted to be limited to around 100 m 50 years post closure.

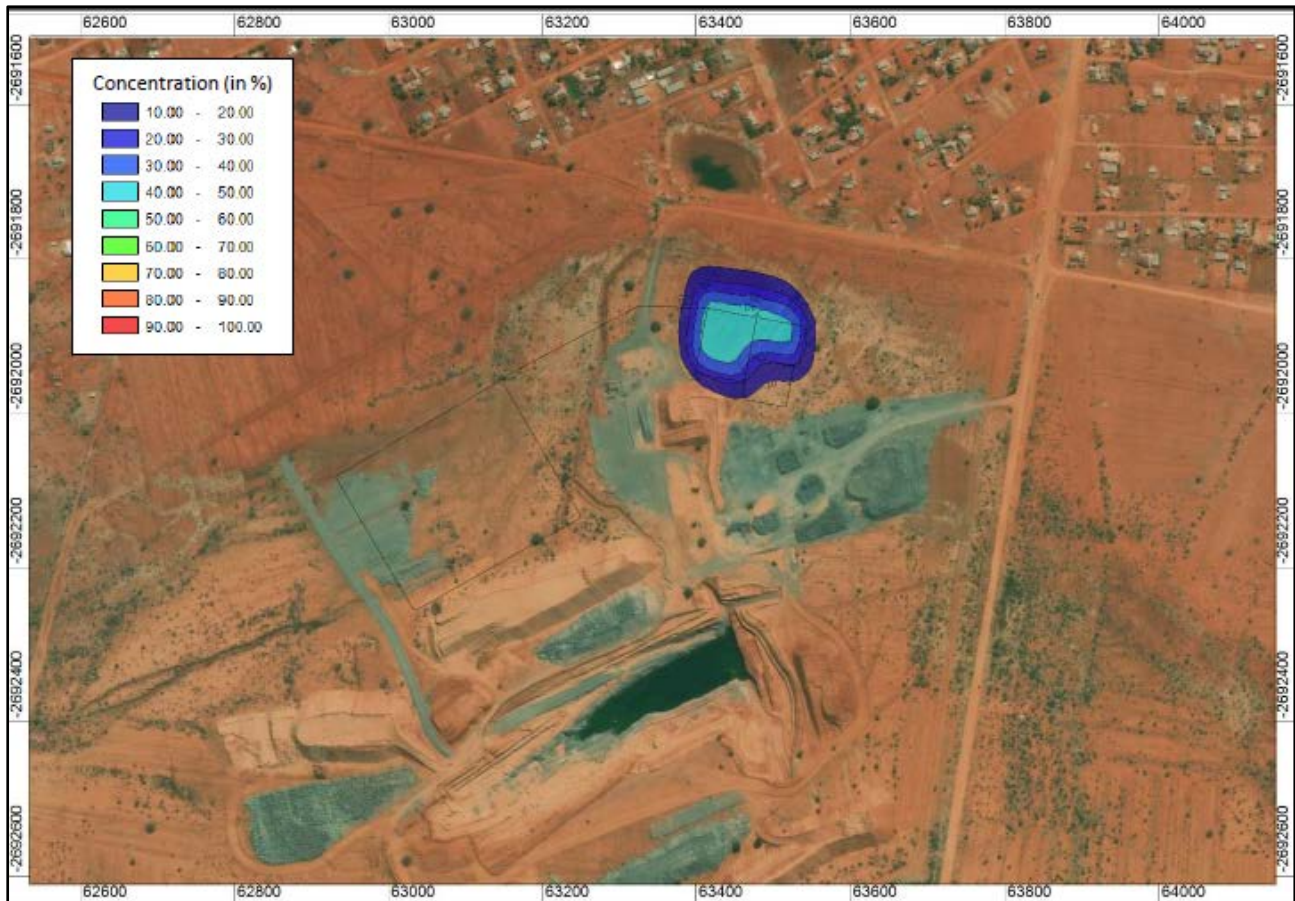


Figure 22: Simulated seepage plume emanating from the TSF 50 years post closure.

10.7 SURFACE WATER

The proposed mining area falls within the Olifants Water Management Area, specifically the Middle Olifants management area, which is lately being characterised by a large number of platinum and chrome mines being developed. The mines have increased the water requirements in the area both due to their direct industrial water use and increased potable use caused by influx of people. Based on the water balance reconciliation study performed by the former Department of Water Affairs and Forestry it was predicted that the water deficit of 241 million m³/a will grow to 279 million m³/a by the year 2025. These figures highlight the shortage of water in this Water Management Area which is classed as severely stressed.

The Mining Right area is located in the B52D quaternary catchment. Various non-perennial drainage lines are located on the project area. The perennial Chunies River flows through the southern end of the proposed mining footprint.

Runoff from the site will drain toward the Chunies River and from there the Olifants River, which flows along the eastern border of the Mining Right area.

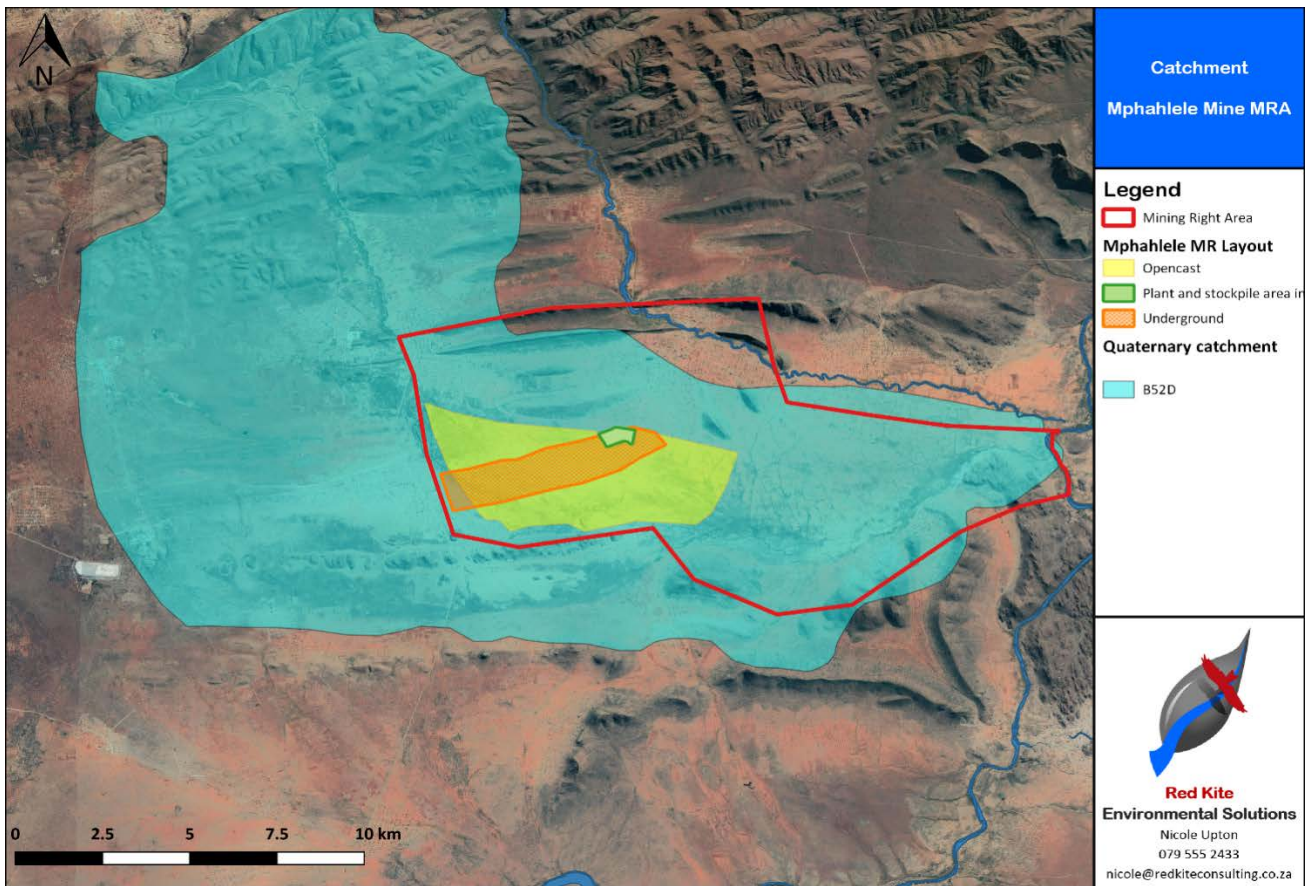


Figure 23: Catchment

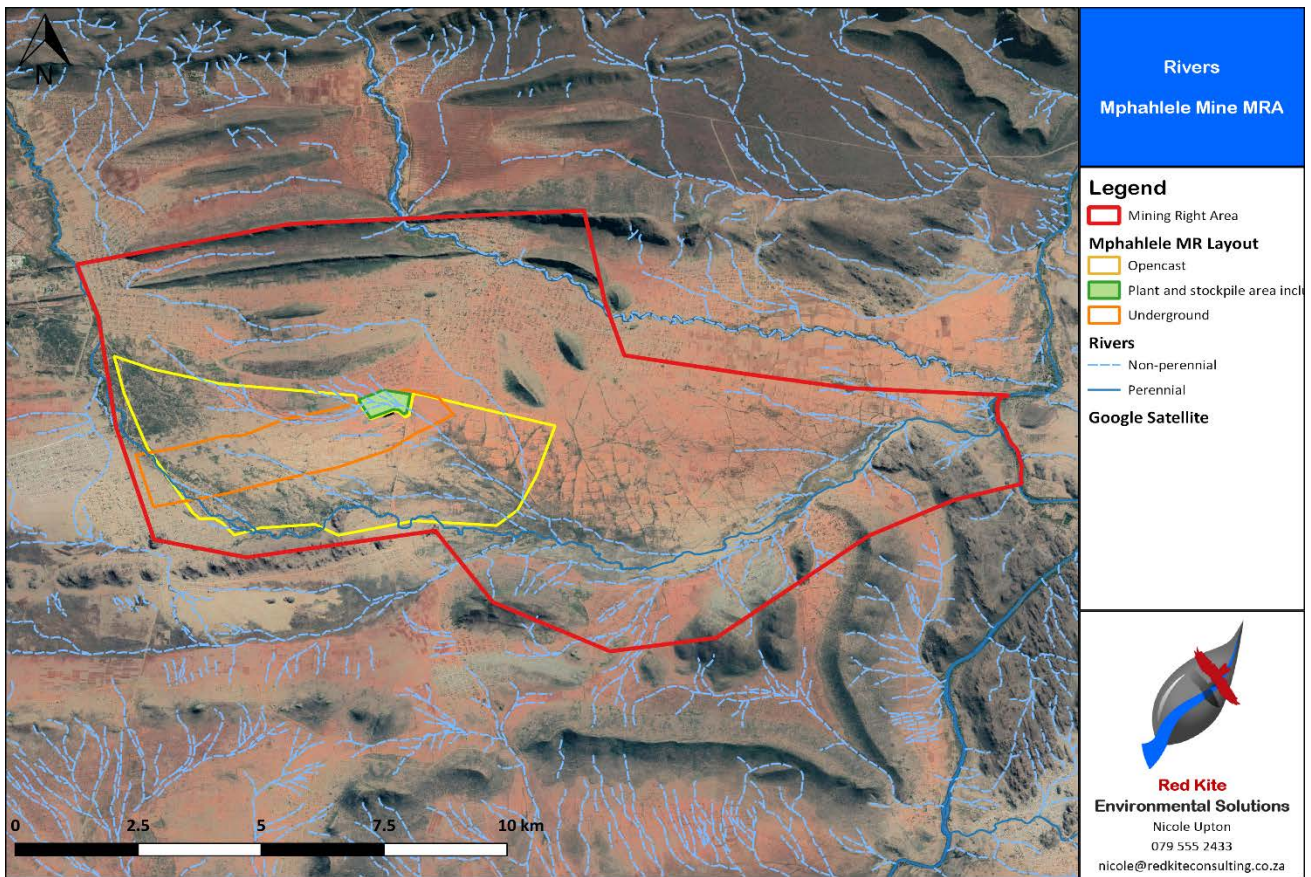


Figure 24: Rivers in the vicinity of the project site

10.7.1 National Freshwater Ecosystem Priority Areas (NFEPA)

As per the National Freshwater Ecosystem Priority Areas (NFEPA) Atlas (Nel et.al., 2011) the relevant sections of river do not intercept with any FEPA areas, the closest FEPA areas are associated with the Northern section of the Mining Right as Hlakaro is n FEPA river.

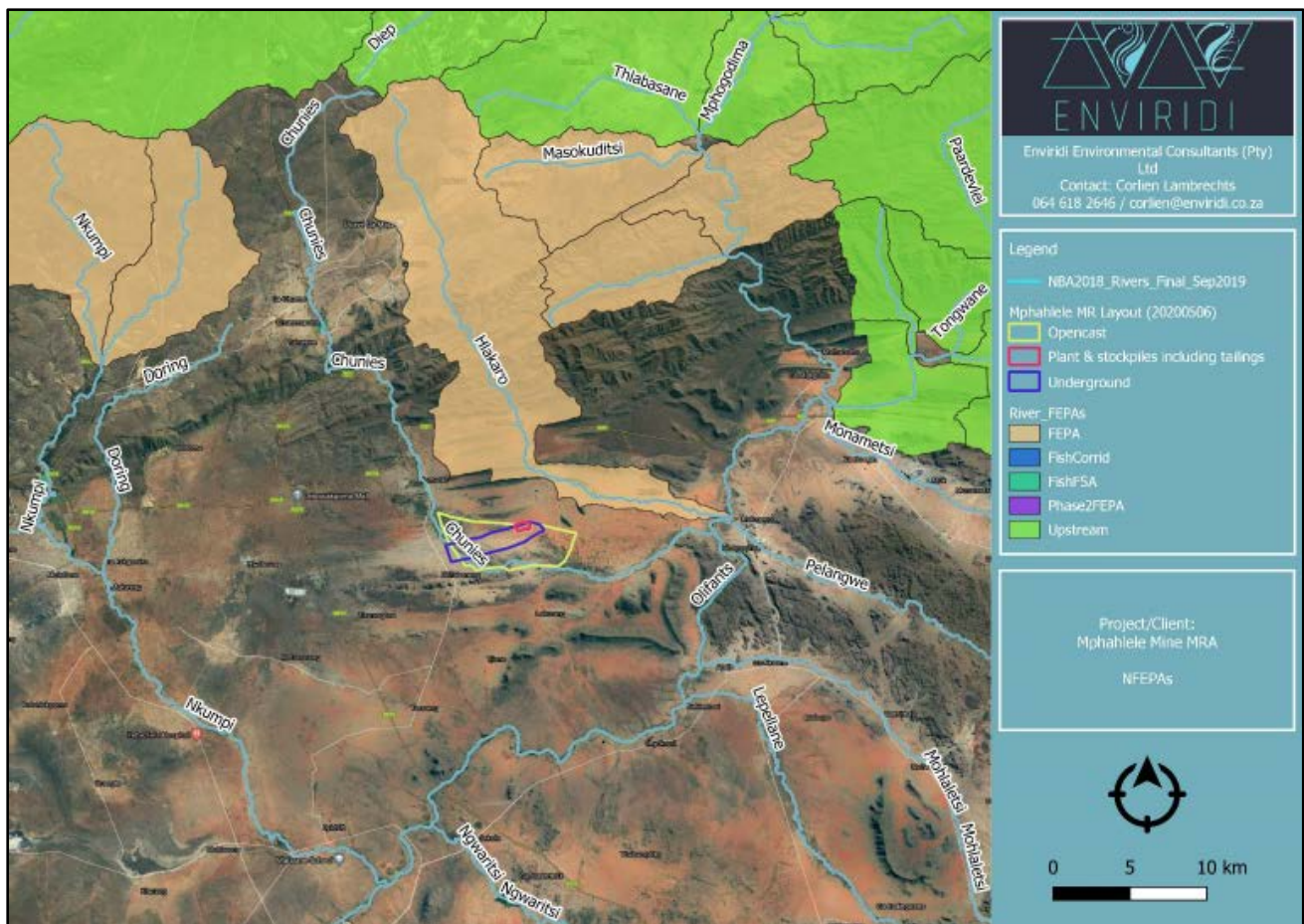


Figure 25: River FEPAs applicable to the mining right area

The project site falls within the Olifants Water Management Area (WMA) within Drainage Region B within catchment B52D and all activity is exclusively focussed within this area. The study site falls within the Middle Olifants (B52) IUA as is visible from the different components of the WMA.

According to the delineation of Ecoregions within South Africa, the Level 1 Ecoregion of the area is the Eastern Bankenveld (Dallas, 2007). The activity exclusively falls within the Eastern Bankenveld including the sections of river investigated, but a section of the Chunies river flows across the Bushveld Basin before re-entering the Eastern Bankenveld Ecoregion again.

10.7.2 Surface Water Quality

The Chunies river contained flowing water at the Downstream point albeit very little, it was suitable for taking a sample. One (1) sample was taken and sent for analysis to an accredited SANAS Laboratory (Waterlab (Pty) Ltd) in Pretoria.

Table 15: Surface water chemical sampling points within the Chunies River (November 2020)

No	Sampling point name	Location sampled (Coordinates)
1	Downstream in Chunies river	24°20'45.82"E; 29°42'55.66"E
Refer to locality of all sites visited during the field assessment.		

Water quality is compared against the formally published Resource Quality Objectives for the specific quaternary catchment.

Exceedances can be summarised as the following:

- Faecal Coliforms, E.coli exceeds Aquatic, Domestic TWQR and SANS 241;

- Aluminium exceeds Aquatic and Domestic TWQR.

Table 16: Water quality results obtained from surface water samples

Analyses in mg/ℓ (Unless specified otherwise)	Sample 2020	RQOs (2017)	TWQR Aquatic (Department of Water Affairs and Forestry, 1996)	TWQR Domestic (Department of Water Affairs and Forestry, 1996)	SANS 241: 2015 (Standards for Potable usage)
pH - Value @ 25 °C	8.1	5.9 – 8.8	6.5 – 9.0	6.0 – 9.0	≥ 5 ≤ 9.7
Electrical Conductivity in mS/m @ 25°C	18.2	55 - 85 mS/m	150 – 500 mS/m	< 70	≤ 170
Total Dissolved Solids (Calculated)	94	N/A	<520	0 - 450	≤ 1 200
Total Alkalinity as CaCO ₃	60	N/A	N/A	N/A	N/A
Total Hardness as CaCO ₃	48	N/A	N/A	N/A	N/A
Chloride as Cl	9	120 – 170 mg/l	N/A	0 - 100	≤ 300
Sulphate as SO ₄	11	150 - 250 mg/l	< 50mg/l	0 - 200	≤ 500 (Acute Health) ≤ 250 (Aesthetic)
Fluoride as F	1.0	3.52 mg/l	0.75	0 - 1	≤ 1.5
Nitrate as N	1.0	N/A	0.5 – 2.5	0 - 6	≤ 11
Nitrite as N	<0.05	N/A		0 - 6	≤ 0.9
Ortho Phosphate as P	<0.1	0.058 - 0.125 mg/l	<0.05	N/A	N/A
Faecal Coliform Bacteria / (100 ml) ¹	1 400	N/A	< 50 FC/100 ml	0 -1 FC/100 ml	0 -1 FC/100 ml
<i>E.Coli</i>	1 400	N/A		0– 1 FC/100 ml	0
Free and Saline Ammonia as N	<0.1	N/A	0.007	0 - 1	≤ 1.5
Sodium as Na	18	92.5 – 115 mg/l	N/A	0 - 100	≤ 200
Calcium as Ca	11	80 mg/l	N/A	0 - 32	N/A
Magnesium as Mg	5	50 - 70 mg/l	N/A	0 - 30	N/A
Aluminium as Al	3.01	N/A	0.005	0.015	≤ 300
Arsenic as As	-	N/A	≤ 0.01	0 - 10	≤ 10
Barium as Ba	-	N/A	N/A		≤ 700
Boron as B	-	N/A	N/A		≤ 2400
Cadmium as Cd	-	N/A	≤ 0.15 – 0.40	0 - 5	≤ 3
Total Chromium as Cr	<0.025	N/A	N/A	N/A	≤ 50
Chromium as Cr ³⁺	<0.025	N/A	0.012	0 - 0.05	N/A
Hexavalent Chromium as Cr	<0.010	N/A	0.007	0 - 0.05	N/A
Copper as Cu	-	N/A	0.0003	0 - 1	≤ 2000
Iron as Fe	1.88	N/A	N/A	0 -0.1	≤ 2 000 (Acute Health) ≤ 300 (Aesthetic)
Lead as Pb	-	N/A	0.0002	0 - 10	≤ 10
Manganese as Mn	-	N/A	0.18	0– 0.05	≤ 400 / ≤ 100
Zinc as Zn	-	N/A	0.002	0 - 3	≤ 5

¹ Faecal coliforms are primarily used to indicate the presence of bacterial pathogens such as *Salmonella* spp., *Shigella* spp. *Vibrio cholerae*, *Campylobacter jejuni*, *Campylobacter coli*, *Yersinia enterocolitica* and pathogenic *E. coli*. These organisms can be transmitted via the faecal/oral route by contaminated or poorly-treated drinking water and may cause diseases such as gastroenteritis, salmonellosis, dysentery, cholera and typhoid fever.

10.8 TERRESTRIAL ECOLOGY

A Terrestrial Ecology Assessment was undertaken by Enviridi Environmental Consultants (2021) (refer to Appendix 10).

10.8.1 Flora

The project area lies within the Savanna Biome, which is the largest biome in South Africa, covering 34.3% of the country (about 435 000 km²). It is a mixture of grasses and trees or shrubs. Savanna stretches from the Kalahari in the north-west across to the lowveld in the north-east and southwards to the lowlands of KwaZulu Natal and the Eastern Cape. It is found from sea level to about 2 000 metres above sea level. More than 5 700 plant species grow in the Savanna Biome. They include various types of grasses (e.g., Rooigras) and trees like the Baobab, Mopane, Camel Thorn and Knob Thorn. Rain falls in summer and varies greatly across the region, from about 235 mm per year in the Kalahari to over 1000 mm per year in the east.

The area is located within the Sekhukhune Plains Bushveld (SVcb27) within the Central Bushveld Bioregion within the Savanna Biome. In 2018, the National Biodiversity Assessment (NBA 2018) rated this vegetation group as Poorly Protected and Endangered (EN).

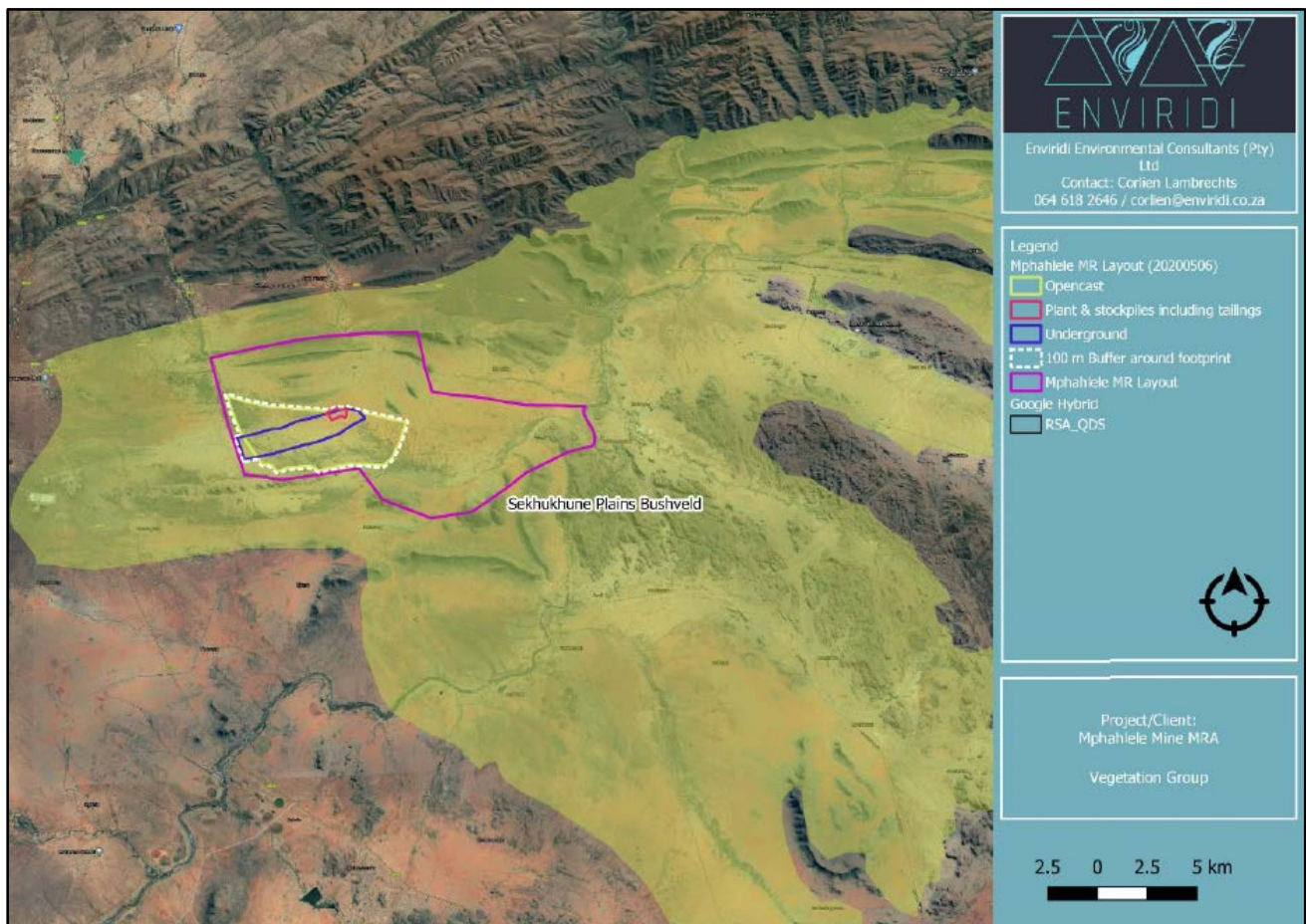


Figure 26: Vegetation Group for the Mphahlele Mining Right Project

According to the Limpopo Conservation Plan the project area is located on areas designated as ESA 1 and ESA 2.

Corresponding areas between LCP and based on observations made during the field assessment delineated Vegetation Units:

- ESA1: Bushveld areas on the project footprint that appear to be intact (VU1) fall within ESA1 areas. The north-western section of the project footprint correlates well with ESA1. However, the site assessment indicated that

the southern section of the project footprint is moderately to heavily impacted and therefore may not meet the requirements / criteria of ESA1.

- ESA2: Bushveld areas on the project footprint which have been moderately to heavily impacted by communities and agriculture.

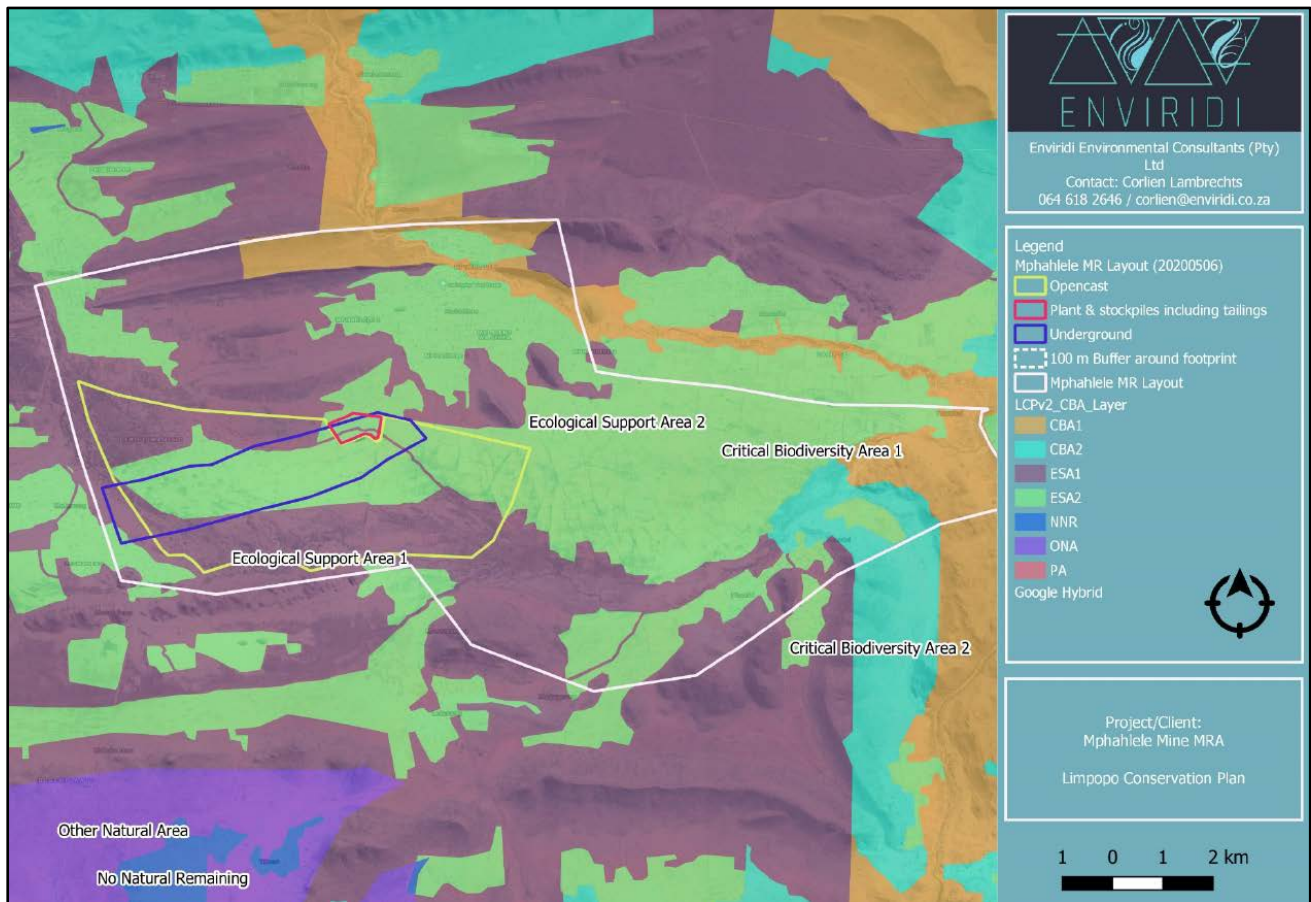


Figure 27: Limpopo Conservation Plan (Terrestrial Biodiversity Assessment)

The study area (project footprint) is approximately 2 407 ha in extent. The proposed development footprint is largely situated on flat plains. The Chunies River, a tributary of the Olifants River, flows along the western and southern border of the project footprint. Various ephemeral tributaries of the Chunies River are located on the project footprint.

Land uses, on and adjacent to the project area, currently consist of subsistence crop cultivation, livestock grazing, natural vegetation, residences and mining. Vegetation units were identified according to plant species composition, previous land use and topography. The state of the vegetation of the proposed development varies from being natural to highly disturbed (transformed).

The following broad classification of Vegetation Units (VU) were found to occur on the proposed project footprint:

1. Plains bushveld (moderate to low disturbance) (VU1);
2. Plains bushveld (moderately to heavy disturbance) (VU2); and
3. Transformed (VU3).

The vegetation units, as identified during site visit, databases and aerial imagery are indicated in the figure below.

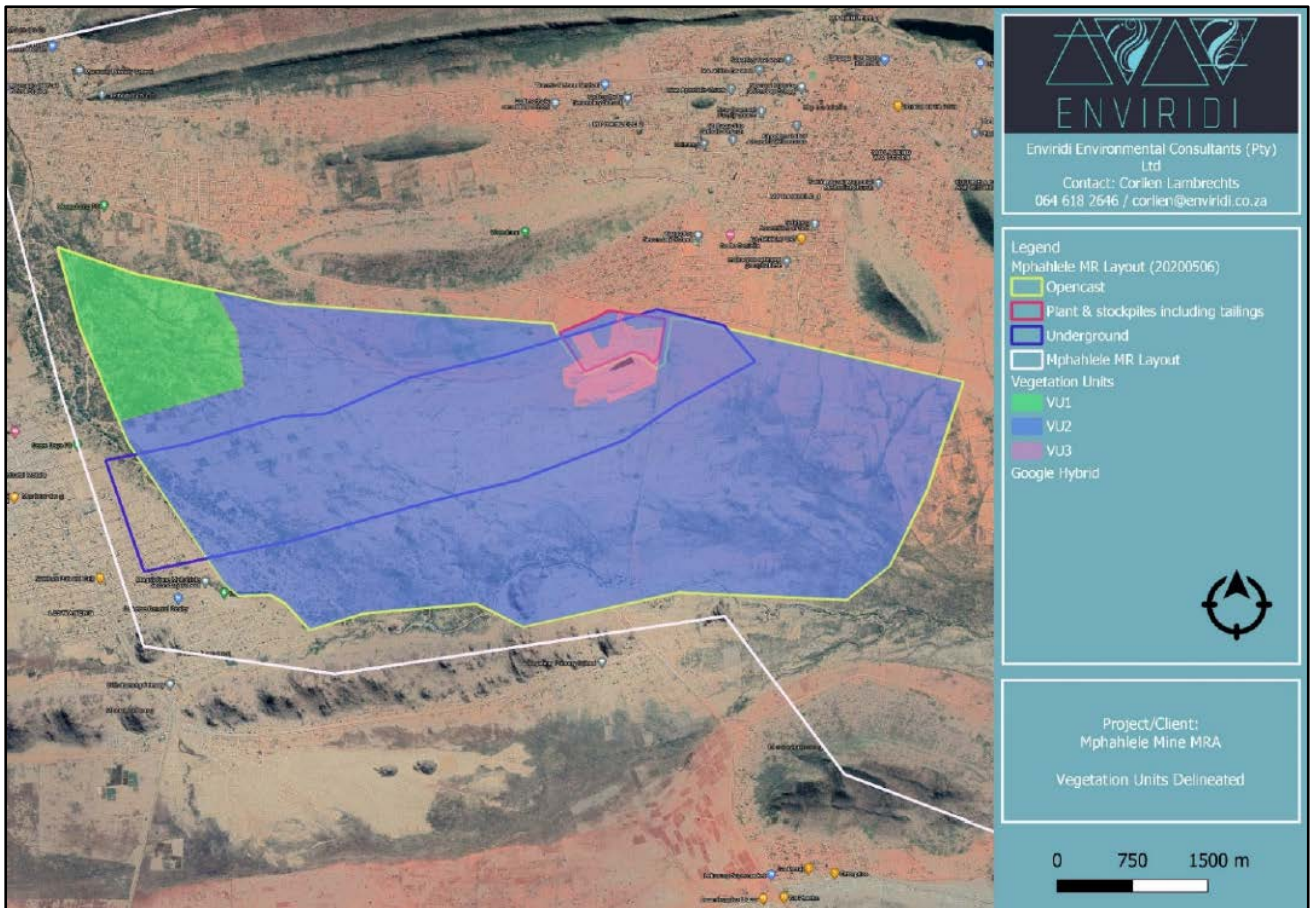


Figure 28: Vegetation Units Delineated

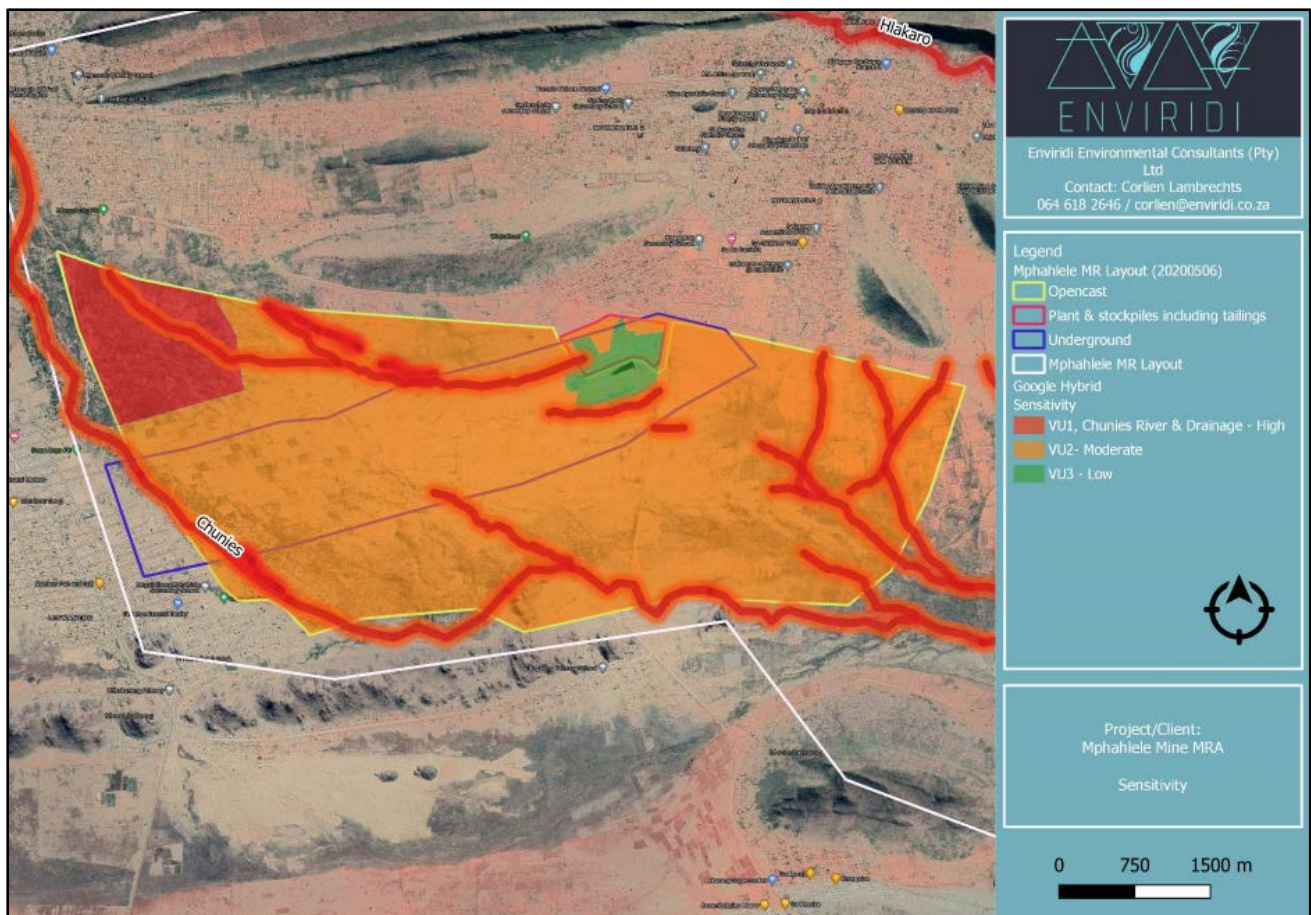


Figure 29: Sensitivity delineated according to vegetation units, habitat remaining

10.8.2 Fauna

A baseline assessment was conducted to establish whether any potentially sensitive species might occur on site. The Virtual Museum and Animal Demography Unit (ADU) was used to compile species lists based on the sightings and data gathering from the South African Biodiversity Institute. The importance of a baseline study is to provide a reference condition to determine the current state of the environment and to draw comparisons between the potential of the area and current degradation from surrounding land uses. This will be compared in terms of the future changes due to the proposed development by the client.

Aerial photographs and satellite imagery were used to delineate potential sensitive areas and wetland areas (that could occur) to guide the sampling during the field visit. During the field assessment, sensitive species were determined according to their close relationship and dependence on the vegetation type and the other sensitive features.

Since the Mining Rights falls within 2429BC Quarter Degree Square, which is the focus of the baseline and desktop assessment of the Mining Right Area.

The faunal investigation provides a description of the ecological diversity in terms of species identification as well as the occurrence of threatened/sensitive species that is dependent on available habitat. During the desktop analysis, it was determined that several Red Data species were listed on the South African National Biodiversity database (SANBI) for the QDS that encompass the specific area.

The most important species of concern that will lead the management is determined to be:

- Species with specialised niches (riverine, ridges or wetland areas) – such as the Chunies River present;

- Species with large range requirements (grazing mammals) – Bovidae species (including the Cattle (Domestic));
- Species that have limited adaptation capabilities (such as reptile niches) – Mountainous areas found towards the north of Mining Right;
- Migrating species (importance of the ecological and aquatic corridor) – utilising the Chunies River and associated dry drainage lines; and
- Species that use the different grassland areas as part of their larger range or preferred habitat (predatory species).

Sensitive invertebrate species are expected to be associated with the ridges and rocky areas as these represent specialised niches. These do not occur on the Mining Right footprint, but as mentioned, towards the northern border.

The habitat (river systems and connected dams) could also be ideal for other species to occur, although no spraints were found during the field assessment, and the Chunies river has been found to be dry and vastly impacted by anthropogenic impacts. The remainder of the area investigated were also impacted and cattle were dominant.

The faunal investigation provides a description of the ecological diversity in terms of species identification as well as the occurrence of threatened/sensitive species that is dependent on available habitat. No National Species of Conservation Concern (SCC) were sighted or thought to occur due to the nature of the vegetation units and associated habitat.

10.9 Air Quality

An Air Quality Impact Assessment was undertaken for the project by Eco Elementum (2021 and can be found in Appendix 11.

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

Looking at the figure below, the predominant wind direction is predicted to occur mainly from the NE 2134 hours per year respectively. A secondary direction is predicted from ENE 1296 hours per year, respectively, with wind speeds higher than 5 km/h.

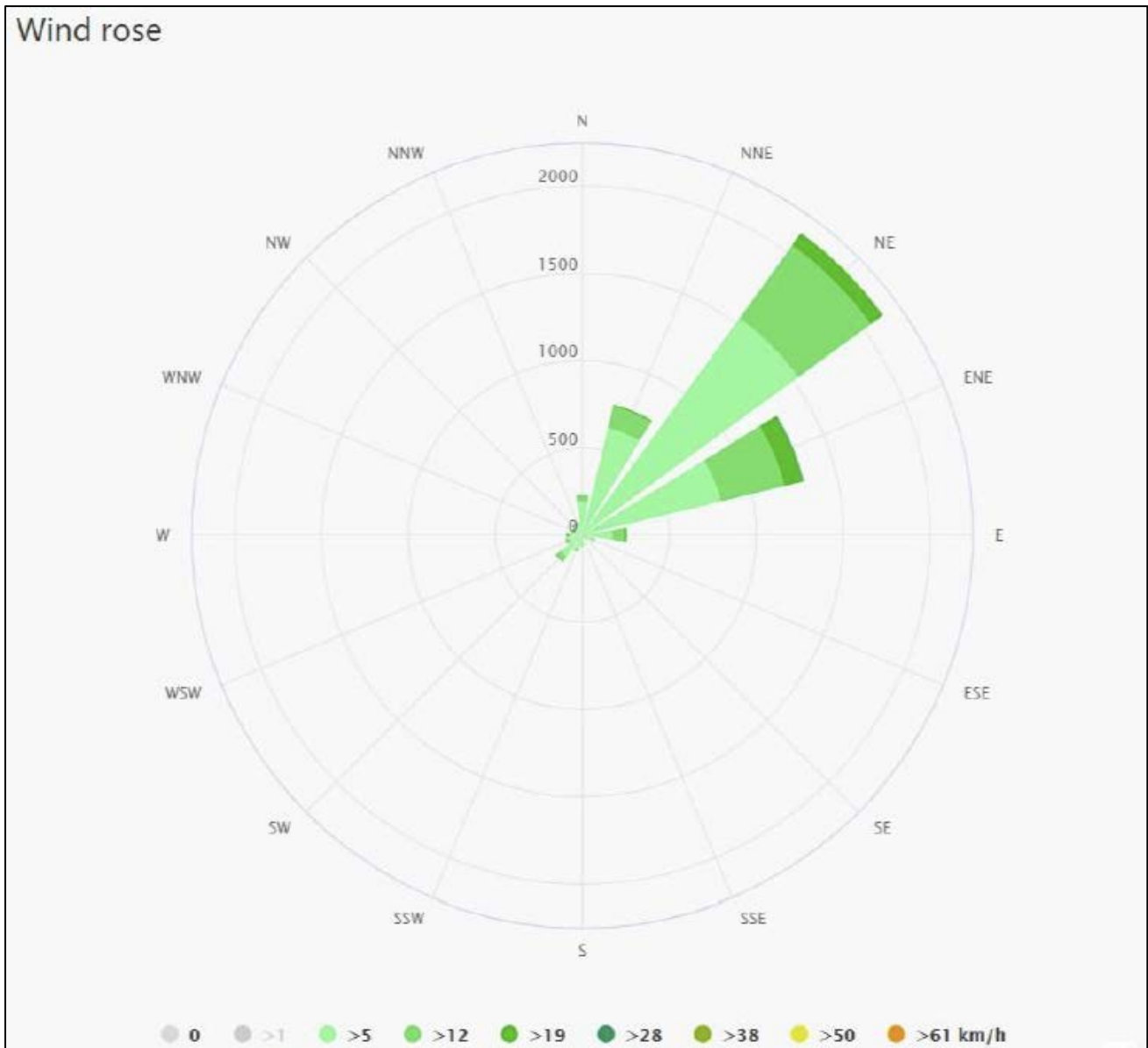


Figure 30: NEMS 30 km simulation model wind rose for the proposed Lebowakgomo project area for the period 1985 to current.

From the figure below, at the site, calm conditions with wind speeds of 12 km/h or less, are predicted 5-17 days per month throughout the year. 12-19 km/h winds are predicted 8-16 days per month through the year. Wind speeds of more than 19 km/h are predicted to occur 2-10 days per year on average.

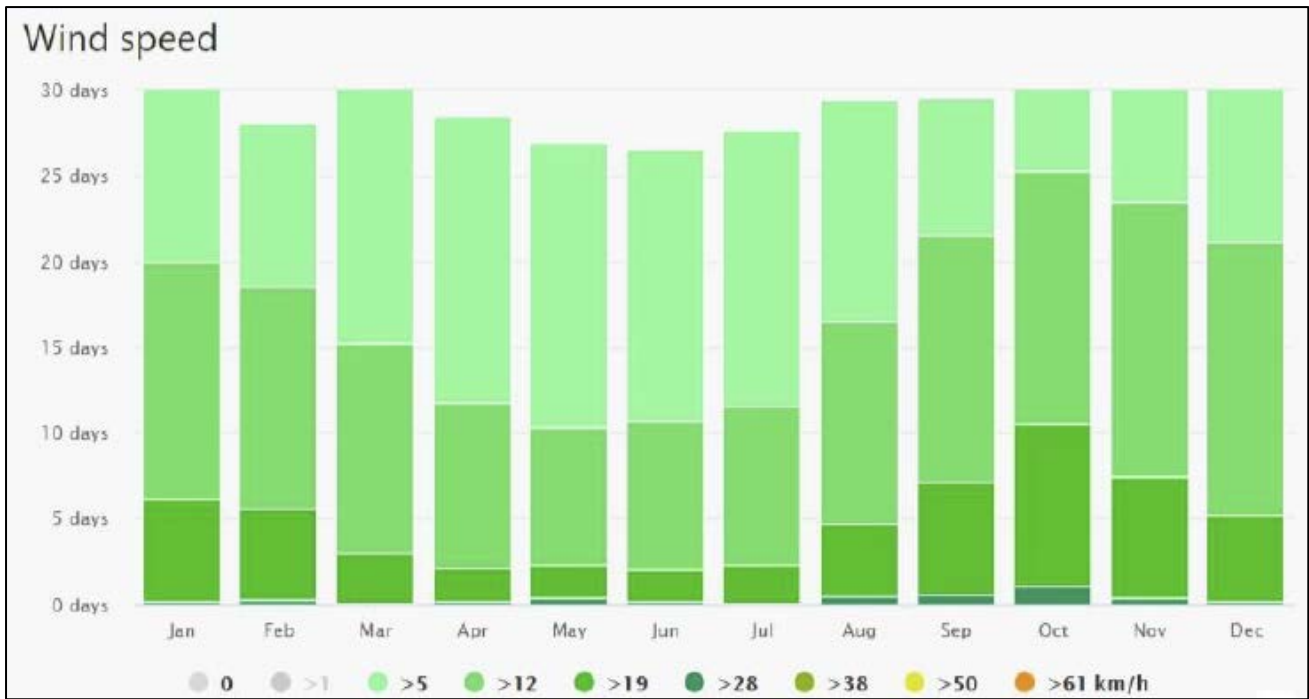


Figure 31: Wind Class Frequency Distribution per month

Sensitive receptors identified in the immediate vicinity (Figure 20) of the study area and proposed project area have been listed below:

- Various human habitation areas surrounding the proposed project site.

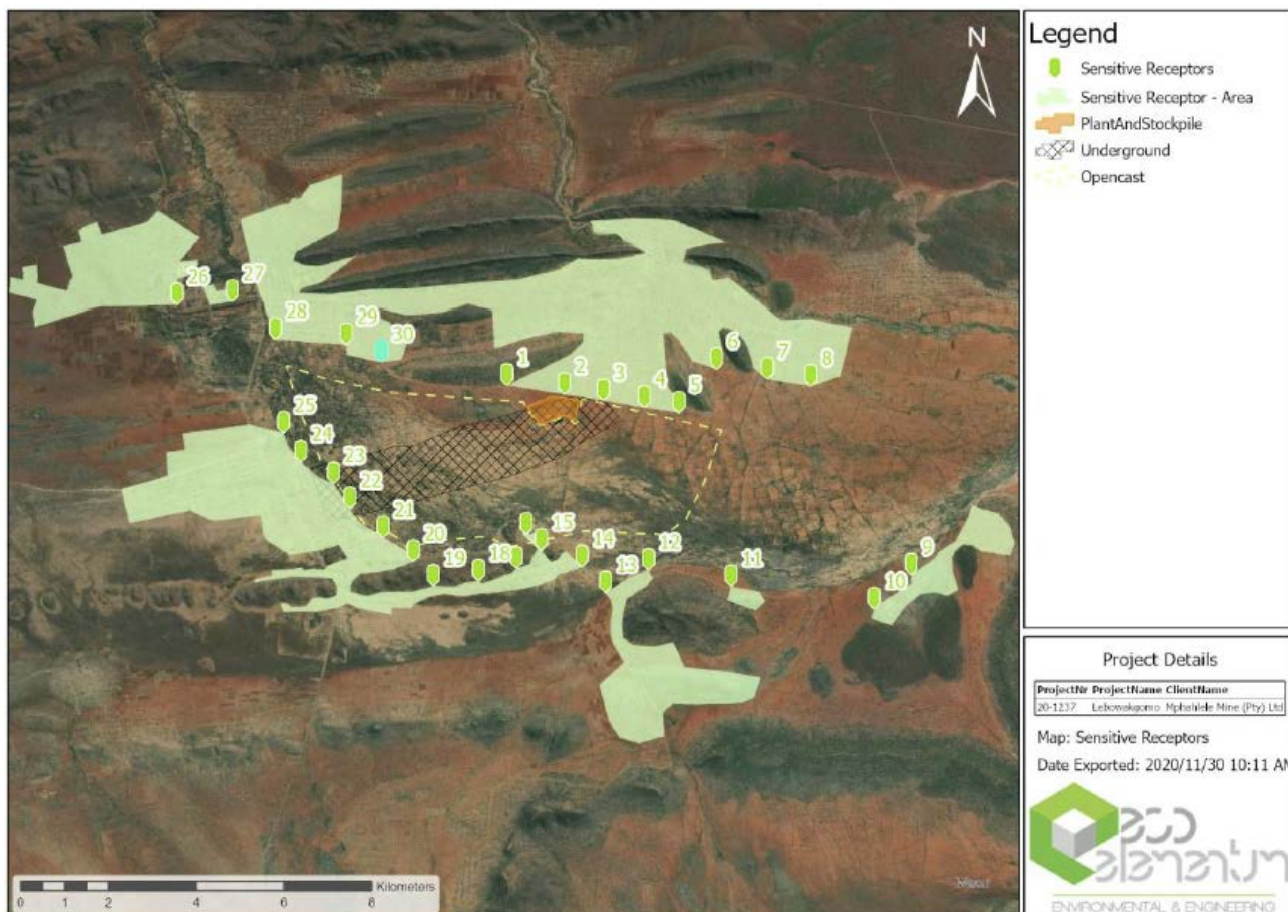


Figure 32: Air quality sensitive receptors

10.10 VISUAL

A Visual Impact Assessment was undertaken by Elemental Sustainability (2021) for the project and can be found in Appendix 15 of this report.

The scenic quality of the landscape is based on its value as a visual resource. The visual resource value of the proposed mining area is rated as Moderate, which is defined by a common landscape that exhibits some positive character, but which has evidence of alteration /degradation/erosion of features resulting in areas of more mixed character.

The Landscape sensitivity change criteria indicates a landscape of Medium sensitivity, which refers to a “*landscape of regional or local value, quality, or rarity, exhibiting some distinct features, considered tolerant of some degree of change e.g., within a locally designated landscape or with landscape elements of local importance*”.

For the proposed mining area, both open cast and underground, and the associated infrastructure, sensitive receptors were identified as the residents of the surrounding settlements that are located around most of the proposed site. Therefore, the sensitivity of the receptors were rated as High. Reference points of the sensitive receptors were selected based on their distance and as central viewpoint of the specific receptor area. Viewpoints 1 to 6 area situated between 0 and 1 km from the proposed boundary of the mining activities. Viewpoints 7 to 13 are situated approximately 2 km away, and Viewpoints 14 to 22 between 2 and 5 km away from the proposed boundary (Refer to Section 4.6.2).

Table 17: Categorisation of Sensitive Receptors for the proposed mining area.

Sensitivity of receptors	Types of receptors
High	Users of all outdoor recreational facilities including public rights of way, whose intention or interest may be focused on the landscape; Important public sites used by many people; Tourist, Resident

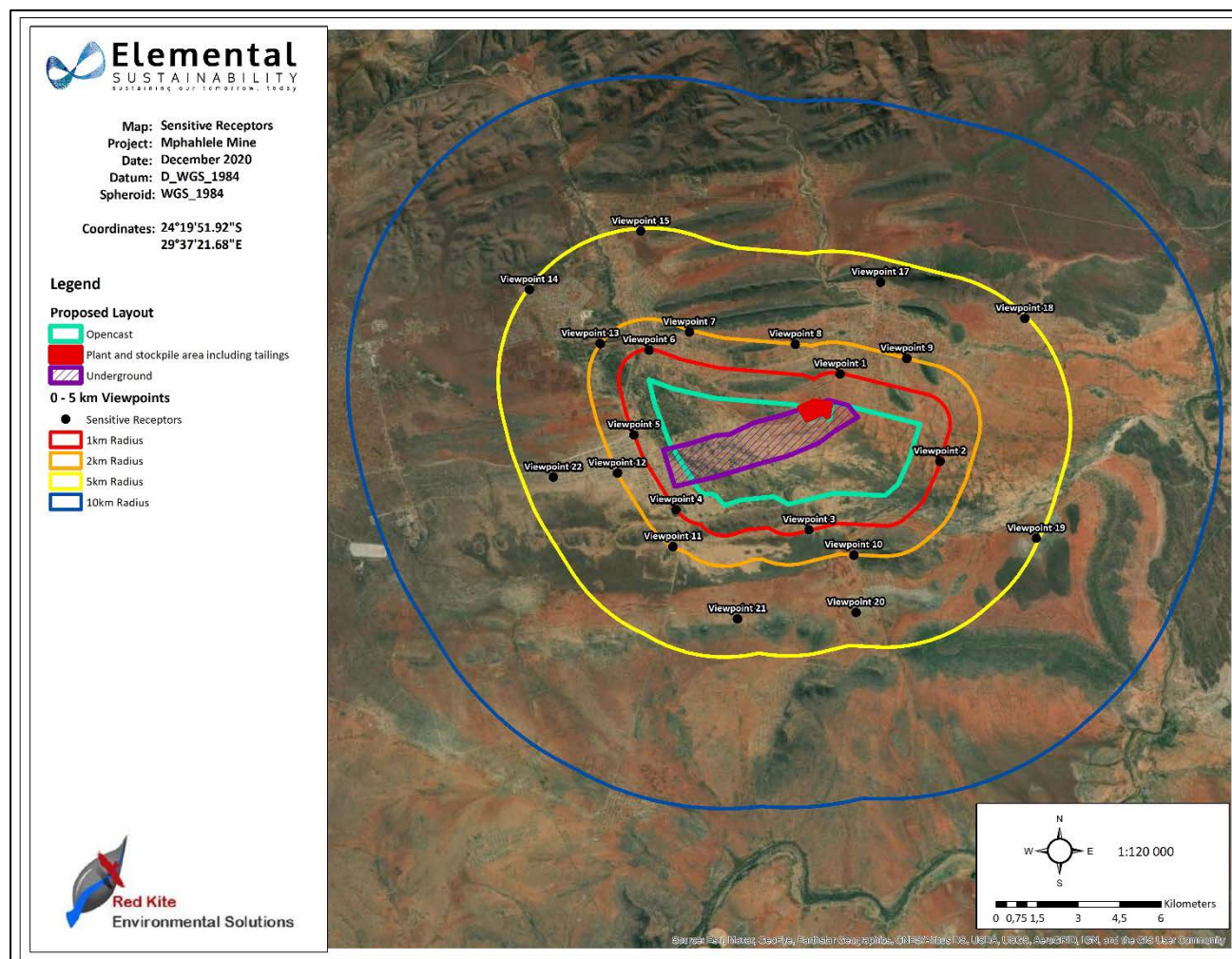


Figure 33: Surrounding Land Users and Sensitive Receptors (Viewpoints)

10.11 NOISE

An Environmental Noise Impact Assessment was undertaken by Enviroroots (2021) and can be found in Appendix 12.

Noise receptors were identified and referenced as R1 to R6. Receptors R1 is the community of Dithabaneng, R2 is the community of Mosetamong, R3 is the community of Mphahlele 4 while R4 is the community of Mamaolo. Certain receptors are based directly adjacent (directly on) a project footprint (receptor R5 and R6). These receptors will not be within the impact assessment and assumed to be relocated after authorisation (see localities in Figure 2, R5 and R6).

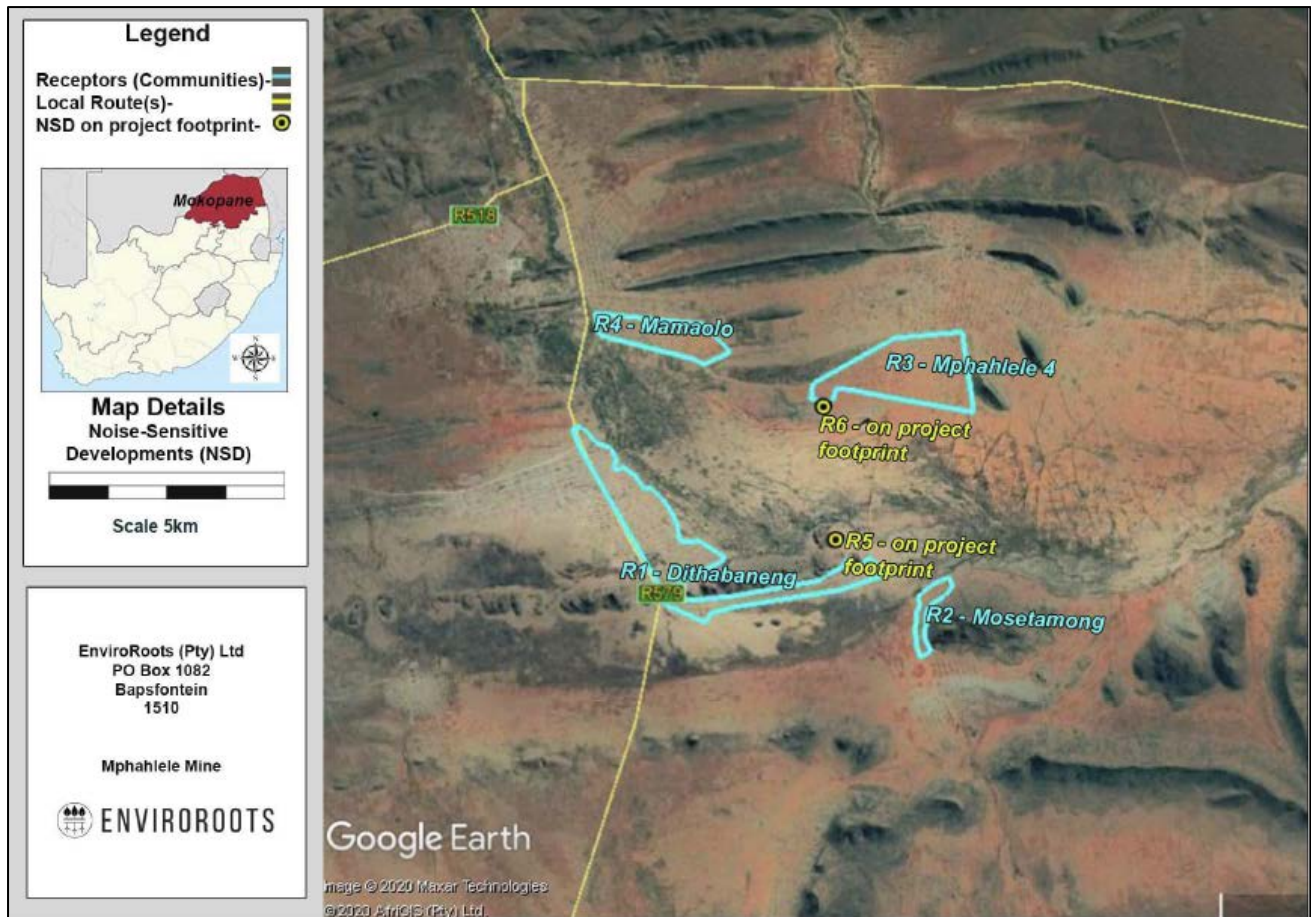


Figure 34: Noise receptors

Based on the noise measurements the following Rating Levels were proposed for receptors:

- Suburban Rating – the communities are significantly well developed to have a suburban day and night Rating level of 50/40 dBA.

10.12 ARCHAEOLOGY AND HERITAGE

A Heritage Assessment was undertaken for the project by A Pelsler Archaeological Consulting (2021) and can be found in Appendix 15 of this Report.

The field assessment section of the study is conducted according to generally accepted HIA practices and aimed at locating all possible objects, sites and features of heritage significance in the area of the proposed development. The location/position of all sites, features and objects are determined by means of a Global Positioning System (GPS), while detailed photographs are also taken where possible.

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. No sites were identified in the study area focused on in the January 2021 assessment.

There is obviously always the possibility of unknown and invisible sites being present in the specific and larger area surrounding the mining operations. Earlier surveys in the larger geographical and neighbouring areas showed that there are both prehistoric archaeological remains (Stone Age & Iron Age), as well as recent historical (homestead remains and graves/cemeteries) present. If any are found during future mining development, an expert should be called in to investigate and recommend on the best way forward.

10.13 SOCIO ECONOMIC

A Socio-economic Assessment was undertaken by Gudani Consulting (2021) and can be found in Appendix 17.

Lepelle-Nkumpi Local Municipality is situated within the Capricorn District in the Limpopo Province.

The proposed Mphahlele mine will add to the economic development of Lepelle -Nkumpi Local Municipality in terms of capital investment, job creation, infrastructure development, services and foreign exchange. Local business will also benefit by providing supplies and services to the mine. Secondary industries are also likely to develop due the proposed Mphahlele mine activities. The Environmental Authorisation (EA) is expected to be for 20 years, which translate to 20 years of economic activity in the region.

10.13.1 Population Profile

The Lepelle-Nkumpi Local Municipality population is approximately 231 239 (Census 2011) with 59 682 households; these makes the municipality a municipality with the second highest population in the Capricorn district. Due to the high mountain ranges, the population is sparsely distributed with many settlements located in valleys. In certain areas the topography is very steep making it impossible for inhabitation.

The Municipality features approximately 109 rural settlements, with Mokopane, Lebowakgomo and Polokwane constituting the main/first order urban centres. The urban centre closest to the Mphahlele Mine site is Lebowakgomo, which is approximately 10 km west of the site. The spatial location of these first order centres generally coincides with the municipality's dominant economic activities. Despite having been influenced by the spatial demarcation of the former homeland areas, the spatial occurrence of settlements has also been influenced by:

- The spatial location of major agricultural and mining activity areas;
- The spatial location of major rivers traversing the municipality; and
- The spatial location of major roads such as R37

It is estimated that a total of 14 120 people reside in the affected villages as follows: 2924 people reside in Dithabaneng, 560 in Bolopa, 3047 in Lekurung, 3466 in Maejane, 2189 in Manaileng and 1934 people reside in Maralaleng village. The village of Dithabaneng comprise of approximately 717 households, Bolopa comprise of 126 households, Lekurung comprise of 671 households, Maejane comprise of 781 households, Manaileng comprise of 571 households and Maralaleng of 437 households. The average number of persons per household is.

In terms of the demography of the population 56% are female and 44% are male in Maejane, 53% female and 47% male in Bolopa, 55% female and 45% male in Manaileng, 56% female and 44% male for Maralaleng, Lekurung and Dithabaneng. There are a high number of children between 0- 4 years, youth between 15-19 years and 20- 24 years which indicates a potential for marked rise in local population in the next decade as pre-adolescent reach child bearing age. This group can be viewed as being highly vulnerable to HIV/Aids and other sexually transmitted diseases in the absence of health education. Their vulnerability is also increased due to the fact that employment opportunities are low in the area, with the exception of mining which is predominantly taken by men.

10.13.2 Education Levels

There are several schools in the affected villages. These learning facilities do not offer vocational/technical/business training to locals. The following are existing schools:

- a) Ngwana- Mohube secondary school
- b) Sedimothole secondary school
- c) Kgatatlou secondary school
- d) Patoga primary school
- e) Sefalaolo primary school



- f) Mutle primary school
- g) Mphahlele creche

According to the 2011 data from Stats SA, 34% in Maejane, 18% in Bolopa, 30% in Manaileng, 22% in Maralaleng, 21% Lekurung and 24% in Dithabaneng have no schooling. 6% in Mejjane, 14% in Bolopa, 18% in Manaileng, 11% in Maralaleng and Dithabaneng and 15% in Lekurung have some primary schooling. 4% in Maejane and Dithabaneng, 3% in Bolopa and Maralaleng, and 5% in Manaileng and Lekurung have complete primary schooling. 29% in Maejane and Dithabaneng, 38% in Bolopa, 31% in Manaileng, 35% in Maralaleng, and 44% in Lekurung have secondary schooling. 25% in Mejjane, 22% in Bolopa, 12% in Manaileng, 24% in Maralaleng, 21% in Lekurung and 26% in Dithabaneng have standard 10/ grade 12(matric).3% in Maejane, 4% in Bolopa, Manaileng and Maralaleng, 8% in Lekurung and 6% in Dithabaneng have higher education level.

The poor level of education has serious implications for the potential of local people to gain employment. This is worsened by the general shortage of skills in the local community, compounded by the lack of training opportunities in areas of science, computer literacy, technical and technological expertise. With the potential employment opportunities from Mphahlele Mine Project, there will be few qualified persons available to fulfil the job specifications. There are a number of people with teaching diplomas, and a few drivers, motor mechanics and builders – however the overall empowerment in the livelihoods the affected four communities would largely depend on capacity building and technical skills training from Mphahlele Mine.

10.13.3 Employment Status

The proportion of employed persons add up to 29% in Maejane, 53% in Bolopa, 19% in Manaileng, 26% in Maralaleng, 24% in Lekurung and Dithabaneng. 50% in Maejane, 14% in Bolopa, 48% in Manaileng, 63% in Maralaleng, 70% in Lekurung and 63% in Dithabaneng are unemployed persons. 21% in Maejane, 33% in Bolopa and Manaileng, 11% in Maralaleng, 6% in Lekurung and 13% in Dithabaneng are discouraged work seekers.

The annual household percent income distribution in the affected villages is as follows: 6% of the households in Maejane, Manaileng and Dithabaneng, 7% in Bolopa and Maralaleng and 8% in Lekurung fall within the income bracket R1-R4800. This income bracket is constituted predominantly by those households earning a living solely from government grant, pension or labour.

Those earning between R4801-R9600 constitute 14% in Maejane, 19% in Bolopa, 12% in Manaileng and Maralaleng, 13% in Lekurung and 16% in Dithabaneng and are most likely earning a salary. 30% in Maejane and Bolopa, 33% in Manaileng, 26% in Maralaleng, 28% in Lekurung and 27% in Dithabaneng earn between R9601-R19600. 25% in Maejane, Bolopa and Maralaleng, 23% in Manaileng and Dithabaneng and 27% in Lekurung earn between R19601-R38200. 6% in Maejane and Maralaleng, 10% in Bolopa, 5% in Manaileng, 8% in Lekurung and 7% in Dithabaneng earn between R38201-R76400. 2% in Maejane and Bolopa, 1% in Manaileng, 9% in Maralaleng 3% in Lekurung and 4% in Dithabaneng earn R76401-R153800 and 2% in Maejane and Dithabaneng, 3% in Bolopa, Maralaleng and Lekurung and 1% in Manaileng earn R153 801 or more. These are most likely to be skilled workers.

1.1.2. Infrastructure

Water supply in the affected villages is mainly from underground sources. Water is pumped from underground into a reservoir/elevated tank on the surface, from where is directed to various communal/public stand pipes/taps. 2% in Maralaleng, 0.7% in Lekurung, 5% households in Dithabaneng, 19% in Maejane, 100% in Bolopa and 38% in Manaileng depend on the communal taps for access to drinking water. Few dwellings (8% in Maralaleng, 1% in Lekurung, 18% in Dithabaneng, 17% in Maejane and 2% in Manaileng) have piped connections and running water in their individual households, a further 84% of the households in Maralaleng, 98% in Lekurung, 48% in Dithabaneng, 28% in Maejane and 57% in Manaileng have boreholes in their respective yards. 6% in Maralaleng, 0.3% in Lekurung, 29% in Dithabaneng, 44% in Maejane and 3% in Manaileng depend on rain water harvested from the roof tops, springs or dams.



Water availability is extremely scarce in the area and the community experience frequent water shortages – especially during the dry winter months. Use of natural, untreated water sources increases the risk of waterborne diseases.

96% of the households in Maejane, 98% in Bolopa and Manaileng, 90% in Maralaleng, 99% in Lekurung and 94% in Dithabaneng have pit toilets. Few households have flush toilets or no toilet, resulting in proper ablution being compromised.

10.14 DESCRIPTION OF THE CURRENT LAND USES

The proposed Mphahlele Mine is situated on the farm Locatie van M'phatlele 457 KS. The operation falls in the Limpopo Province under the jurisdiction of the Lepelle-Nkumpi Local Municipality, situated within the Capricorn District Municipality. The towns / villages of Mphahlele, Phosiri, Dithabaneng and Mamaolo are located on the Mining Right area.

The proposed project area is characterised by a mix of land uses. Sections thereof comprise natural land currently used for the grazing of livestock and subsistence farming by local residents. Various dirt roads traverse the project area.

Current land uses in the area surrounding the proposed project area include livestock grazing, subsistence farming, and residential areas.

Grazing areas are generally regarded as communal and can be used by all members of the community. Over-grazing during dry periods has denuded much of the area and it is hence extremely susceptible to water and wind erosion.

A number of villages are situated in the vicinity of the proposed mining area, i.e. Maralaleng, Lekurung, Dithabaneng, Maejane, Bolopa and Manaileng. The aforementioned villages fall under the Ga- Mphahlele tribal area.

The Mphahlele Community Development Trust holds a Mining Permit (LP30/5/1/3/2/10983MP). Mining has commenced and an opencast area, topsoil and waste rock dumps has been established. A RoM stockpile area, where crushing and screening is taking place has been established. The existing opencast area will be utilised as the box cut area for the mining right.

Illegal mining of the sand in and adjacent to the mining right area has taken place. The illegal activities are un-regulated, and the no rehabilitation has been undertaken.

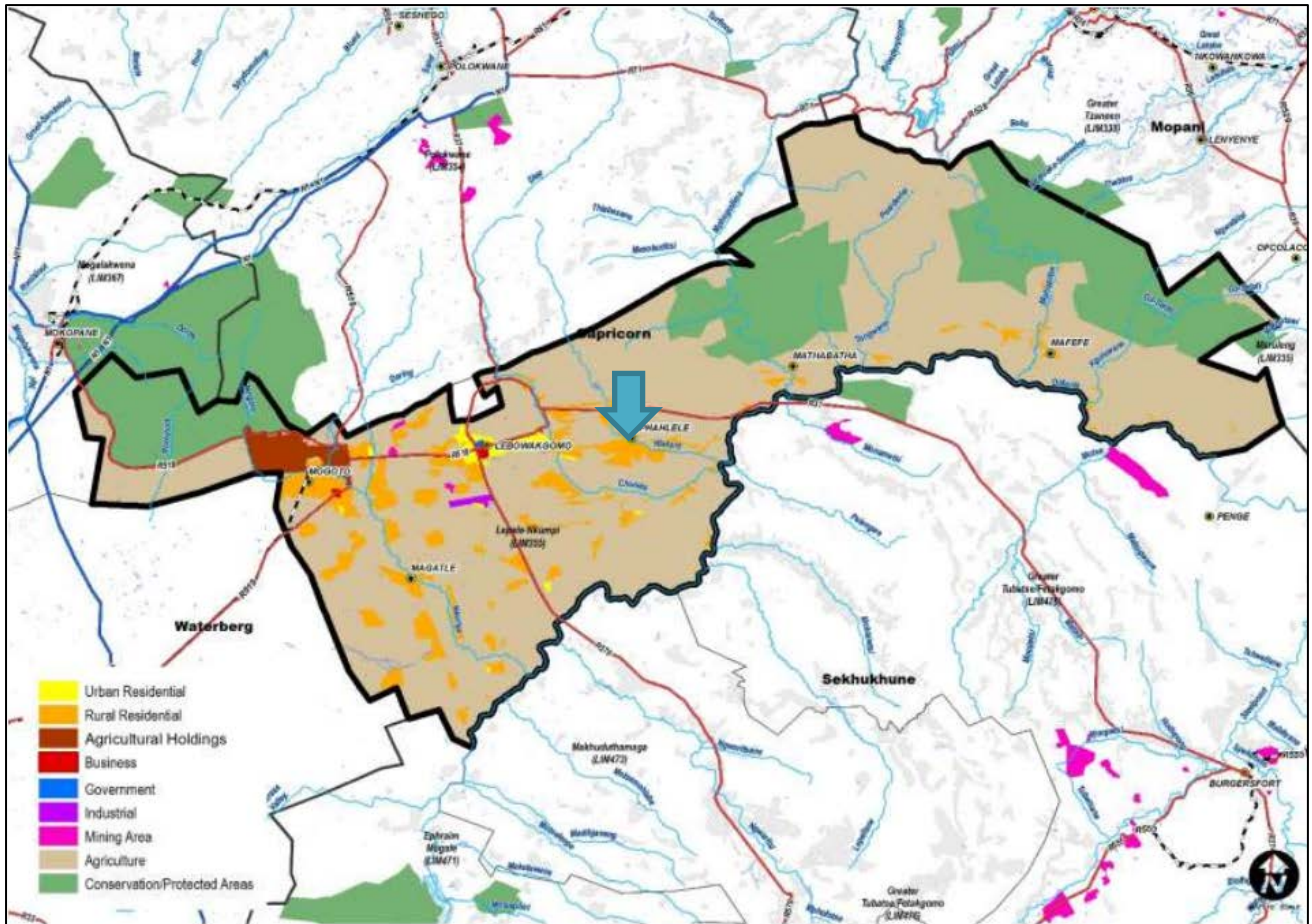


Figure 35: Land use in the Lepelle-Nkumpi LM

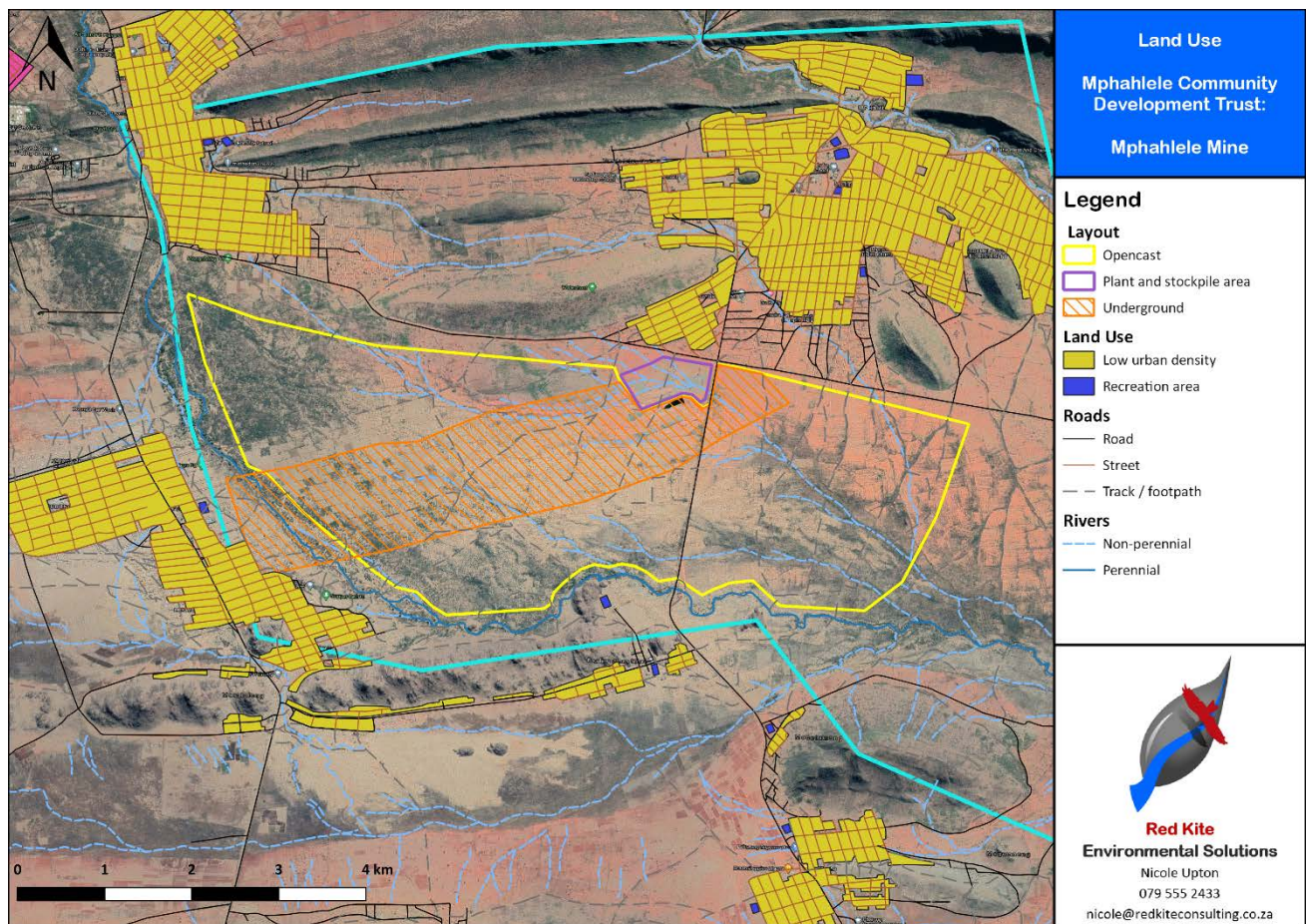


Figure 36: Land use in and around the project area

10.15 DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE

The specific environmental features and infrastructure located across the Target Areas of the Proposed Project have been described in the sections above.

10.15.1 Sensitive landscapes

The occurrence of possible sensitive landscapes at the project site is outlined in the table below.

Table 18: Sensitive Landscapes within the Proposed Mining Site

Types of sensitive landscapes	Occurrence at the Proposed Mining Site
Nature conservation or ecologically sensitive areas - indigenous plant communities (particularly rare communities and forests), wetlands, rivers, riverbanks, lakes, islands, lagoons, estuaries, reefs, inter-tidal zones, beaches and habitats of rare animal species.	<p>This area forms part of the Sekhukhune Centre of Endemism (specifically the Steelpoort Subcentre) which has a high level of biodiversity with some species that can only be found within certain areas along this Centre.</p> <p>The area is located within the Sekhukhune Plains Bushveld. The National Biodiversity Assessment (NBA 2018) rated this vegetation group as Endangered (EN).</p> <p>According to the Limpopo Conservation Plan the project area falls on areas designated as Ecological Support Areas.</p>

Types of sensitive landscapes	Occurrence at the Proposed Mining Site
	Various non-perennial drainage lines, tributaries of the Chunies River, as located on the project footprint. The perennial Chunies River is located on the southern and western border of the project footprint.
Sensitive physical environments - such as unstable soils and geo-technically unstable areas.	None
Important natural resources - river systems, groundwater systems, high potential agricultural land.	The site has medium to high agricultural potential. Various non-perennial drainage lines, tributaries of the Chunies River, as located on the project footprint. The perennial Chunies River is located on the southern and western border of the project footprint.
Sites of special scientific interest	None
Sites of social significance - including sites of archaeological, historic, cultural, spiritual or religious importance and burial sites.	As indicated within the Heritage Report, there are no sites of significance value within the mining area.
Sites of outstanding natural beauty, panoramic views and scenic drives	Due the current mining on site as well as other mining sites within the area, there are no sites of this value.
Green belts or public open space in municipal areas	Not applicable.

10.15.2 Settlements

Three settlement types located within the Lepelle- Nkumpi Local municipal areas can be distinguished. These are clustered or nucleated settlements, linear settlements, and scattered settlements.

- **Clustered or Nucleated Settlements:** This type of settlement is normally found at intersections of roads. The settlement is characterised by buildings or houses which settle together close to the point of intersection
- **Linear Settlements:** This type of settlement is recognised by the line formation of buildings or houses along roads, rivers etc.
- **Linear Settlements:** This type of settlement is recognised by buildings or houses that are far apart which don't follow any particular pattern.

A number of villages are situated in the vicinity of the proposed mining area, i.e. Maralaleng, Lekurung, Dithabaneng, Maejane, Bolopa and Manaileng. The aforementioned villages fall under the Ga- Mphahlele tribal area.

10.15.3 Business

Big businesses are absent from all the affected villages. The smaller businesses are normally found scattered through the residential village areas and are informal in character. Lack of business and employment has caused people to migrate to the bigger towns especially Polokwane and Lebowakgomo in search job opportunities.

10.15.4 Water Supply and Sanitation

Water supply in the affected villages is mainly from underground sources. Water is pumped from underground into a reservoir/elevated tank on the surface, from where is directed to various communal/public stand pipes/taps. 2% in Maralaleng, 0.7% in Lekurung, 5% households in Dithabaneng, 19% in Maejane, 100% in Bolopa and 38% in Manaileng depend on the communal taps for access to drinking water. Few dwellings (8% in Maralaleng, 1% in Lekurung, 18% in

Dithabaneng, 17% in Maejane and 2% in Manaileng) have piped connections and running water in their individual households, a further 84% of the households in Maralaleng, 98% in Lekurung, 48% in Dithabaneng, 28% in Maejane and 57% in Manaileng have boreholes in their respective yards. 6% in Maralaleng, 0.3% in Lekurung, 29% in Dithabaneng, 44% in Maejane and 3% in Manaileng depend on rain water harvested from the roof tops, springs or dams.

Water availability is extremely scarce in the area and the community experience frequent water shortages – especially during the dry winter months. Use of natural, untreated water sources increases the risk of waterborne diseases.

96% of the households in Maejane, 98% in Bolopa and Manaileng, 90% in Maralaleng, 99% in Lekurung and 94% in Dithabaneng have pit toilets. Few households have flush toilets or no toilet, resulting in proper ablution being compromised.

10.15.5 Infrastructure, Electricity and Communication

The level of infrastructure in the affected villages/ communities is low with unreliable means of transport. There is no commercial infrastructure in the affected villages. Of the entire population, only 8% in Maralaleng, 1% in Lekurung, 18% in Dithabaneng, 17% in Maejane and 2% in Manaileng has piped (tap) water inside their dwellings and 67% has piped (tap) water inside the yard. 6% in Maralaleng, 0.3% in Lekurung, 29% in Dithabaneng, 44% in Maejane and 3% in Manaileng has no access to piped (tap) water which implies that they rely on rainwater or have to walk long distances to fetch water.

There is no police station in the affected villages. Access to local policing services can be sought at Lebowakgomo or Polokwane police station. There is no formal waste disposal site and collection method within the villages. The predominant disposal methods are burning or burying.

The electricity provider in the affected villages is ESKOM. 92% of households has access to electricity with only a backlog of 4,809 households to receive electricity. The said electricity power is mainly used for lighting in households due to financial constraints for other uses such as heating and cooking. It is important to note that not all households in these villages are electrified as such, electricity backlogs need to be addressed to ensure electrification in all households. The lack of access to electricity poses a problem to the villages and municipality as it impacts negatively on local economic development and community projects.

The use of animal gas and paraffin and wood as an energy source is common in most villages and it is ascertained that almost all households without electricity depend on either wood or animal gas as an energy source for cooking or heating. Some households use a combination of wood and paraffin for their energy needs. Wood is a natural source that is generally used in most rural areas. Even in a case where electricity is available, it is typical to find rural households using firewood to heat water and for cooking.

Communication within these villages is by mobile public phones and individual cell phones. Other forms of communication include radio and satellite television.

10.15.6 Access Roads

The affected villages of Maejane, Bolopa, Manaileng, Maralaleng, Lekurung and Dithabaneng can be accessed by using the R37 (Polokwane- Burgersfort) provincial road. A survey conducted over a period of five days shows that this road current carries an average of 9200 during the morning hours (06h00-09h00), approximately 8290 vehicles during vehicles daytime (12h00-14h00) and 9100 vehicles in the evening (16h00-18h00).

Access through the affected villages is by both tar and gravel or small dirt roads. Transport is mainly by mini-bus taxis and buses.



11 LIMITATIONS AND ASSUMPTIONS

Assumptions and limitations applicable to specific to the assessment process and mitigation measures proposed in specific specialist studies include the following:

11.1 SOIL AND LAND CAPABILITY ASSESSMENT

- Soil profiles were observed using a 1.2 m hand-held soil auger. A description of the soil characteristics deeper than 1.2 m cannot be given.
- The study does not include a land contamination assessment to determine preconstruction soil pollution levels (should there be any present).
- The study also does not include an agricultural economic assessment to establish the economic value of the activities taking place on site in comparison to the value of the mining activity. It is assumed that the value of the saleable produce that will be produced by the mine is significantly higher than what will be generated by agricultural activities.
- Sampling by definition means that not all areas are assessed, and therefore some aspects of soil and land capability may have been overlooked in this assessment. However, it is the opinion of the specialist that this assessment was carried out with sufficient sampling and in sufficient detail to enable the proponent, the Environmental Assessment Practitioner (EAP) and the regulating authorities to make an informed decision regarding the proposed mining activities.
- Land Capability was classified according to current soil restrictions, with respect to prevailing climatic conditions on site; however, it is virtually impossible to achieve 100% purity in soil mapping, the delineated soil map units could include other soil type(s) as the boundaries between the mapped soils are not absolute but rather form a continuum and gradually change from one type to another. Soil mapping and the findings of this assessment were therefore inferred from extrapolations from individual observation points.
- Since soils occur in a continuum with infinite variances, it is often problematic to classify any given soils as one form, or another. For this reason, the classifications presented in this report are based on the "best fit" to the soil classification system of South Africa.
- Soil fertility status was not considered a limitation, seeing as inherent nutrient deficiencies and/or toxicities would be rectified by appropriate liming and/or fertilization prior to cultivation.

11.2 SURFACE WATER AND AQUATIC ECOLOGY ASSESSMENT

- All opinions and comments are based on available resources and data at the time and findings during the site assessment.
- A field assessment has been conducted based on selected representative biomonitoring points for possible future sampling and although surveyed during the high flow season at the time of assessment, the flow was too little to be viable for meaningful SASS implementation. The quantity was suitable to obtain a water quality sample.
- No formal floodline, hydrological modelling or water balancing formed part of the scope of work for this report, however, these are the subjects of separate stand-alone reports and has been incorporated where appropriate. For detail regarding the aforementioned aspects, please refer to the separate report to be submitted.
- No wetland assessment or delineation forms part of this report or scope of work and no wetlands are applicable since the section of the river was found to be a riparian river system and watercourse and not a channel valley bottom wetland system.

11.3 GROUNDWATER STUDY

Recommendations to improve Model Confidence:

The simulated mine inflow values should therefore be an initial estimate, which should be reviewed once the actual mine plan with reef elevations become available. To increase the formal classification of the model confidence from Class 1 to Class 2, the following steps should be undertaken (in decreasing priority):

1. Incorporation of actual reef elevations and mine plans for open cast and underground workings once available.
2. Re-calibration of groundwater flow model against observed mine inflows once new mining areas become operational.
 - Continuous monitoring of mine inflows/seepages
 - Monitoring boreholes should be drilled/implemented for this purpose once mining commence.

11.4 TERRESTRIAL ECOLOGY ASSESSMENT

- All opinions and comments are based on available resources and data at the time and findings during the site assessment.
- The ecological assessment is confined to the study area and does not include the neighbouring and adjacent properties
- No alternatives are available for the Mphahlele Mining Right nor provided by the client at this stage of the process. It is understood that the client also needs to apply for a WUL application.
- All opinions and comments are based on available resources and data at the time and findings during the site assessment.
- A field assessment has been conducted based on selected representative vegetation and habitat points.
- The baseline desktop study was conducted with up-to-date resources and the site visit was conducted as thoroughly as possible.
- It might however be possible that additional information become available in time, because environmental impact assessments deal with dynamic natural ecosystems;
- To perform an exhaustive fauna survey of a study area requires an extensive amount of time (years) due to the very secretive and unpredictable movements of most reptile and mammal species and the migratory movements of bird species across seasons and time scales. Results of fauna field surveys are limited by time and funding availability as well as the movement/activity patterns of the herpetofauna, avifauna and mammalian community during the survey period. As a result, typical herpetofauna, avifauna and mammalian communities found within the study should/can therefore only be used as a general guideline;
- As the investigation was conducted during more than one site visit within the summer period and a site visit during the winter season, it increases the confidence of the study done;

11.5 AIR QUALITY ASSESSMENT

Worst case scenarios were selected as inputs in the AERMOD model, where both the opencast and underground operations are running at full production rates, for the modelling. The position and length of the haul road were also assumed as no further information were available at the time of this report. The assumption can however be considered conservative.

11.6 NOISE IMPACT ASSESSMENT

There are limitations and uncertainties regarding acoustical measurements. Noise levels has the potential to fluctuate based on numerous components, including:

- The noise level may change from day to day due to activities within a community (e.g. road traffic fluctuations, see point below) or even at a singular dwelling itself. Dwelling related infrastructure (e.g. air-conditioning units, swimming pool pumps etc.) that has the potential to influence noise levels in terms of dB.
- Seasonal changes have the potential to influence sound levels directly (e.g. rain) or indirectly (influence from faunal communication, see point below).
- Faunal communication measurement fluctuations due to seasonal, time of day or night etc. Certain fauna communicates during certain hours e.g. cicada may only audible during night hours, crepuscular birds are only audible during evening or night hours, crickets may be more audible active as seasons get hotter etc.
- Measurements near mining and industries fluctuates depending on equipment in use, capacity load in use, unforeseen equipment in care and maintenance. Certain equipment may not be running optimally, with the consequence been excessive elevated noise levels (e.g. gas leaks, conveyor pulley roller squeaking, excessive vibrations (and associated noise) from unmaintained dampers on equipment etc.
- Road traffic noise fluctuates due to time of measurement investigation (e.g. peak traffic morning or evening conditions, early morning hours etc.); and
- Meteorological conditions can influence noise measurements. These include inversion and diffraction in the temperature layer, change in temperature and humidity etc.

Where necessary longer-term measurements may be required to be conducted. For a Rating level determination, 10-minute measurement (day and night), desktop assessment (of development of the area) as well as onsite investigations can be considered sufficient. For a noise source investigation (e.g. operational monitoring) longer-term measurements may counter above limitations (if confidence in 10- minute measurements is low).

11.7 BLASTING AND VIBRATION ASSESSMENT

The following assumptions have been made:

- The project area is not currently an active full-scale mining operation. Drilling and blasting operations were done under mining permit.
- The anticipated levels of influence estimated in this report are calculated using standard accepted methodology according to international and local regulations.
- The assumption is made that the predictions are a good estimate with significant safety factors to ensure that expected levels are based on worst case scenarios. These will have to be confirmed with actual measurements once the operation is active.
- The limitation is that limited data was available from this operation for a confirmation of the predicted values.
- During the mining of the permit area Blast Management and Consulting provided the contractor with generic blast designs. This report utilises design from the original blast proposals as baseline. Original blast proposal is attached as Appendix 1.
- The work done is based on the author's knowledge and information provided by the project applicant.

11.8 VISUAL ASSESSMENT

Assumptions

- Due to the terrain of the study area, the core study area can be defined as an area with a radius of not more than 5km from the activities and a total study area with a radius of 10 km from the activities. This is because the visual impact beyond 6 km would be so reduced that it can be considered negligible even if there is direct line of sight.
- Only viewpoints within 5 km from the activities were assessed for potential impacts.
- It is assumed that there are no alternative locations for the proposed mining activities and that the visual

assessment, therefore, assessed only the proposed site.

- The assessment was undertaken during the planning stage of the project and is based on the information available at that time.
- Closure Phase impacts were not considered as part of the assessment as closure activities will be of short duration, and mainly rehabilitation monitoring practices will take place in the long term.

Limitations

- Visual perception is by nature a subjective experience, as it is influenced largely by personal opinions and world views. For instance, what one viewer may experience as an intrusion in the landscape, another may regard as positive. Such differences in perception are greatly influenced by culture, education, and socio-economic background. A degree of subjectivity is therefore bound to influence the rating of visual impacts. To limit such subjectivity, combinations of quantitative and qualitative assessment methods were used. A high degree of reliance was placed on GIS-based analysis viewshed and visibility analysis, and on making transparent assumptions and value judgements where such assumptions or judgements are necessary.
- The viewshed generated in GIS and Google Earth Pro are not 100% accurate due to unknown developments and modification of the natural environment and presents a limitation. Site visits are therefore used to verify the physical land conditions, such as natural vegetation, topography and or recent building or construction developments.

11.9 HERITAGE ASSESSMENT

Due to community issues and safety, the Heritage Specialist was accompanied by community representatives during the fieldwork. This hampered movement around the area and access to certain sections to some degree and this needs to be taken into consideration in the results obtained.

Dense vegetation in some sections made visibility difficult and it is possible that small, individual objects and cultural heritage remains could have been missed. It is however believed that large and significant archaeological and historical remains and features would have been visible and that the likelihood that these are present in the area is fairly small.

There is obviously always the possibility of unknown and invisible sites being present in the specific and larger area surrounding the mining operations. Earlier surveys in the larger geographical and neighboring areas showed that there are both prehistoric archaeological remains (Stone Age & Iron Age), as well as recent historical (homestead remains and graves/cemeteries) present.

It should also be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration.

11.10 PALAEOLOGICAL IMPACT ASSESSMENT

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the mafic volcanic rocks, diabase dykes, sandstones and shales are typical for the country and do not contain fossils. The Magaliesberg Formation is on the northern-most margin but is not the target of the mining operation. No trace fossils have been reported from here, and the proximity to the intrusive rocks means that any fossils are likely to have been destroyed when the hot magma intruded.

11.11 SOCIO-ECONOMIC IMPACT ASSESSMENT

No assumptions or limitations are noted in the Socio-economic Impact Assessment report.

12 FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE (IN RESPECT OF THE FINAL SITE LAYOUT PLAN) THROUGH THE LIFE OF THE ACTIVITY.

The criteria for the description and assessment of environmental impacts were drawn from the EIA Guidelines, National Environmental Management Act (Act No. 107 of 1998): EIA Regulations (2014) and as amended from time to time.

The level of detail as depicted in the EIA Guidelines was fine-tuned by assigning specific values to each impact. In order to establish a coherent framework within which all impacts could be objectively assessed, it was necessary to establish a rating system, which was applied consistently to all the criteria. For such purposes, each aspect was assigned a value, ranging from one (1) to five (5), depending on its definition. This assessment is a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

An explanation of the impact assessment criteria is defined below.

Table 19: Impact Assessment Criteria

EXTENT	
Classification of the physical and spatial scale of the impact	
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
Site	The impact could affect the whole, or a significant portion of the site.
Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
National	The impact could have an effect that expands throughout the country (South Africa).
International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.
DURATION	
The lifetime of the impact that is measured in relation to the lifetime of the proposed development.	
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
Short to Medium term	The impact will be relevant through to the end of a construction phase (1.5 years).
Medium term	The impact will last up to the end of the development phases, where after it will be entirely negated.
Long term	The impact will continue or last for the entire operational lifetime i.e. exceed 30 years of the development, but will be mitigated by direct human action or by natural processes thereafter.
Permanent	This is the only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
INTENSITY	
The intensity of the impact is considered by examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment itself. The intensity is rated as	
Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
PROBABILITY	

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:	
Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0 %).
Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25 %.
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50 %.
Highly Likely	It is most likely that the impacts will occur at some stage of the development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75 %.
Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied on. The chance of this impact occurring is defined as 100 %.

The status of the impacts and degree of confidence with respect to the assessment of the significance must be stated as follows:

- **Status of the impact:** A description as to whether the impact would be positive (a benefit), negative (a cost), or neutral.
- **Degree of confidence in predictions:** The degree of confidence in the predictions, based on the availability of information and specialist knowledge.

Other aspects to take into consideration in the specialist studies are:

- Impacts should be described both before and after the proposed mitigation and management measures have been implemented.
- All impacts should be evaluated for the full-lifecycle of the proposed development, including construction, operation and decommissioning.
- The impact evaluation should take into consideration the cumulative effects associated with this and other facilities which are either developed or in the process of being developed in the region.
- The specialist studies must attempt to quantify the magnitude of potential impacts (direct and cumulative effects) and outline the rationale used. Where appropriate, national standards are to be used as a measure of the level of impact.

Mitigation

The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. The mitigation measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

(i) Determination of Significance-Without Mitigation

Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

Table 20: Significance-Without Mitigation

NO SIGNIFICANCE	The impact is not substantial and does not require any mitigation action.
LOW	The impact is of little importance, but may require limited mitigation.
MEDIUM	The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
HIGH	The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

(ii) *Determination of Significance- With Mitigation*

Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures. Significance with mitigation is rated on the following scale:

Table 21: Significance- With Mitigation

NO SIGNIFICANCE	The impact will be mitigated to the point where it is regarded as insubstantial.
LOW	The impact will be mitigated to the point where it is of limited importance.
LOW TO MEDIUM	The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.
MEDIUM	Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
MEDIUM TO HIGH	The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels.
HIGH	The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Assessment Weighting

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

(iii) *Ranking, Weighting and Scaling*

For each impact under scrutiny, a scaled weighting factor is attached to each respective impact (refer Table 22). The purpose of assigning weights serves to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance.

Table 22: Description of assessment parameters with its respective weighting

EXTENT		DURATION		INTENSITY		PROBABILITY		WEIGHTING FACTOR (WF)		SIGNIFICANCE RATING (SR)	
Footprint	1	Short term	1	Low	1	Probable	1	Low	1	Low	0-19
Site	2	Short to Medium	2			Possible	2	Low to Medium	2	Low to Medium	20-39
Regional	3	Medium term	3	Medium	3	Likely	3	Medium	3	Medium	40-59
National	4	Long term	4			Highly Likely	4	Medium to High	4	Medium to High	60-79
International	5	Permanent	5	High	5	Definite	5	High	5	High	80-100
MITIGATION EFFICIENCY (ME)				SIGNIFICANCE FOLLOWING MITIGATION (SFM)							
High				0.2		Low		0 - 19			
Medium to High				0.4		Low to Medium		20 - 39			
Medium				0.6		Medium		40 - 59			
Low to Medium				0.8		Medium to High		60 - 79			
Low				1.0		High		80 - 100			

(iv) Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1:

Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

(v) Identifying the Potential Impacts with Mitigation Measures (WM)

In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it was necessary to re-evaluate the impact.

(vi) Mitigation Efficiency (ME)

The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation efficiency (ME) rating (refer to Table 22). The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency
or WM = WOM x ME

(vii) Significance Following Mitigation (SFM)

The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact is therefore seen in its entirety with all considerations taken into account.

13 THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY (IN TERMS OF THE INITIAL SITE LAYOUT) AND ALTERNATIVES WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

The sites for the infrastructure related to the proposed mining operations are located at the various points which are practical for the mining and would have the least impact on the surrounding environment. The areas used for above ground infrastructure can be altered to a greater extent in relation to receiving environment sensitivities and as such, there are areas which have been determined to be the “preferred alternatives” and those areas which can be considered “secondary alternatives”. These areas have been determined from a preliminary evaluation of how they are most optimally configured between the open-pits, outside of the 1:100 flood line and away from potentially sensitive areas, in favour of proposed positioning on previously disturbed farming and agricultural land.

Refer to Section 7 for details on the alternatives considered.

Similar positive and negative impacts are anticipated for alternative site locations as identified in the sections above. Impacts as specified within the specialist reports are explained in detail within the sections below:

13.1 SOIL AND LAND CAPABILITY IMPACTS

13.1.1 Construction Phase

The impacts to consider are those relating to the disturbance of the natural soil site. When soil is stripped, the physical properties are changed and this impacts on the soil health. During soil stockpiling, the soils’ chemical properties will deteriorate unless properly managed. These will lead to loss of the topsoil layer.

Vehicles will drive on the soil surface during the construction phase, thereby causing compaction of the soils. This reduces infiltration rates and ability for plant roots to penetrate the compacted soil. Vegetation cover will be reduced and runoff potential will be increased. In which increased runoff potential will lead to increased erosion hazards. Soils should be handled with care from the construction phase through to the decommissioning phase. Topsoil and subsoil should not be stockpiled together as the topsoil’s seed bank and natural soil fertility is diluted.

Soil is susceptible to compaction from heavy construction equipment and vehicles when soil is stripped and stockpiled. Soil compaction reduces ability of plants to absorb water due to soil pores being decreased, reduces water infiltration rate and bulk density increases.

Table 23: Summary of the Potential Impact for the Loss of Topsoil as a Resource

Nature of Impact:		
The construction of the Mphahlele Mine and the associated infrastructure will require the clearing and levelling of a limited area of land. It will also consist of open pit excavations and underground excavation. During any excavation activity, the soil chemical and physical properties are impacted on. The movement of heavy machinery on the soil surface causes compaction which reduces the vegetation’s ability to grow and as a result erosion could occur. The erosion potential of the area is increase as a result of the exposed surface.		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Site (2)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude (intensity)	Very High (10)	Moderate (6)
Probability	Definite (5)	Highly Likely (4)
Significance Rating (SR)	High (80)	Moderate (48)

Status (positive, neutral or negative):	Negative
Reversibility:	Yes
Irreplaceable loss of resources:	Yes
Can impact be mitigated:	Yes
Mitigation Measures:	
<ul style="list-style-type: none"> • Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint. • Follow adequate stripping guidelines as mentioned in Section 9. • Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. • If possible, topsoil should be stripped during dry months, as to reduce compaction. • Unnecessary land clearance must be avoided. • Soil stockpiles must be dampened with dust suppressant or equivalent. • Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. • Ensure topsoil is stored in one dedicated stockpile, 10 m high. • Only the designated access routes are to be used. • The Stormwater Management Plan (SWMP) to be implemented. • Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design. • Revegetate cleared areas as soon as possible after construction activities. • Existing excavations and old trenches associated with the historical mining, must be rehabilitated, and revegetated to prevent erosion from these areas. • Oil and hydrocarbon spills should be cleaned in accordance with a spill procedure. 	

Table 24: Summary of the Potential Impact for the Loss of Land Capability and Land Use

Nature of Impact:		
Removal of soil layers will impact on land capability and potential land use. Land use will be changed from subsistence agriculture and grazing to mining, thus increasing the impact on soils.		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Site (2)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude (intensity)	Very High (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance Rating (SR)	High (80)	High (70)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	
Mitigation Measures:		
<ul style="list-style-type: none"> • Keep the project footprint as small as possible. • Rehabilitate and revegetate the soil form areas that were left as open trenches and old excavations in order to improve the land capability of these areas. • Subsistence farming and grazing should be permitted to continue on the areas within the mining area that will not be mined within a 6-month period. 		

13.1.2 Operational Phase

During the operational phase, erosion and compaction of all exposed areas and land capability and land use are the major impacts to consider. When topsoil is compacted or eroded, the soil profile is compromised and its ability to function as a growth medium is restricted. The movement of heavy machinery on the soil surface causes compaction which reduces the vegetation’s ability to grow and as a result the risk of erosion will increase. Stripping and stockpiling as described in the construction phase will continue during the operational phase. When topsoil is removed from the open pit, the land capability is reduced and land use will change from agricultural to mining. There is loss of agricultural potential and topsoil degradation.

The contamination of soil from spillages of organic hydrocarbons is likely to occur as heavy mobile equipment typically use these chemicals. Contamination especially along the plant area is also anticipated. The contamination of topsoil from cement mixing is also anticipated during the construction phase. These contaminants are likely to leach into the soil resulting in the sterilisation of the soil. Soil contamination will minimise the land suitability for other land uses outside of industrial or mining due to the potential human health risk associated with contaminated soils. The impact significance is considered medium-low, given that the effect will be localized and has the potential to be long-term if contaminants are not removed or contained.

Table 25: Summary of the Potential Impacts for the Loss of Stockpiled Topsoil

Nature of Impact:		
The construction of the Mphahlele Mine and the associated infrastructure will require the clearing and levelling of a limited area of land. It will also consist of open pit excavations and underground excavation. Topsoil losses can occur during the operational phase as a result of rainwater runoff and wind erosion from roads and soil stockpiles. Compaction of soils during operational phase will occur.		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Site (2)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude (intensity)	Very High (10)	Moderate (6)
Probability	Definite (5)	Highly Likely (4)
Significance Rating (SR)	High (80)	Moderate (48)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	
Mitigation Measures:		
<ul style="list-style-type: none"> • Follow adequate stripping guidelines in Section 14. • Land clearance must only be undertaken one cut in advance. Unnecessary land clearance must be avoided. • Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. • If possible, topsoil should be stripped when soil is dry, as to reduce compaction. • Ensure topsoil is stored in one dedicated stockpile, 10 m high and away from drainages lines and surface water. • Soil stockpiles must be dampened with dust suppressant or equivalent. • Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. • The Stormwater Management Plan (SWMP) should provide for a drainage system sufficiently designed to prevent water run-off to the open cast and underground areas, as well as from the plant area which will cause soil erosion. • Where discharge of rainwater on roads will be channelled directly into the natural environment, the 		

<p>application of diffuse flow measures must be included in the design.</p> <ul style="list-style-type: none"> • Revegetate cleared areas as soon as possible after construction activities. • Existing excavations and old trenches associated with the historical tungsten mining, must be rehabilitated, and revegetated to prevent erosion from these areas. • Oil and hydrocarbon spills should be cleaned in accordance with a spill procedure. • Only the designated access routes are to be used. • Stockpiles are to be maintained in a fertile and erosion free state by sampling and analysing annually for macro nutrients and soil pH, and vegetating the stockpiles to reduce erosion. • Concurrent rehabilitation and re-vegetation of the areas mined out should take place.
--

Table 26: Summary of the Potential Loss of Land Use and Land Capability

Nature of Impact:		
When topsoil is removed from the open pit, land capability is reduced. The land use will be change from intensive cultivation to mining. As the pit expands in size the level of this impact increases as larger areas of land are converted.		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Site (2)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude (intensity)	Very High (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance Rating (SR)	High (80)	High (70)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	
Mitigation Measures:		
<ul style="list-style-type: none"> • Follow adequate stripping guidelines in Section 9. • Land clearance must only be undertaken one cut in advance. Unnecessary land clearance must be avoided. • Stockpiles are to be maintained in a fertile and erosion free state by sampling and analysing annually for macro nutrients and soil pH, and vegetating the stockpiles to reduce erosion. • Concurrent rehabilitation and re-vegetation of the areas mined out should take place. • Rehabilitate and revegetate the soil form areas that were left as open trenches and old excavations in order to improve the land capability of these areas. • Subsistence farming and grazing should be permitted to continue on the areas within the mining area that will not be mined within a 6-month period. 		

Table 27: Summary of the Potential Soil Contamination Impact Significance

Nature of Impact:
The following construction activities can result in the chemical pollution of the soil:
<ol style="list-style-type: none"> 1. Hydro-carbon spills by machinery and vehicles during earthworks and the mechanical removal of vegetation during site clearing. 2. Spills from vehicles transporting workers, equipment and construction material to and from the construction site. 3. The accidental spills from temporary chemical toilets used by construction workers. 4. The generation of domestic waste by construction and operational workers. 5. Spills from fuel storage tanks during construction. 6. Polluted water from wash bays and workshops during the construction phase. 7. Accidental spills of other hazardous chemicals used and stored on site. 8. Pollution from concrete mixing.

The operation of the mine can result in the chemical pollution of the soil:		
<ol style="list-style-type: none"> 1. Spills from vehicles transporting workers and equipment to and from the operation site. 2. The generation of domestic waste by operational workers. 3. Accidental spills of other hazardous chemicals used and stored on site. 		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Footprint (1)	Footprint (1)
Duration	Short term (2)	Short term (2)
Magnitude (intensity)	Low (4)	Insignificant (2)
Probability	Highly Likely (4)	Likely (3)
Significance Rating (SR)	Low (28)	Low (15)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	No	
Can impact be mitigated:	Yes	
Mitigation Measures:		
<ul style="list-style-type: none"> • High level maintenance must be undertaken on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. • Impermeable and bunded surfaces must be used for storage tanks and to park vehicles on. • Site surface water and wash water must be contained and treated before reuse or discharge from site. • Spills of fuel and lubricants from vehicles and equipment must be contained using a drip tray with plastic sheeting filled with adsorbent material. • Spill kits should be available on site and should be serviced regularly. • Waste disposal at the construction site and during operation must be avoided by separating, trucking out and recycling of waste. • Potentially contaminating fluids and other wastes must be contained in containers stored on hard surface levels in bunded locations. • Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols as outlined in the EMPr. 		

13.1.3 Decommissioning Phase

The major impacts to consider in the decommissioning and rehabilitation of the site will be the loss of topsoil as a resource through erosion and compaction. When the decommissioning and removal of infrastructure takes, vehicles will drive on the surface compacting it and this reduces infiltration rates as well as the ability for plant roots to penetrate the compacted soil. Vegetation cover will be reduced and increases runoff potential, therefore increased runoff potential leads to increased erosion hazards. During the decommissioning and rehabilitation phase, the open pit will be rehabilitated as per the rehabilitation guideline.

Table 28: Loss of Topsoil as a Resource: Compaction and Erosion

Nature of Impact:		
Decommissioning and rehabilitation of the infrastructure and open pit areas could cause erosion and compaction if rehabilitation is not done correctly. Heavy machinery driving continuously over rehabilitated areas may result in compaction which could impact on plant rooting depth which then would have an impact to vegetation establishment.		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Site (2)	Site (2)
Duration	Long Term (4)	Long Term (4)

Magnitude (intensity)	Very High (10)	High (8)
Probability	Definite (5)	Highly Likely (4)
Significance Rating (SR)	High (80)	Moderate (56)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	
Mitigation Measures:		
<ul style="list-style-type: none"> • Deep rip compacted areas to allow for natural vegetation regrowth. • Ensure proper storm water management designs are in place; • Replaced soils to be re-vegetated and designed according to Chamber of Mines Rehabilitation Guidelines. • Soils must be replaced according to the soil types. • Compaction of the topsoil should be avoided. • A bowl scrapper is to be avoided as this piece of machinery compacts soil. • Areas where growth is slow to be re-vegetated to prevent compaction and erosion. • Post-closure monitoring and maintenance to be undertaken. 		

Table 29: Loss of Land Capability

Nature of Impact:		
Backfilling of soil material layers will impact on land capability and land use. Infrastructure area will be rehabilitated and the land capability may be restoring to pre-mining land capability.		
	No Mitigation	With Mitigation
Spatial Scale (extent)	Site (2)	Site (2)
Duration	Long Term (4)	Long Term (4)
Magnitude (intensity)	High (8)	Moderate (6)
Probability	Definite (5)	Highly Likely (4)
Significance Rating (SR)	High (70)	Moderate (48)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	
Mitigation Measures:		
<ul style="list-style-type: none"> • Area to be rehabilitated, re-vegetated and soil amelioration to be undertaken • Grazing should be initiated on areas to improve soil structure and organic content. • Backfill should be done in such a manner that topsoil is not mixed with subsoil or material containing rocks. • Moderate to High agricultural value topsoil should be stored separately and utilised during rehabilitation to create areas of higher agricultural value. • Contour slopes to minimise erosion and run-off. 		

13.2 SURFACE WATER AND AQUATIC ECOLOGY IMPACTS

Activities during Construction and Operation that could potentially create impacts to the aquatic ecological environment:

Table 30: Activities and possible impacts during the Establishment (Construction), Operation and Closure phase

Activity	Impact
Alteration of drainage patterns	Alteration of drainage by diversion of the Chunies river and drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve
Runoff from the dirty water areas	Potentially contaminated runoff reporting into the unnamed tributaries, drainage lines and Chunies river resulting in water contamination and the deterioration of the water quality.
Hydrocarbon spillage and runoff	Deterioration of water quality in the River due to contaminated soil and storm water runoff. Hydrocarbon has a toxic effect on the aquatic communities found within water systems and may lead to death and shifts in community structures occurring
Sedimentation of water resources	Nutrient enrichment and leading to decline of Dissolved Oxygen (DO), thereby impacting the aquatic invertebrate communities found within the areas if flow is present.
Deterioration in surface water quality and changes in PES	If tributaries are negatively affected, the River may also be negatively affected and may lead to a deterioration of the Present Ecological Status (PES).

Table 31: Surface Water and Aquatic Ecology Impact and Risk Assessment

Potential Impact	Activity	Phase	Extend		Duration		Intensity		Probability		WF ²		Significance Without Mitigation		ME ³		Significance With Mitigation	
Alteration of drainage patterns	Alteration of drainage by diversion of the Chunies river and drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve	C, O, D	Site	2	Long term	4	Medium	3	Definite	5	High	4	Medium	56	Medium-High	0,4	Medium-Low	22,4
Runoff from the dirty water areas	Potentially contaminated runoff reporting into the unnamed tributaries, drainage lines and Chunies river resulting in water contamination and the deterioration of the water quality.	C, O, D	Regional	3	Long term	4	Medium	3	Highly likely	4	High	4	Medium	56	Low-Medium	0,8	Medium	44,8
Hydrocarbon spillage and runoff	Deterioration of water quality in the River due to contaminated soil and storm water runoff. Hydrocarbon has a toxic effect on the	C, O, D	Regional	3	Long term	4	Medium	3	Possible	2	High	4	Medium	48	Low-Medium	0,8	Medium-Low	38,4

² Weighting Factor

³ Mitigation Efficiency

Potential Impact	Activity	Phase	Extend		Duration		Intensity		Probability		WF ²		Significance Without Mitigation		ME ³		Significance With Mitigation	
	aquatic communities found within water systems and may lead to death and shifts in community structures occurring																	
Sedimentation of water resources	Nutrient enrichment and leading to decline of Dissolved Oxygen (DO), thereby impacting the aquatic invertebrate communities found within the areas if flow is present.	C, O, D	Regional	3	Long term	4	Medium	3	Possible	2	High	4	Medium	48	High	0,2	Low	9,6
Deterioration in surface water quality and changes in PES	If tributaries are negatively affected, the River may also be negatively affected and may lead to a deterioration of the Present Ecological Status (PES).	C, O, D	Local	2	Long term	4	Medium	3	Highly likely	4	High	4	Medium	52	High	0,2	Low	10,4

13.3 GROUNDWATER IMPACTS

Impacts on the local and regional ambient groundwater environment due to the proposed chrome mining of the Mphahlele Mining Project may consist of changes in the groundwater quantity (i.e. groundwater levels and flow directions), changes in the ambient groundwater quality, or both. The significance rating of impacts on the groundwater quantity during the operational and post-closure phase of the mine is provided in the table below.

13.3.1 Construction Phase

The only foreseeable potential impact on the ambient groundwater quality during the construction phase is due to accidental hydrocarbon or other chemical spillages from the construction vehicles. Such spillages are localised, quickly reversible if properly contained and/or excavated and unlikely to occur. The severity of groundwater being negatively impacted by accidental spillages is rated as “low” during the short construction phase before and after mitigation.

The mine should develop and maintain a Standard Operating Procedure to contain and remediate any accidental hydrocarbon or other chemical spillages.

13.3.2 Operational Phase

1.1.2.1. Impacts on groundwater quantity

The operational phase entails mining of the open pit with truck and shovel with subsequent drilling and blasting of rock (interburden etc.). The opencast will be phased out to allow the underground to be mined in the latter stages of the mine. Groundwater inflows into the open cast pit and underground mine change the volume of groundwater in the aquifer storage (lowering of water table) and re-directs local to regional groundwater flow towards the mine voids (representing a new, lower drainage elevation).

The partial dewatering of the aquifer above and in the vicinity of the mining area mine voids is more significant in the shallow weathered basement aquifers during life of mine. Impacts may relate to the reduction in contribution to the Hlakaro- and Chunies drainage system north and south-west of the pita area, respectively. Within the depicted cone of dewatering area, the lowering of the water table may result in a partial to complete reduction of borehole yields within the affected areas.

1.1.2.2. Impacts on groundwater quality

Influences on the groundwater quality during LoM are associated with seepage from the PCDs and TSFs. However, the PCDs are lined facilities and no significant impacts on the groundwater regime is expected from these facilities. The seepage plumes emanating from the TSF will predominantly impact on the ambient groundwater quality of the shallow weathered aquifer. Considering the expected leachate concentrations (Appendix A and Table 6-3) and slow rate of plume migration low impacts on the ambient groundwater quality are expected.

Once groundwater enters the mine voids, it is considered “dirty” due to the interaction with exposed sulphide bearing minerals, dust, etc. and will require appropriate management after abstraction. However, the successive open cuts of the mine will act as a “sink of groundwater” due to mine inflows and subsequent abstractions to facilitate mining. The groundwater gradient within the aquifer is therefore generally re-directed towards the mine voids and no measurable changes in the ambient groundwater quality due to the mining operation is expected.

Monitoring of mine effluent and seepage should be performed to assure protection of the environment and early detection of potential environmental issues, allowing evaluation and, if necessary, adaptive management interventions. Continuous monitoring of mine inflows, water levels, source concentrations (i.e. regular geochemical characterization of tailings and actual backfill material) and potential leachate plume concentrations around the backfilled pit, downstream of the TSFs and in downstream surface water courses should be performed. Adaptive management of plumes, i.e. hydraulic plume containment should be initiated if and when required.

Concurrent rehabilitation/covering of backfilled pit areas (smooth slope angles, top-soiling and seeding) and augmentation of groundwater supply to affected 3rd party groundwater users.

It is furthermore recommended that the numerical model and geochemical study are updated biennially during the life of mine to calibrate and validate its results and to inform effective water management and closure planning.

13.3.3 Post-mining Phase

1.1.2.3. Impacts on groundwater quantity

Seepage from the TSF will continue to migrate and may impact on the groundwater quality post closure. However, with cessation of active deposition and rehabilitation of the facilities a lower seepage rate will result. In addition, recharge from rainfall will start flushing the higher source concentrations experienced during the operational phase (driven by tailings liquor) slowly out of the system, resulting in a reduced source concentration.

Post-closure, water levels start to re-bound due to groundwater recharge and lateral inflows into the backfilled pit and underground mine voids, filling up the mine voids itself as well as the operational cone of dewatering over time. The previous impacts on water-levels and flow directions associated with the mine dewatering will start to dissipate, albeit the potentially altered topography, elevated conductivity and recharge rate of the backfilled pit areas will result in a new dynamic hydraulic equilibrium, i.e. water levels different from the pre-mining conditions will be gradually established. The water levels within the backfilled areas will be flatter due to the enhanced hydraulic conductivity.

Continuous monitoring of downstream plume migration. Should environmentally unacceptable concentrations of constituents of concern be identified during monitoring of the boreholes, hydraulic plume containment should be initiated.

The rebound within the backfilled areas should be monitored at strategic locations. The monitoring programme should be altered as the operational and closure design triggers changes in the correct position of monitoring boreholes.

Monitoring of the rebounding water levels and qualities within the backfilled pit and the surrounding aquifer should continue until levels and qualities stabilised, which will take at least several decades.

Should the rebounding water levels trigger a risk of diffuse plume migration into the (adjacent) weathered aquifer or to surface, abstraction wells should be drilled into the backfilled areas to maintain the water levels below environmentally critical elevations.

Table 32: Groundwater quantity and quality impacts during the operational and post-closure phase

Nature of Impact	Phase	Extent	Duration	Intensity	Probability	Weighting Factor	Significance	Mitigation measures	Mitigation Efficiency	Significance
							Pre-Mitigation			Post- Mitigation
Mine inflows and associated lowering of water table	Operational (LoM) 16 years	2	4	5	4	3	45	1) Continuous monitoring of mine inflows (daily) and water levels (quarterly) within the predicted zone of dewatering 2) Excess water must be pumped to the water storage facilities (PCDs) for re-use and/or treatment and environmentally acceptable disposal. 3) Provision of alternative water supply to affected users / compensation for well yield losses or increased pumping costs (due to increased lift height and/or yields)	0.8	36
Stockpiling of overburden and TSF, storage of polluted water in the newly built lined PCDs.	Operational (LoM) 16 years	1	4	3	4	3	36	1) Continuous monitoring of downstream concentrations (Stockpiles, TSF, PCDs and mining areas) 2) Concurrent rehabilitation/covering of backfilled areas 3) Adaptive management of TSF plume, i.e. hydraulic plume containment if and when required	0.6	21.6
Rebound of water levels within backfilled mine voids and adjacent pit area (potential diffuse plume migration)	Post-Closure	2	4	3	4	3	39	1) Re-shaping (e.g. free draining) and rehabilitation (e.g. top-soiling and seeding) of backfilled areas. 2) Monitoring of water levels (quarterly) within backfilled mining areas and receiving (adjacent) environment	0.8	31.2
TSF post-closure potential plume migration	Post-Closure	1	4	3	3	2	22	1) Rehabilitation (e.g. top-soiling and seeding) of TSF 2) Reduction in source concentrations and seepage rates (inert material) (natural attenuation) 3) Continuous monitoring of downstream plume migration using proposed monitoring network. 4) Hydraulic plume containment within aquifer as required.	0.6	13.2

13.4 TERRESTRIAL ECOLOGY IMPACTS

13.4.1 Construction Phase and Operational Phase

Impact		
The site has sections which is degraded (specifically VU2), and habitat has been transformed to an extent, however, the onset of additional activities might result in impacts to the natural environment due to increased movement, traffic and large machinery to the area. Heavy machinery and vehicles might result in compaction of the soil and destruction of vegetation habitat which in turn will also impact on the animals that use the area as habitat. From the site visit, a section (VU3) has already been found to be an established mining area associated with the MCDT and the new authorisations will allow extension of these operations.		
Mitigation		
<ul style="list-style-type: none"> • Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. • Adhere to all management and mitigation measures as prescribed within other specialist reports and Environmental Management Programme (EMPr). • To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees. • Continuous rehabilitation of the area should occur, immediate closure and rehabilitation. This will entail the spreading of topsoil, revegetation and management of invasive species. • Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater systems and drains to prevent contaminated water entering the natural environment. This will be prudent in this development, since the mining area is adjacent to the Chunies River. 		
Aspect	No Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Medium (3)	Medium (3)
Probability	Definite (5)	Definite (5)
Weighting factor	Medium (3)	Medium (3) X 0.6 ME
Significance Rating (SR)	Medium (48)	Low to Medium (28.8)

Impact		
Construction, human, and vehicle movement and introduction of foreign material e.g., soils may lead to the introduction of alien invader species, impacting on the floral characteristics of the project site and adjacent natural areas. These species may also compete with indigenous species and will degrade the veld condition by making it unfeasible for other land-uses such as natural veld, grazing and agriculture.		
Mitigation		
<ul style="list-style-type: none"> • Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. • A management plan for the control of invasive and exotic plant species needs to be implemented. Specialist advice should be used in this regard. This plan should include pre-treatment, initial treatment and follow-up treatment and should be planned and budgeted for in advance. 		
Aspect	No Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	Medium (3)
Probability	Highly likely (4)	Highly likely (4)
Weighting factor	Medium (3)	Medium (3) x 0.6 ME
Significance Rating (SR)	Medium (42)	Low to Medium (25.2)

<p>Impact</p> <p>Development related activities may lead to the loss of floral species of conservation concern. Two species listed by POSA for the area are classified as species of conservation concern (SCC), and have a moderate likelihood of occurrence on the project footprint. Three Aloe species protected in terms of LEMA and two tree species protected in terms of the NFA were confirmed to occur on the project footprint.</p> <p>Development and related activities could impact on the sensitive habitats, such as the Chunies River and VU1.</p>		
<p>Mitigation</p> <ul style="list-style-type: none"> All footprint areas should remain as small as possible. This can be achieved by fencing footprint areas to contain all activities within designated areas. If any SCC are encountered within the subject property in the future, the following should be ensured: <ul style="list-style-type: none"> If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. All rescue and relocation plans should be overseen by a suitably qualified specialist. Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed. Human and vehicle movement should be restricted from taking place in sensitive habitats. Areas to be fenced if necessary. Impacts to sensitive areas can be greatly minimised by avoiding mining activities within the Chunies River. It is therefore recommended that consideration be given to the possibility of adjusting the opencast area in order to avoid the Chunies River entirely. 		
Aspect	No Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (5)	High (5)
Probability	Definite (5)	Definite (5)
Weighting factor	Medium (4)	Medium (4) x 0.8 ME
Significance Rating (SR)	Medium to high (72)	Medium (57.6)

Construction Impacts on the Natural Terrestrial (and potentially Aquatic) environment

<p>Impact</p> <p>Impacts on the water resources located south and western border of the development may occur. This may be due to pollutants entering the water resource, specifically petroleum related waste products which could possibly spread from the road access points, during construction or during operational phase from sources such as the parking zones, or other vehicle related zones.</p>
<p>Mitigation</p> <ul style="list-style-type: none"> Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. Adhere to all management and mitigation measures as prescribed within the water resources/ surface water specialist report. Keep spill kits and hazmat prevention kits on-site to remediate any spill immediately before reaching the natural environment. Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater management systems, which should include oil traps. Continuous rehabilitation of the area should occur in accordance with the WUL, as well as monitoring as prescribed. Ensure proper stormwater management and maintenance of this system. Stormwater management will prevent impacts reaching the natural environment.

Aspect	No Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	Medium (3)
Probability	Highly likely (4)	Highly likely (4)
Weighting factor	Medium (3)	Medium (3) x 0.6 ME
Significance Rating (SR)	Medium (42)	Low to Medium (25.2)

13.4.2 Closure/Post-Closure Phase for activities

Continuous rehabilitation and clean-up should take place during the construction and operational phase. The impacts could be similar to that of construction, but impacts will quickly fade and removal of infrastructure and rehabilitation will bring positive impacts.

Impact		
<p>Rehabilitation could be ineffective if measures are not appropriately complied to. Without the necessary mitigation measures, rehabilitation will be unsuccessful and the environment will not be self-sustaining.</p> <p>Without mitigation the alien invasive species will increase and result in a degraded veld condition making the property less viable for post-closure land use activities such as wilderness, grazing and agriculture.</p>		
Mitigation		
<ul style="list-style-type: none"> • A management plan for control of invasive/exotic plant species needs to be implemented for all footprint and surrounding areas. This will be ongoing until the end of the mining closure phase. • Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase. • Rehabilitation plan should be implemented. This includes the process of replanting the vegetation. Rehabilitation plans should be compiled with the use of a specialist and the correct seeding techniques and mixtures should be applied. • Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary. A report should be written and stored and should be available at all times. 		
Aspect	No Mitigation	With Mitigation
Extent	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (3)	Medium (3)
Probability	Likely (3)	Likely (3)
Weighting factor	Medium to high (4)	Medium to high (4) x 0.6 ME
Significance Rating (SR)	Medium (52)	Low to medium (31.2)

13.5 AIR QUALITY IMPACTS

Table 33: Air Quality Impacts according to Development Phases

PHASE	ACTIVITIES
Construction Phase	Typical Activities - Site clearing, removal of topsoil and vegetation, Construction of Infrastructure, General Transportation and hauling of material.
Operational Phase	Typical Activities – Mining Operations such as Drilling and blasting, Hauling of ROM, Crushing and Screening etc.
Closure and Decommissioning	Typical Activities - Demolition & Removal of all infrastructure (incl. transportation off site) and Rehabilitation (Spreading of soil, revegetation, profiling / contouring)

13.5.1 Construction Phase

Typical Activities - Site clearing, removal of topsoil and vegetation, construction of Infrastructure, general transportation and hauling of material.

Construction Phase			
		Unmitigated	Mitigated
Assessment Criteria	Severity [Insignificant / non-harmful (1); Small / potentially harmful (2); Significant / slightly harmful (3); Great / harmful (4); Disastrous / extremely harmful / within a regulated sensitive area (5)]	2	2
	Spatial Scale [Area specific (at impact site) (1); Whole site (entire surface right) (2); Local (within 5 km) (3); Regional / neighbouring areas (5 km to 50 km) (4); National (5)]	1	1
	Duration [One day to one month (immediate) (1); One month to one year (Short term) (2); One year to 10 years (medium term) (3); Life of the activity (long term) (4); Beyond life of the activity (permanent) (5)]	2	2
	Frequency of Activity [Annually or less (1); 6 monthly (2); Monthly (3); Weekly (4); Daily (5)]	4	4
	Frequency of Incident/Impact [Almost never / almost impossible / >20% (1); Very seldom / highly unlikely / >40% (2); Infrequent / unlikely / seldom / >60% (3); Often / regularly / likely / possible / >80% (4); Daily / highly likely / definitely / >100% (5)]	4	3
	Legal Issues [No legislation(1); Fully covered by legislation (5)]	5	5
	Detection [Immediately(1); Without much effort (2); Need some effort (3); Remote and difficult to observe (4); Covered (5)]	2	2
Consequence	Severity + Spatial Scale + Duration	5	5
Likelihood	Frequency of Activity + Frequency of impact + Legal issues + Detection	15	14
Risk	Consequence * Likelihood	MODERATE (75)	MODERATE (70)

13.5.2 Operational Phases

The following activities during the Operational Phases are identified as possible fugitive emission sources and may impact on the ambient air quality at the relevant environmental sensitive receivers:

1. Dust from material handling.
 - Inside and outside the pit area.
2. Haul roads; for transporting the ROM to the Processing plant.
3. Processing Plant, Crushing and Screening
4. Wind erosion from stockpiles and Tailings

These sources were used as inputs in the AERMOD model as unmitigated and mitigated, as discussed earlier.

A worst-case scenario was selected, where both the opencast and underground operations are running at full production rates, for the modelling. The position and length of the haul road were also assumed as no further information was available at the time of this report. The assumption can however be considered conservative.

1.1.2.4. PM10

For the unmitigated Daily PM10 concentrations it was predicted to be higher than the 75 µg/m³ limit for 10 of the sensitive receptors.

When comparing the Daily Mitigated PM10 modelled concentrations, the sensitive receptors exceeding the 75 µg/m³ limit dropped to 0 of the identified sensitive receptors. This as well is the 2nd highest levels predicted for a 24 hour period within the period. Due to site specific atmospheric conditions these exceedances may still occur within the limit of 4 per year.

The annual average PM10 limit of 40 µg/m³ are predicted not to exceed at any of the identified sensitive receptors for the unmitigated or mitigated scenarios.

Table 34: PM Concentrations at sensitive receptors

Receptor	PM10 2nd Highest Daily (µg/m ³)		PM10 Annual Average (µg/m ³)	
	Unmitigated	Mitigated	Unmitigated	Mitigated
1	87.1	9.1	5.5	0.7
2	134.7	15.6	4.7	0.7
3	88.9	11.1	2.2	0.3
4	27.6	3.5	1.0	0.1
5	35.8	4.0	0.8	0.1
6	38.9	5.0	0.8	0.1
7	11.0	1.4	0.4	0.1
8	9.1	1.1	0.3	0.0
9	30.1	3.3	1.7	0.2
10	37.9	4.6	3.5	0.4
11	48.0	5.5	4.9	0.6
12	58.7	6.5	6.3	0.8
13	78.1	8.1	9.4	1.1
14	86.0	9.9	11.3	1.3
15	72.5	9.3	9.4	1.1
16	65.9	7.9	9.4	1.2
17	67.9	8.7	9.8	1.3
18	82.6	13.8	13.0	1.7
19	94.1	18.5	17.1	2.4
20	137.5	21.4	24.8	3.5
21	224.6	33.2	32.8	5.5
22	84.1	17.6	6.2	0.9
23	22.8	6.2	1.9	0.3
24	2.7	0.6	0.2	0.0
25	1.6	0.3	0.2	0.0
26	4.3	1.3	0.5	0.1
27	15.5	4.0	0.9	0.2
28	24.8	3.8	1.7	0.2

1.1.2.5. Total Dust Fallout

In the unmitigated and mitigated scenarios, no sensitive receptors are predicted to exceed the monthly dust fallout for the highest month residential limit of 600 mg/m²/day.

The predicted annual dust fall out for the unmitigated and mitigated scenarios are not predicted to exceed the annual limit of 300 mg/m²/day at any of the sensitive receptors.

Table 35: TSP Deposition rates at the sensitive receptors

Receptor	TSP Highest Monthly (mg/m ² /day)		TSP Annual Average (mg/m ² /day)	
	Unmitigated	Mitigated	Unmitigated	Mitigated
1	46.4	4.7	20.0	2.0
2	23.5	2.4	12.0	1.3
3	10.0	1.0	2.5	0.3
4	6.8	0.7	1.3	0.1
5	4.5	0.5	0.7	0.1
6	2.5	0.3	0.4	0.0
7	1.6	0.2	0.3	0.0
8	0.9	0.1	0.2	0.0
9	0.4	0.0	0.2	0.0
10	0.8	0.1	0.3	0.0
11	0.9	0.1	0.5	0.0
12	1.3	0.1	0.6	0.1
13	1.9	0.2	1.1	0.1
14	2.4	0.3	1.5	0.2
15	1.7	0.2	1.0	0.1
16	1.7	0.2	1.1	0.1
17	1.9	0.2	1.2	0.1
18	3.1	0.3	2.0	0.2
19	8.2	0.8	3.6	0.4
20	20.1	2.1	9.0	0.9
21	38.7	4.1	19.0	2.1
22	17.1	1.8	9.9	1.0
23	10.1	1.0	5.4	0.5
24	1.0	0.1	0.8	0.1
25	1.4	0.1	0.9	0.1
26	2.2	0.2	1.5	0.2
27	3.9	0.4	2.6	0.3
28	7.9	0.8	4.7	0.5

13.6 NOISE IMPACT IMPACTS

13.6.1 Decommissioning and Closure Phase

Typical Activities - Demolition & Removal of all infrastructure (incl. transportation off site) and Rehabilitation (Spreading of soil, revegetation, profiling / contouring).

Closure and Decommissioning Phase			
		Unmitigated	Mitigated
Assessment Criteria	Severity [Insignificant / non-harmful (1); Small / potentially harmful (2); Significant / slightly harmful (3); Great / harmful (4); Disastrous / extremely harmful / within a regulated sensitive area (5)]	3	3
	Spatial Scale [Area specific (at impact site) (1); Whole site (entire surface right) (2); Local (within 5 km) (3); Regional / neighbouring areas (5 km to 50 km) (4); National (5)]	2	2
	Duration [One day to one month (immediate) (1); One month to one year (Short term) (2); One year to 10 years (medium term) (3); Life of the activity (long term) (4); Beyond life of the activity (permanent) (5)]	2	2
	Frequency of Activity [Annually or less (1); 6 monthly (2); Monthly (3);	4	4

Closure and Decommissioning Phase			
	Weekly (4); Daily (5)]		
	Frequency of Incident/Impact [Almost never / almost impossible / >20% (1); Very seldom / highly unlikely / >40% (2); Infrequent / unlikely / seldom / >60% (3); Often / regularly / likely / possible / >80% (4); Daily / highly likely / definitely / >100% (5)]	4	3
	Legal Issues [No legislation(1); Fully covered by legislation (5)]	5	5
	Detection [Immediately(1); Without much effort (2); Need some effort (3); Remote and difficult to observe (4); Covered (5)]	2	2
Consequence	Severity + Spatial Scale + Duration	7	7
Likelihood	Frequency of Activity + Frequency of impact + Legal issues + Detection	15	14
Risk	Consequence * Likelihood	MODERATE (105)	MODERATE (98)
Mitigation Measures	<ul style="list-style-type: none"> - Demolition should not be performed during windy periods (August, September and October), as dust levels and the area affected by dust fallout will increase. - The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. - Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. - Exhaust pipes of vehicles should be directed so that they do not raise dust. - Engine cooling fans of vehicles should be shrouded so that they do not raise dust. - Hard surfaced haul roads or standing areas should be washed down and swept to remove accumulated dust. - Dust suppression of roads being used during rehabilitation should be enforced. - Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. - Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. - Plants used for revegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings. - The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. - Spreading of soil must be performed on less windy days. - The bare soil will be prone to erosion and therefore there is need to reduce the velocity near the surface of the soil by re-vegetation. - Leaving the surface of soil in a coarse condition reduces wind erosion and ultimately reduces dust levels. - Additional mitigation measures include keeping soil moist using sprays or water tanks, using wind breaks. - The best time to re-vegetate the area must be linked to the distribution and reliability of rainfall. - Cabs of machines should be swept or vacuumed regularly to remove accumulated dust. - Exhaust pipes of vehicles should be directed so that they do not raise dust. - Engine cooling fans of vehicles should be shrouded so that they do not raise dust. - Hard surfaced haul roads or standing areas to be washed down and swept to remove accumulated dust. - Dust suppression of roads being used during rehabilitation should be enforced. 		

Closure and Decommissioning Phase	
	<ul style="list-style-type: none">- It is recommended that the rehabilitation by vegetating should begin during the operational phase already as the objective is to minimise the erosion.- These measures should be aimed to reduce the potential for fugitive dust generation and render the impacts on ambient air quality negligible.

13.7 BLASTING AND VIBRATION IMPACTS

13.7.1 Construction Phase: Impact Assessment and Mitigation Measures

During the construction phase no mining drilling and blasting operations is expected. No detail impact evaluation was done during the construction phase.

13.7.2 Operational Phase: Impact Assessment and Mitigation Measures

The opencast operations were evaluated for expected levels of ground vibration from future blasting operations. Review of the site and the surrounding installations / houses / buildings showed that structures vary in distances from the pit area. The influences will also vary with distance from the pit area. The model used for evaluation does indicate significant levels. It will be imperative to ensure that a monitoring program is done to confirm levels of ground vibration to ensure that ground vibration levels are not exceeded.

The distances between structures and the pit area are a contributing factor to the levels of ground vibration expected and the subsequent possible influences. It is observed that for the different charge masses evaluated that levels of ground vibration will change as well. In view of the minimum and maximum charge specific attention will need to be given to specific areas. The minimum charge used indicated three POI's of concern and the maximum charge indicated eleven POI's of concern (included are the Buildings/Structures and Community Houses inside the pit area) in relation to possible structural damage.

On a human perception scale twenty-two POI's were identified where vibration levels may be perceptible and lower for the minimum charge and forty-two POI's for the maximum charge. Perceptible levels of vibration may be experienced up to 1552 m and unpleasant up to 484 m and intolerable up to 212m. Problematic levels of ground vibration – levels greater than the proposed limit – are expected up to 271 m from the pit edge for the maximum charge. Any blast operations further away from the boundary will have lesser influence on these points.

The evaluation mainly considered a distance up to 3500 m from the pit area. The closest structures observed are the Community Houses, Graveyard, Hydrocensus Boreholes and Buildings/Structures. The planned maximum charge evaluated showed that it could be problematic in terms of potential structural damage and human perception. The ground vibration levels predicted for the POI's ranged between 0.1 mm/s and 93.8 mm/s for structures surrounding the open pit area.

The nearest public houses are located 82 m from the pit boundary. Ground vibration level predicted at this building where people may be present is 93.8 mm/s for the maximum charge. In view of this specific mitigations will be required.

Structure conditions ranged from industrial construction to poor condition structures.

Mitigation of ground vibration was considered and discussed in Section 18.4. A detail inspection of the area and accurate identification of structures will also need to be done to ensure the levels of ground vibration allowable and limit to be applied.

1.1.2.6. Ground Vibration and human perception

Considering the effect of ground vibration with regards to human perception, vibration levels calculated were applied to an average of 30Hz frequency and plotted with expected human perceptions on the safe blasting criteria graph (see Figure 37 below). The frequency range selected is the expected average range for frequencies that will be measured for ground vibration when blasting is done. Based on the maximum charge and ground vibration predicted over distance it can be seen from Figure 37 that up to a distance of 1552 m people may experience levels of ground vibration as perceptible. At 484 m and closer the perception of ground vibration could be unpleasant for structures in the areas. Closer than 212 m the levels will be intolerable and generally greater than limits applied for structures in the areas.

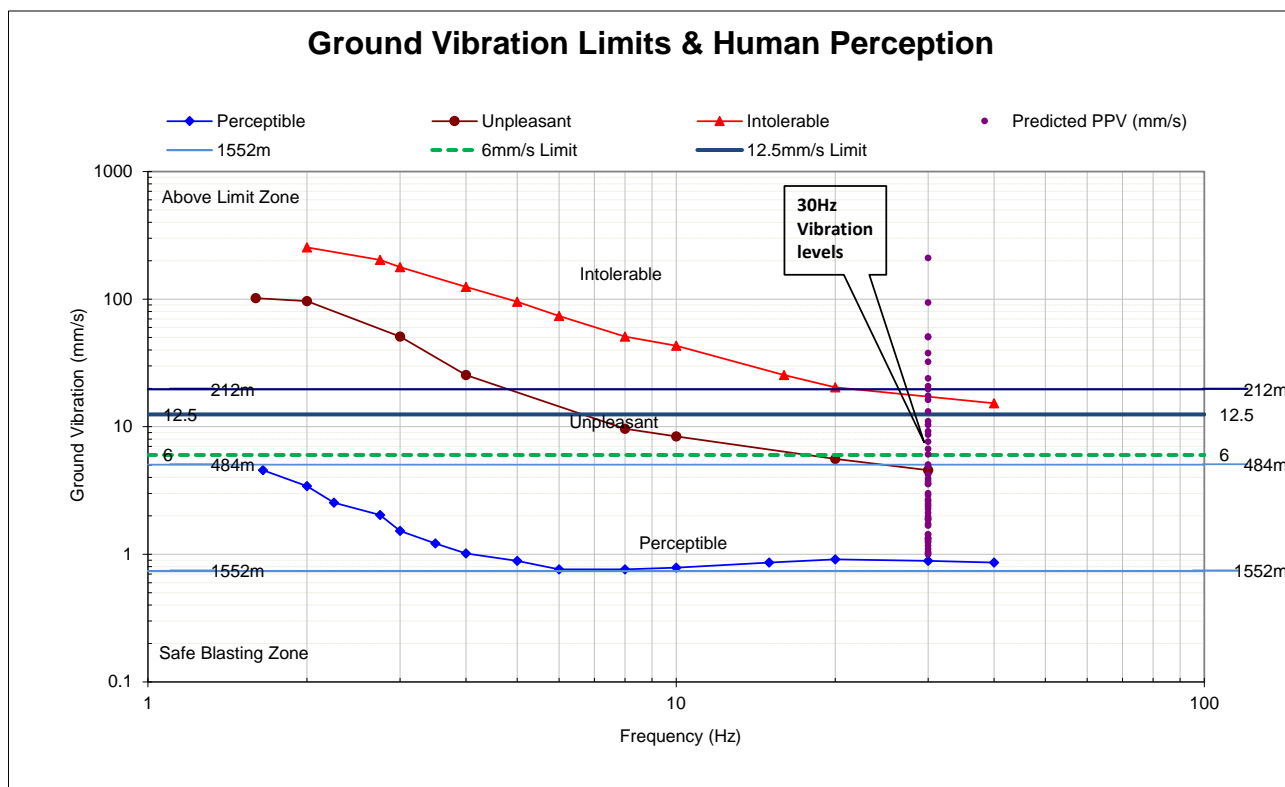


Figure 37: The effect of ground vibration with human perception and vibration limits

1.1.2.7. Vibration impact on roads

The R579 Provincial Road is at an approximate distance of 1043 m from the pit area. No specific consideration regarding effects from blasting operations will be required for these roads. There is a dirt road that runs through the project area (POI 206). This road is specifically of concern when blasting is done more in regards with fly rock concerns than ground vibration.

1.1.2.8. Potential that vibration will upset adjacent communities

Ground vibration and air blast generally upset people living in the vicinity of mining operations. The nearest houses (POI 28) are approximately 82 m from the planned operation. These buildings are located such that levels of ground vibration predicted may be problematic and damaging.

Ground vibration levels expected from maximum charge has possibility to be perceptible up to 1552 m. It is certain that lesser charges will reduce this distance for instance at minimum charge this distance is expected to be 746 m. Within these distance ranges there are only a limited number of houses. The anticipated ground vibration levels are certain to have possibility of upsetting the house holds within these ranges. Intolerable levels are expected up to a distance of 212 m.

The importance of good public relations cannot be over emphasised. People tend to react negatively on experiencing of effects from blasting such as ground vibration and air blast. Even at low levels when damage to structures is out of the question it may upset people. Proper and appropriate communication with neighbours about blasting, monitoring and actions done for proper control will be required.

1.1.2.9. Cracking of houses and consequent devaluation

The structures found in the areas of concern ranges from informal building style to brick and mortar structures. There are various buildings found within the 3500 m range from the mining area. Building style and materials will certainly contribute to additional cracking apart from influences such as blasting operations.

The presence of general vertical cracks, horizontal and diagonal cracks that are found in all structures does not need to indicate devaluation due to blasting operations but rather devaluation due to construction, building material, age, standards of building applied. Thus, damage in the form of cracks will be present. Exact costing of devaluation for normal cracks observed is difficult to estimate. Mining operations may not have influence to change the status quo of any property if correct precautions are considered.

The proposed limits as applied in this document i.e. 6 mm/s, 12.5 mm/s and 25 mm/s are considered sufficient to ensure that additional damage is not introduced to the different categories of structures. It is expected that, should levels of ground vibration be maintained within these limits, the possibility of inducing damage is limited.

Review of the air blast levels predicted indicated some concerns. Air blast predicted for the maximum charge ranges between 117.4 and 141.7 dB for all the POI's considered. This includes the nearest points such as the Community Houses and Buildings/Structures.

The current accepted limit on air blast is 134 dBL. Damages are only expected to occur at levels greater than 134 dBL. Prediction shows that air blast will be greater than 134 dB at distance of 290 m and closer to pit boundary. Infrastructure at the pit areas such as Graveyard and Hydrocensus Boreholes are present, but air blast does not have any influence on these installations.

The possible negative effects from air blast are expected to be the same than that of ground vibration. It is maintained that if stemming control is not exercised this effect could be greater with greater range of complaints or damage. The pit is located such that "free blasting" – meaning no controls on blast preparation – will not be possible. The effect of stemming control will need to be considered. In many cases the lack of proper control on stemming material and length contributes mostly to complaints from neighbours.

1.1.2.10. Fly-rock unsafe zone

The occurrence of fly rock in any form will have a negative impact if found to travel outside the unsafe zone. This unsafe zone may be anything between 10 m or 1000 m. A general unsafe zone applied by most mines is normally considered to be within a radius of 500 m from the blast; but needs to be qualified and determined as best possible.

Calculations are also used to help and assist determining safe distances. A safe distance from blasting is calculated following rules and guidelines from the International Society of Explosives Engineers (ISEE) Blasters Handbook. Using this calculation, the minimum safe distances can be determined that should be cleared of people, animals and equipment. Based on these values a possible fly rock range with a safety factor of 2 was calculated to be 202 m. The absolute minimum unsafe zone is then the 202 m. This calculation is a guideline and any distance cleared should not be less. The occurrence of fly rock can however never be 100% excluded. Best practices should be implemented at all times. The occurrence of fly rock can be mitigated but the possibility of the occurrence thereof can never be eliminated. Figure 38 shows the area around the Pit areas that incorporates the 202 m unsafe zone. Any blasting conducted within the pit boundaries will have

safe boundaries that is based on the specific blast. This report uses the edge of pit area as basis.

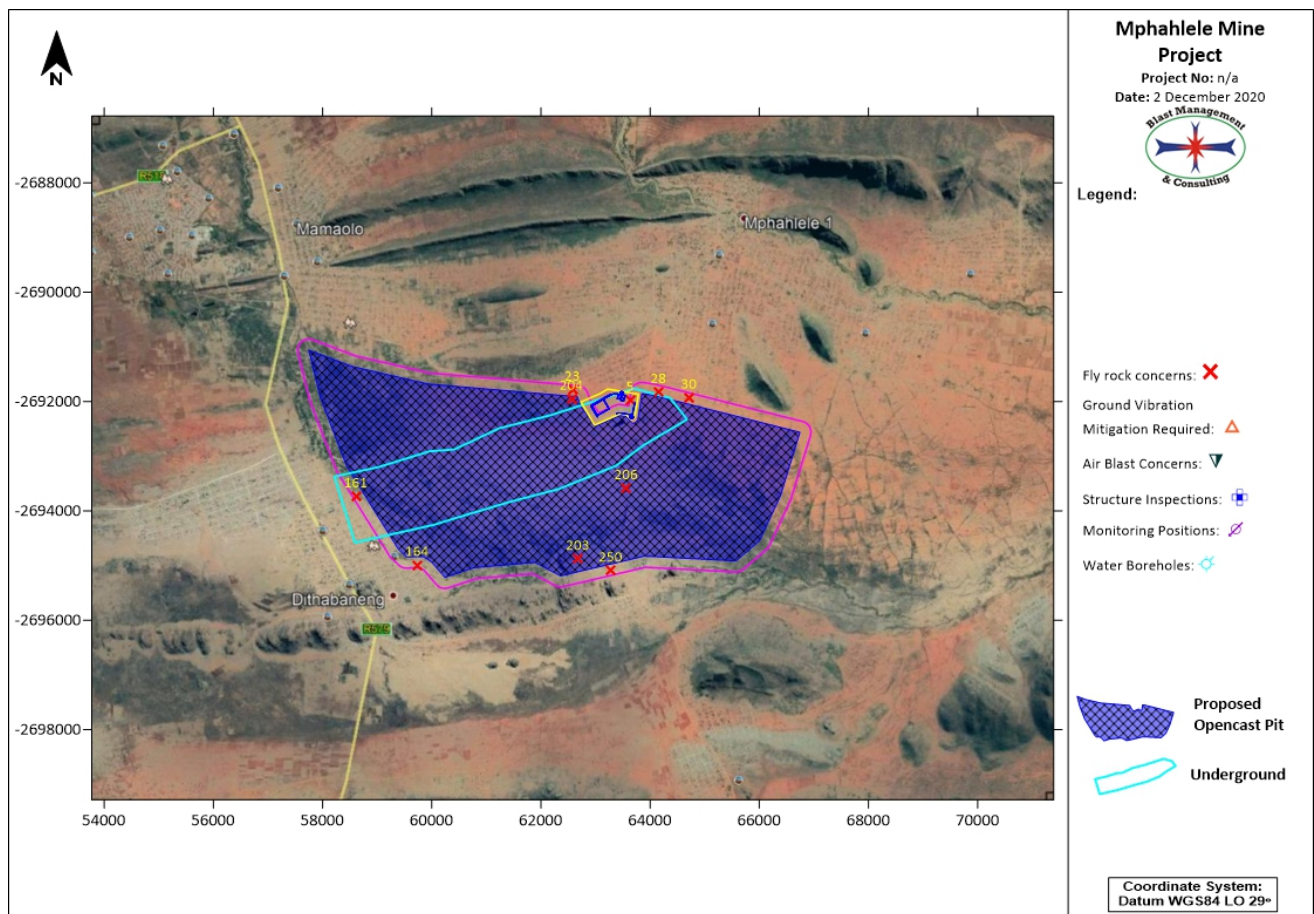


Figure 38: Predicted Fly Rock Exclusion Zone for the Pit area

Review of the calculated unsafe zone showed ten POI's for the Pit area (including four POI's inside the pit area at this stage), are within the unsafe zone. This includes mainly the Buildings/Structures, Community Houses and Dirt Road that is located inside the pit area.

Table 36: Fly rock concern POI's

Tag	Description	Y	X
5	Building (Mphahlele Mine Entrance)	-63639.71	2691974.72
23	Community Houses (Mphahlele)	-62583.43	2691785.68
28	Community Houses (Mphahlele)	-64160.43	2691827.76
30	Buildings/Structures	-64718.54	2691928.41
161	Community Houses (Makurung)	-58617.71	2693738.41
164	Community Houses (Dithabaneng)	-59736.96	2694994.86
203	Buildings/Structures (Inside Pit Area)	-62680.08	2694880.48
204	Community Houses (Inside Pit Area)	-62564.07	2691954.61
206	Dirt Road (Inside Pit Area)	-63564.67	2693589.04
250	Graveyard	-63284.64	2695093.45

1.1.2.11. Noxious fumes

The occurrence of fumes in the form the NOx gas is not a given and very dependent on various factors as discussed in Section 13.6. However, the occurrence of fumes should be closely monitored. Furthermore, nothing can be stated as to fume dispersal to nearby farmsteads, but if anybody is present in the path of the fume cloud it could be problematic.



Table 37: Potential Impacts Without And With Mitigation Measures Mitigation

No.	Receptor Resource /	Process / Activity	Environmental Impact	Extent	Duration	Intensity	Probability	Weighting Factor	Significance		Mitigation and Management Measures	Mitigation Efficiency	Significance Following Mitigation	
									Value	Rating			Value	Rating
1	Building	Blasting	Ground Vibration	2	4	5	5	4	64	Medium to High	Specific blast design to be done, shorter blast holes, smaller diameter blast hole, using electronic initiation instead of shock tube systems to obtain single hole firing. Redefine exact pit limits or blast areas and possibly increase distance between blast areas and houses.	0.2	12.8	Low
2	Community Houses	Blasting	Ground Vibration	2	4	5	5	4	64	Medium to High		0.2	12.8	Low
3	Buildings/Structures	Blasting	Ground Vibration	2	4	5	5	4	64	Medium to High		0.2	12.8	Low
5	Graveyard	Blasting	Ground Vibration	2	4	3	5	4	56	Medium		0.2	11.2	Low
15	Building	Blasting	Air Blast	2	4	5	5	4	64	Medium to High	Specific blast design to be done, shorter blast holes, smaller	0.2	12.8	Low
16	Community Houses	Blasting	Air Blast	2	4	5	5	4	64	Medium to High		0.2	12.8	Low

No.	Receptor Resource /	Process / Activity	Environmental Impact	Extent	Duration	Intensity	Probability	Weighting Factor	Significance		Mitigation and Management Measures	Mitigation Efficiency	Significance Following Mitigation	
									Value	Rating			Value	Rating
17	Buildings/Structures	Blasting	Air Blast	2	4	5	5	4	64	Medium to High	diameter blast hole, use of specific stemming materials to manage air blast, increased stemming lengths to reduce air blast effect. Used of specific stemming to manage fly rock - crushed aggregate of specific size. Re-design with increased stemming lengths.	0.2	12.8	Low
29	Building	Blasting	Fly Rock	2	4	5	5	4	64	Medium to High	Specific blast design to be done, shorter	0.4	25.6	Low to Medium
30	Community Houses	Blasting	Fly Rock	2	4	5	5	4	64	Medium to High	blast holes, smaller diameter blast	0.4	25.6	Low to Medium
31	Buildings/Structures	Blasting	Fly Rock	2	4	5	5	4	64	Medium to High	hole, use of specific	0.4	25.6	Low to Medium

No.	Receptor Resource /	Process / Activity	Environmental Impact	Extent	Duration	Intensity	Probability	Weighting Factor	Significance		Mitigation and Management Measures	Mitigation Efficiency	Significance Following Mitigation	
									Value	Rating			Value	Rating
32	Graveyard	Blasting	Fly Rock	2	4	5	5	4	64	Medium to High	stemming materials to manage air blast, increased stemming lengths to reduce air blast effect. Used of specific stemming to manage fly rock - crushed aggregate of specific size. Re-design with increased stemming lengths.	0.4	25.6	Low to Medium

13.8 VISUAL IMPACTS

13.8.1 Construction Phase Impacts

The potential visual impact on the viewpoints during the construction phase is expected to have a **High** impact before mitigation and **Moderate** after mitigation. The impact on the surrounding residential communities and land users will be Moderate due to the short time the proposed construction activities will be undertaken. The construction activities will not be highly visible due to the topography, vegetation and the short time of exposure, and thus the impact on the users will be **Moderate** after mitigation measures have been implemented.

Table 38: Summary of the Visual Impact Significance during the Construction Phase

Nature of Impact: Potential visual impact on the Sensitive Receptors/Viewpoints		
	No Mitigation	With Mitigation
Spatial Scale	Regional (3)	Site (2)
Duration	Short term (2)	Short term (2)
Magnitude	Very High (10)	Moderate (6)
Probability	Definite (5)	Likely (3)
Significance Rating (SR)	High (75)	Moderate (30)
Status (positive, neutral or negative):	Negative	
Reversibility:	Yes	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	

13.8.2 Operational Phase Impacts

The proposed mining will be opencast and underground mining with a life of mine extending to 21 years. At the time of this report, no specific open pit and associated infrastructure layout plan was available. The application area is approximately 11 725.1 Ha in size. The planned mining methods consist of open pit and underground mining, drilling, and blasting. The open cast pit will be mined in a typical grid by grid truck and shovel method. Initially there will be topsoil stripping and stockpiling, then subsequent drilling and blasting of rock (interburden etc.), rock face thereafter. Handling of Run of Mine (ROM) with large front-end loaders and trucks will complete the open cast mining. Waste rock will be stockpiled until such time as there is sufficient space available inside the pit for storage of waste. Then waste rock will be placed in mined out areas as the face is advanced. Current mining activities on site stockpile at significant heights, which contribute to a high visual impact on the surrounding land users.

There are no popular tourist attractions, lodges or destinations near the proposed site. Prominent mountains and steep hills are evident in the surrounding topography. The proposed open pit mine area and stockpiling heights may potentially have a significant effect and a noticeable change on the natural quality and scenic appearance of the immediate environment. Both legal and illegal small-scale mining take place on site and in the area, however, the large extent of the proposed opencast mine will establish a new precedent for development in the area and a noticeable change in the visual character of the area is expected, as well as the natural vegetation cover. Without concurrent rehabilitation, this will have a high visual impact.

The degree of visual impact cannot be established with certainty, due to the layout not being established at the time of this report. However, the potential visual impact on the viewpoints during the operational phase is expected to have a **High** impact before mitigation and **Moderate** after mitigation. The open cast mining and related structures will possibly be visible from most Viewpoints within a 2 km radius, depending on topography and vegetation occurrence. All Viewpoints consist of rural housing and related infrastructure. The time of exposure however is long term and thus the

impact on the land users remains Medium after mitigation.

The long-term impact on the surrounding residential communities and land users will be increased due to the open pit mining added to the area and an increase in heavy vehicles on the roads in the region. However, the topography and vegetation cover will allow for some visual barriers. Road users of the area, as well as haul trucks leaving the site, will only have a short exposure time, therefore this impact will not be significant.

Table 39: Summary of the Visual Impact Significance during the Operational Phase

Nature of Impact: Potential visual impact on the Sensitive Receptors/Viewpoints		
	No Mitigation	With Mitigation
Spatial Scale	Regional (3)	Regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Likely (3)
Significance Rating (SR)	High (85)	Moderate (45)
Status (positive, neutral or negative):	Negative	
Reversibility:	No	
Irreplaceable loss of resources:	Yes	
Can impact be mitigated:	Yes	

13.8.3 Mitigation Measures

Visual impact mitigation can generally be defined as actions taken to avoid, minimize, rectify, reduce, or compensate for visual impacts arising from a proposed project or action (BLM, 2017). The Council on Environmental Quality (CEQ) has defined environmental impact mitigation to include:

Avoidance: Avoid the impact altogether by not taking a certain action or parts of an action.

Minimization: Minimize impacts by limiting the degree or magnitude of the action and its implementation.

- It is recommended that the construction site be screened by using meshing fencing in natural colour (green).
- The surface infrastructure should use material with colours that blend in with the environment.
- Retain the natural bushveld vegetation as much as possible for visual screening of the infrastructure.
- Keep Infrastructure and stockpile to the minimum height prescribed.

Rectification: Rectify the impact by repairing, rehabilitating, or restoring the affected environment.

- 3 to 5 years has been set aside for rehabilitation purposes.
- It is recommended that the mine practise concurrent rehabilitation and revegetate impacted areas with indigenous vegetations with the help of a botanist/rehabilitation specialist.
- Reshape berms, overburden stockpile, ROM stockpile and all affected areas to be free draining and follow the natural drainage line.

Reducing or eliminating over time: Preservation and maintenance operations during the life of the action.

- Continued removal of invasive plants species arising from site disturbance.
- Monitor rehabilitated areas.
- Dismantle and remove all surface infrastructure.

Specifically relating to the **Construction Phase**, the following mitigation measures should be implemented to minimise the visual impact:

- Reduce the construction period through careful planning and productive implementation of resources. Clearly define areas to be cleared. Do not clear past designated areas. Retain natural vegetation outside of clearance zone.

- Plan the placement of lay-down areas and any potential temporary construction camps to minimise vegetation clearing.
- Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
- Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. Screen the whole construction site via fence cover.
- Reduce and control construction dust using approved dust suppression techniques. Implement daily dust suppression and pave roads where possible to avoid transport related dust pollution.
- Restrict construction activities to daylight hours to negate, or reduce, the visual impacts associated with lighting. Direct light downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places.

During the **Operational Phase**, the following mitigation measures should be implemented to minimise the visual impact:

- Planning open pit mining areas in accordance with the topography to limit visual impact on surrounding residential communities.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment.
- Place topsoil and subsoil stockpiles on the edge of the site boundary to create visual screening into the open pit. Place overburden stockpile behind topsoil stockpile.
- Backfilling of the open pit as part of concurrent rehabilitation.
- Vegetate and maintain stockpiles to the recommended minimum height. Revegetate soon after stockpiling to avoid erosion and a drainage patterns forming on the stockpile.
- Rehabilitation of disturbed areas and re-establishment of vegetation.
- Restrict mining activities to daylight hours to negate or reduce the visual impacts associated with lighting. Keep lighting to minimum. Direct light downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places.

In addition, the following measures are recommended:

- Planting / avoid removal of indigenous trees to create a visual barrier for the surrounding residential settlements.
- Backfill and reshape with a surveyor. Reshape to create a gentle slope of free-draining topography.
- Dust suppression measures must be implemented on roads and in stockpile areas to prevent excessive dust.
- Blasting must be done under controlled conditions (i.e., Windy days must be avoided) and must be done in such a way that dust is minimised.
- Blasting should not take place before 08:00 and after 16:00.
- Institute a rehabilitation monitoring program with a rehabilitation specialist.

13.9 HERITAGE IMPACTS

A number of known cultural heritage sites (archaeological and/or historical) exist in the larger geographical area within which the study area falls. No sites were identified in the study area focused on in the January 2021 assessment.

It should also be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.

13.10 PALAEOLOGICAL IMPACTS

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are much too old to contain body fossils as they are about 2060 million years old and are volcanic in origin. There is a very small chance that trace fossils such as stromatolites and microbial mats or vermiform traces (e.g. *Manchuriphycus*) do occur in the shales of the Magaliesberg Formation (Pretoria Group, Transvaal Supergroup), but it is unlikely that they fall in the mine footprint. Nonetheless, a Fossil Chance Find Protocol has been added to this report. Taking account of the defined criteria, there are no fossils in the main mining area, only on the northern margin, so the potential impact to fossil heritage resources is extremely low.

Table 40: Palaeontological Impact Assessment

SEVERITY/NATURE	H	-
	M	-
	L	Rustenburg Layered mafic intrusive rocks do not preserve fossils. The Magaliesburg Fm is close to the margin of the opencast mine in the north and so far, there are no records of microbial or trace fossils from this area and so it is very unlikely that fossils occur on the site. The impact would be very unlikely.
	L+	-
	M+	-
	H+	-
DURATION	L	-
	M	-
	H	Where manifest, the impact will be permanent.
SPATIAL SCALE	L	Since the only possible fossils within the area would be microbial or trace fossils from the Magaliesberg Fm, the spatial scale will be localised within the site boundary.
	M	-
	H	-
PROBABILITY	H	-
	M	-
	L	It is extremely unlikely that any fossils would be found in the Magaliesburg Fm because none has been recorded to date. The intrusive rocks are likely to have destroyed any fossils in their vicinity. Nonetheless, a Fossil Chance Find protocol should be added to the eventual EMPr.

13.11 SOCIO-ECONOMIC IMPACTS

13.11.1 Noise

NATURE:

The natural ambient noise levels in the area are largely determined by natural sounds, i.e. birds, insects and the wind in the foliage of plants. Occasional anthropogenic sounds include vehicles moving on R37 main road and the occasionally aircraft flying over the area. The estimated noise levels are comparative (80 - 90 dBA during the day and 30 - 40 dBA during the night) to those listed in the revised SABS 0103 standard, where the typical ambient noise level for a 'rural residential' area is given as 70 - 90 dBA and 30 - 40 dBA during the day and night, respectively. The proposed Mphahlele activities will not raise noise levels significantly. Movement of tipper trucks, excavators and other mining equipment/machinery will create some noise – especially during day time when operations are active. The noise levels will increase to 90 - 100 dBA during day time (5h00 – 19h00). Rock breakers and blasting for the excavation during mining operations will generate noise levels of 100 – above 120 dBA respectively. There is no

informal settlement within the Mphahlele mine which may be impacted by the noise generated from the activities that will be taking place on the site. However, the closest village to Mphahlele mine is approximately 1.5 km away and likely to be impacted by activities in the site. Noise rating for activities similar to that proposed at Mphahlele mine vary between 50 dB (A) and 57.8 dB (A).

Complaints can be expected if the difference between neighbourhood noise levels and the ambient noise levels are more than 10dB. Alternatively noise levels in excess of 45dB would be a nuisance especially during the night when neighbourhood noise levels are low.

STATUS OF THE IMPACT:

Operational Phase:

The impact of noise from various aspects and equipment will be of **medium negative** significance taking cognizance of the occasional open cast pits, blasting and the rural nature of the area. The impact will be **medium to high** for the affected villages. The earth moving equipment and blasting together with grinding and stone crushing activities will generate noise above ambient noise levels in the surrounding areas – especially the close villages.

Decommissioning and Closure:

Noise levels will revert to pre-mining ambient levels when the construction activities and mining activities come to an end. Depending on the volumes of available waste rock, the crushing operations may continue even after Mphahlele Project closure. The impact will be of **medium** negative significance for the duration of waste rock crushing post mining operations.

MITIGATION:

Measures such as ensuring all vehicles and equipment are in good working order, and that any faulty exhaust- and/or intake silencers are replaced timorously, will reduce the severity and significance of the impact.

The noise generating aspects and equipment must be confined to the project area approved by the DMRE under the mining right authorization. Drilling and blasting are generally intermittent and should be limited to daylight hours when ambient noise levels are highest. Personnel working within the plant must wear ear protection gear. A complete blasting schedule and timeframes must be compiled and communicated with the adjacent communities to ensure that they are notified in advance prior to blasting taking place.

Operators must wear ear protection at all times when operating the earth moving equipment and machinery to prevent noise induced hearing loss. Noise pollution must be monitored monthly, and recorded throughout the life of mine.

EXTENT		INTENSITY		DURATION		PROBABILITY	
Mining Site and Local	2	High	4	Long Term	4	Definite	5

WEIGHTING FACTOR: Medium to High **4**

SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Medium to High -ve **60**

SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME

WOM	ME
60	0.6

SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -ve **36**

NO GO OPTION:

The existing ambient noise levels will remain if the proposed activities do not take place.

CUMULATIVE IMPACTS:

The noise impacts of the Mphahlele Mine Project, exiting villages and retail activities in the area do overlap, therefore the cumulative impacts to noise sensitive areas are low to medium, and remain of low to medium negative significance as per the current ambient noise levels.

EXTENT	INTENSITY	DURATION	PROBABILITY
--------	-----------	----------	-------------

Mining Site and Local	2	Low	1	Long Term	4	Likely	3
WEIGHTING FACTOR: Medium							3
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low to Medium -Ve							30
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME							
WOM				ME			
30				0.6			
SIGNIFICANCE RATING WITH MITIGATION (WM): Low -Ve							18

13.11.2 Air Pollution

<p>NATURE:</p> <p>Air pollution is a factor of impacts of fine particulates or PM10 (i.e. particulate matter with an aerodynamic diameter of < 10 µm). The Department of Environmental Affairs (DEA) has stipulated guidelines for highest daily and annual average PM10 concentrations. New limit values for South Africa as published by the South African National Standards (SANS 1929: 2005) have been included in legislation (Air Quality Act, 2004), which are in line with international criteria.</p> <p>Once the vegetation has been cleared, construction equipment will generate dust from exposed surfaces. Excessive dust may have an impact on surrounding vegetation and an indirect impact on animals that feed on the vegetation as well as the nearby communities.</p> <p>Dust will also be generated from the opencast pits, access roads to and from the open pits and crusher/plant sites. Dust pollution will be high during dry winter months and windy autumn season. Fall-out dust will be generated during open pit mining operations. The effect however will be localised and in the main be confined to within the working areas. Dust will be high after blasting events.</p> <p>In term of the requirements of the Mine Health and Safety Act, 1996, Mphahlele mine (or their appointed contractor) must provide protective clothing and equipment for all its employees, and must periodically conduct risk assessments to analyze and monitor the effects of dust on the staff members and the surrounding environment due to their mining and construction activities.</p> <p>Controlled movement of haul trucks and light delivery vehicles (LDVs) around the site will generate some nuisance dust into the atmosphere. The typical ambient dust levels around semi-rural and rural settlements areas range between 50 – 90 mg/m²/day TSP depending on daily wind speed and direction, and movement of vehicles. It is estimated that the said vehicle movements may increase the dust levels to approximately 80 - 100 mg/m²/day during day time mine operational phase. This is, however, significantly low and well within the maximum allowable guidelines set by SANS 1929:2005 for both residential and industrial areas.</p> <p>STATUS OF THE IMPACT:</p> <p>Construction and Operational Phase:</p> <p>The impact is considered medium negative significance. The dust generated during the construction phase and operational phase of the surface mine infrastructure and mining of the opencast pits will reduce the air quality of the local area immediately adjacent to the mining works. The ore crushing and waste rock disposal activities will also generate dust. Dust impact will be high after blasting events.</p> <p>The impact is considered negative. The dust and vehicle emissions generated by the mining activities will reduce the air quality of the immediate local area.</p> <p>Decommissioning and Closure:</p> <p>Once the mining activities, rehabilitation and re-vegetation over the entire surface are complete no further dust will</p>

emanate from the mining site. There will be no dust or any other emission. Dust will however be generated from the existing gravel access road if used for other purposes subsequent to mining access – if these are not upgraded to tar. This will however conform to the surrounding ambient levels.

MITIGATION:

Wetting of the access roads with water periodically to suppress the dust will greatly reduce the impact of dust. This wetting with water must be done daily during dry and windy seasons.

Dust and smoke monitoring will be conducted during the life of mine to determine the prominent wind directions and dust / smoke levels at various points around the mining site.

In term of the requirements of the Mine Health and Safety Act, 1996 Mphahlele mine must provide protective clothing and equipment for all its employees, and must periodically conduct risk assessments to analyze and monitor the effects of dust and smoke on the staff members and the surrounding environment.

Concurrent rehabilitation and re-vegetation of the project sites will also reduce surfaces that are exposed to wind generated dust.

EXTENT	INTENSITY	DURATION	PROBABILITY
Mining Site and Local	2 High	4 Long Term	4 Highly Likely

WEIGHTING FACTOR: Medium 3

SIGNIFICANCE RATING WITHOUT MITIGATION(WOM): Medium -ve 42

SIGNIFICANCE WITH MITIGATION(WM)=WOM x ME

WOM	ME
42	0.6

SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -ve 25.6

NO GO OPTION:

The current ambient dust TSP levels around the area ranging between 50 – 90 mg/m²/day depending on daily wind speed and direction, and movement of vehicles will be remain.

CUMULATIVE IMPACTS:

Mphahlele Mine Project construction activities may add to the annual PM10 concentrations in the area. Sensitive receptors for PM10 will be the residential houses at closest village. The said village is at least 1.5km away from Mphahlele project.

Predicted dust fall-out impacts will be below the residential standard of 600mg/m²/day, therefore no significant impacts are anticipated in the sensitive receptors.

EXTENT	INTENSITY	DURATION	PROBABILITY
Mining Site and Local	2 Medium	3 Long Term	4 Possible

WEIGHTING FACTOR: Medium 3

SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low - Medium -ve 33

SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME

WOM	ME
33	0.6

SIGNIFICANCE RATING WITH MITIGATION (WM): Low -Ve 19.8

13.11.3 Light and Visual Impacts

NATURE:

Visual impact will result from the visual contrast of the site with the surrounding areas due to the following factors:

- The crushing and screening activities create a high visual contrast with the surrounding areas, which are greener and less uniform. In the first phase of rehabilitation, trees and natural vegetation will be used to disguise or buffer the mine workings as far as possible and provide some degree of stabilization of the substrate;
- The position of the mine workings, tailings storage facility and waste rock dump above the R37 Road, which raises it above the level of any naturally occurring tree, making it more visible;
- The relatively undeveloped nature of the surrounding area immediately reveals the presence of man-made infrastructure and man-made forms (straight lines, bold colours etc.)

The proposed Mphahlele opencast activities and surface infrastructure will further change the aesthetic character of surrounding area by a permanently changed landscape and the development associated with the mining operation. The mine will be visible from R37 main road.

STATUS OF THE IMPACT:

Construction and Operational Phase:

The visual impact is **negative and of high** significance since the mine opencast areas and surface infrastructures will be visible to the surrounding village and from the main road for the entire life of mine.

The impact is highly negative from the nearby community point of view, due to intensified loss of scenic values – beyond what existed prior to the commencement of the proposed activities. However, the existing mining operations render this impact to be of low significance.

Decommissioning and Closure:

Progressive rehabilitation will be implemented throughout the life of mine, such that as closure approaches a significant portion of the mining site would have been rehabilitated to conform to surrounding environmental characteristics and topographic features. This is subject to strict implementation and compliance with this environmental management programme report. Over time and towards closure the visual impact should gradually change from high to moderate and low after final rehabilitation is complete.

MITIGATION:

Concurrent rehabilitation should be implemented throughout the life of the mine to minimize and return the environment to - as much as possible – the original status. Screening with vegetation (trees) should also be implemented to mask the mine and the other mine infrastructure from various settlement viewpoints and soften the visual impacts.

The visual impact of the Mphahlele opencast pits, residue dumps and surface infrastructure sites can be reduced by doing the following:

- Filling up the mining site to match the surrounding landscape as closely as possible in the final phase of rehabilitation;
- Planting trees on the available fill material at a high density in the first phase of rehabilitation to match the “texture” of the surrounding landscape;
- Keeping the stockpiled topsoil over until the final finishing is done to match the existing soil colour, since the rock below is markedly different in colour (ie. grey vs reddish brown).

To reduce the impact of the cutting on the topography and restore the landscape character to closely resemble the conditions prior to the opencast pits, the following is recommended:

- Studying the contour map of the site and mimicking the surrounding areas on the final earthworks plan as closely as possible without excessive cost as part of the final phase of rehabilitation;



<ul style="list-style-type: none"> Stabilising the substrate/backfill material by means of a variety of metal-tolerant grasses, shrubs and trees; Screening the road as far as possible with indigenous trees, grasses and shrubs. 							
EXTENT		INTENSITY		DURATION		PROBABILITY	
Mining Site and Local	2	Very High	5	Long Term	4	Definite	5
WEIGHTING FACTOR: High							5
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): High -ve							80
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME							
WOM				ME			
80				0.8			
SIGNIFICANCE RATING WITH MITIGATION (WM): Medium to High -ve							64
NO GO OPTION:							
The communities in the immediate vicinity of the Mphahlele mine may have come to terms with views of existing mining infrastructure and changes in landscape. They will unlikely be affected in any way if the Mphahlele Mine does not proceed.							
CUMULATIVE IMPACTS:							
The proposed additional mining infrastructure at Mphahlele Mine may form part of the “sense of place” in the long term, even after operations cease.							
EXTENT		INTENSITY		DURATION		PROBABILITY	
Mining Site and Local	2	Medium	3	Long Term	4	Likely	3
WEIGHTING FACTOR: Medium							3
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low-Medium -ve							36
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME							
WOM				ME			
36				0.8			
SIGNIFICANCE RATING WITH MITIGATION (WM): Low-Medium -Ve							28.8

4.3.1 Landuse and Capacity

<p>NATURE:</p> <p>The construction and expansion of the Mphahlele mine surface infrastructure including crushing and screening plant, tailings dam, waste rock dumps, access roads and opencast pits will require topsoil stripping and clearing of vegetation. The inherent land capability will be permanently lost below the footprint of these mining entities. The severity of the impact is considered to be of moderate to high significance. The reason for the moderate severity is that the land is zoned for mining and currently being mined by Mphahlele mine.</p> <p>The proposed mining area expansion and mining infrastructure will not alter the landuse at the mine footprint due to current mining activities at the Mphahlele mine. There is no major impact on the landuse since the area is already zoned for mining.</p> <p>The positive impact of mining in the project area include increased business opportunities, greater demand for goods and services, pressures for housing (ability to own houses), etc.</p> <p>STATUS OF THE IMPACT:</p> <p>Construction and Operational Phase:</p> <p>The Mphahlele mine construction and mining operational activities will add to the existing negative impacts of air pollution due to dust, visual impacts due to mining, restricted access, loss of grazing land, and loss of land for cultural or traditional practices. There will a medium negative impact on the bio-physical aspects of the land (Locatie van M’phahlele 457 KS) due to exiting mining operations.</p>
--

The active mining areas are already demarcated and access to the land is restricted due to safety reasons. The nearby communities are therefore deprived of the notion of “the sense of place” and their respective sentimental attachments to their ancestral land.

The positive impact of mining in the project area include increased business opportunities, greater demand for goods and services, pressures for housing (ability to own houses), etc. Housing developments adjacent to the mine may also improve the value of land in nearby communities. The economic benefits will therefore be of **high positive** significance.

Decommissioning and Closure:

The land on the applicable farm for the Mphahlele proposed activities will be rehabilitated to as close as practically possible to its pre-mining conditions. The opencast voids will be backfilled (if practical) and re-vegetated. The waste rocks may be re-processed as construction stone and sold to the open market. The net effect is that eventually the waste rock dumps will disappear and the land can revert to wilderness. The tailings may also be re-processed and the overall size of the tailings dam can be significantly removed. If successful, the net effect is also complete removal of the tailings waste on the surface, and rehabilitation of land for grazing purposes.

MITIGATION:

Rehabilitate the land to as close as possible to its wilderness and grazing land state during and after the mining activities are concluded. Re-vegetation should be with indigenous plant species that are able to sustain the regional climate and soil conditions.

The farm where the current mining activities are taking place, is already a restricted/controlled access, therefore the larger Mphahlele mining proposed activities will not reduce availability of natural resources and land to local communities.

EXTENT	INTENSITY	DURATION	PROBABILITY
Mining Site and Local	2 High	4 Permanent	5 Highly Likely 4
WEIGHTING FACTOR: Medium to High +ve			4
SIGNIFICANCE RATING WITHOUT MITIGATION(WOM): Medium to High +ve			60
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME			
WOM		ME	
60		0.8	
SIGNIFICANCE RATING WITH MITIGATION (WM): Medium -ve			48
NO GO OPTION:			
If the Mphahlele proposed activities do not proceed, the current landuse around the farm (Locatie van M’phahlele 457 KS) - will remain with no change – including the existing mining activities and road infrastructure.			
CUMULATIVE IMPACTS:			
Possible further changes in landuse due to secondary industries that may be developed around the areas to provide support services and material to the mine. Urbanization and modern residential developments also likely.			
EXTENT	INTENSITY	DURATION	PROBABILITY
Mining Site and Local	2 Medium	3 Long Term	4 Possible 3
WEIGHTING FACTOR: Medium			3
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low - Medium -ve			36
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME			
WOM		ME	
36		0.6	

SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -Ve	21.6
--	-------------

13.11.4 Cultural and Heritage Aspects

<p>NATURE:</p> <p>There has been no record of any archaeological or heritage sites identified within the site footprint both during the initial construction and operational phases. This must however be verified through a detailed heritage impact assessment as part of the EMP process.</p> <p>Open pit mining disturbs and destroys the surface and sub-surface components of the earth crust. In the unlikely event that some cultural, heritage or archaeological resources are encountered during any future mining activities or construction associated surface infrastructure, these may be destroyed by the earth moving machinery used in both activities.</p> <p>STATUS OF THE IMPACT:</p> <p>Operational Phase:</p> <p>The status of the impact is considered as low negative significance since no cultural and heritage resources have been report or encountered during this SEA field investigations.</p> <p>The cultural and historic remains are area specific and very important to the cultural and values of the area. In the unlikely event that some resources are encountered during operations of the mining activities, the impact will become of medium negative significance since the earth moving equipment will destroy such resources to the detriment of the local people or inhabitants.</p> <p>Decommissioning and Closure:</p> <p>Mphahlele mine will form part of the history of the local area. Some mine infrastructure may be preserved as local heritage resources.</p> <p>MITIGATION:</p> <p>All Archaeological, paleontological and heritage sites and resources must be preserved if they are of cultural, historic or pre-historic significance. This must be done in conjunction with an expert or competent person:</p> <p>Monitoring for chance finds (e.g. burial sites, old waste disposal sites, ruins, foundations etc.) must be done continuously during operations. If any old graves are encountered, these must be demarcated, documented and fenced-off if preservation is the option taken. However, if preservation is not feasible, the identified graves must be relocated to another suitable site. Thus must be done by an accredited archaeologist through a Section 36 SAHRA permit application.</p> <p>Findings, if encountered during mining activities, must be reported to the LIHRA Office, Limpopo and Lepelle- Nkumpi Municipality who will decide, after consultation with other relevant authorities, company representatives and local communities whether work may go ahead. Special precautions may be instituted to enable the mining work to proceed.</p> <p>The following mitigations measures are also recommended:</p> <ul style="list-style-type: none"> ▪ Should any human remains be disturbed, exposed or uncovered during mining activities, these should immediately be reported to an accredited archaeologist. Burial remains should not be disturbed or removed until inspected by an archaeologist; ▪ Mining activities must also be monitored for the occurrence of any other archaeological material (Stone Age tools, Iron Age artefacts, historic waste disposal sites etc.) and similar hidden/buried chance finds and an archaeologist should be asked to inspect the area when this has reached an advanced stage in order to verify the presence or absence of any such material; ▪ Any graves in the vicinity of the mining operations that will or not be directly affected must be documented and monitored for damage.
--

EXTENT		INTENSITY		DURATION		PROBABILITY	
Mining Site and Local	2	High	4	Permanent	5	Likely	3
WEIGHTING FACTOR: Low to Medium -ve							2
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low to Medium -ve							28
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME							
WOM				ME			
28				0.8			
SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -ve							22.4
NO GO OPTION:							
Status Quo Remains. The proposed Mphahlele Mine site is not pristine land and communities have historically lived in this area for a prolonged period of time.							
CUMULATIVE IMPACTS:							
Any further mining development will form part of the history of the local area. No other cumulative impacts are anticipated.							
EXTENT		INTENSITY		DURATION		PROBABILITY	
Mining Site and Local	2	Medium	3	Long Term	4	Likely	3
WEIGHTING FACTOR: Medium							3
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low to Medium -ve							36
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME							
WOM				ME			
36				0.6			
SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -ve							21.6

13.11.5 Crime and HIV

<p>NATURE:</p> <p>Crime is commonly in most settlement areas and the affected communities of Ga- Mphahlele are not different. However, due to the rural nature of the settlements, crime may be lower comparative to urban centers such as Lebowakgomo and Polokwane. The traditional livelihoods and sharing of communal resources in rural settlements also minimizes crime to some extent.</p> <p>Crime, Covid-19 and HIV statistics in the affected villages have NOT been verified in this SEA study, however as a general norm influx of foreign people and job seekers in communities adjacent to projects such as the Mphahlele mine project is inherent. Covid- 19, HIV and crimes such as theft, sex crimes, traffic violations, fraud and drugs are possible, and likely to increase if not managed and policed because of the Mphahlele mine project.</p>
<p>STATUS OF THE IMPACT:</p> <p>Influx of foreigners and job seekers and increase in disposable income for local people may create negative social impacts such as crime, alcoholism and prostitution in and around the project area. This will result in moderate to high negative impacts to the surrounding communities.</p>

MITIGATION:

Labour should be sort from the local settlement areas to prevent influx of foreign who are likely to disrupt the social fabric, values and norms of the village people.

Through the SLP and day-to-day training and awareness programmes pandemics such as HIV and Covid-19 can be managed and minimized. The Mphahlele mine must also have an HIV and Covid-19 awareness outreach programme in conjunction with local health centers and clinics to extend awareness and knowledge about the disease to the broader communities affected by the proposed mine activities.

Visible policing and community policing forums must be established to curb incidents of crime in the communities. This option must be implemented in conjunction with existing tribal authority processes to manage crime and illegal activities.

EXTENT	INTENSITY	DURATION	PROBABILITY
Local and Regional	3 High	4 Long Term	4 Highly Likely

WEIGHTING FACTOR: Medium -ve **3**

SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Medium -ve **45**

SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME

WOM	ME
45	0.6

SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -ve **27**

NO GO OPTION:

Status Quo Remains. Current lockdown restrictions and Covid-19 regulations will continue to apply.

CUMULATIVE IMPACTS:

Possible loss of life and Covid-19 pandemic spread and new cases.

EXTENT	INTENSITY	DURATION	PROBABILITY
Mining Site and Local	2 Medium	3 Long Term	4 Likely

WEIGHTING FACTOR: Medium **3**

SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Low to Medium -ve **36**

SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME

WOM	ME
36	0.6

SIGNIFICANCE RATING WITH MITIGATION (WM): Low to Medium -ve **21.6**

13.11.6 Economic Opportunities, Infrastructure Development and Employment

NATURE:

Maejane, Bolopa, Manaileng, Maralaleng, Lekurung and Dithabaneng are villages in Ga- Mphahlele and the closet and most likely to be affected by the Mphahlele mine project. They are characterized by rural to semi-rural settlements with high levels of unemployment levels and low literacy levels. The region’s economy is derived from a variety of sectors, of which mining and agriculture are the main contributors.

A high percentage of residents in the local villages of Maejane, Bolopa, Manaileng, Maralaleng, Lekurung and Dithabaneng are unemployed. The mine will alleviate this unemployment problem, though it will not eradicate it completely.

Local business will also benefit by providing supplies and services to the mine. Secondary industries are also likely to develop. The life of mine (LOM) is expected to be over 20 years, which translate to 20 years and more of economic activity in the region.

The social and labour plan (SLP) to be implemented by the Mphahlele Mine will contribute to the development of the adjacent community in terms of skills training, local economic development projects, and improved infrastructure. This is a requirement in terms of Section 22 and Regulation 42 of the MPRDA, 2002.

STATUS OF THE IMPACT:

Construction and Operational Phase:

The impact will be positive to the local and regional economy and those who will get jobs at the mining operation. The number of actual jobs and contracts that will be created renders the mining operation to be of **high positive** significance. This will further be enhanced by the possible secondary economic activities that may arise within Lepelle- Nkumpi Local Municipality.

Increase in disposable income may create negative social impacts such as crime, alcoholism and prostitution in and around the project area.

Decommissioning and Closure:

The Mphahlele Mine will inject revenue and income to local residents during the over 20 year life of mine. Skilling and training of local people will make them more marketable to other industries in the region. LED projects will continue to sustain economic activity post Mphahlele Mine.

MITIGATION:

Promotion of chrome beneficiation within the Limpopo Province to improve the quality and value of the product being mined, and create further economic activity. Mphahlele mine already has chrome concentrator plants in their mine. Subject to economic modelling and feasibility study, another concentrator plant in the vicinity of Mphahlele can further significantly stimulate the economic activity in Lepelle-Nkumpi Local Municipality, Lebowakgomo and the surrounding region.

Labour should be sort from the local settlement areas to prevent influx of foreign people and job seekers who are likely to disrupt the social fabric, values and norms of the village people.

EXTENT	INTENSITY	DURATION	PROBABILITY
Local and Regional	3 Medium	3 Medium Term	5 Likely

WEIGHTING FACTOR: High 5

SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): High -ve 70

SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME

WOM	ME
70	0.8

SIGNIFICANCE RATING WITH MITIGATION (WM): Medium +ve 56

NO GO OPTION:

The current high poverty levels, lack of jobs and economic empowerment will remain in the adjacent communities and Lepelle- Nkumpi Local Municipality.

The No-Go option will result in the same challenges persisting and getting worse for the community in terms of unemployment and socio-economic development.

CUMULATIVE IMPACTS:

Cumulative impacts of socio-economic change include increase in crime, alcohol abuse, prostitutions, HIV and AIDS, Covid-19 and other transmitted diseases, influx of foreign people and change in social fabric of the community. Improved way of life due to job creation.

EXTENT	INTENSITY	DURATION	PROBABILITY
--------	-----------	----------	-------------

Mining Site and Local	2 3	Medium High	3 5	Long Term Long Term	4 4	Highly Likely Definite	4 5
WEIGHTING FACTOR: Medium							3
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Crime - Medium -ve							39
SIGNIFICANCE RATING WITHOUT MITIGATION (WOM): Job - Medium -ve							51
SIGNIFICANCE WITH MITIGATION (WM) = WOM x ME							
WOM						ME	
39						0.6	
51						0.6	
SIGNIFICANCE RATING WITH MITIGATION (WM): Crime, Alcohol, Diseases							23.4 -ve
SIGNIFICANCE RATING WITH MITIGATION (WM): Job Creation and Improved Life for Locals							30.6 +ve

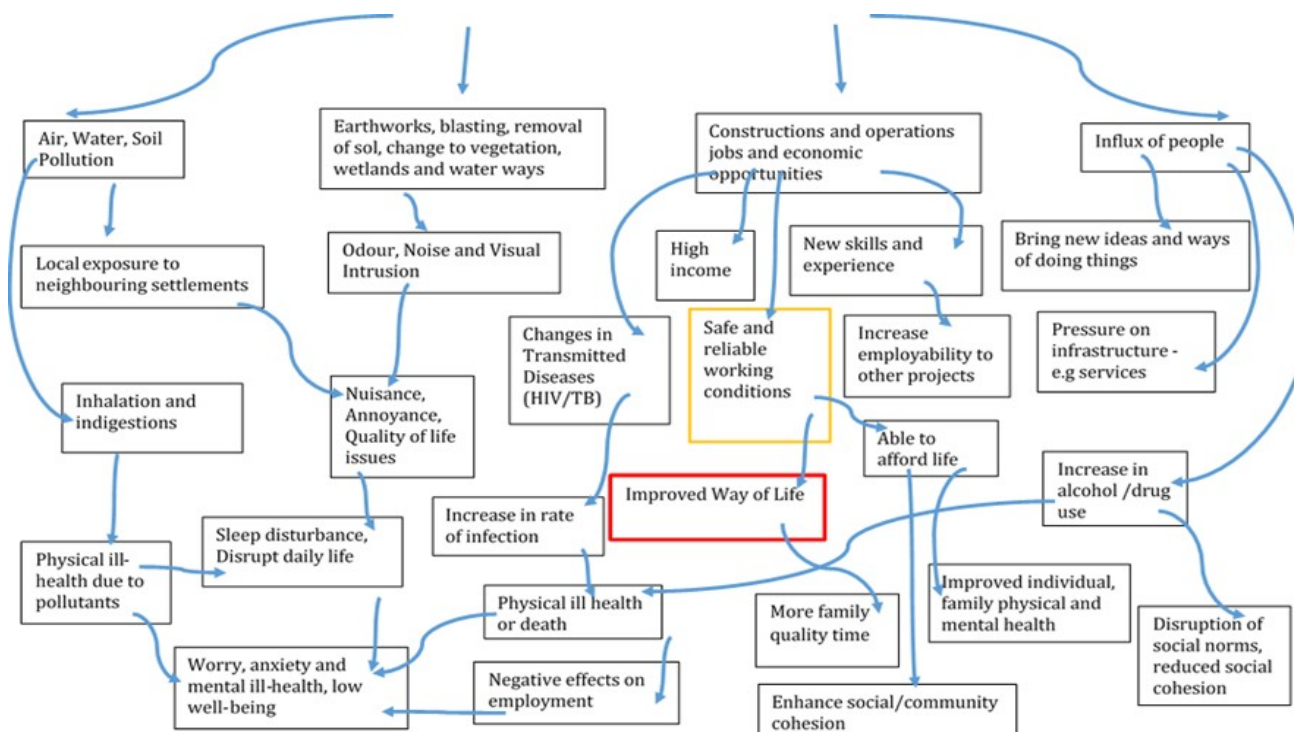


Figure 39: Potential Social Change Paths due to Mphahlele Mine

14 IMPACTS AND RISKS IDENTIFIED INCLUDING THE NATURE, SIGNIFICANCE, CONSEQUENCE, EXTENT, DURATION AND PROBABILITY OF THE IMPACTS

Refer to Section 13 for discussions on identified impacts as well as to Table 46 and Table 47.

Table 41: Impact Assessment Table (Complete with Ratings used to obtain Significance)

Aspect	Potential Impact	Phase	Extent	Duration	Intensity	Probability	Weighting Factor	Significance	Mitigation Efficiency	Significance
								Pre-Mitigation		Post-Mitigation
Soil and land capability	Erosion and topsoil loss	C	2	4	5	5	5	80	0.6	48
Soil and land capability	Loss of land capability and land use	C	2	4	5	5	5	80	0.8	64
Soil and land capability	Erosion and topsoil loss	O	2	4	10	5	4	84	0.6	50.4
Soil and land capability	Loss of land capability and land use	O	2	4	10	5	4	84	0.8	67.2
Soil and land capability	Soil contamination	O	1	2	4	4	2	22	0.4	8.8
Soil and land capability	Erosion and topsoil loss	D	2	4	10	5	4	84	0.6	50.4
Soil and land capability	Loss of land capability and land use	D	2	4	8	5	4	76	0.6	45.6
Surface water and aquatic ecology	Alteration of drainage by diversion of the Chunies river and drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve	C, O, D	2	4	3	5	4	56	0.4	22.4
Surface water and aquatic ecology	Deterioration of water quality	C, O, D	3	4	3	4	4	56	0.8	44.8
Surface water and aquatic ecology	Deterioration of water quality	C, O, D	3	4	3	2	4	48	0.8	38.4

Aspect	Potential Impact	Phase	Extent	Duration	Intensity	Probability	Weighting Factor	Significance	Mitigation Efficiency	Significance
								Pre-Mitigation		Post-Mitigation
Surface water and aquatic ecology	Erosion and sedimentation of water resources	C, O, D	3	4	3	2	4	48	0.2	9.6
Surface water and aquatic ecology	Deterioration of the Present Ecological Status (PES).	C, O, D	2	4	3	4	4	52	0.2	10.4
Groundwater	Lowering of water table	O	2	4	5	4	3	45	0.8	36
Groundwater	Deterioration of groundwater quality	O	1	4	3	4	3	36	0.6	21.6
Groundwater	Deterioration of groundwater quality	D	2	4	3	4	3	39	0.8	31.2
Groundwater	Deterioration of groundwater quality	D	1	4	3	3	2	22	0.6	13.2
Terrestrial ecology	Loss of Biodiversity and Ecological function within degraded areas	C, O	3	5	3	5	3	48	0.6	28.8
Terrestrial ecology	Distribution / proliferation of Alien Invasive Plant species	C, O	3	4	3	4	3	42	0.6	25.2
Terrestrial ecology	Loss of floral species of conservation concern	C, O	3	5	5	5	4	72	0.8	57.6
Terrestrial ecology	Environment not sustainable	D	3	4	3	3	4	52	0.6	31.2
Air Quality	Deterioration of ambient air quality (dust generation)	C	2	2	3	4	5	55	0.8	44

Aspect	Potential Impact	Phase	Extent	Duration	Intensity	Probability	Weighting Factor	Significance	Mitigation Efficiency	Significance
								Pre-Mitigation		Post-Mitigation
Air Quality	Deterioration of ambient air quality (dust generation)	O	2	2	3	4	5	55	0.8	44
Air Quality	Deterioration of ambient air quality (dust generation)	D	2	2	3	4	5	55	0.8	44
Noise	Disturbing noise, Day time and Night time	C	3	2	5	3	4	52	0.6	31.2
Noise	Disturbing noise, day and night	O	3	4	5	3	4	60	0.6	36
Noise	Disturbing noise	D	3	2	5	3	3	39	0.6	23.4
Visual	Potential visual impact on the Sensitive Receptors/Viewpoints	C	3	2	5	5	5	75	0.6	45
Visual	Potential visual impact on the Sensitive Receptors/Viewpoints	O	3	2	5	5	5	75	0.6	45
Blasting and vibration	Damage to buildings, houses and graveyards due to ground vibrations	C	2	4	5	5	4	64	0.2	12.8
Blasting and vibration	Damage to buildings, houses and graveyards due to air blast	C	2	4	5	5	4	64	0.2	12.8
Blasting and vibration	Damage to buildings, houses and graveyards due to fly rock	C	2	4	5	5	4	64	0.4	25.6
Heritage resources	Disturbance of heritage sites	C, O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Aspect	Potential Impact	Phase	Extent	Duration	Intensity	Probability	Weighting Factor	Significance	Mitigation Efficiency	Significance
								Pre-Mitigation		Post-Mitigation
Palaeontology resources	Disturbance or destruction of palaeontological resources	C, O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Socio-Economic	Increase in crime and HIV	C, O	3	4	4	4	3	45	0.6	27
Socio-Economic	POSITIVE: Economic Opportunities, Infrastructure Development and Employment	C. O	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Socio-Economic	Negative social and economic impact from closure	D	3	4	4	4	3	45	0.6	27

14.1 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

Table 42: Summary of potential environmental impacts and mitigation measures⁴

Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
Erosion and topsoil loss	C	80	<ul style="list-style-type: none"> Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint. Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. If possible, topsoil should be stripped during dry months, as to reduce compaction. Unnecessary land clearance must be avoided. Soil stockpiles must be dampened with dust suppressant or equivalent. Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. Ensure topsoil is stored in one dedicated stockpile, 10 m high. Only the designated access routes are to be used. The Stormwater Management Plan (SWMP) to be implemented. Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design. Revegetate cleared areas as soon as possible after construction activities. Oil and hydrocarbon spills should be cleaned in accordance with a spill procedure. 	48
Loss of land capability and land use	C	80	<ul style="list-style-type: none"> Keep the project footprint as small as possible. Subsistence farming and grazing should be permitted to continue on the areas within the mining area that will not be mined within a 6-month period. 	64
Erosion and topsoil loss	O	84	<ul style="list-style-type: none"> Land clearance must only be undertaken one cut in advance. Unnecessary land clearance must be avoided. Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. If possible, topsoil should be stripped when soil is dry, as to reduce compaction. Ensure topsoil is stored in one dedicated stockpile, 10 m high and away from drainages lines and surface water. Soil stockpiles must be dampened with dust suppressant or equivalent. Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to 	50.4

⁴ Monitoring is listed as part of the mitigation measures; however, it must be noted that monitoring in itself is not a mitigation measure. Monitoring is important to quantify and verify impacts against pre-development baseline and must be used to pro-actively determine when mitigations should be required.

Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			minimise soil erosion from these. <ul style="list-style-type: none"> • The Stormwater Management Plan (SWMP) should provide for a drainage system sufficiently designed to prevent water run-off to the open cast and underground areas, as well as from the plant area which will cause soil erosion. • Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design. • Revegetate cleared areas as soon as possible after construction activities. • Oil and hydrocarbon spills should be cleaned in accordance with a spill procedure. • Only the designated access routes are to be used. • Stockpiles are to be maintained in a fertile and erosion free state by sampling and analysing annually for macro nutrients and soil pH, and vegetating the stockpiles to reduce erosion. • Concurrent rehabilitation and re-vegetation of the areas mined out should take place. 	
Loss of land capability and land use	O	84	<ul style="list-style-type: none"> • Land clearance must only be undertaken one cut in advance. Unnecessary land clearance must be avoided. • Stockpiles are to be maintained in a fertile and erosion free state by sampling and analysing annually for macro nutrients and soil pH, and vegetating the stockpiles to reduce erosion. • Concurrent rehabilitation and re-vegetation of the areas mined out should take place. • Subsistence farming and grazing should be permitted to continue on the areas within the mining area that will not be mined within a 6-month period. • As part of the Social and Labour commitments and capital investment that the mine will make during rehabilitation, the mine should investigate the possibility to establish a sustainable agricultural project that can be handed over to the community. Some of the projects that should be investigate are hydroponics, aquiculture and or greenhouses. These forms of agriculture can produce high value crops in a relatively small area at large volumes. 	67.2
Soil contamination	O	22	<ul style="list-style-type: none"> • Maintenance must be undertaken on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. • Impermeable and bunded surfaces must be used for storage tanks and to park vehicles on. • Site surface water and wash water must be contained and treated before reuse or discharge from site. • Spills of fuel and lubricants from vehicles and equipment must be contained using a drip tray with plastic sheeting filled with adsorbent material. • Spill kits should be available on site and should be serviced regularly. • Potentially contaminating fluids and other wastes must be contained in containers stored on hard surface levels in bunded locations. 	8.8



Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			<ul style="list-style-type: none"> Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols as outlined in the EMPr. 	
Erosion and topsoil loss	D	84	<ul style="list-style-type: none"> Deep rip compacted areas to allow for natural vegetation regrowth. Ensure proper storm water management designs are in place. Replaced soils to be re-vegetated. Soils must be replaced according to the soil types. Compaction of the topsoil should be avoided. A bowl scrapper is to be avoided as this piece of machinery compacts soil. Areas where growth is slow to be re-vegetated to prevent compaction and erosion. Post-closure monitoring and maintenance to be undertaken. 	50.4
Loss of land capability and land use	D	76	<ul style="list-style-type: none"> Area to be rehabilitated, re-vegetated and soil amelioration to be undertaken where necessary Grazing should be initiated on areas to improve soil structure and organic content. Backfill should be done in such a manner that topsoil is not mixed with subsoil or material containing rocks. Contour slopes to minimise erosion and run-off. 	45.6
Alteration of drainage by diversion of the Chunies river and drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve	C, O, D	56	<ul style="list-style-type: none"> Define the runoff/flood characteristics of the study site and design storm water management facilities accordingly. This will ensure appropriate separation of clean and dirty storm water and will maximise the return of clean water to the downstream drainage system. Keep the dirty area footprint as small as possible and capture all dirty storm water generated on site for potential re-use. Adherence to the Storm Water Management Plan as compiled by an accredited engineer is crucial. 	22.4
Deterioration of water quality	C, O, D	56	In compliance with the GN 704 Regulations, the applicant should divert clean runoff from its mine surface infrastructure and collect dirty runoff from the sites of infrastructure.	44.8
Deterioration of water quality	C, O, D	48	<ul style="list-style-type: none"> Spills resulting from vehicle maintenance or as result of the storage of hydrocarbon materials must immediately be cleaned and properly disposed of. Petroleum (and other hazardous materials) storage areas should be effectively banded and applicable safety standards must be adhered to. Hazardous materials and chemicals must be stored on solid concrete surfaces. Storage containers must be inspected regularly for leaks and repaired as needed. 	38.4



Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			<ul style="list-style-type: none"> • Maintain parking areas and roads in good conditions for the duration of operations. • Spill kits should be available on site, especially in areas with high risk of spillages. • Storm water runoff generated on the mining site should be directed to and contained within the lined Pollution Control Dams. • Design wastewater containing structures according to applicable standards. • Immediate action must be taken to contain spillage. • The dams must be inspected regularly for early detection of leaks or damage. • Ensure that pipelines are of a hard enough material to withstand damage. • Uncontrolled disposal of waste near any construction site must be communicated to all contractors as unacceptable. • All waste should be placed in a central collection point and removed from the site. • Encourage and implement the separation and recycling of general waste. Place refuse bins on strategic places to encourage the disposal of litter to these bins. • Erect notices to inspire the staff to keep their environment clean and hazardous free. • Inspect all on-site disposal sites regularly to ensure adherence to all legal requirements. • The applicant should ensure that all storm water collection facilities and dirty-water holding facilities are designed for the 1:50 year storm event and that erosion protection and appropriate energy dissipation structures will be provided at each point necessary and as per approved designs. 	
Erosion and sedimentation of water resources	C, O, D	48	<ul style="list-style-type: none"> • Storm water management will be based on the objective of separating clean water from dirty water and therefore encompass the key principle of pollution prevention. • The following objectives will apply: <ul style="list-style-type: none"> o Keep clean water clean; o Collect and contain dirty water; o Ensure sustainable storm water management over mine life cycle; and o Compliance with Regulations as contained in GN 704 	9.6
Deterioration of the Present Ecological Status (PES).	C, O, D	52	<ul style="list-style-type: none"> • Mobile sanitary facilities must be inspected regularly and adequately maintained by an approved contractor to prevent any spills/leaks from occurring. • Mobile sanitary facilities must be located outside the applicable buffer zones. • Ensure that an adequate number of mobile toilets are available for workers on site. • Storm water runoff generated at stockpile areas should be directed to and contained within the lined Pollution Control Dams. 	10.4



Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			<ul style="list-style-type: none"> • Appropriate management measures should be implemented to drain any seepage to the lined PCDs. • Dirty water should be re-used wherever practical. 	
Lowering of water table	O	45	<ol style="list-style-type: none"> 1) Continuous monitoring of mine inflows (daily) and water levels (quarterly) within the predicted zone of dewatering 2) Excess water must be pumped to the water storage facilities (PCDs) for re-use and/or treatment and environmentally acceptable disposal. 3) Provision of alternative water supply to affected users / compensation for well yield losses or increased pumping costs (due to increased lift height and/or yields) 	36
Deterioration of groundwater quality	O	36	<ol style="list-style-type: none"> 1) Continuous monitoring of downstream concentrations (Stockpiles, TSF, PCDs and mining areas) 2) Concurrent rehabilitation/covering of backfilled areas 3) Adaptive management of TSF plume, i.e. hydraulic plume containment if and when required 	21.6
Deterioration of groundwater quality	D	39	<ol style="list-style-type: none"> 1) Re-shaping (e.g. free draining) and rehabilitation (e.g. top-soiling and seeding) of backfilled areas. 2) Monitoring of water levels (quarterly) within backfilled mining areas and receiving (adjacent) environment 	31.2
Deterioration of groundwater quality	D	22	<ol style="list-style-type: none"> 1) Rehabilitation (e.g. top-soiling and seeding) of TSF 2) Reduction in source concentrations and seepage rates (inert material) (natural attenuation) 3) Continuous monitoring of downstream plume migration using proposed monitoring network. 4) Hydraulic plume containment within aquifer as required. 	13.2
Loss of Biodiversity and Ecological function within degraded areas	C, O	48	<ul style="list-style-type: none"> • Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. • To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees. • Continuous rehabilitation of the area should occur, immediate closure and rehabilitation. This will entail the spreading of topsoil, revegetation and management of invasive species. • Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater systems and drains to prevent contaminated water entering the natural environment. This will be prudent in this development, since the mining area is adjacent to the Chunies River. 	28.8
Distribution / proliferation of Alien Invasive Plant species	C, O	42	<ul style="list-style-type: none"> • Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. • A management plan for the control of invasive and exotic plant species needs to be implemented. Specialist 	25.2

Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			advice should be used in this regard. This plan should include pre-treatment, initial treatment and follow-up treatment and should be planned and budgeted for in advance.	
Loss of floral species of conservation concern	C, O	72	<ul style="list-style-type: none"> All footprint areas should remain as small as possible. This can be achieved by fencing footprint areas to contain all activities within designated areas. If any SCC are encountered within the subject property in the future, the following should be ensured: <ul style="list-style-type: none"> If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. All rescue and relocation plans should be overseen by a suitably qualified specialist. Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed. Human and vehicle movement should be restricted from taking place in sensitive habitats. Areas to be fenced if necessary. 	57.6
Environment not sustainable	D	52	<ul style="list-style-type: none"> A management plan for control of invasive/exotic plant species needs to be implemented for all footprint and surrounding areas. This will be ongoing until the end of the mining closure phase. Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase. Rehabilitation plan should be implemented. This includes the process of replanting the vegetation. Rehabilitation plans should be compiled with the use of a specialist and the correct seeding techniques and mixtures should be applied. Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary. A report should be written and stored and should be available at all times. 	31.2
Deterioration of ambient air quality (dust generation)	C	55	<ul style="list-style-type: none"> Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed thus increasing the moisture content. Blasting should also not take place when poor atmospheric dispersion are expected i.e. early morning and late evening. Material needs to be removed to dedicated stockpiles to be used during rehabilitation. This hauling of materials should take place on roads which are being watered and/or sprayed with dust suppressant. To reduce the amount of dust being blown from the load bin in the haul roads, the material being 	44



Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. <ul style="list-style-type: none"> • Constricting the areas and time of exposure of pre-strip clearing in advance of construction to limit exposed soil surfaces. • Use of pre-blast environmental checklists, real-time weather monitoring data and stringent controls on blasts carried out in sensitive areas. • Respiratory protection should only be used to control the dust exposures where other dust collection or suppression systems have not been able to reduce the dust to acceptable levels. • When using hand held rock drills efforts should be made to control dust at source e.g. water injection or extraction. If control of dust at source is not practicable then respiratory protection should be used. • Low or in-pit dumping of overburden during high wind conditions • Filtration systems can be utilised to remove the pollutants from the underground air prior to their release to the surface via the vent. • Restricting the areas and time of exposure of pre-strip clearing in advance of mining development 	
Deterioration of ambient air quality (dust generation)	O	55	<ul style="list-style-type: none"> • Hauling of materials and transportation of people should take place on roads which are being watered and/or sprayed with dust suppressant. • To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. • In order to mitigate the impacts of the activity, the speed limit should be kept low. • Speed limits need to be observed and adhered to. • Application of wetting agents or application of dust suppressant to bind soil surfaces to avoid soil erosion. • The drop heights should be minimised when depositing materials to the ground. • Planting plenty of trees or hedges as shelterbelts to eliminate or minimise wind disturbance. • Disturbed areas such as those caused by stripping off grass and topsoil should be kept to a minimum. • Use water sprays or water carts to settle dust. There are additives available that reduce the volume of water used. • Use of water sprays at each contact or transfer point along the conveyance system which have adjustable rates of application (low, medium and high) depending on dust levels. • Speed restrictions should be imposed and enforced. • Topsoil handling and storage procedures including stockpile inventory, vegetative cover and signage to optimise rehabilitation and minimise wind erosion. • Dust from stockpile sources can be reduced through the use of plastic or other material cover, compaction 	44



Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			of the surface and the use of water or sprays, trees and careful citing of stockpiles. <ul style="list-style-type: none"> Restricting the areas and time of exposure of pre-strip clearing in advance of mining development in turn limiting stockpile requirements. 	
Deterioration of ambient air quality (dust generation)	D	55	<ul style="list-style-type: none"> Demolition should not be performed during windy periods (August, September and October), as dust levels and the area affected by dust fallout will increase. The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. Speed restrictions should be imposed and enforced. Dust suppression of roads being used during rehabilitation should be enforced. Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. Plants used for revegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings. The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. Spreading of soil must be performed on less windy days. The bare soil will be prone to erosion and therefore there is need to reduce the velocity near the surface of the soil by re-vegetation. Leaving the surface of the soil in a coarse condition reduces wind erosion and ultimately reduces the dust levels. It is recommended that the rehabilitation by vegetating should begin during the operational phase already as the objective is to minimise the erosion. These measures should be aimed to reduce the potential for fugitive dust generation and render the impacts on ambient air quality negligible 	44
Disturbing noise, Day time and Night time	C	52	<ul style="list-style-type: none"> Should a noisy construction activity occur off the project footprint and near a receptor, the Environmental Coordinator should inform the receptor prior to the activity. Should noisy night-time activity occur, the Environmental Coordinator should make receptors aware of the activity prior to the occurrence. Recommended (not compulsory) – The construction team should make use of equipment that has lower SPL 	31.2

Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			<p>or is designed to produce lower SPL (heavy equipment operating within 300m of a receptor).</p> <ul style="list-style-type: none"> •The Environmental Co-ordinator should implement continuous communication regarding noises and potential loud noise events (a potential situation whereby some noisy activity will commence near a receptor for some unforeseen circumstance). Prior knowledge of a noise event will be far more ideal than a receptor being unaware of a loud noise circumstance. 	
Disturbing noise, day and night	O	60	<ul style="list-style-type: none"> • Where feasible, noisy equipment and areas (crushing, screening and specifically tipping points and conveyor feeds) should not be raised at high elevations. The noisy equipment and areas should be cited as low as possible. •The Environmental Co-ordinator should implement continuous communication regarding noises and potential loud noise events (a potential situation whereby some noisy activity will commence near a receptor for some unforeseen circumstance). Prior knowledge of a noise event will be far more ideal than a receptor being unaware of a loud noise circumstance. 	36
Disturbing noise	D	39	<ul style="list-style-type: none"> •The Environmental Co-ordinator should implement continuous communication regarding noises and potential loud noise events (a potential situation whereby some noisy activity will commence near a receptor for some unforeseen circumstance). Prior knowledge of a noise event will be far more ideal than a receptor being unaware of a loud noise circumstance. 	23.4
Potential visual impact on the Sensitive Receptors/Viewpoints	C	75	<ul style="list-style-type: none"> • Reduce the construction period through careful planning and productive implementation of resources. Clearly define areas to be cleared. Do not clear past designated areas. Retain natural vegetation outside of clearance zone. • Plan the placement of lay-down areas and any potential temporary construction camps to minimise vegetation clearing. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. Screen the whole construction site via fence cover. • Reduce and control construction dust using approved dust suppression techniques. Implement daily dust suppression and pave roads where possible to avoid transport related dust pollution. • Restrict construction activities to daylight hours to negate, or reduce, the visual impacts associated with lighting. Direct light downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places. 	45



Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
Potential visual impact on the Sensitive Receptors/Viewpoints	O	75	<ul style="list-style-type: none"> • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way. • Backfilling of the open pit as part of concurrent rehabilitation. • Vegetate and maintain stockpiles to the recommended minimum height. Revegetate soon after stockpiling to avoid erosion and a drainage patterns forming on the stockpile. • Rehabilitation of disturbed areas and re-establishment of vegetation. 	45
Damage to buildings, houses and graveyards due to ground vibrations	C	64	<ul style="list-style-type: none"> • Specific blast design to be done, shorter blast holes, smaller diameter blast hole, using electronic initiation instead of shock tube systems to obtain single hole firing. • Redefine exact pit limits or blast areas and possibly increase distance between blast areas and houses. 	12.8
Damage to buildings, houses and graveyards due to air blast	C	64	<ul style="list-style-type: none"> • Specific blast design to be done, shorter blast holes, smaller diameter blast hole, use of specific stemming materials to manage air blast, increased stemming lengths to reduce air blast effect. Use of specific stemming to manage fly rock - crushed aggregate of specific size. Re-design with increased stemming lengths. 	12.8
Damage to buildings, houses and graveyards due to fly rock	C	64	<ul style="list-style-type: none"> • Specific blast design to be done, shorter blast holes, smaller diameter blast hole, use of specific stemming materials to manage air blast, increased stemming lengths to reduce air blast effect. Used of specific stemming to manage fly rock - crushed aggregate of specific size. Re-design with increased stemming lengths. 	25.6
Disturbance of heritage sites	C, O	N/A	<ul style="list-style-type: none"> • No impact on the identified heritage resource sites is expected, but in the event that the project layout changes in a way that will affect additional footprint areas or in the event that additional sites are discovered a heritage specialist should be consulted. 	N/A
Disturbance or destruction of palaeontological resources	C, O	N/A	<ul style="list-style-type: none"> • A Fossil Chance Find Protocol should be added to the EMP: if fossils are found once excavations, drilling or blasting have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. 	N/A
Increase in crime and HIV	C, O	45	<ul style="list-style-type: none"> • Labour should be sourced from the local settlement areas to prevent influx of foreign people who are likely to disrupt the social fabric, values and norms of the village people. • Through the SLP and day-to-day training and awareness programmes pandemics such as HIV and Covid-19 can be managed and minimized. The Mphahlele mine must also have an HIV and Covid-19 awareness outreach programme in conjunction with local health centres and clinics to extend awareness and knowledge about the disease to the broader communities affected by the proposed mine activities. 	27

Potential Impact	Phase	Significance	Mitigation measures	Significance
		Pre-Mitigation		Post- Mitigation
			<ul style="list-style-type: none"> •Visible policing and community policing forums must be established to curb incidents of crime in the communities. This option must be implemented in conjunction with existing tribal authority processes to manage crime and illegal activities. 	
POSITIVE: Economic Opportunities, Infrastructure Development and Employment	C. O	N/A	<ul style="list-style-type: none"> •Promotion of chrome beneficiation within the Limpopo Province to improve the quality and value of the product being mined, and create further economic activity. Mphahlele mine already has chrome concentrator plants in their mine. Subject to economic modelling and feasibility study, another concentrator plant in the vicinity of Mphahlele can further significantly stimulate the economic activity in Lepelle-Nkumpi Local Municipality, Lebowakgomo and the surrounding region. •Labour should be sourced from the local settlement areas to prevent influx of foreign people and job seekers who are likely to disrupt the social fabric, values and norms of the village people. 	N/A
Negative social and economic impact from closure	D	45	<ul style="list-style-type: none"> •Adequate communication with the surrounding communities during all phases of the development to ensure that an open policy regarding timelines is enforced during all stages of the development. •SLP projects and programmes should be aimed at long-term sustainability in the absence of the mine 	27

14.2 SUMMARY OF SPECIALIST REPORTS

Table 43: Summary of specialist reports

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
<p>Soil and Land Capability Assessment</p>	<p>The proposed project will have moderate to high impacts on soil and land capability properties as well as current land uses in the areas where the footprint will result in surface disturbance. Cumulative impacts are related to an increase in the loss of agricultural land used for livestock farming. These impacts can be reduced by keeping the footprints minimised where possible and strictly following soil management measures as presented in this report. If soil management measures are followed as outlined in this report and the land rehabilitated to the highest standard possible, livestock farming will be possible on the rehabilitated land. The rehabilitated land will be return to Class V and Class IV land where possible.</p> <p>It should all be taken into consideration that dry land crop production is not the only agricultural activities that can be undertaken as end land use after mining. As part of the capital investment made by the mine to mitigate the impacts associated with the mining activities other forms of agricultural activities can be established i.e. hydroponics, aquiculture and or greenhouses).</p> <p>It is therefore the opinion of the author that the activity should be authorised and that the layout proposed for the development is acceptable from a soils and agricultural potential perspective. It follows that the recommendations and monitoring requirements as set out in this report should form part of the conditions of the environmental authorisation for the proposed project.</p> <p>The following is recommended for the project.</p> <ul style="list-style-type: none"> As part of the Social and Labour commitments and capital investment that the mine will make during rehabilitation, the mine should investigate the possibility to establish a sustainable agricultural project that can be handed over to the community. Some of the projects that should be investigate are hydroponics, aquiculture and or greenhouses. These forms of agriculture can produce high value crops in a relatively small area at large volumes. 	<p>X</p>	<p>Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>It is therefore the opinion of the author that the activity should be authorised and that the layout proposed for the development is acceptable from a soils and agricultural potential perspective. It follows that the recommendations and monitoring requirements as set out in this report should form part of the conditions of the environmental authorisation for the proposed project.</p>		
<p>Surface Water and Aquatic Ecology Assessment</p>	<p>The findings should be confirmed during the several seasons, since the results of one assessment cannot be taken as a standard indefinitely. However, based on the results of the biomonitoring reports available in the downstream areas (Olifants River) which also shows ephemeral nature of the watercourses in the area, no deviations are expected (future permanent flow is not expected) and the implementation of SASS does not seem feasible for the project in the long run. This is why sediment monitoring has been conducted in recent seasons and these could continue as part of the monitoring framework.</p> <p>Based on the risks assessed, the applicant needs to develop an Environmental Management Programme / Plan which describe in detail how identified impacts will be managed on site to ensure that impacts are minimized. The management measures as indicated in th report must be implemented where applicable.</p> <p>The following should also be included in the EMP:</p> <ul style="list-style-type: none"> • Define the runoff/flood characteristics of the study site and design storm water management facilities accordingly. This will ensure appropriate separation of clean and dirty storm water and will maximise the return of clean water to the downstream drainage system. • Keep the dirty area footprint as small as possible and capture all dirty storm water generated on site for potential re-use. • Adherence to the Storm Water Management Plan as compiled by an accredited engineer is crucial. • In compliance with the GN 704 Regulations, the applicant should divert clean runoff from its mine surface infrastructure and collect dirty runoff from the sites of infrastructure. 	<p>X</p>	<p>Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> • An increase in traffic and the additional logistics may result in hydrocarbon spillages which could in turn result in contaminated runoff reaching drainage lines. • Spills resulting from vehicle maintenance or as result of the storage of hydrocarbon materials must immediately be cleaned and properly disposed of. • Petroleum (and other hazardous materials) storage areas should be effectively bunded and applicable safety standards must be adhered to. • Hazardous materials and chemicals must be stored on solid concrete surfaces. • Storage containers must be inspected regularly for leaks and repaired as needed. • Maintain parking areas and roads in good conditions for the duration of operations. • In case of accidental spillages, specialized equipment should be available on site to mop up the pollutants before irreversible damage is caused. • Else, specialized contractors may be used to fulfil this function. • Increased risk of surface water pollution as result of poor water quality and materials emanating from the processing plants. Overflow could occur during storm events. Pipelines carrying contaminated water could burst, leak, or discharge during maintenance. Storm water runoff generated on the mining site should be directed to and contained within the lined Pollution Control Dams. • Design wastewater containing structures according to applicable standards. • Immediate action must be taken to contain spillage. • The dams must be inspected regularly for early detection of leaks. • Ensure that pipelines are of a hard enough material to withstand damage. • Solid waste could reach drainage lines if not correctly disposed of. • Uncontrolled disposal of waste near any construction site must be communicated to all contractors as unacceptable. • All waste should be placed in a central collection point and removed from the site. • Encourage and implement the separation and recycling of general waste. Place refuse bins on strategic places to encourage the disposal of litter to these bins. Erect notices to inspire the staff to keep their 		



List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>environment clean and hazardous free.</p> <ul style="list-style-type: none"> • Inspect all on-site disposal sites regularly to ensure adherence to all legal requirements. • Inspect all contractors and disposal agents, premises and sites regularly to ensure that all environmental and legal requirements are adhered to. • The applicant should ensure that all storm water collection facilities and dirty-water holding facilities are designed for the 1:50 year storm event and that erosion protection and appropriate energy dissipation structures will be provided at each point necessary and as per approved designs. • Flow meters to be installed and maintained • Storm water management will be based on the objective of separating clean water from dirty water and therefore encompass the key principle of pollution prevention. • The following objectives will apply: <ul style="list-style-type: none"> • Keep clean water clean; • Collect and contain dirty water; • Ensure sustainable storm water management over mine life cycle; and • Compliance with Regulations as contained in GN 704 • Mobile sanitary facilities must be inspected regularly and adequately maintained by an approved contractor to prevent any spills/leaks from occurring. • Mobile sanitary facilities must be located outside the applicable buffer zones. Ensure that an adequate number of mobile toilets are available for workers on site. • Seepage and runoff from stockpile areas are moderately contaminated and could impact on surface water quality. • Storm water runoff generated at stockpile areas should be directed to and contained within the lined Pollution Control Dams. • Appropriate management measures should be implemented to drain any seepage to the lined PCDs. • Dirty water should be re-used wherever practical. • Implement monitoring plan as provided in the EMPr and above. 		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>Based on the risks predicted and assessed, the applicant needs to develop an Environmental Management Programme / Plan which describe in detail how identified impacts will be managed on site to ensure that impacts are minimized. The management measures as indicated in this report must be implemented where applicable.</p> <p>It is the opinion of the specialist that the development could take place if all management features are adhered to, the SWMP is formally designed by competent Engineers and approved by the Department of Housing Services, Water and Sanitation (DHSWS). It is further recommended that the Opencast activity be moved away from the Chunies River which will lower impacts significantly to the surface water environment and should be considered.</p>		
Groundwater Study	Mitigation measures as recommended in the Groundwater Assessment should be impemented. The groundwater monitoring Programme recommended should be implemented.	X	Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.
Terrestrial Ecology Assessment	<p>TERRESTRIAL MANAGEMENT PLAN AND RECOMMENDATIONS</p> <p>Pre-Construction Phase</p> <ul style="list-style-type: none"> • <i>Aloe marlothii</i> (Mountain aloe), <i>Aloe aculeata</i> (Prickly aloe) and <i>Aloe davyana</i> (Spotted aloe) were observed to occur on the project footprint. All three these Aloe species are protected in terms of the LEMA. Limpopo Environmental Affairs should be consulted and a permit in terms of LEMA should be obtained if required; • <i>Boscia albitrunca</i> (Shepherd's tree) and <i>Sclerocarya birrea</i> (Marula) were observed to occur on the project footprint and are protected in terms of the NFA. Protected Tree permits should be obtained for these species in terms of NFA; • General preference in terms of layout will be within those areas delineated as lower sensitivity, • Adhering to sensitivity areas delineated and delineated buffers will also ensure minimal impacts related to 	X	Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>vegetation clearance practices; and</p> <ul style="list-style-type: none"> Impacts to sensitive areas can be greatly minimised by avoiding mining activities within the 1:100 year floodline of the Chunies River. It is therefore recommended that consideration be given to the possibility of adjusting the opencast area in order to avoid the Chunies River 1;100 year floodline area entirely; <p>Construction and Operational Phases</p> <p><u>Aims and Objectives</u></p> <ul style="list-style-type: none"> A suitable responsible person should be appointed during the construction phase to ensure that no unnecessary ecological impacts occur or animal is harmed and no breeding ground or unexpected discovery of red listed/sensitive animals that may require relocation is handled incorrectly by uninformed personnel; Prevent the needless loss of or damage to flora particularly with regard to protected, endemic, near-endemic and rare species to keep the specific habitat type as unaltered as possible. This will include the active management of Alien and Invasive species around the perimeter and within the development footprint; Prevent death, injury or hindrance to any fauna encountered during the project phases, and particularly with regard to any possible protected or endemic species; Prevent impacts from reaching the downstream river environments at any stage of the development as these will impact the aquatic life within the systems as well as impact all the animals using the water resources on-site as well as downstream impacts. Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater systems and drains to prevent contaminated water entering the natural environment. <p><u>Ecological Mitigation and Management measures</u></p> <ul style="list-style-type: none"> All footprint areas should remain as small as possible. This can be achieved by fencing footprint areas to contain all activities within designated areas. If any SCC are encountered within the subject property in the future, the following should be ensured: 		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> ○ If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property; ○ All rescue and relocation plans should be overseen by a suitably qualified specialist; and ○ Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed, <ul style="list-style-type: none"> ● Human and vehicle movement should be restricted from taking place in sensitive habitats. Areas to be fenced if necessary. ● Impacts to sensitive areas can be greatly minimised by avoiding mining activities within the Chunies River. It is therefore recommended that consideration be given to the possibility of adjusting the opencast area in order to avoid the Chunies River entirely. ● Keep spill kits and hazmat prevention kits on-site to remediate any spill immediately before reaching the natural environment. As mentioned, this will be prudent in this development, since petroleum and other hydrocarbons associated are likely to be spilled in the environment if not managed well. ● Prevent impacts from reaching downstream water resources by ensuring no spillage and proper handling of infrastructure during removal. ● Continuous rehabilitation of the area should occur in accordance with the WUL, as well as monitoring as prescribed. ● Ensure awareness amongst all staff, contractors and visitors to site to not needlessly harm or hinder animals or damage flora that is endemic and serve as habitat for the animals inhabiting the area. ● Allow animals to escape areas of activity freely and do not hinder their movement. ● All activities should be preferably restricted to one area as delineated within the formal layout. Strict measurements should be implemented. <p><u>Monitoring</u> Monitoring framework should be instigated and managed by their responsible body and the following system may enforce good practice:</p>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.																							
	<ul style="list-style-type: none"> Implement an “Observe and report” approach which will enable employees to report any disturbance of flora/fauna or degradation that they encounter. Alien invasive awareness, eradication and control programme on an annual basis. Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase and application and success should be monitored. This includes the process of replanting the vegetation. Rehabilitation plans should be compiled with the use of a specialist and the correct seeding techniques and mixtures should be applied. <p>It is the reasoned opinion of the specialists that the development may continue if all mitigation measures are implemented. As recommended, impacts to sensitive areas and species can be greatly minimised by avoiding mining activities within the Chunies River. It is therefore recommended that consideration be given to the possibility of adjusting the opencast area in order to avoid the Chunies River entirely.</p>																									
Air Quality Assessment	<p>The mitigation measures as seen in the table below are recommended at the various sources:</p> <table border="1"> <thead> <tr> <th>Operation</th> <th>Reduction</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td>Material Handling ROM - UG</td> <td>50%</td> <td>Water Sprays</td> </tr> <tr> <td>Opencast Pit</td> <td>50%</td> <td>Water Sprays</td> </tr> <tr> <td rowspan="2">Wind Erosion</td> <td>50%</td> <td>Water Sprays</td> </tr> <tr> <td>90%</td> <td>Revegetation on Tailings and Topsoil</td> </tr> <tr> <td>Haul Road</td> <td>90%</td> <td>Sealed or Salt-Encrusted roads</td> </tr> <tr> <td>Primary Crushing</td> <td>50%</td> <td>Water Sprays</td> </tr> <tr> <td>Secondary Crushing</td> <td>50%</td> <td>Water Sprays</td> </tr> </tbody> </table> <p>Based on the results presented the following further recommendations are outlined:</p>	Operation	Reduction	Method	Material Handling ROM - UG	50%	Water Sprays	Opencast Pit	50%	Water Sprays	Wind Erosion	50%	Water Sprays	90%	Revegetation on Tailings and Topsoil	Haul Road	90%	Sealed or Salt-Encrusted roads	Primary Crushing	50%	Water Sprays	Secondary Crushing	50%	Water Sprays	<p>X</p>	<p>Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.</p>
Operation	Reduction	Method																								
Material Handling ROM - UG	50%	Water Sprays																								
Opencast Pit	50%	Water Sprays																								
Wind Erosion	50%	Water Sprays																								
	90%	Revegetation on Tailings and Topsoil																								
Haul Road	90%	Sealed or Salt-Encrusted roads																								
Primary Crushing	50%	Water Sprays																								
Secondary Crushing	50%	Water Sprays																								

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> It is recommended that ambient air quality monitoring be established to get a baseline condition prior to the onset of the operations and in order to establish the level at which the proposed operations are noted to impact on the ambient air quality. Fallout monitoring should be continued for the life of mine to better assess the level of nuisance dust associated with both mining and process related operations. Sampling of fallout should be undertaken within the neighbouring areas as well as on-site. Dust fallout monitoring is recommended at the locations as shown in Figure 35. PM10 and PM2.5 dust monitoring must also be undertaken at the same sites as mentioned under the previous bullet but also in and around potential fugitive emission sources to determine mitigation measures and focus management efforts. If it is found that dust and PM10 levels are measured to be exceeding limits, it is highly recommended to establish a Real-Time indicative monitoring network to quantitatively help identify the sources and to assist in the management of the mitigation of these sources. <p>The impacts from dust fallout and Particulate matter can be reduced by implementing dust control measures. The highest intensity of the construction work should be carried out during the summer months and not over the harsh winter months as can result in increased dispersion of fugitive dust. The mine should ensure that unpaved roads are continuously watered and treated with dust binding additive products to reduce the volume of fugitive dust emitted from unpaved roads.</p> <p>Mitigation and management measures for mining operation as discussed in this report should be sufficient to ensure the mining operation can be conducted with minimal impact on the receiving environment and therefore not have a detrimental effect and can go ahead.</p>		
Archaeology and Heritage	It should also be noted that although all efforts are made to locate, identify and record all possible cultural heritage sites and features (including archaeological remains) there is always a possibility that some might have been missed	X	Section10, Section13, Section 14, Table 41

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>as a result of grass cover and other factors. The subterranean nature of these resources (including low stone-packed or unmarked graves) should also be taken into consideration. Should any previously unknown or invisible sites, features or material be uncovered during any development actions then an expert should be contacted to investigate and provide recommendations on the way forward.</p> <p>Finally, from Cultural Heritage point of view the Mining Rights Application should therefore be allowed to continue, taking cognizance of the above recommendations. Once the final layout and locations of mining infrastructure and activities have been determined then a more focused and detailed cultural heritage assessment should be undertaken in these areas.</p>		<p>and Table 42. As well as all Impact and Management tables.</p>
Noise Quality	<p>To ensure that the noise compliance is achieved under all circumstances, to minimise the potential of a disturbing noise, and to ensure compliance of the footprint boundary limits, to the following key mitigation options should be implemented at the Mphahlele Mine:</p> <ul style="list-style-type: none"> • Operational Phases – The developer must implement various management and design acoustical mitigation regarding their plant and open cast operations. The introduction of berms in key areas (or the use of pit highwalls/stockpile slopes as berms) is a primary mitigation option to consider. Berms near R1 (Dithabaneng community) and R3 (Mphahlele 4) are proposed. • It is highly recommended that the Environmental Co-ordinator keep continuous communication with receptors regarding noises and potential loud noise events. Prior knowledge of a noise event will be far more ideal than a receptor who has not been notified of loud events. • A Quarterly noise measurements programme is recommended during all phases. • Should the layout assessed in this report change, the new layout should be reviewed in terms of environmental acoustics. • Should the mine develop underground ventilation stacks (at surface level) within 1,000m of a receptor, this document be reviewed with the ventilation stacks assessed. 	X	<p>Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> Existing municipal routes feature within the study area of which mining vehicles would have to use access the mine. If mining vehicles make use of these routes, the municipality should be aware that it may have the potential to change receptors Rating levels up to 250m from the route should 30 heavy vehicles pass per month. Planning (in terms of noise) should be conducted by the municipality. <p>With mitigation measures implemented the mine would comply to GN R154 legislation. In terms of noise the project does not present a fatal flaw. International Finance Corporation (IFC) guidelines targets will also be achieved should mitigation be implemented. The project should be authorised in terms of noise, with mitigation measures adhered to.</p>		
Visual Assessment	<p>Visual impact mitigation can generally be defined as actions taken to avoid, minimize, rectify, reduce, or compensate for visual impacts arising from a proposed project or action (BLM, 2017). The Council on Environmental Quality (CEQ) has defined environmental impact mitigation to include:</p> <p>Avoidance: Avoid the impact altogether by not taking a certain action or parts of an action.</p> <p>Minimization: Minimize impacts by limiting the degree or magnitude of the action and its implementation.</p> <ul style="list-style-type: none"> It is recommended that the construction site be screened by using meshing fencing in natural colour (green). The surface infrastructure should use material with colours that blend in with the environment. Retain the natural bushveld vegetation as much as possible for visual screening of the infrastructure. Keep Infrastructure and stockpile to the minimum height prescribed. <p>Rectification: Rectify the impact by repairing, rehabilitating, or restoring the affected environment.</p> <ul style="list-style-type: none"> 3 to 5 years has been set aside for rehabilitation purposes. It is recommended that the mine practise concurrent rehabilitation and revegetate impacted areas with indigenous vegetations with the help of a botanist/rehabilitation specialist. Reshape berms, overburden stockpile, ROM stockpile and all affected areas to be free draining and follow the natural drainage line. 	X	Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>Reducing or eliminating over time: Preservation and maintenance operations during the life of the action.</p> <ul style="list-style-type: none"> • Continued removal of invasive plants species arising from site disturbance. • Monitor rehabilitated areas. • Dismantle and remove all surface infrastructure. <p>Specifically relating to the Construction Phase, the following mitigation measures should be implemented to minimise the visual impact:</p> <ul style="list-style-type: none"> • Reduce the construction period through careful planning and productive implementation of resources. Clearly define areas to be cleared. Do not clear past designated areas. Retain natural vegetation outside of clearance zone. • Plan the placement of lay-down areas and any potential temporary construction camps to minimise vegetation clearing. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. Screen the whole construction site via fence cover. • Reduce and control construction dust using approved dust suppression techniques. Implement daily dust suppression and pave roads where possible to avoid transport related dust pollution. • Restrict construction activities to daylight hours to negate, or reduce, the visual impacts associated with lighting. Direct light downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places. <p>During the Operational Phase, the following mitigation measures should be implemented to minimise the visual impact:</p>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<ul style="list-style-type: none"> • Planning open pit mining areas in accordance with the topography to limit visual impact on surrounding residential communities. • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. • Place topsoil and subsoil stockpiles on the edge of the site boundary to create visual screening into the open pit. Place overburden stockpile behind topsoil stockpile. • Backfilling of the open pit as part of concurrent rehabilitation. • Vegetate and maintain stockpiles to the recommended minimum height. Revegetate soon after stockpiling to avoid erosion and a drainage patterns forming on the stockpile. • Rehabilitation of disturbed areas and re-establishment of vegetation. • Restrict mining activities to daylight hours to negate or reduce the visual impacts associated with lighting. Keep lighting to minimum. Direct light downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places. <p>In addition, the following measures are recommended:</p> <ul style="list-style-type: none"> • Planting / avoid removal of indigenous trees to create a visual barrier for the surrounding residential settlements. • Backfill and reshape with a surveyor. Reshape to create a gentle slope of free-draining topography. • Dust suppression measures must be implemented on roads and in stockpile areas to prevent excessive dust. • Blasting must be done under controlled conditions (i.e., Windy days must be avoided) and must be done in such a way that dust is minimised. • Blasting should not take place before 08:00 and after 16:00. • Institute a rehabilitation monitoring program with a rehabilitation specialist. 		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
Blasting and Vibrations	<p>The following recommendations are proposed.</p> <p>Regulatory requirements – MHSA Reg. 4.16(2) Regulatory requirements indicate specific requirements for all non-mining structures and installations within 500 m from the mining operation. Various POI’s are observed within the pit that needs consideration as well within 500 m from the mining area. The mine will have to apply for the necessary authorisations as prescribed in the various acts, and specifically Mine Health and Safety Act Reg 4.16 as well as recommendations regarding infrastructure within the pit areas.</p> <p>Regulatory requirements – MHSA Reg. 17.6(a) On review of the pit area’s location, it is such that Mine Health and Safety act regulation 17.6(a) will be applicable and will need to be considered. The location of the opencast Pit boundary is closer than 100 m from private installations and the necessary legal requirements will need to be addressed</p> <p>Blast Designs Blast designs can be reviewed prior to first blast planned and done. Specific attention can be given to the possible use of electronic initiation rather than conventional timing systems. This will allow for single blast hole firing instead of multiple blast holes where necessary if ground vibration is of concern for the specific blast. Single blast hole firing will provide single hole firing – thus less charge mass per delay and less influence.</p> <p>Test Blasting It is always good to conduct a first test blast to confirm levels and ground vibration and air blast. It is recommended that such a blast be done, and detail monitoring done and used to help define blasting operations going forward. This test blast can be based on the existing design and only after this blast it may be necessary to define if changes are required or not.</p>	<p style="text-align: center;">X</p>	<p>Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.</p>

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>Stemming length The current proposed stemming lengths used provides for some control on fly rock. Consideration can be given to increase this length for better control. Specific designs where distances between blast and point of concern are known should be considered. Recommended stemming length should range between 20 and 30 times the blast hole diameter. In cases for better fly control this should range between 30 and 34 times the blast holes diameter. Increased stemming lengths will also contribute to more acceptable air blast levels.</p> <p>Safe blasting distance and evacuation Calculated minimum safe distance is 202 m. The final blast designs that may be used will determine the final decision on safe distance to evacuate people and animals. This distance may be greater pending the final code of practice of the mine and responsible blaster’s decision on safe distance. The blaster has a legal obligation concerning the safe distance and he needs to determine this distance.</p> <p>Road management The R579 Provincial Road is at an approximate distance of 1043 m from the pit area. No specific consideration regarding effects from blasting operations will be required for these roads. There are other roads in the vicinity of the project area to be considered. There is a dirt road that runs through the project area (POI 206). This road is specifically of concern when blasting is done. There may be people and animals on these routes and will require careful planning to maintain safe blasting radius. It will be required that clearance distances be set, and road travel managed during blasting operations.</p> <p>Photographic Inspections The option of photographic survey of all structures up to 1500 m from the pit areas is recommended. The mine will be operating for a significant number of years. This will give advantage on any negotiations with regards to complaints from neighbours on structural issues due to blasting. This process can however only succeed if done in conjunction with a proper monitoring program. It is expected that ground vibration levels will be significantly less</p>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	<p>than proposed limits at 1500 m, but this process will ensure record of the pre-blasting status of the nearest structures to the pit areas. At 1500 m the expected level of ground vibration will be perceptible. It must be noted that a point may represent a group of structures found in the vicinity of the point identified.</p> <p>Recommended ground vibration and air blast levels The ground vibration and air blast levels limits recommended for blasting operations in this area are provided.</p> <p>Blasting times A further consideration of blasting times is when weather conditions could influence the effects yielded by blasting operations. It is recommended not to blast too early in the morning when it is still cool or when there is a possibility of atmospheric inversion or too late in the afternoon in winter. Do not blast in fog. Do not blast in the dark. Refrain from blasting when wind is blowing strongly in the direction of an outside receptor. Do not blast with low overcast clouds. These 'do not's' stem from the influence that weather has on air blast. The energy of air blast cannot be increased but it is distributed differently and therefore is difficult to mitigate.</p> <p>It is recommended that a standard blasting time is fixed and blasting notice boards setup at various routes around the project area that will inform the community of blasting dates and times.</p> <p>Third party monitoring Third party consultation and monitoring should be considered for all ground vibration and air blast monitoring work. This will bring about unbiased evaluation of levels and influence from an independent group. Monitoring could be done using permanent installed stations. Audit functions may also be conducted to assist the mine in maintaining a high level of performance with regards to blast results and the effects related to blasting operations.</p> <p>Video monitoring of each blast</p>		

List of studies undertaken	Recommendations of specialist reports	Specialist recommendations that have been included in the EIA report	Reference to applicable section of report where specialist recommendations have been included.
	Video of each blast will help to define if fly rock occurred and from origin. Immediate mitigation measure can then be applied if necessary. The video will also be a record of blast conditions.		
Socio-Economic Assessment	Mitigation measures as stated in the Socio-economic Assessment should included in the EMPr.	X	Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.
Palaeontological Assessment	Based on experience and the lack of any previously recorded fossils from the area, it is very unlikely that any fossils would be preserved in the shales of the Magaliesberg Formation (Pretoria Group, Transvaal Supergroup) because none has been recorded from here, and other records are rare. Since there is a very small chance that stromatolites or MISS might occur only on the northern-most margin, a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once excavations, drilling or blasting have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.	X	Section10, Section13, Section 14, Table 41 and Table 42. As well as all Impact and Management tables.

Refer to Appendix 7 to 17 for the specialists studies undertaken for the project:

- Appendix 7: Soil and Land Capability Assessment
- Appendix 8: Surface Water and Aquatic Ecology Assessment
- Appendix 9: Groundwater Study
- Appendix 10: Terrestrial Ecology Assessment
- Appendix 11: Air Quality Assessment
- Appendix 12: Noise Impact Assessment
- Appendix 13: Blasting and Vibration Assessment
- Appendix 14: Visual Assessment
- Appendix 15: Heritage Assessment
- Appendix 16: Palaeontological Impact Assessment
- Appendix 17: Socio-economic Impact Assessment

14.3 ENVIRONMENTAL IMPACT STATEMENT

14.3.1 Summary of the Key Findings of the Environmental Impact Assessment

The findings of the specialist studies undertaken for this EIA/EMP process provide an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed and existing project. The findings conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental fatal flaws that should prevent the proposed project from proceeding.

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through practical measures, the recommendations from this EIA/EMP will form part of the contract with the contractors appointed to construct and maintain the proposed mine and associated infrastructure. The EIA/EMP would be used to ensure compliance with environmental specifications and management measures. The implementation of this EIA/EMP for key cycle phases (i.e. construction, operation and closure/decommissioning) of the proposed project is considered to be fundamental in achieving the appropriate environmental management standards as detailed for this project.

For a detailed impact assessment layout specifying all the ratings used to obtain Significance of impacts with and without mitigation, refer to Table 41 above. For a summary giving only the Significance obtained, refer below.

Table 44: Summary of Key findings in terms of Impact Significance

Aspect	Potential Impact	Phase	Significance	
			Pre-Mitigation	Post- Mitigation
Soil and land capability	Erosion and topsoil loss	C	High	Medium
Soil and land capability	Loss of land capability and land use	C	High	Medium-high
Soil and land capability	Erosion and topsoil loss	O	High	Medium
Soil and land capability	Loss of land capability and land use	O	High	Medium-high
Soil and land capability	Soil contamination	O	Low to medium	Low
Soil and land capability	Erosion and topsoil loss	D	High	Medium
Soil and land capability	Loss of land capability and land use	D	Medium-high	Medium
Surface water and aquatic ecology	Alteration of drainage by diversion of the Chunies river and drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve	C, O, D	Medium	Low to medium
Surface water and aquatic ecology	Deterioration of water quality	C, O, D	Medium	Medium
Surface water and aquatic ecology	Deterioration of water quality	C, O, D	Medium	Low to medium
Surface water and aquatic ecology	Erosion and sedimentation of water resources	C, O, D	Medium	Low

Aspect	Potential Impact	Phase	Significance	
			Pre-Mitigation	Post- Mitigation
Surface water and aquatic ecology	Deterioration of the Present Ecological Status (PES).	C, O, D	Medium	Low
Groundwater	Lowering of water table	O	Medium	Low to medium
Groundwater	Deterioration of groundwater quality	O	Low to medium	Low to medium
Groundwater	Deterioration of groundwater quality	D	Low to medium	Low to medium
Groundwater	Deterioration of groundwater quality	D	Low to medium	Low
Terrestrial ecology	Loss of Biodiversity and Ecological function within degraded areas	C, O	Medium	Low to medium
Terrestrial ecology	Distribution / proliferation of Alien Invasive Plant species	C, O	Medium	Low to medium
Terrestrial ecology	Loss of floral species of conservation concern	C, O	Medium-high	Medium
Terrestrial ecology	Environment not sustainable	D	Medium	Low to medium
Air Quality	Deterioration of ambient air quality (dust generation)	C	Medium	Medium
Air Quality	Deterioration of ambient air quality (dust generation)	O	Medium	Medium
Air Quality	Deterioration of ambient air quality (dust generation)	D	Medium	Medium
Noise	Disturbing noise, Day time and Night time	C	Medium	Low to medium
Noise	Disturbing noise, day and night	O	Medium-high	Low
Noise	Disturbing noise	D	Low to medium	Low
Visual	Potential visual impact on the Sensitive Receptors/Viewpoints	C	Medium-high	Medium
Visual	Potential visual impact on the Sensitive Receptors/Viewpoints	O	Medium-high	Medium
Blasting and vibration	Damage to buildings, houses and graveyards due to ground vibrations	C	Medium-high	Low
Blasting and vibration	Damage to buildings, houses and graveyards due to air blast	C	Medium-high	Low
Blasting and vibration	Damage to buildings, houses and graveyards due to fly rock	C	Medium-high	Low to medium
Heritage resources	Disturbance of heritage sites	C, O	N/A	N/A
Palaeontology resources	Disturbance or destruction of palaeontological resources	C, O	N/A	N/A
Socio-Economic	Increase in crime and HIV	C, O	Medium	Low to medium
Socio-Economic	POSITIVE: Economic Opportunities, Infrastructure Development and Employment	C, O	N/A	N/A
Socio-Economic	Negative social and economic impact from closure	D	Medium	Low to medium

14.4 FINAL SITE MAP

Please refer to Appendix 4.

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

Refer to Table 41, Table 44 and Section 13.

14.5 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND THE IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

Specialist recommendations which could be included as conditions have been discussed in Table 43. Specialist management measures as well as the significance of the impacts prior and post mitigation are provided in Table 42 and contained in the respective studies.

Table 45: Proposed impact management objectives and the impact management outcomes for inclusion in the EMPR

Aspect	Potential Impact	Management Objectives	Management Outcomes
Soil and land capability	Erosion and topsoil loss	To conserve soil resources disturbed by the development of the mine and to ensure that the pre-mining land capability can be restored. To prevent erosion.	Storing of topsoil in berms that are covered with vegetation. Implementation and compliance with the soil conservation procedure.
Soil and land capability	Loss of land capability and land use	To conserve soil resources disturbed by the development of the mine and to ensure that the pre-mining land capability can be restored. To prevent erosion.	Storing of topsoil in berms that are covered with vegetation. Implementation and compliance with the soil conservation procedure.
Soil and land capability	Soil contamination	To prevent contamination of soils.	
Surface water and aquatic ecology	Alteration of drainage by diversion of drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve	Minimise the impacts on the environment (ecological, economic, social) due to the alteration of drainage patterns in the project area.	Compliance with legislation. Compliance with legislation. Prevent impacts on surface water quality. Comply with WUL issued for the expansion project which is to include river crossings and rehabilitation plans. Prevent impacts on surface water quality. Prevent impacts on surface water resource. Safe mining conditions.
Surface water and aquatic ecology	Deterioration of water quality	To prevent discharges of contaminated water to the environment and to prevent pollution of water resources in the vicinity of the project	Compliance with legislation. Prevent impacts on surface water quality.
Surface water and	Erosion and sedimentation of water resources	Minimise the impacts on the environment (ecological,	Compliance with legislation

Aspect	Potential Impact	Management Objectives	Management Outcomes
aquatic ecology		economic, social) due to the alteration of drainage patterns in the project area.	
Surface water and aquatic ecology	Deterioration of the Present Ecological Status (PES).	Minimise the impacts on the environment (ecological, economic, social) due to the alteration of drainage patterns in the project area and pollution of water resources.	Prevent impacts on surface water quality. Prevent soil and water pollution. Compliance with legislation.
Groundwater	Lowering of water table	To prevent unacceptable negative impacts on surrounding groundwater users.	Identification of impacts on groundwater levels.
Groundwater	Deterioration of groundwater quality	To limit the impact of infiltration of potentially contaminated leachate to the underlying aquifers.	Identification of impacts on groundwater quality.
Terrestrial ecology	Loss of Biodiversity and Ecological function within degraded areas	To minimise the area of disturbance. To rehabilitate disturbed land to a stable physical state and prevent proliferation of invasive plants. To remove, protect and conserve any red data species, as well as any other species with conservation value.	Reducing footprint on which activities occur. Planning and preparation. Protection of environment.
Terrestrial ecology	Distribution / proliferation of Alien Invasive Plant species	To prevent the proliferation of AIP species	Effective implementation of AIP control and management plan. Protection of environment.
Terrestrial ecology	Loss of floral species of conservation concern	To minimise the area of disturbance. To rehabilitate disturbed land to a stable physical state and prevent proliferation of invasive plants. To remove, protect and conserve any red data species, as well as any other species with conservation value.	Reducing footprint on which activities occur. Planning and preparation. Protection of environment.
Air Quality	Deterioration of ambient air quality (dust generation)	To limit public exposure to unacceptable health risks.	Dust generation to comply with MHS requirements.
Noise	Disturbing noise, Day time and Night time	To prevent public exposure to disturbing noise in excess of 7 dBA increases above ambient noise levels	Reducing disturbing noise to outside boundaries.
Visual	Potential visual impact on the Sensitive Receptors/Viewpoints	To limit the visual impact of the project on both the surrounding landowners and the Natural	Reduce the visual impact of the project.

Aspect	Potential Impact	Management Objectives	Management Outcomes
		areas	
Blasting and vibration	Damage to buildings, houses and graveyards due to ground vibrations	To prevent injury to people and animals and to avoid damage to structures.	Safe mining environment.
Blasting and vibration	Damage to buildings, houses and graveyards due to air blast	To prevent injury to people and animals and to avoid damage to structures.	Safe mining environment.
Blasting and vibration	Damage to buildings, houses and graveyards due to fly rock	To prevent injury to people and animals and to avoid damage to structures.	Safe mining environment.
Heritage resources	Disturbance of heritage sites	To avoid disturbing sites of archaeological and cultural interest. Where disturbance of sites of archaeological and cultural interest, is unavoidable, the objective is to ensure that adequate measures are taken to conserve the information held within the sites. This must be done in accordance with legal requirements.	No sites will be impacted.
Palaeontology resources	Disturbance or destruction of palaeontological resources	To avoid disturbing palaeontological resources. Where disturbance of palaeontological resources, is unavoidable, the objective is to ensure that adequate measures are taken to conserve the information held within the sites. This must be done in accordance with legal requirements.	No sites will be impacted.
Socio-Economic	Increase in crime and HIV	To mitigate the negative social impacts of the project.	Communication with IAPs and upliftment of the community. Increased security and reduced crime.
Socio-Economic	POSITIVE: Economic Opportunities, Infrastructure Development and Employment	To enhance the socio-economic benefits of the project.	Employment at a local level.

14.6 FINAL PROPOSED ALTERNATIVES

Refer to Section 7.

15 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation.

Refer to Table 42 for conditions which could possibly be included in the Environmental Authorisation. The Mitigation measures as specified within the EMPr are to be included in the Environmental Authorisation.

The environmental monitoring programme, as set out in the EMPr, should be implemented.

Mining operations in the area must be conducted in accordance with the Mining Work Programme (or any amendments to such MWP) and the approved Environmental Management Programme.

Once mining has ceased the area must be rehabilitated and a closure certificate must be applied for in terms of Section 43 (3) of the MPRDA.

The applicant must take all necessary and reasonable steps to adequately safeguard and protect the environment, the mining area and any person/s using or entitled to use the surface of the mining area from any possible damage or injury associated with the activities of the mining area.

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

Please refer to Section 11 giving a description of all the “Limitations and Assumptions” of the specialist studies undertaken for the project.

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

17.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

Refer to Section 14, specifically Section 14.3, for the impact statements. The findings of the specialist studies undertaken within this EIA/EMP provide an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed project. The findings conclude that, provided that the recommended mitigation and management measures are implemented, there are no environmental fatal flaws that post the provided mitigation, should prevent the proposed project from proceeding.

17.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

17.2.1 Specific Conditions to Be Included Into the Compilation and Approval of EMPr

Please refer to Section 15.

A description of the rehabilitation objectives to be undertaken throughout the life of the mine, as well as during the closure phase.

A monitoring programme must be established for the following environmental aspects:

- Surface Water Impacts (Quality, Quantity, SASS / Habitat integrity)
- Groundwater Impacts (Quality, Ground water levels)
- Air Quality Impacts
- Noise impacts
- Vegetation impacts
- Blast impacts

An Alien Invasive Control Programme must be established in order to ensure that AIPs do not become established in the area and especially do not spread or impact upon the nearby Potlake Nature Reserve.

17.2.2 Rehabilitation Requirements

For the mining operations, the following closure objectives and goals are proposed:

- To rehabilitate all disturbed land to a state that is suitable for its post closure use;
- To ensure that affected areas are safe and secure for both human and animal activities;
- The physical and chemical stability of the remaining structures should be such that risk to the environment through naturally occurring forces is eliminated;
- To rehabilitate all disturbed land to a state where limited or preferably no post closure management is required;
- To rehabilitate all disturbed land to a state that facilitates compliance with current environmental quality objectives (air and water quality);
- To limit the impact on personnel whose positions may become redundant on decommissioning of the mine;
- Removal of unneeded surface infrastructures, e.g. roads, offices, explosive storage areas etc. as indicated in the construction phase;
- Rehabilitation and reshaping of stockpiles, overburden, waste rock dump
- Rehabilitation of Pollution Control Dams;
- Rehabilitation of opencast area with overburden (rehabilitation of the opencast areas on site will follow the mining cut and be completed within the operational phase of the project);
- Reshaping of topography to desired closure land use;
- Re-vegetation of rehabilitated areas; and
- Monitoring of rehabilitation objectives.



18 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The Life of Mine is described as 16 years in the Mining Works Programme, followed by 3-5 years of rehabilitation. There for the Environmental Authorisation will be required for a period of 21 years.

19 UNDERTAKING

The signed undertaking is included in Section 32 of Part B.

20 FINANCIAL PROVISION



Table 46: Financial Provision Calculation

Closure Component		Unscheduled Closure				
		Applicable	Quantity	Unit	Unit Rate	Total Cost
1.	Infrastructure Areas					
1.1	Dismantling of Process plant and related infrastructure	No	0	Ton	R4 500,00	R0,00
1.2	Dismantling of Concrete and steel structures	Yes	10756	m2	R202,80	R2 181 316,80
1.3	Removal of containers and removal structures	No	0	m2	N/A	R0,00
Sub-total for Infrastructure Areas						R2 181 316,80
2.	Mining Areas					
2.1	Open pit rehabilitation including final voids, ramps and haul roads					
2.1.1	Concurrent backfill	No	485 595	m3	R0,00	R0,00
2.1.2	Backfill final void from stockpile	Yes	339 916	m3	R20,17	R6 856 105,72
2.1.3	Dozing of overfill	Yes	145 679	m3	R13,67	R1 991 431,93
Sub-total for Infrastructure Areas Open pit rehabilitation including final voids, ramps and haul roads						R8 847 537,65
2.2	Sealing of adits and shafts					
2.2.1	Sealing of adits - underground areas	No	0	m3	R2 370,00	R0,00
Sub-total for Sealing of adits and shafts						R0,00
3.	General Surface rehabilitation and placement of Topsoil					
3.1	Topsoil placement over rehabilitation area	Yes	38	ha	R10 365,30	R393 881,40
3.2	Rip and scarify	Yes	38	ha	R4 250,00	R161 500,00
3.3	Hydroseed areas	Yes	38	ha	R19 481,90	R740 312,20
Sub-total for General Surface rehabilitation and placement of Topsoil						R1 295 693,60
Subtotal 1:						R12 324 548,05
4.	P&G's, Contingencies and Additional Allowances					



4.1	Preliminaries and general	Yes	7,5	/sum	R924 341,10	R924 341,10
4.2	Contingencies	Yes	7,5	/sum	R924 341,10	R924 341,10
4.3	Specialist Studies and Additional Allowances	No	1	/sum	n/a	R0,00
Subtotal 2:						R1 848 682,21
5.	Pre-Site Relinquishment Monitoring and Aftercare					
5.1	Surface Water Quality Monitoring and Reporting	Yes	5	/yr	R49 500,00	R247 500,00
5.2	Groundwater Quality Monitoring and Reporting	Yes	5	/yr	R49 500,00	R247 500,00
5.3	Rehabilitation Monitoring (Vegetation, soil, land capacity)	Yes	3	/yr	R75 350,00	R226 050,00
5.4	Care and maintenance of rehabilitation areas	Yes	3,8	ha/3yr	R23 520,00	R89 376,00
5.5	Contingencies for post-closure aspects	Yes	10	/sum	R81 042,60	R81 042,60
Subtotal 3:						R891 468,60
Grand Total						
Excl. Vat. (or Subtotal 1+2+3)						R15 064 698,86

20.1 EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED

The costing methodology applied is summarized as follows:

- Undertook a site visit to key areas and facilities to confirm observations and assumptions;
- Developed an itemised plan indicating an inventory of closure aspects based on the proposed mine schedule and discussions with mine personnel;
- Defined specific rehabilitation actions for each through reviewing specialist studies, impact assessment outcomes, industry guidelines, conceptual modelling and rehabilitation experience;
- Calculated monitoring and maintenance costs and
- Compiled a dedicated closure spreadsheet to determine the closure costs of the quantified actions through applicable rates.

The closure-related financial provision for Mphahlele Mine was undertaken by Elemental Sustainability (Pty) Ltd in March 2021 (refer to Appendix 19).

The financial provision based as per the requirements as set out in GNR 1147 has been calculated at R 15 064 698.8. It should be noted that the mining permit has financial provision of R 1 045 507.00 available and the mine will be required to provide the shortfall of **R 14 019 191.86**.

20.2 CONFIRM THAT THE FINANCIAL PROVISION WILL BE PROVIDED AS DETERMINED

The applicant will provide the financial provision upon the DMRE's request.

21 DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

The layout presented in the Scoping Report has been altered to take into consideration the some of the recommendations made in the specialist reports, leading to the new preferred layout having lower impacts on the environment. The layout presented in the Scoping Report has been given as an alternative layout in this EIA Report.

21.1 DEVIATIONS FROM THE METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS AND RISKS.

No deviations were made to the methodology used.

21.1.1 Motivation For The Deviation

Not applicable.

22 OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

No additional request related to additional information has been received from the Competent Authority to date.

22.1 COMPLIANCE WITH THE PROVISIONS OF SECTIONS 24(4)(A) AND (B) READ WITH SECTION 24 (3) (A) AND (7) OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) THE EIA REPORT MUST INCLUDE THE:

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as Appendix.

The Socio-Economic report is included as Appendix 17.

Refer to Section 10.13 and Section 13.11 for a description of the Socio-economic environment and potential impacts.

22.1.2 Impact on Any National Estate Referred To In Section 3(2) of the National Heritage Resources Act

No significant impacts are expected, refer to the Heritage (Appendix 15) and Palaeontology (Appendix 16) specialist reports compiled for the project. Also refer to Section 13.9 and Section 13.10.

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

Please refer to Sections 7. A number of alternatives were investigated: no motivation is required in terms of sub-regulation 22(2)h.

PART B ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

23 DETAILS OF THE EAP

The information can be found in Section 1.1. Also refer to Appendix 1 and Appendix 2.

24 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Refer to Section 3 of the EIA Report.

25 COMPOSITE MAP

Refer to Appendix 4.



26 DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

26.1 DETERMINATION OF CLOSURE OBJECTIVES

The preliminary objectives have been developed against the background of the mine location in the Sekhukhune region of Limpopo, particularly that the region is disturbed by mining activities and land available for non mining has become more limited. The objectives (see below) are therefore designed largely to manage residual risks and provide land that can be utilised after rehabilitation.

Rehabilitation will be done concurrently, with additional rehabilitation still being required in years 1-6 as provided above. The table provides a breakdown of the annual rehabilitation as well as the total post closure expenditure to be incurred by the operation.

For the mining operations, the following closure objectives and goals are proposed:

- Adhere to all statutory and other legal requirements.
- To develop landforms supporting stable and functioning ecosystems that are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks.
- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders.
- Promote biodiversity and biological sustainability to the maximum extent practicable.
- Utilise closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.
- To achieve agreed quality targets set by the Catchment Management Authority (CMA) and the Department of Water and Sanitation (DWS) as far as practical relative to impacts and reasonability to achieve.
- The physical and chemical stability of the remaining structures should be such that risk to the environment through naturally occurring forces is eliminated.
- To rehabilitate all disturbed land to a state that facilitates compliance with current environmental quality objectives (air and water quality).
- To limit the impact on personnel whose positions may become redundant on decommissioning of the mine.

26.2 THE PROCESS FOR MANAGING ANY ENVIRONMENTAL DAMAGE, POLLUTION, PUMPING AND TREATMENT OF EXTRANEIOUS WATER OR ECOLOGICAL DEGRADATION AS A RESULT OF UNDERTAKING A LISTED ACTIVITY

Refer to Table 45 for the proposed mitigation measures.

Any activity that results in damage or pollution to the environment has been rated and signed a value to determine the risk. An environmental emergency is defined as an unplanned situation or event resulting in potential pollution of the environment. A pollution incident means an incident or set of circumstances during or as a consequence of which there is or is likely to be a leak, spill or other escape or deposit of a substance, as a result of which pollution has occurred, is occurring or is likely to occur.

26.2.1 Roles and Responsibilities

All employees and its contractors working for the mine are responsible for reporting any accident/emergency to their supervisor immediately, and if required notifying the emergency response teams. Personnel must be nominated as response team members and must receive appropriate training to manage emergencies. All other personnel must be made aware of potential emergencies and trained in emergency response. Management must be aware of their responsibilities in case of emergency.

26.2.2 Response to Environmental Emergencies

26.2.2.1 Emergency Plan

An emergency plan must be developed for each potential environmental emergency situation. The emergency plan must give information on:

- Description of the emergency;
- Reference to relevant material safety data sheets;
- Responsibilities for management of emergencies;
- Contact telephone numbers (on-site & off-site);
- Equipment required (including locations); and
- Site plan where applicable.

26.2.2.2 Classification of Emergencies

The following incidents will be classified as an emergency:

- Natural Disasters;
- Damage to radiological/nuclear sources equipment;
- Strikes, protest or unrest;
- Information Management System Failure (plc systems);
- Health and Disease Outbreaks;
- Serious Incident or Fatality;
- High Potential Risk Incidents (Fatality, serious environmental pollution); and
- Other emergencies.

26.2.2.3 Reporting Emergencies

The mine will establish procedures to identify the potential for, and response to, incidents and emergency situations and for preventing and mitigating the illness, injury or environmental hazard that may be associated with them. The Mine will review its emergency preparedness and response plans and procedures, in particular, after the occurrence of incidents or emergency situations. The mine shall also periodically test such procedures where and when practicable.

In the event of a serious incident or fatality occurring it is of the utmost importance to not only ensure the Health and Safety of every person involved but also to ensure that certain evidence is protected and gathered for use by the mine, with the aim of the prevention of a similar incident/accident occurring in the future.

A “No Blame Fixing” approach to incident investigation will be implemented and it must be stressed that the gathering of information must be seen as preventative action and not as blame fixing. In light of the above, and in addition to the emergency procedure that is relevant to the specific area where the incident/accident occurred, and in relation to the notifying of person and first aid treatment/safety of any person involved, the following steps must be taken immediately after an incident/accident classified above has occurred.

In the event of a reportable/major environmental incident that could lead to danger to the public or the environment (death or sustaining impact on the environment) the appointee of that specific section, in consultation with SHEQ Manager, is responsible for communicating with and drafting an external report (in terms of Section 30 of National

Environmental Management Act, 1998 (Act No. 108 of 1998) and Sections 19 and 20 of the National Water Act, 1998 (Act No. 36 of 1998) to the national and provincial department and the municipality containing the:

- Nature of the incident;
- Substances and quantities and accurate effect on persons and environment;
- Initial measures to minimise impacts;
- Causes of the incident;
- Accordance measures;
- When an environmental incident occurs, the following should be adhered to:
 - Report incident as per Incident Reporting Flow Diagram;
 - Measures to clean up any spillage/pollution must be taken as per Emergency Procedure.
 - It is important to ensure that no secondary pollution is caused by incorrect handling of an environmental incident, e.g. incorrect disposal of absorbent material use to clean up a spill; and
- For high potential risk incident (HPRI) / reportable environmental incidents, the SHEQ Manager will conduct a closeout investigation prior to closure of the incident. This will be done one month after all actions has been completed to verify the effectiveness of the actions.

26.2.2.4 Formalise Policies

Objectives

To formalise and sign off on company policies.

Actions

Compile Health and Safety Policy; and
Compile Environmental Policy.

When

Before construction starts.

The notification process has six main steps in managing an emergency, from the identification of the situation to final close off. These are as follows:

- Find and identify;
- Ensure human safety;
- Reporting;
- Containment and clean-up;
- Corrective action; and
- Monitoring.

26.2.2.5 Environmental Emergency Incidents

The SHEQ Manager must, within 14 days of the incident, report information on the incident to enable initial evaluation to the following

- Director-General of DEAT / LEDET;
- Provincial Head of Department (DMR);
- Provincial Head of Department (DWS); and
- Local Municipality.

The report must include:

- Nature of the incident;
- Substance involved and an estimation of quantity released and their possible acute effects on persons and the environment;
- Initial measures taken to minimise impacts;

- Cause of incident, whether direct or indirect; and
- Measures taken to avoid recurrence of such incident.

26.2.2.6 Water Pollution Emergency Incident

Water Pollution Emergency Incident is any accident /incident in which a substance pollutes or has the potential to pollute a water resource or a substance that has or is likely to have a detrimental effect on a water resource.

The responsible person who was in control of the substance involved in the incident at the time or responsible for the section the incident occurred will immediately inform the superior of the area where the incident occurred.

The information with regard to the incident is communicated to the Business Manager, SHEQ Manager and Security Personnel immediately by the superior of the area. The SHEQ Manager and the General Manager must, as soon as reasonably practicable after obtaining the knowledge of the incident, (i.e. within 14 days) report to:

- DWS (Regional Manager);
- South African Police Services or relevant fire department; and
- The Catchment Management Agency.
- The SHEQ Manager and crisis management team must
 - Take all reasonable measures to contain and minimise the effects of the incident;
 - Undertake clean-up procedures;
 - Remedy the effects of the incidents; and
 - Sample the water together with the responsible person of the area.

26.2.2.7 Air Pollution Emergency Incidents;

- Non-compliance with the air quality registration certificate condition and requirements.
- Record of any non-compliance is kept;
- The non-compliance with the certificate conditions will be reported telephonically, by fax or by email to the Chief Air Pollution Control Officer as soon as possible but not later than 24 hours after violation will start to occur. The particulars of such violation, including details of measure is put in place to prevent it happening in the future, will be included respective or in the weekly or monthly report;
- If the utilisation and/or efficiency of air pollution control fail to meet requirements as specified in the certificate then the process is managed under emergency procedures until such time as it will be possible to operate in compliance with the conditions of this certificate; and
- Record is kept of periods of upset and abnormal emissions, e.g. off-gas vented directly to the atmosphere or excess thereof due to the faults or limited capacity of air pollution control equipment or limits for process parameters being exceeded, etc. and the Chief Air Pollution Control Officer is notified immediately should it occur.

26.2.2.8 Environmental Impact Register

All non-conformances pertaining to safety, health, environmental, quality of project activities and employees shall be documented as identified by the relevant documented procedures. The mine will make provision for recording and reviewing the nature and extent of any non-conformance that may be encountered during the Project Execution phase.

The Project Steering Committee in conjunction with the identifier shall decide on the impact of poor performance and the actions that would be necessary to prevent further deterioration or occurrence.

26.2.2.9 Records

Records must be kept of all environmental emergencies and non-conformances.

27 ACID MINE DRAINAGE

27.1 POTENTIAL RISK OF ACID MINE DRAINAGE

Delta-H (Delta-H Water System Modelling PTY Ltd) conducted a geochemical assessment (Appendix 9) of the RoM stockpile, tailings as well as composited overburden and waste rock materials as potential pollution sources at the proposed Mphahlele chrome ore mine. This geochemical site characterisation includes static testing and waste classifications according to the NEMWA – Norms and Standards as specified in the Government Notices R. 634, 635 and 636 (Government Gazette No. 36784, 23/08/2013) of three samples including RoM stockpile, Tailings and composited overburden and waste rock material.

All three samples showed total sulphur contents below the detection limit (<0.01%). As a result, the derived Acid Potential(AP) was low with 0.31 kg/t H₂SO₄ for all samples (Table 47). Additionally, the actual acid generating sulphide sulphur contents were also below the detection limit (<0.01%), providing similar Sulphide Acid Potential (SAP) results of less than 0.31 kg/t H₂SO₄. The Neutralisation Potential (NP) exceeded the limited Acid Potentials in all samples, ranging from 12 kg/t H₂SO₄ (RoM stockpile and Tailings) to 25 kg/t H₂SO₄ (Mixed waste rock and overburden). The differences of the NP and AP, the Net Neutralisation Potentials (NNP), ranged from 11 kg/t H₂SO₄ (RoM stockpile) to 25 kg/t H₂SO₄ (Mixed waste rock and overburden), and the Neutralisation Potential Ratios (NPR = NP/AP) from 37 (RoM stockpile) to 80 (Mixed waste rock and overburden). Based on the ABA test results (Figure 4-1), all three samples including the duplicate sample were classified as non-acid generating due to high NPR values (>4), positive NNP values and very limited Acid Potentials (0.31 kg/t H₂SO₄).

Table 47: ABA, NAG and S-Speciation results for the Mphahlele mine samples and calculated NP, NNP and NPR values (duplicate)

Sample ID		RoM stockpile	Tailings	Mixed waste rock and overburden	Mixed waste rock and overburden D	RPD
Lab ID		112022	112023	112024	112024D	112024D
SULPHUR	Total Sulphur (%)	<0.01	<0.01	<0.01	<0.01	0%
	Sulphate Sulphur as S (%)	<0.01	<0.01	<0.01	<0.01	0%
	Sulphide Sulphur (%)	<0.01	<0.01	<0.01	<0.01	0%
NAG	NAG pH 4.5	6.80	6.90	7.60	7.50	1.3%
	pH 4.5 NAG (kg H ₂ SO ₄ /t)	<0.01	<0.01	<0.01	<0.01	0.0%
	NAG pH 7	6.80	6.90	7.60	7.50	1.3%
	pH 7 NAG (kg H ₂ SO ₄ /t)	1.37	<0.01	<0.01	<0.01	0.0%
ACID BASE ACCOUNTING	Paste pH	8.60	8.10	8.20	8.20	0.0%
	Acid Potential (AP) (kg/t)	0.31	0.31	0.31	0.31	0.0%
	S ²⁻ Acid Potential (SAP) (kg/t)	<0.31	<0.31	<0.31	<0.31	
	Neut Potential (NP)	12.00	12.00	25.00	26.00	3.9%
	Net Neut Potential (NNP)	11.00	12.00	25.00	25.00	0.0%
	Neut Potential Ratio (NPR)	37.00	38.00	80.00	82.00	2.5%
	NNP-S ²⁻	<11.69	<11.69	<11.69	<11.69	
	NPR-S ²⁻	<38.71	<38.71	<38.71	<38.71	

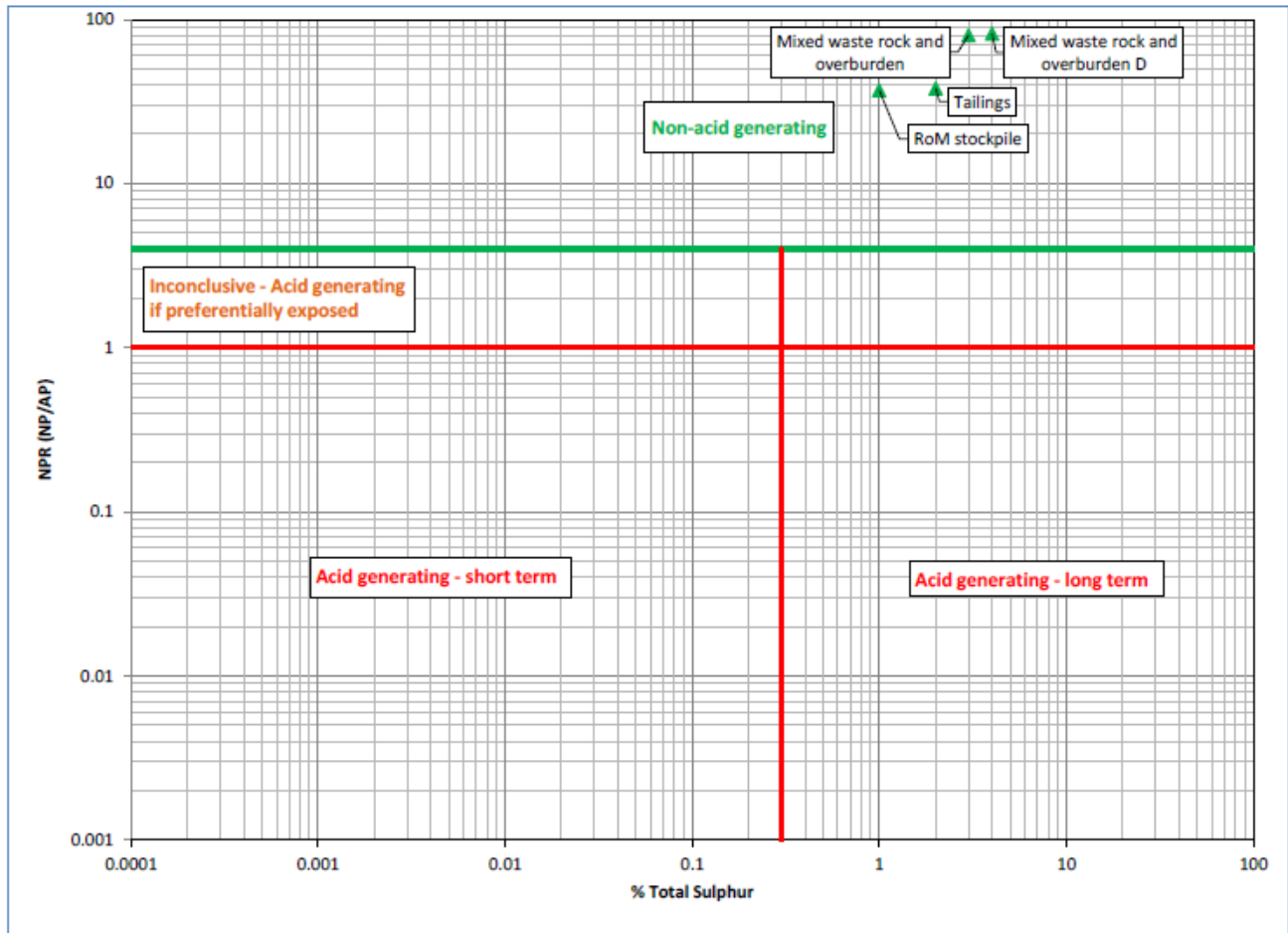


Figure 40: Neutralising potential ratio versus total sulphur content

Results of the sulphur speciation showed that the amount of acid-generating sulphide sulphur in all three samples was below the detection limit (<0.01%) including the total sulphur content. As stated earlier, the ABA methodology assumes conservatively that all sulphur in the sample will react to form sulphuric acid; while a significant part of the total sulphur may occur as non-acid producing sulphate sulphur, reducing potentially the overall risk of acid generation. Since all sulphur species were measured below the detection limit in all three samples (and duplicate), the samples were classified as nonacid generating based on a plot of the sulphide neutralising potential ratio (NPR-S₂-), calculated using the sulphide acid potential (SAP) versus the sulphide sulphur instead of total sulphur content (Figure 40).

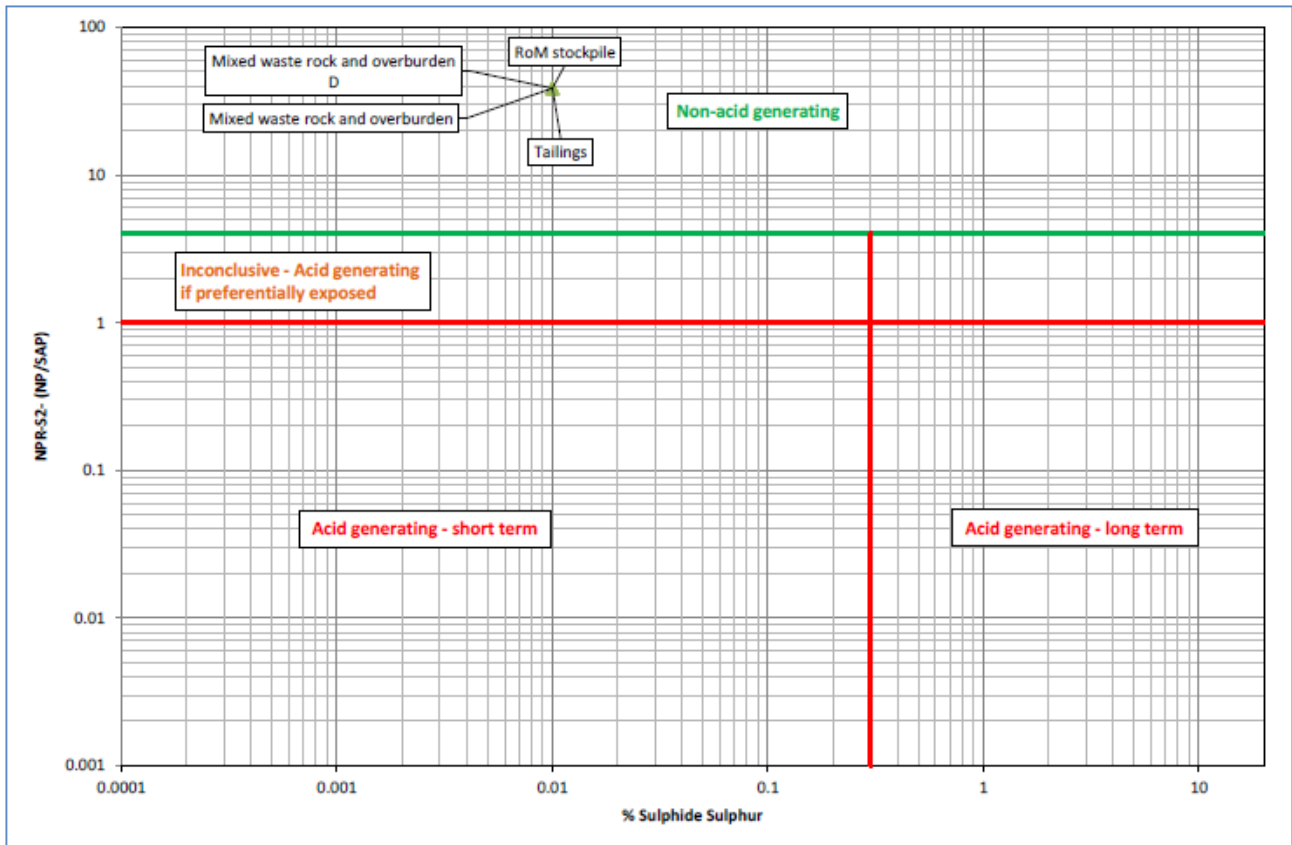


Figure 41: Sulphide neutralising potential ratio versus sulphide sulphur content (negative/absent NPR values visualised as 0.01).

The NAG pH is the result of oxidation of sulphide minerals in the samples by hydrogen peroxide (H₂O₂). The NAG test would also be expected to oxidise iron/manganese carbonate minerals in the samples and release the residual acidity associated with these minerals if present. Samples with a NAG pH value less than 3.5 are considered to indicate potentially acid generating (PAG) material, while samples with a NAG pH larger than 5.5 are considered to indicate non-acid generating (NAG) material, with intermediate values between 3.5 and 5.5 indicating a low risk of acid generation. The pH 4.5 NAG results (Table 47) for the Mphahlele samples ranged from pH 6.8 to 7.6.

A combined evaluation of the NAG pH and NPR values in Figure 4-3 applies a lower NPR screening criteria for samples with NAG pH values larger 5.5. Based on these criteria, the three Mphahlele stockpile, tailings and composited waste rock and overburden samples were classified as non-acid generating.

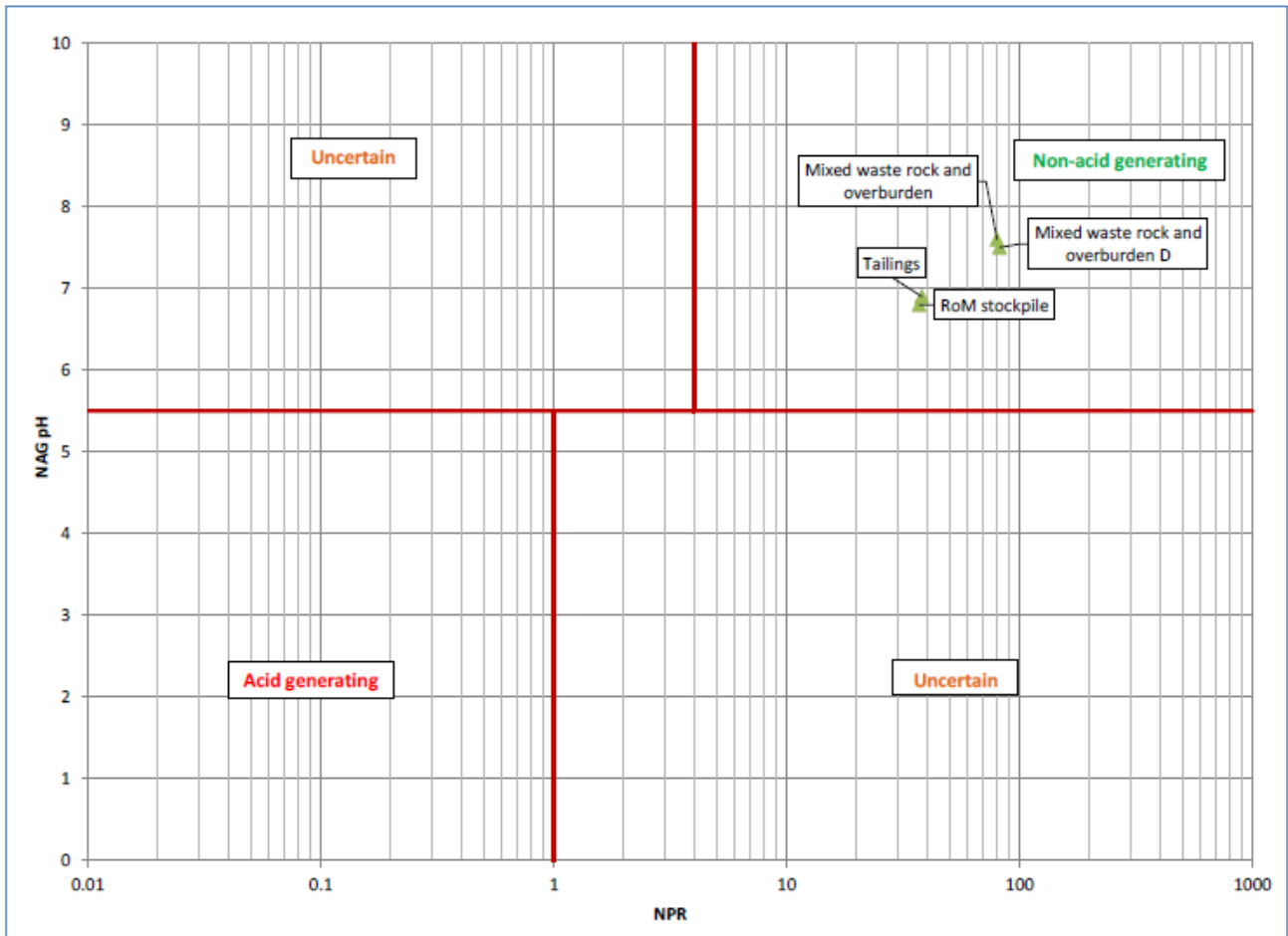


Figure 42: NAG pH versus neutralisation potential ratio

If the sulphur speciation is considered in a combined evaluation of the NAG pH and the calculated NPR-S₂ values in Figure 43, all three samples (and duplicate) remain in the non-acid generating field due to the low sulphide sulphate values below the detection limit.

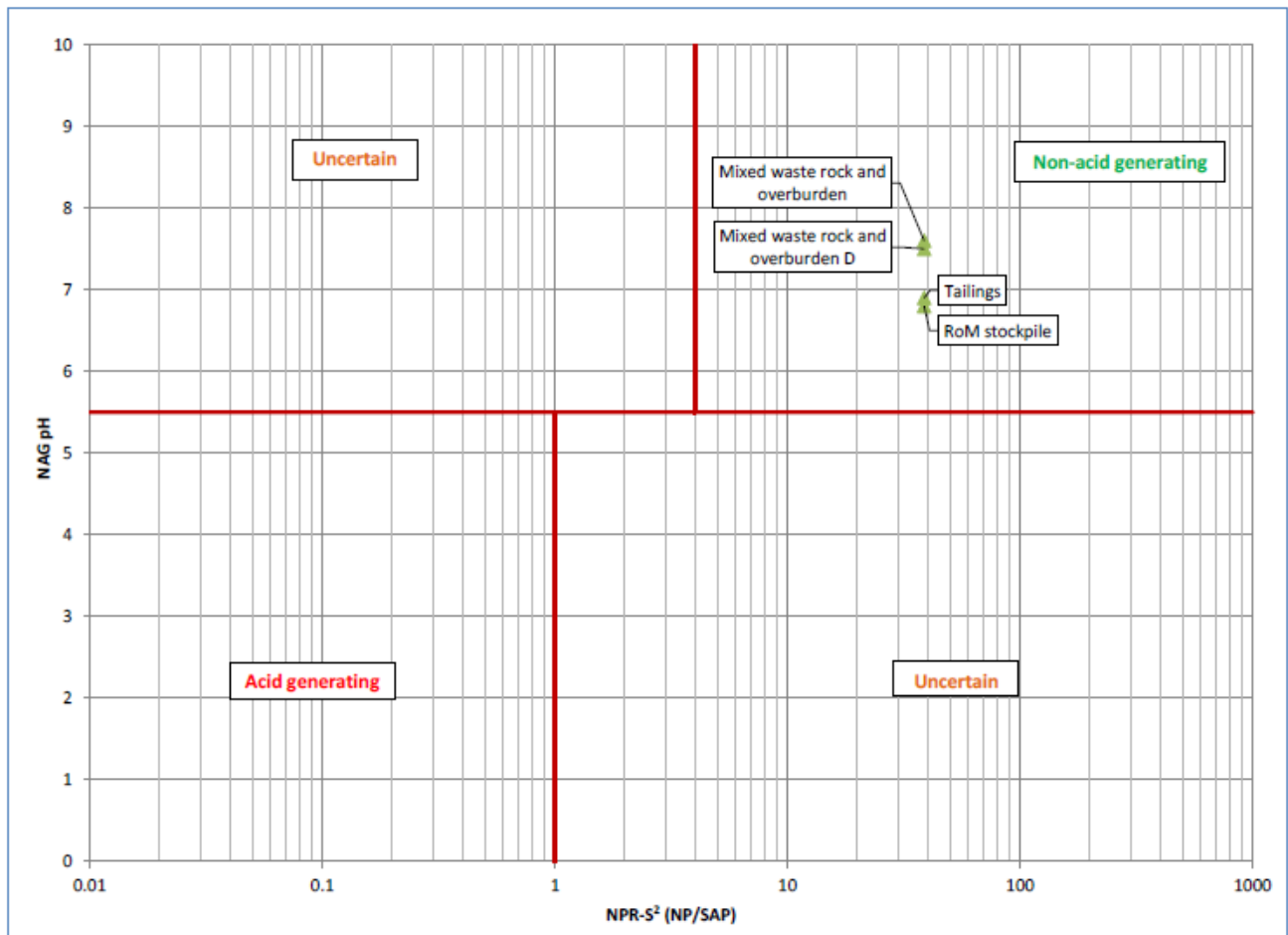


Figure 43: NAG pH versus sulphide sulphur neutralisation potential ratio.

Based on a combined evaluation of the analysis above, the three (3) tested material samples (including one duplicate analysis) were classified as non-acid generating. All samples are unlikely to generate acidity due to low total sulphate and acid generating sulphide sulphur values below their detection limits. Additionally, the neutralisation potential in the Mphahlele samples clearly outweighed their acid generation capacity.

27.1.1 Steps Taken To Investigate, Assess, and Evaluate the Impact of Acid Mine Drainage

Refer to Section above as well as Appendix 9 of this report.

Delta-H (Delta-H Water System Modelling PTY Ltd) conducted a geochemical assessment (Appendix 9) of the RoM stockpile, tailings as well as composited overburden and waste rock materials as potential pollution sources at the proposed Mphahlele chrome ore mine. This geochemical site characterisation includes static testing and waste classifications according to the NEMWA – Norms and Standards as specified in the Government Notices R. 634, 635 and 636 (Government Gazette No. 36784, 23/08/2013) of three samples including RoM stockpile, Tailings and composited overburden and waste rock material.

27.1.2 Engineering Or Mine Design Solutions To Be Implemented To Avoid Or Remedy Acid Mine Drainage

- **RoM Stockpile** – The TCT0 (<TCT1) threshold exceedance is observed for only cobalt, nickel and vanadium. Due to the low concentrations of leachable constituents and non-acid generating classification, the environmental risk associated with drainage from the stockpile is like that of a Type 4 waste.

- **Mixed waste rock and overburden** – The TCT0 (<TCT1) threshold exceedance is observed for only cobalt, manganese and nickel. Due to the low concentrations of leachable constituents and non-acid generating classification, the environmental risk associated with drainage from the stockpile is like that of a Type 4 waste. The mixed waste rock and overburden is part of the open pit mining process and remains within the footprint (as the pit acts as a will act as a “sink of groundwater”). Any leachate caused by opencast mining, will be managed as part of the dirty water management system. Refer to the main report for contamination plume modelling and risk assessment.
- **TSF material** – The TCT0 (<TCT1) threshold exceedance is observed for only cobalt, manganese and nickel. The only LCT0 (<LCT1) threshold exceedance of the leachable concentrations is nitrate. Due to the low concentrations of leachable constituents and non-acid generating classification, the environmental risk associated with drainage from the TSF may fall in between a Type 3 and Type 4 waste. Therefore, it is recommended that, source-pathway-receptor modelling should be considered to identify the most appropriate barrier system for the TSF. Refer to the main report for contamination plume modelling and risk assessment.

The following comments relate to the disposal of the material:

- The Class D liner setup is depicted in Figure 44 below. According to GNR 636: "Type 4 waste may only be disposed of at a Class D landfill designed in accordance with section 3(1) and (2) of these Norms and Standards, or, subject to section 3(4) of these Norms and Standards, may be disposed of at a landfill site designed in accordance with the requirements for a G:L:B+ landfill as specified in the Minimum Requirements for Waste Disposal by Landfill (2nd Ed., DWAF, 1998)";
- The Class C liner setup is depicted in Figure 45 below. According to GNR 636: "Type 3 Waste may only be disposed of at a Class C landfill designed in accordance with section 3(1) and (2) of these Norms and Standards, or, subject to section 3(4) of these Norms and Standards, may be disposed of at a landfill site designed in accordance with the requirements for a G:L:B+ landfill as specified in the Minimum Requirements for Waste Disposal by Landfill (DWAF MR, 1998)".

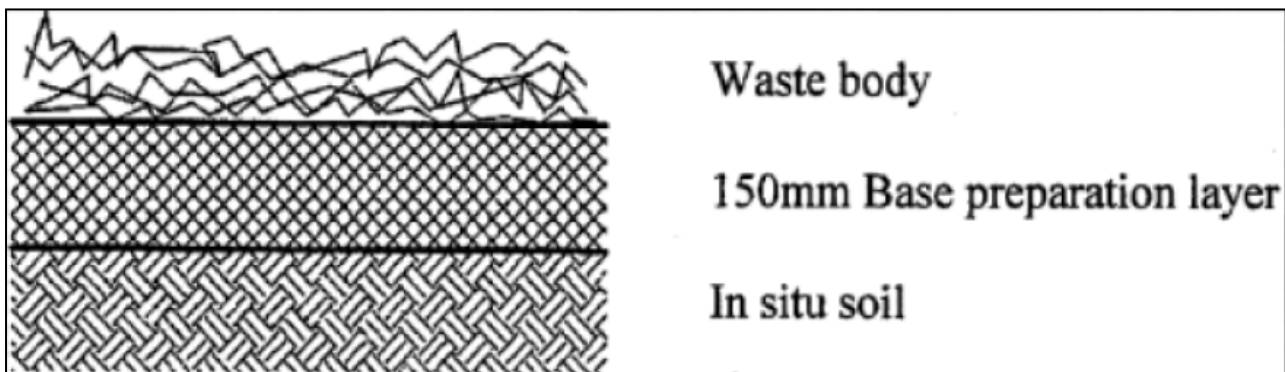


Figure 44: Class D landfill (GNR 636)

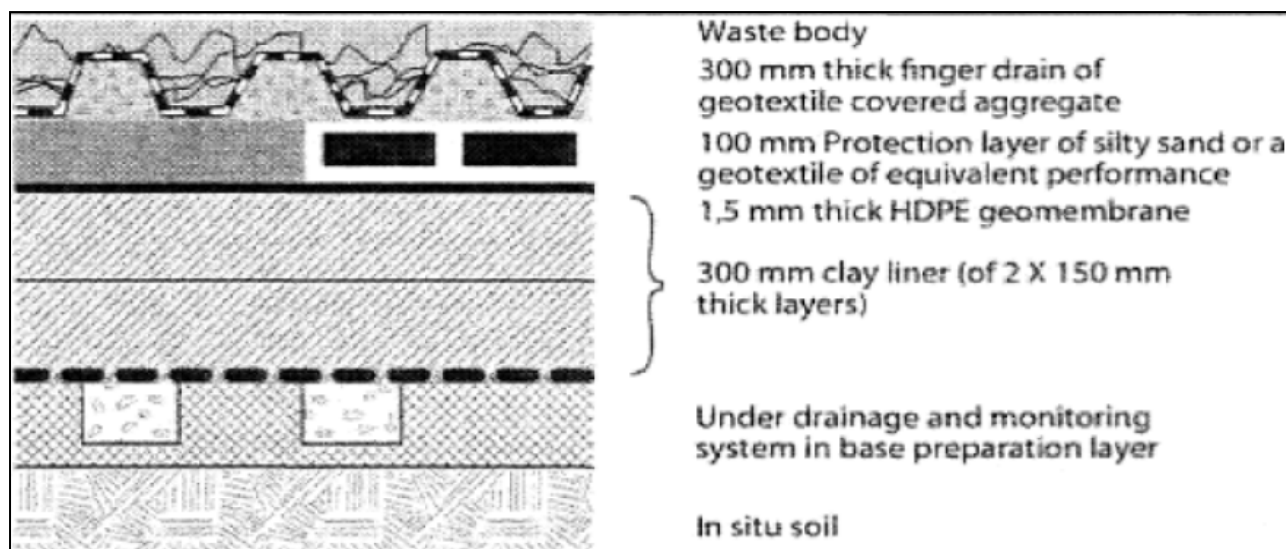


Figure 45: Class C landfill (GNR 636)

27.1.3 Measures That Will Be Put In Place to Remedy Any Residual or Cumulative Impact That May Result From Acid Mine Drainage

Acid mine drainage is not anticipated, however in the unlikely event that AMD occurs in the future, the responsibility will be with the mine to implement management measures and these will include:

- The construction and operation of a water treatment plant to treat the effected water; and
- Sealing of or resealing of leachate sources.

28 WATER

28.1 VOLUMES AND RATE OF WATER USE REQUIRED FOR THE MINING, TRENCHING OR BULK SAMPLING OPERATION

Both potable and service water will be needed for the operations throughout the life of mine. Potable water will be extracted from a borehole located on site. The water to be used at the mine will be sourced either from the local borehole on site, groundwater inflows into the opencast and underground workings, storm water dam or a combination of the above. Water management facilities for the control of storm water and for pollution prevention such as water supply dams, pollution control dams, clean and dirty storm water controls will be designed to meet the requirements of relevant legislation. Recycling dirty/process water will be priority.

Total estimated water consumption (usage) of 50 m³/Hr.

A Water Use Licence Application was submitted to the Department of Water and Sanitation on the 30th of October 2017 (refer to Appendix 9).

28.2 HAS A WATER USE LICENCE HAS BEEN APPLIED FOR?

A Water Use Licence Application was submitted to the Department of Water and Sanitation.

29 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Table 48: Mitigation Measures

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
Soil and land capability	<p>Site establishment.</p> <p>Site clearing, including the removal of topsoil and vegetation.</p> <p>Construction of mine related infrastructure, including haul roads, pipes.</p> <p>Construction of plant area – on existing cleared area of the mining permit area.</p> <p>Blasting and extending of box-cut for mining, including stockpiling of material from initial box-cut.</p>	Erosion and topsoil loss	C	<ul style="list-style-type: none"> • Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint. • Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. • If possible, topsoil should be stripped during dry months, as to reduce compaction. • Unnecessary land clearance must be avoided. • Soil stockpiles must be dampened with dust suppressant or equivalent. • Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. • Ensure topsoil is stored in one dedicated stockpile, 10 m high. • Only the designated access routes are to be used. • The Stormwater Management Plan (SWMP) to be implemented. • Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design. • Revegetate cleared areas as soon as possible after construction activities. 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				<ul style="list-style-type: none"> Oil and hydrocarbon spills should be cleaned in accordance with a spill procedure. 	
Soil and land capability	<p>Site establishment.</p> <p>Site clearing, including the removal of topsoil and vegetation.</p> <p>Construction of mine related infrastructure, including haul roads, pipes.</p> <p>Construction of plant area – on existing cleared area of the mining permit area.</p> <p>Blasting and extending of box-cut for mining, including stockpiling of material from initial box-cut.</p>	Loss of land capability and land use	C	<ul style="list-style-type: none"> Keep the project footprint as small as possible. Subsistence farming and grazing should be permitted to continue on the areas within the mining area that will not be mined within a 6-month period. 	Continuous
Soil and land capability	<p>Stripping topsoil and soft overburden.</p> <p>Removal of overburden, including drilling and blasting of hard overburden.</p> <p>Loading, hauling and stockpiling of overburden.</p> <p>Load, haul and stockpiling of RoM.</p> <p>Use and maintenance of haul roads for the transportation of ore to the washing plant.</p> <p>Water use, pit dewatering and storage on-site.</p> <p>Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste.</p> <p>Concurrent rehabilitation of mining area.</p>	Erosion and topsoil loss	O	<ul style="list-style-type: none"> Land clearance must only be undertaken one cut in advance. Unnecessary land clearance must be avoided. Topsoil should be stripped by means of an excavator bucket and loaded onto dump trucks. If possible, topsoil should be stripped when soil is dry, as to reduce compaction. Ensure topsoil is stored in one dedicated stockpile, 10 m high and away from drainages lines and surface water. Soil stockpiles must be dampened with dust suppressant or equivalent. Soil stockpiles must be located away from any waterway or preferential water flow path in the landscape, to minimise soil erosion from these. 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				<ul style="list-style-type: none"> • The Stormwater Management Plan (SWMP) should provide for a drainage system sufficiently designed to prevent water run-off to the open cast and underground areas, as well as from the plant area which will cause soil erosion. • Where discharge of rainwater on roads will be channelled directly into the natural environment, the application of diffuse flow measures must be included in the design. • Revegetate cleared areas as soon as possible after construction activities. • Oil and hydrocarbon spills should be cleaned in accordance with a spill procedure. • Only the designated access routes are to be used. • Stockpiles are to be maintained in a fertile and erosion free state by sampling and analysing annually for macro nutrients and soil pH, and vegetating the stockpiles to reduce erosion. • Concurrent rehabilitation and re-vegetation of the areas mined out should take place. 	
Soil and land capability	Stripping topsoil and soft overburden. Removal of overburden, including drilling and blasting of hard overburden. Loading, hauling and stockpiling of overburden. Load, haul and stockpiling of RoM.	Loss of land capability and land use	O	<ul style="list-style-type: none"> • Land clearance must only be undertaken one cut in advance. Unnecessary land clearance must be avoided. • Stockpiles are to be maintained in a fertile and erosion free state by sampling and 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
	<p>Use and maintenance of haul roads for the transportation of ore to the washing plant.</p> <p>Water use, pit dewatering and storage on-site.</p> <p>Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste.</p> <p>Concurrent rehabilitation of mining area.</p>			<p>analysing annually for macro nutrients and soil pH, and vegetating the stockpiles to reduce erosion.</p> <ul style="list-style-type: none"> • Concurrent rehabilitation and re-vegetation of the areas mined out should take place. • Subsistence farming and grazing should be permitted to continue on the areas within the mining area that will not be mined within a 6-month period. • As part of the Social and Labour commitments and capital investment that the mine will make during rehabilitation, the mine should investigate the possibility to establish a sustainable agricultural project that can be handed over to the community. Some of the projects that should be investigated are hydroponics, aquiculture and or greenhouses. These forms of agriculture can produce high value crops in a relatively small area at large volumes. 	
Soil and land capability	<p>The following construction activities can result in the chemical pollution of the soil:</p> <ol style="list-style-type: none"> 1. Hydro-carbon spills by machinery and vehicles during earthworks and the mechanical removal of vegetation during site clearing. 2. Spills from vehicles transporting workers, equipment and construction material to and from the construction site. 	Soil contamination	O	<ul style="list-style-type: none"> • Maintenance must be undertaken on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills. • Impermeable and bunded surfaces must be used for storage tanks and to park vehicles on. • Site surface water and wash water must be contained and treated before reuse or 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
	<p>3. The accidental spills from temporary chemical toilets used by construction workers.</p> <p>4. The generation of domestic waste by construction and operational workers.</p> <p>5. Spills from fuel storage tanks during construction.</p> <p>6. Polluted water from wash bays and workshops during the construction phase.</p> <p>7. Accidental spills of other hazardous chemicals used and stored on site.</p> <p>8. Pollution from concrete mixing.</p> <p>The operation of the mine can result in the chemical pollution of the soil:</p> <p>1. Spills from vehicles transporting workers and equipment to and from the operation site.</p> <p>2. The generation of domestic waste by operational workers.</p> <p>3. Accidental spills of other hazardous chemicals used and stored on site.</p>			<p>discharge from site.</p> <ul style="list-style-type: none"> Spills of fuel and lubricants from vehicles and equipment must be contained using a drip tray with plastic sheeting filled with adsorbent material. Spill kits should be available on site and should be serviced regularly. Potentially contaminating fluids and other wastes must be contained in containers stored on hard surface levels in bunded locations. Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately by trained staff with the correct equipment and protocols as outlined in the EMPr. 	
Soil and land capability	<p>Demolition and removal of all infrastructure, including transporting materials off site.</p> <p>Rehabilitation, including spreading of soil, re-vegetation and profiling or contouring.</p> <p>Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste.</p>	Erosion and topsoil loss	D	<ul style="list-style-type: none"> Deep rip compacted areas to allow for natural vegetation regrowth. Ensure proper storm water management designs are in place. Replaced soils to be re-vegetated. Soils must be replaced according to the soil types. Compaction of the topsoil should be avoided. A bowl scrapper is to be avoided as this piece of machinery compacts soil. 	During decommissioning and rehabilitation

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				<ul style="list-style-type: none"> • Areas where growth is slow to be re-vegetated to prevent compaction and erosion. • Post-closure monitoring and maintenance to be undertaken. 	
Soil and land capability	Demolition and removal of all infrastructure, including transporting materials off site. Rehabilitation, including spreading of soil, re-vegetation and profiling or contouring. Storage, handling and treatment of hazardous products (including fuel, explosives and oil) and waste.	Loss of land capability and land use	D	<ul style="list-style-type: none"> • Area to be rehabilitated, re-vegetated and soil amelioration to be undertaken where necessary • Grazing should be initiated on areas to improve soil structure and organic content. • Backfill should be done in such a manner that topsoil is not mixed with subsoil or material containing rocks. • Contour slopes to minimise erosion and run-off. 	During decommissioning and rehabilitation
Surface water and aquatic ecology	Alteration of drainage by diversion of the Chunies river and drainage lines	Alteration of drainage by diversion of the Chunies river and drainage lines leading to decrease and changes in water quantity and availability in the Ecological Reserve	C, O, D	<ul style="list-style-type: none"> • Define the runoff/flood characteristics of the study site and design storm water management facilities accordingly. This will ensure appropriate separation of clean and dirty storm water and will maximise the return of clean water to the downstream drainage system. • Keep the dirty area footprint as small as possible and capture all dirty storm water generated on site for potential re-use. • Adherence to the Storm Water Management Plan as compiled by an accredited engineer is crucial. 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
Surface water and aquatic ecology	Runoff from the dirty water areas	Deterioration of water quality	C, O, D	In compliance with the GN 704 Regulations, the applicant should divert clean runoff from its mine surface infrastructure and collect dirty runoff from the sites of infrastructure.	Continuous
Surface water and aquatic ecology	Hydrocarbon spillage and runoff	Deterioration of water quality	C, O, D	<ul style="list-style-type: none"> • Spills resulting from vehicle maintenance or as result of the storage of hydrocarbon materials must immediately be cleaned and properly disposed of. • Petroleum (and other hazardous materials) storage areas should be effectively bunded and applicable safety standards must be adhered to. • Hazardous materials and chemicals must be stored on solid concrete surfaces. • Storage containers must be inspected regularly for leaks and repaired as needed. • Maintain parking areas and roads in good conditions for the duration of operations. • Spill kits should be available on site, especially in areas with high risk of spillages. • Storm water runoff generated on the mining site should be directed to and contained within the lined Pollution Control Dams. • Design wastewater containing structures according to applicable standards. • Immediate action must be taken to contain spillage. 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				<ul style="list-style-type: none"> • The dams must be inspected regularly for early detection of leaks or damage. • Ensure that pipelines are of a hard enough material to withstand damage. • Uncontrolled disposal of waste near any construction site must be communicated to all contractors as unacceptable. • All waste should be placed in a central collection point and removed from the site. • Encourage and implement the separation and recycling of general waste. Place refuse bins on strategic places to encourage the disposal of litter to these bins. • Erect notices to inspire the staff to keep their environment clean and hazardous free. • Inspect all on-site disposal sites regularly to ensure adherence to all legal requirements. • The applicant should ensure that all storm water collection facilities and dirty-water holding facilities are designed for the 1:50 year storm event and that erosion protection and appropriate energy dissipation structures will be provided at each point necessary and as per approved designs. 	
Surface water and aquatic ecology	Site establishment. Site clearing, including the removal of topsoil and vegetation.	Erosion and sedimentation of water resources	C, O, D	<ul style="list-style-type: none"> • Storm water management will be based on the objective of separating clean water from dirty water and therefore encompass 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
	Construction of mine related infrastructure, including haul roads, pipes. Construction of plant area – on existing cleared area of the mining permit area. Blasting and extending of box-cut for mining, including stockpiling of material from initial box-cut.			the key principle of pollution prevention. • The following objectives will apply: o Keep clean water clean; o Collect and contain dirty water; o Ensure sustainable storm water management over mine life cycle; and o Compliance with Regulations as contained in GN 704	
Surface water and aquatic ecology	Runoff from the dirty water areas Alteration or diversion of drainage lines	Deterioration of the Present Ecological Status (PES).	C, O, D	<ul style="list-style-type: none"> • Mobile sanitary facilities must be inspected regularly and adequately maintained by an approved contractor to prevent any spills/leaks from occurring. • Mobile sanitary facilities must be located outside the applicable buffer zones. • Ensure that an adequate number of mobile toilets are available for workers on site. • Storm water runoff generated at stockpile areas should be directed to and contained within the lined Pollution Control Dams. • Appropriate management measures should be implemented to drain any seepage to the lined PCDs. • Dirty water should be re-used wherever practical. 	Continuous
Groundwater	Mine inflows and associated lowering of water table	Lowering of water table	O	<ol style="list-style-type: none"> 1) Continuous monitoring of mine inflows (daily) and water levels (quarterly) within the predicted zone of dewatering 2) Excess water must be pumped to the 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				water storage facilities (PCDs) for re-use and/or treatment and environmentally acceptable disposal. 3) Provision of alternative water supply to affected users / compensation for well yield losses or increased pumping costs (due to increased lift height and/or yields)	
Groundwater	Stockpiling of overburden and TSF, storage of polluted water in the newly built lined PCDs.	Deterioration of groundwater quality	O	1) Continuous monitoring of downstream concentrations (Stockpiles, TSF, PCDs and mining areas) 2) Concurrent rehabilitation/covering of backfilled areas 3) Adaptive management of TSF plume, i.e. hydraulic plume containment if and when required	Continuous
Groundwater	Rebound of water levels within backfilled mine voids and adjacent pit area (potential diffuse plume migration)	Deterioration of groundwater quality	D	1) Re-shaping (e.g. free draining) and rehabilitation (e.g. top-soiling and seeding) of backfilled areas. 2) Monitoring of water levels (quarterly) within backfilled mining areas and receiving (adjacent) environment	During decommissioning and rehabilitation
Groundwater	TSF post-closure potential plume migration	Deterioration of groundwater quality	D	1) Rehabilitation (e.g. top-soiling and seeding) of TSF 2) Reduction in source concentrations and seepage rates (inert material) (natural attenuation) 3) Continuous monitoring of downstream plume migration using proposed monitoring network.	During decommissioning and rehabilitation



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				4) Hydraulic plume containment within aquifer as required.	
Terrestrial ecology	Site clearance, vehicle and human movement	Loss of Biodiversity and Ecological function within degraded areas	C, O	<ul style="list-style-type: none"> • Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. • To minimize potential impacts to animal species, animals (wildlife and domestic animals) may under no circumstances be handled, removed, killed or interfered with by the Contractor, his employees, his Sub-Contractors or his Sub-Contractors' employees. • Continuous rehabilitation of the area should occur, immediate closure and rehabilitation. This will entail the spreading of topsoil, revegetation and management of invasive species. • Prevent impacts from reaching downstream water resources by ensuring installation and proper functioning of stormwater systems and drains to prevent contaminated water entering the natural environment. This will be prudent in this development, since the mining area is adjacent to the Chunies River. 	Continuous
Terrestrial ecology	Construction, human, and vehicle movement and introduction of foreign material	Distribution / proliferation of Alien Invasive Plant species	C, O	<ul style="list-style-type: none"> • Demarcate specific areas to be developed and remain clear of other areas where activities are not necessary. • A management plan for the control of 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				invasive and exotic plant species needs to be implemented. Specialist advice should be used in this regard. This plan should include pre-treatment, initial treatment and follow-up treatment and should be planned and budgeted for in advance.	
Terrestrial ecology	Site clearance, vehicle and human movement	Loss of floral species of conservation concern	C, O	<ul style="list-style-type: none"> • All footprint areas should remain as small as possible. This can be achieved by fencing footprint areas to contain all activities within designated areas. • If any SCC are encountered within the subject property in the future, the following should be ensured: <ul style="list-style-type: none"> o If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas or within designated open space on the subject property. o All rescue and relocation plans should be overseen by a suitably qualified specialist. o Obtain relevant permits/consent, if applicable, for each protected or endangered floral species identified within the proposed development area that will be destroyed. • Human and vehicle movement should be restricted from taking place in sensitive habitats. Areas to be fenced if necessary. 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
Terrestrial ecology	Rehabilitation	Environment not sustainable	D	<ul style="list-style-type: none"> • A management plan for control of invasive/exotic plant species needs to be implemented for all footprint and surrounding areas. This will be ongoing until the end of the mining closure phase. • Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase. • Rehabilitation plan should be implemented. This includes the process of replanting the vegetation. Rehabilitation plans should be compiled with the use of a specialist and the correct seeding techniques and mixtures should be applied. • Close monitoring of plant communities to ensure that ecology is restored and self-sustaining. The monitoring of the flora should be conducted annually by the environmental practitioner, until a suitably qualified specialist deems the monitoring to no longer be necessary. A report should be written and stored and should be available at all times. 	During decommissioning and rehabilitation
Air Quality	Site clearing, removal of topsoil and vegetation, construction of Infrastructure, general transportation and hauling of material.	Deterioration of ambient air quality (dust generation)	C	<ul style="list-style-type: none"> •Dust emitted during bulldozing activity can be reduced by increasing soil dampness by watering the material being removed thus increasing the moisture content. • Blasting should also not take place when poor atmospheric dispersion are expected 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				i.e. early morning and late evening. <ul style="list-style-type: none"> • Material needs to be removed to dedicated stockpiles to be used during rehabilitation. • This hauling of materials should take place on roads which are being watered and/or sprayed with dust suppressant. • To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. • Constricting the areas and time of exposure of pre-strip clearing in advance of construction to limit exposed soil surfaces. • Use of pre-blast environmental checklists, real-time weather monitoring data and stringent controls on blasts carried out in sensitive areas. • Respiratory protection should only be used to control the dust exposures where other dust collection or suppression systems have not been able to reduce the dust to acceptable levels. • When using hand held rock drills efforts should be made to control dust at source e.g. water injection or extraction. If control of dust at source is not practicable then respiratory protection should be used. • Low or in-pit dumping of overburden 	

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				during high wind conditions <ul style="list-style-type: none"> • Filtration systems can be utilised to remove the pollutants from the underground air prior to their release to the surface via the vent. • Restricting the areas and time of exposure of pre-strip clearing in advance of mining development 	
Air Quality	1. Dust from material handling (Inside and outside the pit area) 2. Haul roads; for transporting the ROM to the Processing plant. 3. Processing Plant, Crushing and Screening 4. Wind erosion from stockpiles and Tailings	Deterioration of ambient air quality (dust generation)	O	<ul style="list-style-type: none"> • Hauling of materials and transportation of people should take place on roads which are being watered and/or sprayed with dust suppressant. • To reduce the amount of dust being blown from the load bin in the haul roads, the material being transported can be watered or the back of the vehicles can be covered with plastic tarpaulin covers. • In order to mitigate the impacts of the activity, the speed limit should be kept low. • Speed limits need to be observed and adhered to. • Application of wetting agents or application of dust suppressant to bind soil surfaces to avoid soil erosion. • The drop heights should be minimised when depositing materials to the ground. • Planting plenty of trees or hedges as shelterbelts to eliminate or minimise wind disturbance. • Disturbed areas such as those caused by 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				stripping off grass and topsoil should be kept to a minimum. <ul style="list-style-type: none"> • Use water sprays or water carts to settle dust. There are additives available that reduce the volume of water used. • Use of water sprays at each contact or transfer point along the conveyance system which have adjustable rates of application (low, medium and high) depending on dust levels. • Speed restrictions should be imposed and enforced. • Topsoil handling and storage procedures including stockpile inventory, vegetative cover and signage to optimise rehabilitation and minimise wind erosion. • Dust from stockpile sources can be reduced through the use of plastic or other material cover, compaction of the surface and the use of water or sprays, trees and careful citing of stockpiles. • Restricting the areas and time of exposure of pre-strip clearing in advance of mining development in turn limiting stockpile requirements. 	
Air Quality	Demolition and removal of all infrastructure (incl. transportation off site) and Rehabilitation (Spreading of soil, revegetation, profiling / contouring).	Deterioration of ambient air quality (dust generation)	D	<ul style="list-style-type: none"> • Demolition should not be performed during windy periods (August, September and October), as dust levels and the area affected by dust fallout will increase. • The area of disturbance must be kept to a 	During decommissioning and rehabilitation

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				<p>minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion.</p> <ul style="list-style-type: none"> • Speed restrictions should be imposed and enforced. • Dust suppression of roads being used during rehabilitation should be enforced. • Revegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. • Plants with roots that bind the soil, and vegetation cover should be used that breaks the impact of falling raindrops, thus preventing wind and water erosion. • Plants used for revegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings. • The area of disturbance must be kept to a minimum, as demolition should be done judiciously avoid the exposure of larger areas to wind erosion. • Spreading of soil must be performed on less windy days. • The bare soil will be prone to erosion and therefore there is need to reduce the velocity near the surface of the soil by re- 	

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				vegetation. • Leaving the surface of the soil in a coarse condition reduces wind erosion and ultimately reduces the dust levels. • It is recommended that the rehabilitation by vegetating should begin during the operational phase already as the objective is to minimise the erosion. • These measures should be aimed to reduce the potential for fugitive dust generation and render the impacts on ambient air quality negligible	
Noise	Topsoil removal/clearance, development of stockpiles, construction of haul roads, construction of surface infrastructure	Disturbing noise, Day time and Night time	C	• Should a noisy construction activity occur off the project footprint and near a receptor, the Environmental Coordinator should inform the receptor prior to the activity. Should noisy night-time activity occur, the Environmental Coordinator should make receptors aware of the activity prior to the occurrence. • Recommended (not compulsory) – The construction team should make use of equipment that has lower SPL or is designed to produce lower SPL (heavy equipment operating within 300m of a receptor). • The Environmental Co-ordinator should implement continuous communication regarding noises and potential loud noise events (a potential situation whereby some	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				noisy activity will commence near a receptor for some unforeseen circumstance). Prior knowledge of a noise event will be far more ideal than a receptor being unaware of a loud noise circumstance.	
Noise	Stockpiles/Open cast pits, plant, traffic on haul and access roads, plant operation	Disturbing noise, day and night	O	<ul style="list-style-type: none"> Where feasible, noisy equipment and areas (crushing, screening and specifically tipping points and conveyor feeds) should not be raised at high elevations. The noisy equipment and areas should be cited as low as possible. The Environmental Co-ordinator should implement continuous communication regarding noises and potential loud noise events (a potential situation whereby some noisy activity will commence near a receptor for some unforeseen circumstance). Prior knowledge of a noise event will be far more ideal than a receptor being unaware of a loud noise circumstance. 	Continuous
Noise	General rehabilitation activities	Disturbing noise	D	<ul style="list-style-type: none"> The Environmental Co-ordinator should implement continuous communication regarding noises and potential loud noise events (a potential situation whereby some noisy activity will commence near a receptor for some unforeseen circumstance). Prior knowledge of a noise 	During decommissioning and rehabilitation

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				event will be far more ideal than a receptor being unaware of a loud noise circumstance.	
Visual	Topsoil removal/clearance, development of stockpiles, construction of haul roads, construction of surface infrastructure	Potential visual impact on the Sensitive Receptors/Viewpoints	C	<ul style="list-style-type: none"> • Reduce the construction period through careful planning and productive implementation of resources. Clearly define areas to be cleared. Do not clear past designated areas. Retain natural vegetation outside of clearance zone. • Plan the placement of lay-down areas and any potential temporary construction camps to minimise vegetation clearing. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way. Use material with colours that will visually blend with the natural environment. Screen the whole construction site via fence cover. • Reduce and control construction dust using approved dust suppression techniques. Implement daily dust suppression and pave roads where possible to avoid transport related dust pollution. • Restrict construction activities to daylight hours to negate, or reduce, the visual impacts associated with lighting. Direct light 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				downwards to avoid illumination to the sky. Use motion light sensor to avoid lighting unused places.	
Visual	Stockpiles, open cast pits, plant, traffic on haul and access roads, plant and surface infrastructure	Potential visual impact on the Sensitive Receptors/Viewpoints	O	<ul style="list-style-type: none"> • Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way. • Backfilling of the open pit as part of concurrent rehabilitation. • Vegetate and maintain stockpiles to the recommended minimum height. • Revegetate soon after stockpiling to avoid erosion and a drainage patterns forming on the stockpile. • Rehabilitation of disturbed areas and re-establishment of vegetation. 	Continuous
Blasting and vibration	Blasting	Damage to buildings, houses and graveyards due to ground vibrations	C	<ul style="list-style-type: none"> • Specific blast design to be done, shorter blast holes, smaller diameter blast hole, using electronic initiation instead of shock tube systems to obtain single hole firing. • Redefine exact pit limits or blast areas and possibly increase distance between blast areas and houses. 	Continuous
Blasting and vibration	Blasting	Damage to buildings, houses and graveyards due to air blast	C	<ul style="list-style-type: none"> • Specific blast design to be done, shorter blast holes, smaller diameter blast hole, use of specific stemming materials to manage air blast, increased stemming lengths to reduce air blast effect. Use of specific stemming to manage fly rock - crushed 	Continuous



Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				aggregate of specific size. Re-design with increased stemming lengths.	
Blasting and vibration	Blasting	Damage to buildings, houses and graveyards due to fly rock	C	<ul style="list-style-type: none"> •Specific blast design to be done, shorter blast holes, smaller diameter blast hole, use of specific stemming materials to manage air blast, increased stemming lengths to reduce air blast effect. Used of specific stemming to manage fly rock - crushed aggregate of specific size. Re-design with increased stemming lengths. 	Continuous
Heritage resources	Topsoil removal/clearance, development of stockpiles, construction of haul roads, construction of surface infrastructure	Disturbance of heritage sites	C, O	<ul style="list-style-type: none"> •No impact on the identified heritage resource sites is expected, but in the event that the project layout changes in a way that will affect additional footprint areas or in the event that additional sites are discovered a heritage specialist should be consulted. 	Continuous
Palaeontology resources	Excavations (opencast and underground)	Disturbance or destruction of palaeotogical resources	C, O	<ul style="list-style-type: none"> •A Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once excavations, drilling or blasting have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample. 	Continuous
Socio-Economic	Construction and operation of mine and associated activities	Increase in crime and HIV	C, O	<ul style="list-style-type: none"> •Labour should be sourced from the local settlement areas to prevent influx of foreign people who are likely to disrupt the social fabric, values and norms of the village people. •Through the SLP and day-to-day training 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				and awareness programmes pandemics such as HIV and Covid-19 can be managed and minimized. The Mphahlele mine must also have an HIV and Covid-19 awareness outreach programme in conjunction with local health centres and clinics to extend awareness and knowledge about the disease to the broader communities affected by the proposed mine activities. <ul style="list-style-type: none"> •Visible policing and community policing forums must be established to curb incidents of crime in the communities. This option must be implemented in conjunction with existing tribal authority processes to manage crime and illegal activities. 	
Socio-Economic	Construction and operation of mine and associated activities	POSITIVE: Economic Opportunities, Infrastructure Development and Employment	C. O	<ul style="list-style-type: none"> •Promotion of chrome beneficiation within the Limpopo Province to improve the quality and value of the product being mined, and create further economic activity. Mphahlele mine already has chrome concentrator plants in their mine. Subject to economic modelling and feasibility study, another concentrator plant in the vicinity of Mphahlele can further significantly stimulate the economic activity in Lepelle-Nkumpi Local Municipality, Lebowakgomo and the surrounding region. •Labour should be sourced from the local settlement areas to prevent influx of foreign people and job seekers who are 	Continuous

Aspect	Activity	Potential Impact	Phase	Mitigation measures	Time period for implementation
				likely to disrupt the social fabric, values and norms of the village people.	
Socio-Economic	Cessation on mining activities and closure	Negative social and economic impact from closure	D	<ul style="list-style-type: none"> •Adequate communication with the surrounding communities during all phases of the development to ensure that an open policy regarding timelines is enforced during all stages of the development. •SLP projects and programmes should be aimed at long-term sustainability in the absence of the mine 	During decommissioning and rehabilitation

Table 49: Impact Management Outcomes

Aspects Affected	Potential Impact	Phase	Mitigation Type	Standard To Be Achieved
Soils	Loss of soil resource	Construction; Operational; Decommissioning	Management, Rehabilitation	N/A
Soils	Erosion	Construction; Operational; Decommissioning; Closure	Management, Rehabilitation	N/A
Soils	Soil contamination	Construction; Operational; Decommissioning	Remedy through rehabilitation, infrastructure design and Management	N/A
Land Capability	Loss of grazing land within footprint	Construction; Operational; Decommissioning; Closure	Remedy through rehabilitation and management.	N/A
Land Capability	Loss of grazing land in greenfield sites	Construction; Operational; Decommissioning; Closure	Remedy through rehabilitation and management.	N/A
Blasting	Blasting hazard and damage to structures by blasting vibrations	Construction; Operational	Control through management and communication Control through management and monitoring	N/A
Blasting	Blasting hazard - Nuisance to people	Construction; Operational	Modify through management	N/A
Land Use	Road disturbance due to increase in traffic (within degraded areas)	Construction; Operational; Decommissioning; Closure	Modify through management	N/A
Land Use	Road disturbance due to increase in traffic (within greenfield areas)	Construction; Operational; Decommissioning; Closure	Modify through management	N/A
Land Use	Failure of mine residue deposit	Construction; Operational; Decommissioning	Infrastructure design, Management, Monitoring, rehabilitation	SABS Code for mine residue deposits
Terrestrial Ecology	Loss of Biodiversity and Ecological function	Construction; Operational; Decommissioning	Management, infrastructure design	N/A
Surface water	Alteration of drainage patterns due to river	Construction; Operational; Decommissioning	Infrastructure design, Management, Monitoring, rehabilitation	GN704, Licence and Rehabilitation plans and monitoring

Aspects Affected	Potential Impact	Phase	Mitigation Type	Standard To Be Achieved
	diversion or impacts on drainage lines: Quantity			
Surface water	Exposed surfaces could result in increased erosion and associated runoff which in turn may result in increased siltation of surface streams. Exposed surfaces together with increased traffic on-site could result in increased siltation of surface water streams by excessive dust generation.	Construction; Operational; Decommissioning	Infrastructure design, Management, Monitoring, rehabilitation	Rehabilitation plans and monitoring
Surface water	Deterioration in surface water quality	Construction; Operational; Decommissioning	Infrastructure design; Management; Licencing	GN704, WUL
Groundwater	Lowering of groundwater levels due to mine dewatering - effect on surrounding groundwater users	Construction; Operational; Decommissioning; Closure	Monitoring; Compensation	WUL
Groundwater	Lowering of groundwater levels due to mine dewatering - effect on base flow	Construction; Operational; Decommissioning; Closure	As above	WUL
Groundwater	Deterioration of water quality as a result of seepage - operational phase	Operational	Infrastructure designs; Management; Monitoring	WUL

Aspects Affected	Potential Impact	Phase	Mitigation Type	Standard To Be Achieved
Groundwater	Deterioration of water quality as a result of seepage - at the end of the life of mine	Decommissioning, closure	As above	WUL
Air Quality	Emissions from site clearance and Infrastructure development, specifically dust	Construction, Operational	Infrastructure design; Management	NEMA; National Environmental Management: Air Quality, 2004 (Act 39 Of 2004)
Air Quality	General transportation, hauling and vehicle movement on site	Construction, Operational	Infrastructure design; Management	
Air Quality	Generation of stockpiles and associated mining waste	Operational	Infrastructure design; Management	
Air Quality	Beneficiation by means of crushing, screening and washing	Operational	Infrastructure design; Management	
Air Quality	Demolition & Removal of all infrastructure (incl. transportation off site), Rehabilitation	Decommissioning; Closure	Infrastructure design; Management	
Noise	Disturbing noise, Day time and Night time	Construction	Infrastructure design; Management; Monitoring; Maintenance	
Noise	Disturbing noise, Day time	Operational	Infrastructure design; Management; Monitoring; Maintenance	
Noise	Disturbing noise	Closure	Infrastructure design; Management; Monitoring; Maintenance	



Aspects Affected	Potential Impact	Phase	Mitigation Type	Standard To Be Achieved
Sites of archaeological and cultural interests	Disturbance of heritage sites	Construction; Operational	Management; Conservation; Permitting	N/A
Visual aspects	Negative visual impact	Construction; Operational; Decommissioning; Closure	Infrastructure design; Management; Rehabilitation	N/A
Socio-Economic	Positive Socio-economic impacts	Construction; Operational; Decommissioning; Closure	Management; Consultation	N/A
Socio-Economic	Negative impact from closure	Decommissioning, Closure	Management; Communication; Strategy implementation	N/A
Socio-Economic	Negative cumulative impacts	Construction; Operational; Decommissioning; Closure	Management; Communication; Strategy implementation	N/A

30 FINANCIAL PROVISION

30.1 DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION

30.1.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under Regulation 22 (2) (d) as described in 2.4 herein

The preliminary objectives have been developed against the background of the mine location in the Sekhukhune region of Limpopo, particularly that the region is disturbed by mining activities and land available for non mining has become more limited. The objectives (see below) are therefore designed largely to manage residual risks and provide land that can be utilised after rehabilitation.

Rehabilitation will be done concurrently, with additional rehabilitation still being required in years 1-6 as provided above. The table provides a breakdown of the annual rehabilitation as well as the total post closure expenditure to be incurred by the operation.

For the mining operations, the following closure objectives and goals are proposed:

- Adhere to all statutory and other legal requirements.
- To develop landforms supporting stable and functioning ecosystems that are aesthetically acceptable on closure and will gradually sustain the desired land-uses post closure.
- Ensure safety & health of all stakeholders during closure and post closure and that communities using the site after closure are not exposed to unacceptable risks.
- Ensure that closure supports productive uses considering pre-mining conditions and are in agreement with commitments to stakeholders.
- Promote bio-diversity and biological sustainability to the maximum extent practicable.
- Utilise closure strategies that promote a self-sustaining condition with little or no need for ongoing care and maintenance.
- To achieve agreed quality targets set by the Catchment Management Authority (CMA) and the Department of Water and Sanitation (DWS) as far as practical relative to impacts and reasonability to achieve.
- The physical and chemical stability of the remaining structures should be such that risk to the environment through naturally occurring forces is eliminated.
- To rehabilitate all disturbed land to a state that facilitates compliance with current environmental quality objectives (air and water quality).
- To limit the impact on personnel whose positions may become redundant on decommissioning of the mine.

30.1.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

The environmental objective in relation to closure which will be made available to all registered I&APs for comment. All comments received and the relevant meeting minutes are appended to this report

30.1.3 Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure

Refer to Appendix 19 for the Preliminary Closure and Rehabilitation Plan.

30.1.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The rehabilitation plan has been compiled in accordance with the objectives and goals and is deemed to be satisfactory according to the Mine and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) as amended and GNR 1147 of the National Environmental Management Act, 1988 (Act No. 107 of 1998).

30.1.5 Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline

Refer to Section 20 of the EIA Report.

The financial provision based as per the requirements as set out in GNR 1147 has been calculated at R 15 064 698.8. It should be noted that the mining permit has financial provision of R 1 045 507.00 available and the mine will be required to provide the shortfall of **R 14 019 191.86**.

30.1.6 Confirm that the financial provision will be provided as determined

The above-mentioned amount will be provided for upon the request of the DMRE.

31 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON

Table 50: Mechanisms for monitoring (Including Time period, Functional requirements, Roles and responsibilities and Frequency)

Aspects Affected	Potential Impact	Time Period for Implementation	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency	Implementation of Impact Management Options	
Soils	Loss of soil resource	During closure	Confirm vegetation establishment	SHEQ	Annually	Continuous	
		Continuous	Confirm that soil is conserved and stockpiled correctly	SHEQ	Annually	Continuous	
	Erosion	As needed	Confirm vegetation establishment	SHEQ	Annually	Continuous	
		Continuous	Conduct inspections to determine sites prone to erosion. Implement management measures to reduce potential for erosion.	SHEQ	Annually	Continuous	
		Continuous	Conduct inspections to determine sites prone to erosion. Implement management measures to reduce potential for erosion.	SHEQ		Continuous	
	Soil contamination	Continuous	Confirm areas are constructed correctly and maintained.	SHEQ	As needed / Annually	Continuous	
		Continuous	Set up service plan and record services of vehicles	Workshop manager	As needed	Continuous	
		As needed	Confirm clean up done correctly, soil disposed of correctly and inspect rehabilitated area.	SHEQ	As needed	Continuous	
	Land Capability	Loss of grazing land within footprint	Continuous	Demarcate areas for development, confirm that	ECO / Contractor	Annually	Continuous



Aspects Affected	Potential Impact	Time Period for Implementation	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency	Implementation of Impact Management Options
			soil is stockpiled correctly and conserved, revegetate correctly. Landscape Management			
	Loss of grazing land in greenfield sites	Continuous	Demarcate areas for development, confirm that soil is stockpiled correctly and conserved, revegetate correctly	SHEQ	Annually	Continuous
Blasting	Blasting hazard and damage to structures by blasting vibrations	As needed	Conduct crack survey	SHEQ, Contractor/ Specialist	Annually	As soon as authorisation is obtained, before the new mining areas are constructed
	Blasting hazard - Nuisance to people	Continuous	Inform public	Mine manager	Annually	when blasting occurs or plan change
Terrestrial Ecology	Loss of Biodiversity and Ecological function within degraded areas	Continuous	Demarcate area	ECO / Contractor	As needed	Continuous
	Loss of Biodiversity and Ecological function within Greenfield sites	Immediately, before construction begins	Annual Vegetation monitoring	SHEQ, Contractor / specialist	Annually	Continuous

Aspects Affected	Potential Impact	Time Period for Implementation	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency	Implementation of Impact Management Options
Surface water	Alteration of drainage patterns due to river diversion or impacts on drainage lines: Quantity	Continuous	As per WUL for Section 21(c) and (i)	SHEQ / Contractor / Specialist	As per WUL	Continuous
	Exposed surfaces could result in increased erosion and associated runoff which in turn may result in increased siltation of surface streams. Exposed surfaces together with increased traffic on-site could result in increased siltation of surface water streams by excessive dust generation.	Continuous	Site inspections	SHEQ, Contractor / specialist	As per WUL	Continuous
	Deterioration in surface water quality	Continuous	WUL monitoring related to surface water and groundwater samples (water quality)	SHEQ, Contractor	As per WUL	Continuous
Groundwater	Lowering of groundwater levels due to mine dewatering - effect on surrounding groundwater users	Continuous	Monitor boreholes for quality and water levels	SHEQ, Contractor / specialist	Quarterly	Continuous



Aspects Affected	Potential Impact	Time Period for Implementation	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency	Implementation of Impact Management Options
Groundwater	Lowering of groundwater levels due to mine dewatering - effect on base flow	Continuous	Monitor boreholes for quality and water levels	SHEQ, Contractor / specialist	Quarterly	Continuous
	Deterioration of water quality as a result of seepage - operational phase	Continuous	Monitor boreholes for quality and water levels	SHEQ, Contractor / specialist	Quarterly	Continuous
	Deterioration of water quality as a result of seepage - at the end of the life of mine	During decommissioning phase	Monitor boreholes for quality and water levels	SHEQ, Contractor / specialist	Quarterly	Continuous
Air Quality	Emissions from site clearance and Infrastructure development, specifically dust	Continuous	Conduct air quality monitoring.	SHEQ, Contractor	Monthly	Continuous
	General transportation, hauling and vehicle movement on site	Continuous	Conduct air quality monitoring.	SHEQ	Monthly	Continuous
	Generation of stockpiles and associated mining waste	Continuous	Conduct air quality monitoring.	SHEQ, Contractor	Monthly	Continuous
	Beneficiation by means of crushing, screening and washing	Continuous	Conduct air quality monitoring.	SHEQ, Contractor	Monthly	Continuous



Aspects Affected	Potential Impact	Time Period for Implementation	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency	Implementation of Impact Management Options
	Demolition & Removal of all infrastructure (incl. transportation off site), Rehabilitation	Continuous	Conduct air quality monitoring.	SHEQ, Contractor	Monthly	Continuous
Noise	Disturbing noise, Day time and Night time	Continuous	Conduct noise monitoring, establish berms as per noise specialist study	SHEQ, Contractor	An annual Acoustical Measurement & Audit Programme report is recommended.	Continuous
Sites of archaeological and cultural interests	Disturbance of heritage sites	Continuous	Record occurrences of sites and artefacts if found	SHEQ, ECO during construction if needed	As needed	Continuous
Visual aspects	Negative visual impact	Continuous	Monitor visual integrity or landscape character changes	SHEQ, ECO	Annually	Continuous
Socio-Economic	Positive Socio-economic impacts	Continuous	Keep records of service providers and where they are from	Procurement	Annually	Continuous
	Negative impact from closure	Continuous	Compliance with programme principles / vision	Human Resources	Annually	Continuous
	Negative cumulative impacts	N/A	Ensure regular communication and good relationship with SAPS of the region	Human Resources	Annually	Continuous
		Continuous	Compliance with policy principles / vision	Human Resources	Annually	Continuous

31.1 DETAILED MONITORING PROGRAMMES

31.1.1 Soil and Land Capability Monitoring Plan

Monitoring should be undertaken annually at the same time of the year. Stockpiled top soil should be sampled and analysed for the following parameters:

- pH (KCl);
- Phosphorus (Bray 1);
- Cations: Calcium, Magnesium, Potassium, Sodium, Zin (mg/kg);
- Cation exchange capacity (CEC);
- Soil organic carbon (%); and
- Soil texture (Clay, Silt and Sand).

31.1.2 Blasting and Vibration Monitoring Plan

A monitoring programme for recording blasting operations is recommended. The following elements should be part of such a monitoring program:

- Ground vibration and air blast results;
- Blast Information summary;
- Meteorological information at time of the blast;
- Video Recording of the blast;
- Fly rock observations.

Most of the above aspects do not require specific locations of monitoring. Ground vibration and air blast monitoring requires identified locations for monitoring. Monitoring of ground vibration and air blast is done to ensure that the generated levels of ground vibration and air blast comply with recommendations. Proposed positions were selected to indicate the nearest points of interest at which levels of ground vibration and air blast should be within the accepted norms and standards as proposed in this report. The monitoring of ground vibration will also qualify the expected ground vibration and air blast levels and assist in mitigating these aspects properly. This will also contribute to proper relationships with the neighbours.

Twelve monitoring positions were identified as possible locations that will need to be considered. Not all points will be required at once but active monitoring and observation of where blasting is done will dictate the requirements for the areas around the pit. Some of these points may be applicable to more than one location to be monitored. The size of the pit area and not knowing where blasting will be started at this stage makes exact recommendations for blast monitoring points difficult. However monitoring positions are indicated in Figure 46 and Table 51 lists the positions with coordinates. These points will need to be re-defined with an availability of a detailed mining plan and after the first blasts done and the monitoring programme defined.

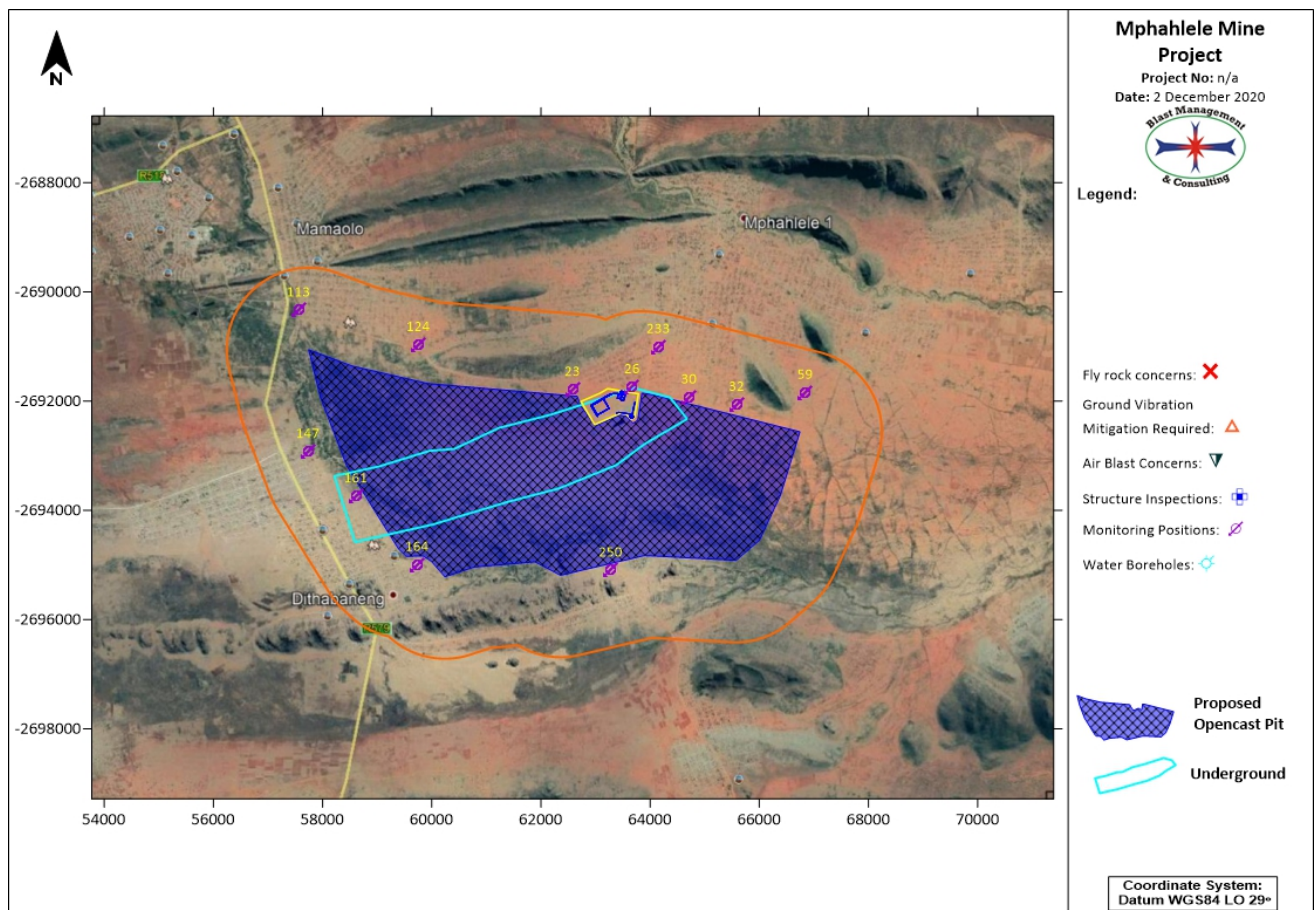


Figure 46: Suggested monitoring positions

Table 51: List of possible monitoring positions

Tag	Description	Y	X
23	Community Houses (Mphahlele)	-62583.43	2691785.68
26	Community Houses (Mphahlele)	-63674.06	2691738.42
30	Buildings/Structures	-64718.54	2691928.41
32	Community Houses (Mphahlele)	-65588.12	2692059.52
59	Buildings/Structures	-66844.86	2691839.72
113	Community Houses	-57565.63	2690332.27
124	Community Houses	-59760.86	2690964.04
147	Community Houses (Makurung)	-57735.24	2692922.37
161	Community Houses (Makurung)	-58617.71	2693738.41
164	Community Houses (Dithabaneng)	-59736.96	2694994.86
233	Hydrocensus Borehole (H01-NN1)	-64158.58	2691002.95
250	Graveyard	-63284.64	2695093.45

31.1.3 Groundwater Monitoring Plan

The spatial distribution of proposed monitoring boreholes for the Mphahlele Mining Project is shown in Figure 8-1, with the approximate coordinates of the proposed boreholes and their scope provided in Table 8-1. The borehole locations should be refined based on site specific geophysical investigations and ground truthing regarding potential infrastructure conflicts.

Note: Should the mine layout change, the monitoring programme should be re-assessed.

The newly proposed boreholes monitoring boreholes should be drilled with a nominal inside diameter of 110 mm to the bottom of weathered aquifer plus 2 m into fractured rock. The open cast monitoring boreholes should be drilled to reef elevation (depth).

The boreholes should be equipped with screened casing throughout the saturated thickness of the aquifer. Additional monitoring boreholes into the underground mine voids should be drilled post closure to monitor the flooding of these and enable sampling. These boreholes should be sited and designed as part of the post closure strategy for the entire mine site.

Table 52: Proposed monitoring boreholes list and monitoring target.

Label	Latitude	Longitude	Type/Area	Borehole
H01-1379	-24.3689	29.63738	Receptor	Existing
H01-1382	-24.3682	29.61769		
H01-1399	-24.3579	29.58875		
H01-1421	-24.3477	29.57307		
H01-2531	-24.3176	29.57621		
H01-3632	-24.3146	29.63029		
MpBH01	-24.3305	29.61922	MRF (upstream)	Proposed
MpBH02	-24.3329	29.62767	PCD	
MpBH03	-24.3286	29.62582		
MpBH11	-24.3318	29.64733	Open Cast & Underground	
MpBH10	-24.3574	29.61018		
MpBH06	-24.3498	29.58637		
MpBH07	-24.352	29.62590		
MpBH08	-24.3514	29.65072		
MpBH09	-24.3298	29.57209	MRF (pathway)	
MpBH04	-24.3293	29.62617		
MpBH04b	-24.3301	29.62591		
MpBH05	-24.3292	29.62468		



Figure 47: Proposed monitoring boreholes for the Mphahlele Mine.

1.1.2.12. Monitoring Frequency

The following monitoring frequencies are recommended during the construction and Life of Mine:

- Mine inflows: Continuously, and aggregated as daily inflow rates
- Water levels: Monthly
- Water qualities: Quarterly

The monitoring frequency could be relaxed post-closure once water levels and qualities stabilise:

- Mine inflows: Not applicable
- Water levels: Quarterly
- Water qualities: Quarterly until stabilised, thereafter annually

1.1.2.13. Monitoring Parameters

A list of groundwater parameters to be monitored is given in Table 8-2. The following recommendations are given regarding the monitoring protocol for the mine:

- The static groundwater levels should be measured in the boreholes without any preceding abstractions.
- The boreholes should be purged (replacing approximately three times the stagnant water within the borehole) until the physic-chemical parameters stabilize and are determined. Samples for analysis should be retrieved after stabilization of the field parameters.
- Suitable sample containers should be utilised for the sample collection, i.e. plastic or glass containers for major elements and plastic or boron-glass containers for minor and trace elements.
- Samples for trace element analysis should be filtered and acidified (HNO₃, pH < 2) on-site.
- Sample collection including determined physic-chemical parameter should be documented in a sample protocol

for each site and signed off by the sampling personnel as part of the chain of custody.

- The samples should be delivered to an accredited laboratory as soon as possible for analysis of the above parameters.

Table 53: List of groundwater monitoring parameter

Description	Parameter	Comments
Potential heads	Static groundwater levels	Measured in metres below ground level (mbgl) and converted into metres above mean seal level (mamsl). Collar elevations of the boreholes need to be considered.
Physico-chemical parameter, field	pH, Electrical Conductivity (EC), Temperature, Redox-Potential (mV), colour and smell (if any)	Parameters to be measured during sampling in the field, should stabilize before sample is retrieved
Physico-chemical parameter, laboratory	pH, Electrical Conductivity (EC), Temperature, Redox-Potential (mV)	To assess deviations from field measurements
Major elements	Ca, Mg, Na, K, Total Alkalinity, SO ₄ , NO ₃ , Cl, Total Dissolved Solids (TDS)	
Trace elements	Al, As, B, Ba, Cr, Cu, F, Fe, Mn, Mo, Ni, Pb	Samples to be filtered and acidified on-site.

31.1.4 Surface Water and Aquatic Ecology

Assessments of the process, surface, ground and drinking water monitoring localities should be carried out. The monitoring localities are presented in the Tables below.

Table 54: Monitoring Localities

Surface Water Points	Monitoring Frequency	Coordinates	
Upstream – If water is present	Monthly	24°18'58.70"S; 29°33'58.58"E	
Midstream– If water is present	Monthly	24°21'16.51"S; 29°37'32.13"E	
Downstream– If water is present	Monthly	24°20'45.80"S; 29°42'57.12"E	
Additionally recommended			
Upstream point in Olifants river (just before confluence of Chunies)	Monthly	24°20'10.60"S 29°44'54.14"E	
Downstream point in Olifants river (just after confluence of Chunies)	Monthly	24°19'47.54"S 29°44'40.72"E	
Process Water Points			
PCD	Monthly	As per SWMP	
Return Water Dam	Monthly	As per SWMP	
Drinking Water Points			
If applicable – if borehole water is utilised, this feature should form part of the groundwater monitoring programme. If drinking water is obtained from a contractor, no sampling is required			
Groundwater Monitoring Boreholes			
As per specification in Geohydrological Report			
Other aspects	Aspect	Parameters	Frequency
Water balance	Based on Flow meter values – to be installed	Annual updating of formal water balance based on seasonal trends, usage (flow meter data).	Daily recording, monthly statistics and annual water balance update to determine trends.
Footprints within buffer zones which includes the rehabilitation zones within 100m (rivers and drainage features)	Monitor regularly to ensure no additional erosion is taking place within these zones.	Monitor for impacts within sensitive and rehabilitated zones	Monthly and shortly after heavy rainfall has been experienced.

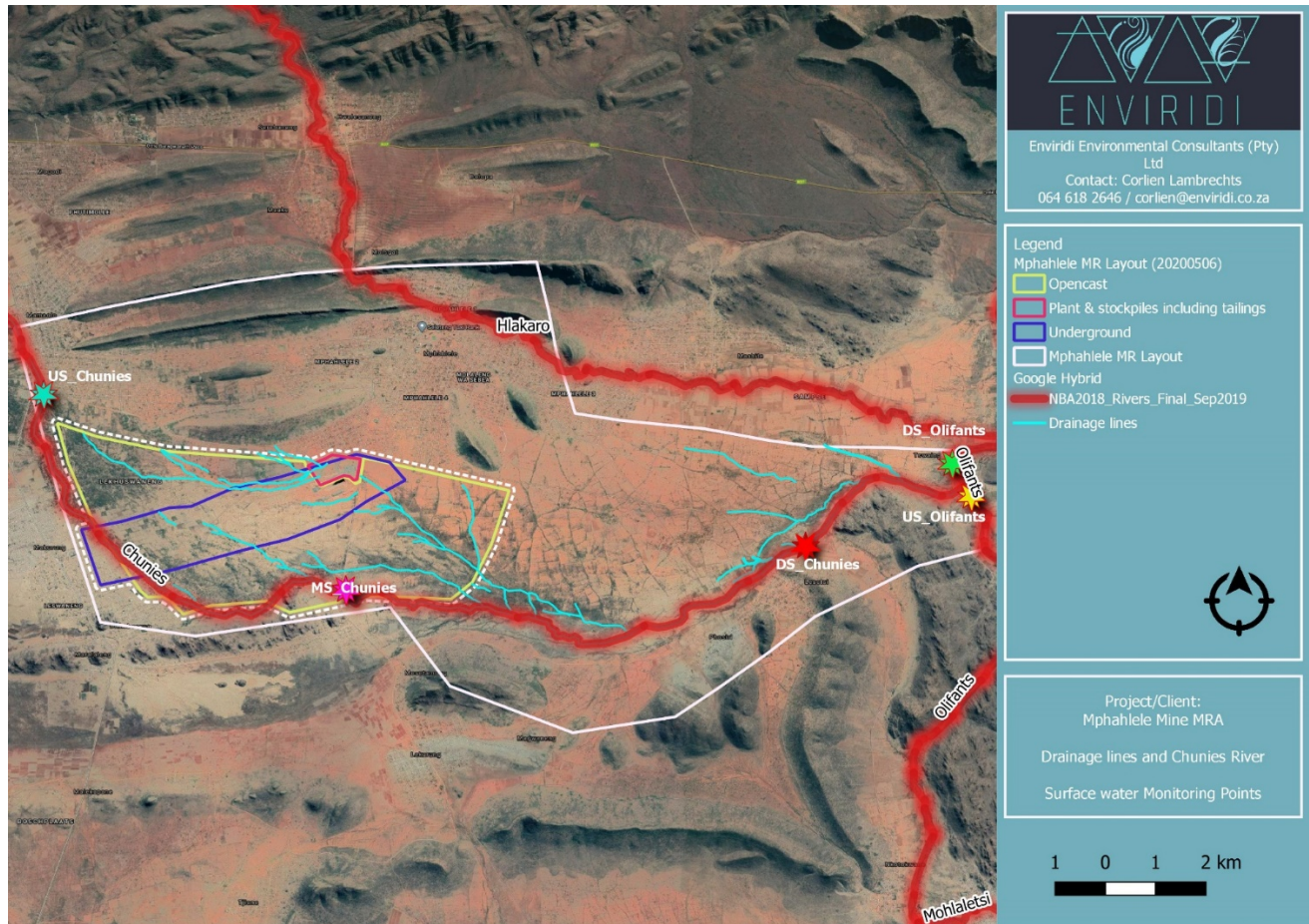


Figure 48: Surface water monitoring locations recommended

31.1.5 Terrestrial Ecology Monitoring Plan

Monitoring framework should be instigated and managed by their responsible body and the following system may enforce good practice:

- Implement an “Observe and report” approach which will enable employees to report any disturbance of flora/fauna or degradation that they encounter.
- Alien invasive awareness, eradication and control programme on an annual basis.
- Rehabilitation plans should be planned long before the closure phase is due. Continuous rehabilitation should also take place during the operational phase and application and success should be monitored. This includes the process of replanting the vegetation. Rehabilitation plans should be compiled with the use of a specialist and the correct seeding techniques and mixtures should be applied.

31.1.6 Air Quality Monitoring Plan

Site layout for sampling points must be carried out according to the eight main compass directions; the site layout and equipment placement must be done in accordance with the ASTM standard, D 1739 – 2010, thereafter relevant sampling reference numbers will be allocated to the receptors accordingly. At each gravimetric dust fallout gauge/receptor point there is a stand built according to specification containing the dust sample collection bucket. Samples will be collected after a 1 month running period (+30 day’s exposure). After sample collection, the samples are taken to a SANAS accredited laboratory as required. A visual site investigation is done where after correlations are drawn and findings are identified and reported on.

Dust buckets of a standard size and shape are prepared and set up at locations related to the eight main compass points on the borders of the property so that dust can settle in them for periods of 30+/- days. The dust buckets are then sealed and

replaced with new empty ones and send away to the SANAS accredited laboratory for analysis. The masses of the water-soluble and –insoluble components of the material collected are then determined and results are reported as mg/m²/day. This methodology is described according to South African National Standards 1929:2004 and the American Society for Testing and Materials (ASTM) Designation: D 1739-98 (2010). The results for this method of testing are obtained by gravimetric weighing. The apparatus required include open top buckets/containers not less than 150 mm in diameter with a height not less than twice its diameter. The buckets must be placed on a stand at a height of 2 +/-0.2 m above the ground.

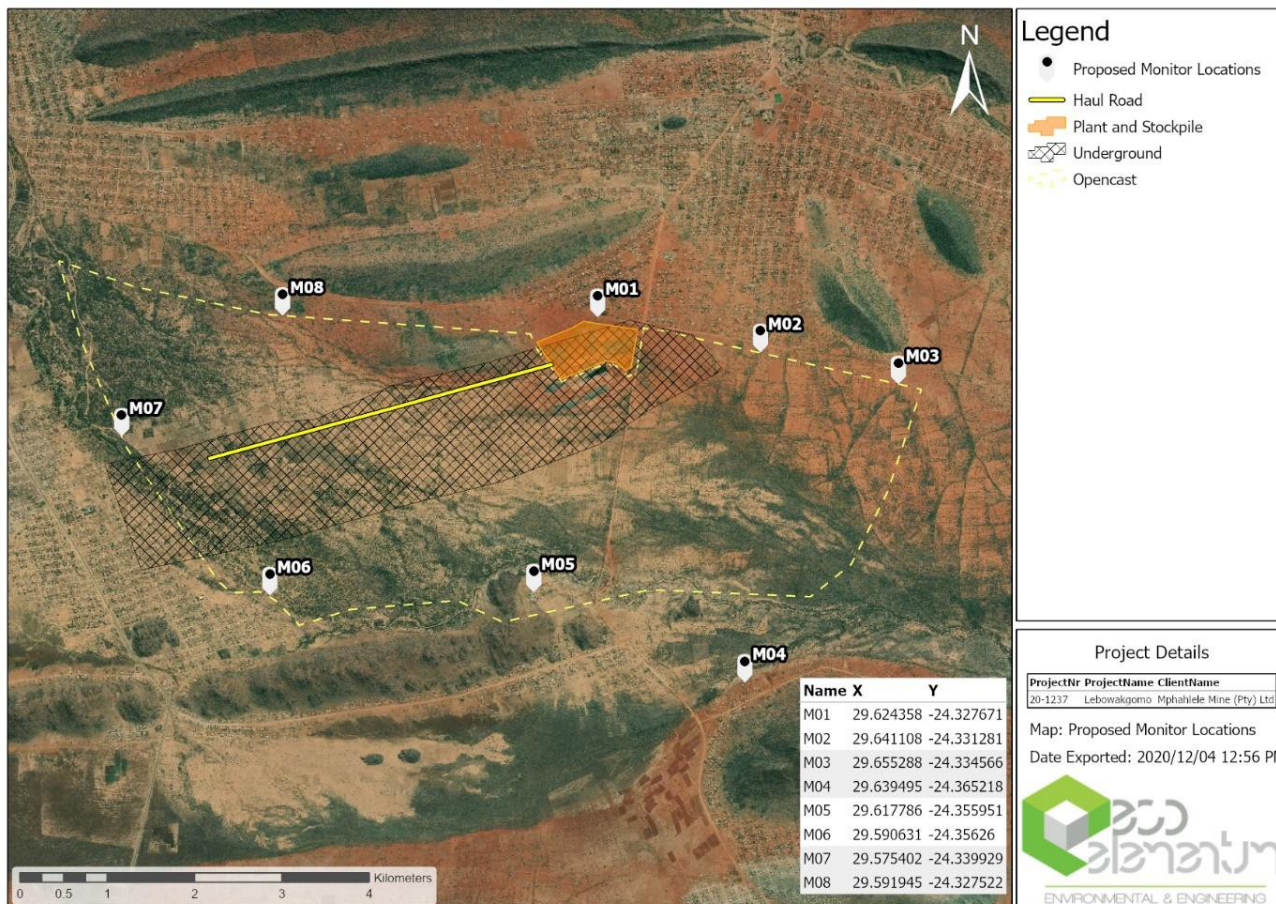


Figure 49: Proposed dust fallout monitoring locations

It is recommended that the client should establish a fine particulate monitoring programme, which should include one particulate instrument to monitor PM10 and preferably PM2.5 specifically at the problem areas shown by the passive sampling campaign at the residential areas. Handheld sampling instruments not only allows for sampling in the 8 main wind directions, but also on-site sampling down-wind of potential dust sources to quantify and determine impacts that need to be managed. It is advised to conduct this sampling on a monthly basis but also when the need arise during periods of elevated dust concentrations being emanated from the site.

31.1.7 Environmental Noise Monitoring Plan

Frequency and locality:

- Quarterly noise measurements to be conducted at For R1 (Dithabaneng community) and R3 (Mphahlele 4 community).
- The Environmental measurements should be conducted at I&AP's i.e., farmsteads, receptors, communities. Should the receptors be relocated, the measurement locality be investigated to be removed.
- Monitoring at the plant footprint boundary needs to be conducted. There are receptors at the plant boundary, and the noise spill over extent into neighbouring properties must be assessed.

- The measurements should be conducted prior to any phase to ensure baseline findings. Measurements should further be conducted during all phases including construction, operational and closure phases.

EMPr Monitoring Programme:

- Measurements should be conducted in terms of LAeq equivalent values (impulse), with statistical and octave data logged (if uncertain about LAeq or due to limitations). Meteorological (wind) conditions should be logged. International (fast) measurements could be considered for comparison with the International Finance Corporation requirements (if required).
- Where feasible longer term (+24 hours) unattended or 10-minute measurements should be attempted to represent a maximum capacity of evaluated scenario, and at/near receptors (or project footprint).
- The quarterly measurement report should be reviewed after the first 2 years of monitoring.
- Reporting should be compiled and submitted to the relevant authorities. The ToR of the report should include SANS10103:2008 methodologies in it, with the Noise Control Regulations limits applied.
- Reports should be made available to receptors with the frequency and platform decided by the project team.
- Each measurement should be conducted during a “worst-case scenario” (identify, discuss operations, ensure what is been measured is relevant for a moderate operational protocol or higher), and to minimise limitations of measuring only every quarterly period.

Target Criterion:

- The methodology as proposed by SANS10103:2008 should be used. Compliance with the Noise Control Regulations should be met (no increase of +7dBA from identified Rating level of 50/40 dBA day/night).
- The boundary of the property/farm portion/mining rights area should not be exceeded by 61 dBA 24 hour or similar (controlled zone).

31.2 ENVIRONMENTAL MONITORING AND AUDITING

Department of Environmental Affairs defines environmental auditing as “a process whereby an organisation’s environmental performance is tested against its environmental policies and objectives.” Monitoring and auditing is an essential environmental management tool which is used to assess, evaluate and manage environmental and sustainability issues:

In order to ensure that the objectives of sustainable development and integrated environmental management are met and in order to obtain data which can inform continuous improvement of environmental practices at the site (adaptive management), monitoring and reporting will be an essential component of the proposed operations.

Monitoring and management actions associated with the project are contained in the section above as well as in the various specialist reports associated with this project. This section provides a summary of the critical monitoring aspects per specific environmental field.

31.3 GENERAL MONITORING AND MANAGEMENT

The appointment of a suitably qualified on-site Environmental Control Officer (ECO) is essential to the successful implementation of this project, although this role can be fulfilled by the SHE Representative. The ECO will be responsible for the implementation of the EMP, applicable environmental legislation and any stipulations/conditions set by the relevant competent authorities (including but not limited to the DMR and DWS). The Environmental officer will conduct formal monthly site inspections and conduct an internal annual audit during the construction and operational phase.

31.3.1 Specific Monitoring Requirements

Monitoring of the proposed development (both on site and where appropriate in the surrounding environments) should be considered a high priority and should be conducted in accordance with the relevant specialist recommendations as summarised below:

31.3.2 Monitoring Protocol

It is essential that during the construction and operational phase of the proposed development that the monitoring of certain elements are carried out to ensure compliance with regulatory bodies. A monitoring protocol for both the construction phase and the operational phase will be required. The monitoring only includes those activities identified in the EMP and excludes any monitoring that should take place according to the water use license if and when it will be authorised.

31.3.3 Monitoring Requirements and Record Keeping

To ensure that the procedures outlined throughout the EMP are implemented effectively it will be necessary to monitor the implementation of the EMP and evaluate the success of achieving the objectives listed in the EMP. To ensure that all personnel on site are aware of their obligation to protect the environment, induction training will also include environmental awareness.

The audit procedure will include a Compliance audit, conducted by the Environmental Control Officer. Where the objectives of the EMP are not being met the reasons will be determined and remedial action or variation to the tasks will be recommended. Major residual effects shall be documented in a Non-Conformance Report, during the construction and operational phases. Follow-up audits will be conducted as per the audit protocol in the EMP.

Monitoring as described in Section 31.2 and Table 50 must be conducted.

31.3.3.1 Audit Protocol

It is essential that during the construction and operational phases of the proposed development, the monitoring and auditing of certain elements are carried out to ensure compliance with regulatory bodies. An Audit Protocol for both the construction phase and the actual operational phase will be required. The auditing only includes those activities identified in the EIA/EMP and excludes any auditing that should take place according to the water use license or any other legislative authorisation process if and when they will be authorised.

31.3.3.1.1 CONSTRUCTION PHASE

The following audits need to be completed (valid for this EMP):

- EMP compliance (on a weekly basis): to be checked by an on-site ECO, SHE representative or Environmental manager (EM).
- EMP compliance (on a annual basis): to be checked by an independent ECO and if all is inline with the current EMP as well.

31.3.3.1.2 OPERATIONAL PHASE

The following audits must be completed:

- Annual external environmental compliance audits (EIA/EMP annually during operations).

31.3.3.2 Environmental Incidents

An environmental incident is defined as any unplanned event that results in actual or potential damage to the environment, whether of a serious or non-serious nature. An incident may involve non-conformance with environmental legal requirements, the requirements of the EMP, or contravention of written or verbal orders given by the ECO or relevant authority.

In the event of any incident, an Environmental Incident Log should be completed and these reports should be kept on file by the Environmental Manager. Such reports should provide the following details:

- Date of the Incident (and time if relevant);
- Description of the nature of the incident (what happened);

- Explanation for current conditions (why it happened), responsible person, supporting photographs etc.
- Description of corrective actions taken.

Corrective action to mitigate the impact (appropriate to the nature and scale of the incident) should be conducted immediately and affected parties notified.

In the case of serious incidents or emergencies, the incident report should be sent to the relevant authority as soon as possible after the incident has been recorded.

31.3.3.2.1 WATER POLLUTION EMERGENCY INCIDENT

Water Pollution Emergency Incident is any accident /incident in which a substance pollutes or has the potential to pollute a water resource or a substance that has or is likely to have a detrimental effect on a water resource.

The responsible person who was in control of the substance involved in the incident at the time or responsible for the section the incident occurred will immediately inform the superior of the area where the incident occurred.

The information with regard to the incident is communicated to the Business Manager, SHEQ Manager and Security Personnel immediately by the superior of the area.

The SHEQ Manager and the General Manager must, as soon as reasonably practicable after obtaining the knowledge of the incident, (i.e. within 14 days) report to:

- DWS (Regional Manager);
- South African Police Services or relevant fire department; and
- The Catchment Management Agency.

The SHEQ Manager and crisis management team must

- Take all reasonable measures to contain and minimise the effects of the incident;
- Undertake clean-up procedures;
- Remedy the effects of the incidents; and
- Sample the water together with the responsible person of the area.

31.3.3.2.2 AIR POLLUTION EMERGENCY INCIDENTS

- Non-compliance with the air quality registration certificate condition and requirements.
- Record of any non-compliance is kept;
- The non-compliance with the certificate conditions will be reported telephonically, by fax or by e-mail to the Chief Air Pollution Control Officer as soon as possible but not later than 24 hours after violation will start to occur. The particulars of such violation, including details of measure is put in place to prevent it happening in the future, will be included respectively or in the weekly or monthly report;
- If the utilisation and/or efficiency of air pollution control fail to meet requirements as specified in the certificate, then the process is managed under emergency procedures until such time as it will be possible to operate in compliance with the conditions of this certificate; and
- Record is kept of periods of upset and abnormal emissions, e.g. off-gas vented directly to the atmosphere or excess thereof due to the faults or limited capacity of air pollution control equipment or limits for process parameters being exceeded, etc. as per requirements of Annexure II and Chief Air Pollution Control Officer is notified immediately should it occur.

31.3.3.3 Penalties and Fines for Non-Compliance or Misconduct

This EMP forms part of the contract agreement between the Client and the Principal contractor. As such, non-compliance with conditions of the EMP will amount to a breach of contract. Penalties will be issued directly to the contractor by the

applicant in the event of non-compliance to the EMP specifications. The issuing of a penalty will be preceded by a verbal warning by the applicant, as well as strict instruction in at least one monthly ECO report to rectify the situation. The ECO and applicant will communicate with regards to realistic time-frames for possible rectification of the contravention, and possible consequences of continued non-compliance to the EMP.

Penalties incurred do not preclude prosecution under any other law. Cost of rehabilitation and/or repair of environmental resources that were harmed by the actions of the contractor if such actions were in contravention of the specifications of the EMP will be borne by the contractor himself. Penalties may be issued over and above such costs. The repair or rehabilitation of any environmental damage caused by non-compliance with the EMP cannot be claimed in the Contract Bill, nor can any extension of time be claimed for such works. Penalty amounts shall be deducted from Certificate payments made to the Contractor.

The following categories of non-compliance are an indication of the severity of the contravention, and the fine or penalty amounts may be adjusted depending on the seriousness of the infringement.

- Category One: Acts of non-compliance that are unsightly, a nuisance or disruptive to adjacent landowners, existing communities, tourists or persons passing through the area.
- Category Two: Acts of non-compliance that cause minor environmental impact or localised disturbance.
- Category Three: Acts of non-compliance that affect significant environmental impact extending beyond point source.
- Category Four: Acts of non-compliance that result in major environmental impact affecting large areas, site character, protected species or conservation areas.

31.3.4 Environmental Awareness Plan

Environmental awareness training is critical for two primary reasons:

- a) The workforce must understand how they can play a role in achieving the objectives specified in the EMP; and
- b) The workforce must understand their obligations in terms of the implementation of the EMP and adherence to environmental-legislative requirements.

This environmental awareness plan is aimed at ensuring that employees, contractors, subcontractors and other relevant parties are aware of and able to meet their environmental commitments. This plan is to be updated on a yearly basis during the construction and operational phases of the project in light of operational changes, learning experiences and identified training needs.

All full-time staff and contractors are required to attend an induction session when they start, which session should include environmental aspects.

It is therefore recommended that the ECO/Environmental Manager be involved in induction training. The induction sessions may be modified / adapted based on the audience attending the specific session, but it should ensure that all employees gain a suitable understanding of:

- Environmental requirements of the project, and how these will be implemented and monitored;
- including each employee's responsibilities with respect to environmental issues;
- Contents and commitments of the EMP, including no-go areas, employee conduct, pollution prevention (prohibitions against littering, unauthorised fires, loud music, entry to adjacent properties, road conduct etc.);
- Environmentally sensitive areas on and around the proposed development sites, including why these are deemed important and how these are to be managed. Employees will also be made aware of protected species found on the site and how these are to be conserved, as well as alien invasive species potentially found on the site and how these should be managed; and
- Incident identification, remediation and reporting requirements: what constitutes an environmental incident (spillages, fire etc.) and how to react when such an incident occurs.

Environmental training will not be restricted to induction training sessions alone, but will be conducted on an on-going basis throughout the lifecycle of the project as and when required. Records are to be kept of the type of training given (matters discussed and by whom), date on which training was given and the attendees of each training session.

31.3.5 Indicate the Frequency of the Submission of the Performance Assessment Report

Yearly performance assessment reports are recommended.

31.4 ENVIRONMENTAL AWARENESS PLAN

31.4.1 Manner in Which the Applicant Intends to Inform Employees of Any Environmental Risk Which May Result From Their Work

The Holder will develop procedures for environmental awareness. This procedure will define the process for identifying and planning environmental training and awareness. It will pertain to all employees and contractors whose work may create a significant impact upon the environment. Personnel performing the tasks, which can cause significant environmental impacts shall be competent on the basis of appropriate education, training and/or experience.

Training records are maintained to identify the level of instruction needed by personnel whose jobs may create a significant impact on the environment.

Environmental awareness will be part of the induction programme that is compulsory to all new, part-time and transferred employees, as well as onsite contractors.

Three basic categories of training are required. The first is induction training, the second is environmental awareness training and the third is technical training. All people entering the site are required to complete the induction training.

31.5 MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT

Refer to Table 59 for the recommended mitigation measures to limit environmental impacts.

31.5.1.1 Objectives

The following requirements are relevant:

- The organisation shall establish, implement and maintain a procedure(s) to identify potential emergency situations and potential accidents that can have an impact(s) on the environment and how it will respond to them.
- The organisation shall respond to actual emergency situations and accidents and prevent or mitigate associated adverse environmental impacts.
- The organisation shall periodically review and, where necessary, revise its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations.
- The organisation shall also periodically test such procedures where practicable.

31.5.1.2 Identification of Environmental Risks

Environmental risks must be identified and procedures must be set in place to deal with potential environmental risks, which could include:

- Environmental emergency situations;
- Potential accidents that can have an impact on the environment; and
- General environmental ignorance that could lead to unnecessary pollution or disturbance to the environment.

Potential environmental risks identified on the Moeijelik Mine include:

- Petrochemical/chemical spillages;
- Hazardous material spillages;
- Uncontrolled emissions to the atmosphere;
- Fires;
- Tailings residue stockpiles (wet or dry) failures;
- Untreated effluent spillages;
- Explosions and natural disasters;
- Disturbance of sensitive ecological environments;
- Disturbance to heritage and cultural resources;
- Uncontrolled erosion; and
- Dissatisfaction of local communities / outrage of communities.

31.5.1.3 Risk Matrix

31.5.1.3.1 Risk Calculation

Exposure X Probability X Result (Consequence) = Risk Rating

31.5.1.3.2 Risk Reduction

Exposure X Probability X Result (Consequence after mitigation steps are implemented) = Risk Rating after Mitigation

31.5.1.3.3 Risk Level

- 400 < = Very High risk, discontinuation considered immediate correction required
- 200 to 400 = High risk, immediate correction required
- 70 to 200 = Medium / Substantial risk, mitigation required
- 20 to 70 = Low / Possible risk, mitigate when required
- >20 = Tolerable risk, report to Supervisor when complete

Probability Of Event Occurring	Risk	Exposure To Event	Risk
Almost Certain	10	Yearly	0.5
Has happened	6	Quarterly	1
Possible	3	Monthly	2
Heard of	1	Weekly	3
Unlikely	0.5	Daily	6
		Continuous	10
Result (Consequence)			Risk Rating
Catastrophic Environmental Impact Irreversible / regional degradation of the biophysical environment, biodiversity compromised on regional scale, formal complaints with clear expectations of corrective actions, impact on immediate and remote neighbours			100
Major Environmental Impact. Irreversible and localised degradation of the biophysical environment, biodiversity compromised on local scale, formal complaints with clear expectations of corrective actions, impact on immediate neighbours (level 3)			40
Very Serious Environmental Impact Irreversible and localised degradation of the biophysical environment, biodiversity compromised on local scale, formal complaints with clear expectations of corrective actions, impact on immediate neighbours (level 2)			15
Serious Environmental Impact Reversible and localised degradation of the biophysical environment, biodiversity not compromised, low-level complaints, no perceived expectations of corrective action(level 1)			7
Self-reversible impact within life of business. No reasonable cause for external complaints			3

Minor environmental incident. Very low impact on biophysical environment, No reasonable cause for external complaints	1
---	---

31.6 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The Financial Provision will be updated yearly as part of the annual liability assessment required by the MPRDA and the NEMA, once operations commence.

32 UNDERTAKINGS

The EAP,Red Kite Environmental Solutions (Pty) Ltd....., 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 at.....Pretoria.....on this...6th day ofApril 2021

Signature of EAP

Designation.....EAP

COMMITMENT/UNDERTAKING BY THE APPLICANT

I,, the undersigned and duly authorised thereto by the Mphahlele Community Development Trust undertake to adhere to the requirements and to the conditions as set out in the EMPR submitted to the Director: Mineral Development and approved on

.....

Signed at.....on this..... day

Signature of applicant

Designation

-END-