



Sibanye-Stillwater Kroondal Operations Marikana Platinum Mine

Draft Basic Assessment Report and Environmental Management Programme for the Proposed Infrastructure in Support of the Meccano Tailings Retreatment Project

November 2022

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Marikana Platinum Mine**

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Environmental Management Programme for the
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Meccano Tailings Retreatment Project**

November 2022

Project Ref: 406459

Prepared by: Kirthi Peramaul



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VERSION CONTROL

Alta van Dyk Environmental cc

Version: Draft

Approved by: Alta van Dyk

Signed:

Position: Environmental Specialist

Date: November 2022



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT BASIC ASSESSMENT REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT ACTIVITIES

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

NAME OF APPLICANT: Sibanye-Stillwater Kroondal Operations (Pty) Ltd Marikana Platinum Mine

PROJECT: Proposed Infrastructure in Support of the Meccano Tailings Retreatment Project

CONTACT PERSON: Madeleine Bornman

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DMRE Reference No: NW 30/5/1/2/2/113 MR

IMPORTANT NOTICE

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

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

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

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

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

OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process-

- a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- b) identify the alternatives considered, including the activity, location, and technology alternatives;
- c) describe the need and desirability of the proposed alternatives;
- d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine:
 - (i) The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
 - (ii) The degree to which these impacts-
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided or mitigated;
- e) Through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to
 - (i) identify and motivate a preferred site, activity and technology alternative;
 - (ii) identify suitable measures to manage, avoid or mitigate identified impacts; andidentify residual risks that need to be managed and monitored

Table of Contents

List of abbreviations	vii
PART A – Scope of Assessment and Basic Assessment Report	8
1 Project Information and description	8
1.1 Introduction and Background	8
1.2 Purpose of the report	8
2 Details of the applicant and EAP	9
2.1 Applicant details	9
2.2 Details of the EAP who prepared the report	9
2.3 Expertise of the EAP	9
2.3.1 Qualifications of the EAP.....	9
2.3.2 Summary of the EAP’s past experience	9
3 Location of activity.....	10
3.1 Location of overall activity.....	10
4 Description of the scope of the activity.....	14
4.1 Project Description.....	14
4.1.1 Sibanye-Stillwater Kroondal Operations.....	14
4.1.2 Project Infrastructure.....	14
4.2 Listed and specified activities.....	23
5 Policy and legislative context	26
6 Need and desirability of the project.....	31
6.1 Project Need.....	31
6.2 Project Desirability.....	31
6.2.1 National.....	31
6.2.2 Provincial.....	32
6.2.3 Local	32
7 Motivation for the overall preferred site, activities and technology alternative	34
8 Full description of the process followed to reach the proposed preferred alternatives within the site	34
8.1 Details of the development footprint alternatives considered	34
8.1.1 The property on which or location where it is proposed to undertake the activity	34
8.1.2 The type of activity to be undertaken.....	34
8.1.3 The design or layout of the activity	34
8.1.4 The technology to be used in the activity	35
8.1.5 The operational aspects of the activity.....	35
8.1.6 The option of not implementing the activity	35
9 Details of the public participation process followed	37
9.1 Pre-application.....	37
9.2 Identification of Interested and Affected Parties	Error! Bookmark not defined.

9.3	<i>Project announcement</i>	37
9.4	<i>Newspaper Advert</i>	37
9.5	<i>Availability of the Draft Basic Assessment Report</i>	37
9.6	<i>Final Basic Assessment Report</i>	38
9.7	<i>Decision</i>	38
10	Environmental attributes of the project area	39
10.1	<i>Climate</i>	39
10.2	<i>Topography</i>	39
10.3	<i>Soils and land capability</i>	39
10.3.1	Land Types	39
10.3.2	Soil Properties.....	40
10.3.3	Chemical Soil Properties	41
10.3.4	Land Capability.....	42
10.3.5	Calculated Land Capability.....	42
10.4	<i>Biodiversity</i>	44
10.4.1	Vegetation.....	45
10.4.2	North West Biodiversity Sector Plan.....	46
10.4.3	Habitat Units	47
10.4.4	Protected Species	50
10.4.5	Habitat Summary and Sensitivity.....	50
10.4.6	Fauna	51
10.5	<i>Surface water</i>	51
10.5.1	Catchment.....	51
10.5.2	Freshwater Ecosystem Priority Area.....	52
10.5.3	Wetland Delineation	52
10.5.4	Wetland Present Ecological State	55
10.5.5	Wetland Functional Assessment.....	57
10.5.6	Wetland Importance and Sensitivity.....	58
10.5.7	Functional Importance of the Riparian Habitat	58
10.6	<i>Heritage</i>	60
10.7	<i>Palaeontological Features</i>	61
10.8	<i>Socio-economic setting</i>	62
10.8.1	Free Basic Water	63
10.8.2	Sanitation.....	63
10.8.3	Electricity	63
10.9	<i>Description of current land uses</i>	63
10.10	<i>Description of specific environmental features and infrastructure on site</i>	64
11	Impacts and risks identified	65
11.1	<i>National Environmental Screening Tool</i>	65
11.1.1	Specialist Assessments Identified	65
11.2	<i>Methodology used in determining the significance of environmental impacts</i>	66
11.3	<i>Positive and negatives impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that me by affected</i>	68
11.3.1	Positive Impacts	68

11.3.2	Negative Impacts	68
11.4	Possible mitigation measures that could be applied and the level of risk	68
11.5	Motivation where no alternatives were considered	69
11.6	Statement motivating the alternative development location within the overall site	69
11.7	Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site through the life of the activity.....	69
11.8	Assessment of each identified potentially significant impact and risk	69
12	Summary of specialist report findings	78
13	Environmental impact statement.....	83
13.1	Summary of key findings.....	83
13.2	Final site map.....	84
14	Proposed Impact management objectives and outcomes for inclusion in the EMPr.....	84
14.1	Proposed management objectives and outcomes for environmental and socio-economic impacts	84
15	Aspects for inclusion as conditions of the Authorisation	84
16	AssumptionS, uncertainties, limitationS and gaps in knowledge	85
17	Reasoned opinion as to whether the proposed activity should or should not be authorised	85
17.1	Reasons why the activity should be authorised or not.....	85
17.2	Conditions that must be included in the authorisation.....	86
18	Period for which authorisation is required	86
19	Undertaking	86
20	Financial Provision	86
20.1	Method to derive the financial provision	86
20.2	Confirm that the amount can be provided from operating expenditure	86
21	Specific information required by the competent authority	86
22	Other matters required in terms of Sections24(4)(A) of the Act	86
PART B – ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT.....		87
1	DETAILS OF THE EAP.....	88
2	Description of the aspects of the activity	88
3	Composite map.....	88
4	Description of the impact management objectives including management statement	90
4.1	Determination of closure objectives	90
4.2	Volumes and rate of water use for the operation.....	90
4.3	Has a Water Use Licence been applied for?.....	90

5	Impacts to be mitigated in their respective phases	91
6	Financial provision	99
6.1	<i>Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the regulation</i>	99
6.2	<i>Confirmation specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties</i>	99
6.3	<i>Provide a rehabilitation plan</i>	99
6.4	<i>Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives</i>	100
6.5	<i>Calculate and state the quantum of the financial provision required to manage the rehabilitate the environment in accordance with the applicable guideline</i>	100
6.6	<i>Confirmation that the financial provision will be provided</i>	100
7	Mechanisms for monitoring compliance and performance against the EMPr	101
8	Frequency of the submission of the performance assessment/environmental audit report	102
9	Environmental awareness plan	102
9.1	<i>Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work</i>	102
9.2	<i>Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment</i>	102
10	Specific information required by the Competent Authority	103
11	Undertaking	103
12	References	104
Appendix A: Curriculum vitae of the EAP		105
Appendix B: Screening tool report		106
Appendix C: maps		107
Appendix D: public participation		108
Appendix D1: minutes of pre-application meeting		109
Appendix D2: comments and response report		110
Appendix D3: stakeholder register		111
Appendix D4: background information document		112
Appendix D5: notification emails		113
Appendix D6: site notice		114
Appendix D7: newspaper advert		115
Appendix D8: comments recieved		116

Appendix E: Specialist studies	117
Appendix E1: Vegetation assessment	118
Appendix E2: Solis and Agricultural assessment	119
Appendix E3: Heritage Impact Assessment	120
Appendix E4: Wetland Delineation and Assessment	121
Appendix F: Design Layout	122
Appendix G: Financial Provision	123

List of figures

Part A: Scope of Assessment and Basic Assessment Report

Figure 3-1: Locality Map	12
Figure 3-2 Property Description Map	13
Figure 4-1: Proposed Pipelines	16
Figure 4-2: Picture showing an example of a Steel HDPE lined pipeline	17
Figure 4-3: Typical Cross Section of the Proposed Pipelines	17
Figure 4-4: 3D view of a Typical Watercourse Crossing Conveyor Gantry with Concrete Foundations and Piers	17
Figure 4-5: Meccano Plant Plot Plan	18
Figure 4-6: Dangerous Goods Storage Area.....	20
Figure 4-7: Reagents Images.....	20
Figure 4-8: Diesel and Hydraulic Oil Images	21
Figure 4-9: Proposed Pump Station Layout	21
Figure 4-10: Proposed Access Road	22
Figure 6-1 Operations in terms of the Meccano Project.....	33
Figure 10-1: Rustenburg Monthly Temperatures, & Precipitation (Meteoblu, 2022)	39
Figure 10-2: Land Types of the Study Area (TerraAfrica, 2022).....	40
Figure 10-3: Soil Classification Map (TerraAfrica, 2022).....	41
Figure 10-4: Land capability classification of the Meccano Tailings Retreatment Project. (data source: DALRRD, 2016) (TerraAfrica, 2022).....	42
Figure 10-5: Land Capability of the Study Area (TerraAfrica, 2022)	43
Figure 10-6: Location of field crop boundaries around the Meccano Tailings Treatment Project (data source: DALRRD, 2019) (TerraAfrica, 2022).....	44
Figure 10-7: Grazing capacity of the Meccano Tailings Treatment Project (data source: DALRRD, 2018) (TerraAfrica, 2022).....	44
Figure 10-8: The Study Area in Relation to the Vegetation Types (TBC, 2022)	46
Figure 10-9: The Study Area in Relation to the Biodiversity Sector Plan (TBC, 2022)	47
Figure 10-10: Habitats within the Study Area (TBC, 2022)	48
Figure 10-11: Transformed area within the Study Area	48
Figure 10-12: Transformed Area within the Study Area.....	48
Figure 10-13: Disturbed habitat within the Study Area.....	49
Figure 10-14: Disturbed habitat within the Study Area.....	49
Figure 10-15: Wetland Habitat within the Study Area	49
Figure 10-16: Location of the Protected Tree	50
Figure 10-17: The Sensitivity of the Study Area (TBC, 2022)	51
Figure 10-18: Map Showing the Study Area in Relation to the Quaternary Catchment (WCS Scientific. 2022)	52
Figure 10-19: Map of the delineated and classified wetlands, riparian habitat, and watercourses within the study area (WCS Scientific, 2022).....	53

Figure 10-20: Channelled and Unchannelled Valley Bottom Wetlands on site	54
Figure 10-21: River HGM units classified on site dominated by smaller, seasonal channels with limited or poorly developed riparian fringes (WCS Scientific, 2022).....	55
Figure 10-22: Map showing the results of the PES assessment (WCS Scientific, 2022)	56
Figure 10-23: Wetland Importance and Sensitivity Assessment (WCS Scientific, 2022)	58
Figure 10-24: Watercourse crossing points	59
Figure 10-25: Map Showing the Location of the Graveyard	60
Figure 10-26: Graveyard (GY01) situated on the Northern Shoulder of the Haul Road	61
Figure 10-27: Paleontological Sensitivity of the Study Area as Indicated on the SAHRA Palaeontological Sensitivity Map.....	62
Figure 10-28: Map Showing the Landuse Mapping Results for the Larger Wetland Catchment (WCS Scientific, 2022)	64

Part B: Environmental Management Programme

Figure 3-1: Composite Map	89
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List of tables

Part A: Scope of Assessment and Basic Assessment Report

Table 2-1 Applicant details	9
Table 2-2 EAP Details	9
Table 3-1 Description of the property	10
Table 4-1: Pipeline Description	15
Table 4-2: Details of Material to be stored.....	19
Table 4-3: Details of the Proposed Access Road.....	21
Table 4-4 Listed and specified activities	24
Table 5-1 Policy and Legislative Context.....	26
Table 6-1 ESG opportunities for Sibanye-Stillwater (SS, 2021).....	31
Table 8-1 Below ground tailings pipelines	34
Table 8-2 Above ground tailings pipelines (covered with soil)	35
Table 10-1: Soil Chemical Results (TerraAfrica, 2022)	41
Table 10-2: Spatial Features of the Study Area (TBC, 2022)	44
Table 10-3: Rating Scale Used for the PES Assessment	56
Table 10-4: Results of the WET-EcoServices Assessment for the Wetland HGM type	57
Table 11-1: Environmental Sensitivity of the Project Area	65
Table 11-2: Specialist studies required as per the Screening Tool Report and relevant motivations	65
Table 11-3: Scale utilised for the evaluation of the Environmental Risk rating.....	66
Table 11-4: Scale used for the evaluation of the Environmental Significance Ratings	67
Table 11-5 Assessment of Identified Potential Impacts of the Proposed Project During the Construction Phase	70
Table 11-6: Assessment of Identified Potential Impacts of the Proposed Project During the Operational Phase.....	75
Table 12-1: Summary of Specialist Report Findings	78
Table 13-1: Summary of significance of the Potential Impacts of the Proposed Project	83

Part B: Environmental Management Programme

Table 5-1: Measures to Manage the Environment by the Undertaking of any Listed Activity Including Management Outcomes.....	91
Table 7-1 Mechanisms for monitoring compliance with and performance assessment against the Environmental Management Programme	101

LIST OF ABBREVIATIONS

Abbreviation/Symbol	Description
BAR	Basic Assessment Report
BID	Background Information Document
BRP	Bio Regional Plan
CA	Competent Authority/Authorities
CBA	Critical Biodiversity Area
CRR	Comments and Response Report
DBAR	Draft Basic Assessment Report
DWS	Department of Water and Sanitation
DMRE	Department of Mineral Resources and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EMPr	Environmental Management programme
ESA	Ecological Support Area
Ha	Hectare
MRPDA	Mineral and Petroleum Resources Development Act 2002 (Act No
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
NWA	National Water Act
PPP	Public Participation Process
TSF	Tailings Storage Facility
WULA	Water Use License Application

PART A – SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1 PROJECT INFORMATION AND DESCRIPTION

1.1 Introduction and Background

Sibanye-Stillwater owns the Kroondal Operations (Pty) Ltd, Marikana Mine located near Rustenburg, North West Province, approximately 140km west from Johannesburg. Sibanye-Stillwater produces Platinum Group metals (PGMs) such as platinum (Pt), palladium (Pd), rhodium (Rh), iridium (Ir), ruthenium (Ru), osmium (Os) and gold (Au). Other refined by-products that are produced include silver, copper, nickel, chromite, and cobalt sulphate, as well as sulphuric acid and sodium sulphate. It is the intention of Sibanye-Stillwater to roll-out the Meccano Tailings Retreatment project through the Meccano Processing Plant (old Marikana plant) which includes the recovery of fine chrome and PGMs from various tailings streams and deposits from Sibanye-Stillwater sites within the region. This project forms part of the long-term strategic planning for Sibanye-Stillwater's tailings management.

To ensure that the mine is ready to accommodate the proposed retreatment and reclamation process as well as to optimise the existing processes, Sibanye-Stillwater intends to construct various pipelines for the conveyance of tailings and return water, associated booster pump station, access road, as well as the storage and handling of material that contain components listed as dangerous goods in terms of South African National Standards (SANS) 10234.

Alta van Dyk Environmental Consultants cc (AvDE) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the required environmental related applications for the proposed project. This Environmental authorisation application is limited to the construction and operation of the proposed pipelines and associated booster pump station, access road and storage of dangerous goods and not the retreatment and reclamation activities.

1.2 Purpose of the report

In terms of Section 38A of the Mineral and Petroleum Resources Development Act (28 of 2002) as amended, the Department of Mineral Resources and Energy (DMRE) is the responsible authority for the implementation of provisions of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) in respect to mining. The proposed activities are triggered due to the mining operations undertaken by Sibanye-Stillwater; hence the existing Mining Right reference NW 30/5/1/2/2/113 MR will be used for this Basic Assessment process and the DMRE is the Competent Authority in respect of the application for Environmental Authorisation.

This Basic Assessment Report (BAR) is in a format prescribed by the DMRE and has been compiled in support of the Environmental Authorisation process. The Draft BAR documents the steps undertaken during the Basic Assessment process to assess the significance of impacts and determine measures to mitigate the potential impacts identified and enhance the benefits (or positive impacts) of the proposed project. The report presents the findings of the impact assessment and a description of the public participation undertaken that forms part of the Basic Assessment process. More specifically, the objectives of this BAR are to:

- Inform the stakeholders about the proposed project and the basic assessment process followed;
- Obtain contributions from stakeholders (including the applicant, relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented and addressed;
- Assess in detail the potential environmental and socio-economic impacts of the project;
- Identify environmental and social mitigation measures to address the impacts assessed; and
- Produce a BAR that will assist the competent authority, the DMRE to decide whether (and under what conditions) to authorise the proposed project.

2 DETAILS OF THE APPLICANT AND EAP

2.1 Applicant details

The applicant for the project is Sibanye-Stillwater Western Platinum Limited. Details are provided in **Table 2-1**.

Table 2-1 Applicant details

Name	Sibanye-Stillwater Kroondal Operations (Pty) Ltd Marikana Platinum Mine
Address:	Hex River Complex, Old Mine Road Rustenburg, 0350
Responsible person:	Ms Madeleine Bornman
Email	madeleine.bornman@sibanyestillwater.com
Contact number:	014 495 0761

2.2 Details of the EAP who prepared the report

Table 2-2 provides details of the EAP that prepared the report.

Table 2-2 EAP Details

Name of practitioner	Alta van Dyk Environmental Consultants cc
Contact Person	Mrs Kirthi Peramaul
Tel No	012 940 9457
Fax No	086 634 3967
Email address	kirthi@avde.co.za / alta@avde.co.za

2.3 Expertise of the EAP

2.3.1 Qualification s of the EAP

Mrs Peramaul holds a BSc (Hons) degree in Environmental Monitoring and Modelling. She is currently registered with the South African Council of Natural Scientific Professions (SACNASP) as a Professional natural Scientist (Registration No 400012/18: Environmental Science) and as a Registered Environmental; Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (Registration No 2020/1537). The EAP's CV is included as **Appendix A**.

2.3.2 Summary of the EAP's past experience

Mrs Peramaul is an Environmental Assessment Practitioner with twelve (13) years of professional experience in the water and environmental sector. Kirthi specialises in environmental authorisations, environmental compliance monitoring, environmental management plans, water use authorisation, stakeholder engagement, risk assessments and blue and green drop auditing. She has been involved in projects related to Waste Management, Linear Infrastructure, as well as Mixed-Use developments. Her contribution as an auditor in South Africa's incentive-based regulation programmes (blue and green drop) allowed her to be part of water safety planning (water treatment) and the wastewater risk abatement planning processes of various municipalities within South Africa.

3 LOCATION OF ACTIVITY

3.1 Location of overall activity

The proposed project is situated approximately 5km west of the Marikana Town within Wards 32 and 45 of the Rustenburg Local Municipality. A locality map is provided in **Figure 3-1**. A description of the property on which the proposed project is located is provided in **Table 3-1**.

Table 3-1 Description of the property

Farm name	Farm Rooikoppies 297 (Portions 1, 122, 221, 248, 249, 250, 278, 279, 280,283, RE/281, RE/282, RE/329, & RE/328 Farm 342 (Portions 89, 42, 52, 57, 59, 71, 325, 272, 300, 43, 55, 95, 61, 63, 73, 340, 121, 17, 271, 273, 94, 115) Farm Spruitfontein 341 (Portions 6, 101, RE/5)																																					
Application area (ha)	Total Application area: approximately 8 ha																																					
Magisterial district	District Municipality – Bojanala Platinum District Municipality Local Municipality – Rustenburg Local Municipality																																					
Distance and direction from nearest town	Approximately 5km west of Marikana Town																																					
21 digit Surveyor General Code for each farm portion	<table border="1"> <tr> <td>Portion 279 of the Farm Rooikoppies 297</td> <td>TOJQ0000000029700279</td> </tr> <tr> <td>Portion 278 of the Farm Rooikoppies 297</td> <td>TOJQ0000000029700278</td> </tr> <tr> <td>Portion 122 of the Farm Rooikoppies 297</td> <td>TOJQ0000000029700122</td> </tr> <tr> <td>Portion 248 of the Farm Rooikoppies 297</td> <td>TOJQ0000000029700248</td> </tr> <tr> <td>Portion 249 of the Farm Rooikoppies 297</td> <td>TOJQ0000000029700249</td> </tr> <tr> <td>Portion 250 of the Farm Rooikoppies 297</td> <td>TOJQ0000000029700250</td> </tr> <tr> <td>Portion 89 of the Farm 342</td> <td>TOJQ0000000034200089</td> </tr> <tr> <td>Portion 42 of the Farm 342</td> <td>TOJQ0000000034200042</td> </tr> <tr> <td>Portion 52 of the Farm 342</td> <td>TOJQ0000000034200052</td> </tr> <tr> <td>Portion 57 of the Farm 342</td> <td>TOJQ0000000034200057</td> </tr> <tr> <td>Portion 59 of the Farm 342</td> <td>TOJQ0000000034200059</td> </tr> <tr> <td>Portion 71 of the Farm 342</td> <td>TOJQ0000000034200071</td> </tr> <tr> <td>Portion 325 of the Farm 342</td> <td>TOJQ0000000034200325</td> </tr> <tr> <td>Portion 272 of the Farm 342</td> <td>TOJQ0000000034200272</td> </tr> <tr> <td>Portion 300 of the Farm 342</td> <td>TOJQ0000000034200300</td> </tr> <tr> <td>Portion 43 of the Farm 342</td> <td>TOJQ0000000034200043</td> </tr> <tr> <td>Portion 55 of the Farm 342</td> <td>TOJQ0000000034200055</td> </tr> <tr> <td>Portion 95 of the Farm 342</td> <td>TOJQ0000000034200095</td> </tr> </table>		Portion 279 of the Farm Rooikoppies 297	TOJQ0000000029700279	Portion 278 of the Farm Rooikoppies 297	TOJQ0000000029700278	Portion 122 of the Farm Rooikoppies 297	TOJQ0000000029700122	Portion 248 of the Farm Rooikoppies 297	TOJQ0000000029700248	Portion 249 of the Farm Rooikoppies 297	TOJQ0000000029700249	Portion 250 of the Farm Rooikoppies 297	TOJQ0000000029700250	Portion 89 of the Farm 342	TOJQ0000000034200089	Portion 42 of the Farm 342	TOJQ0000000034200042	Portion 52 of the Farm 342	TOJQ0000000034200052	Portion 57 of the Farm 342	TOJQ0000000034200057	Portion 59 of the Farm 342	TOJQ0000000034200059	Portion 71 of the Farm 342	TOJQ0000000034200071	Portion 325 of the Farm 342	TOJQ0000000034200325	Portion 272 of the Farm 342	TOJQ0000000034200272	Portion 300 of the Farm 342	TOJQ0000000034200300	Portion 43 of the Farm 342	TOJQ0000000034200043	Portion 55 of the Farm 342	TOJQ0000000034200055	Portion 95 of the Farm 342	TOJQ0000000034200095
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	Portion 340 of the Farm 342	TOJQ0000000034200340
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	Portion 17 of the Farm 342	TOJQ0000000034200017
	Portion 271 of the Farm 342	TOJQ0000000034200271
	Portion 273 of the Farm 342	TOJQ0000000034200273
	Portion 94 of the Farm 342	TOJQ0000000034200094
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	Portion 1 of the Farm Rooikoppies 297	TOJQ0000000029700001
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	Remaining extent of Portion 282 of the Farm Rooikoppies 297	TOJQ0000000029700282
	Remaining Extent of Portion 329 of the Farm Rooikoppies 297	TOJQ0000000029700329
	Portion 280 of the Farm Rooikoppies 297	TOJQ0000000029700280
	Remaining Extent of Portion 328 of the Farm Rooikoppies 297	TOJQ0000000029700328
	Portion 6 of the Farm Spruitfontein 341	TOJQ0000000034100006
	Remaining Extent of Portion 5 of the Farm Spruitfontein 341	TOJQ0000000034100005
	Portion 101 of the Farm Spruitfontein 341	TOJQ0000000034100101
	Portion 115 of the Farm 342	TOJQ0000000034200115

A property map showing all potentially affected properties is provided in Error! Reference source not found.. The surface ownership of the potentially affected properties vests with Sibanye-Stillwater.

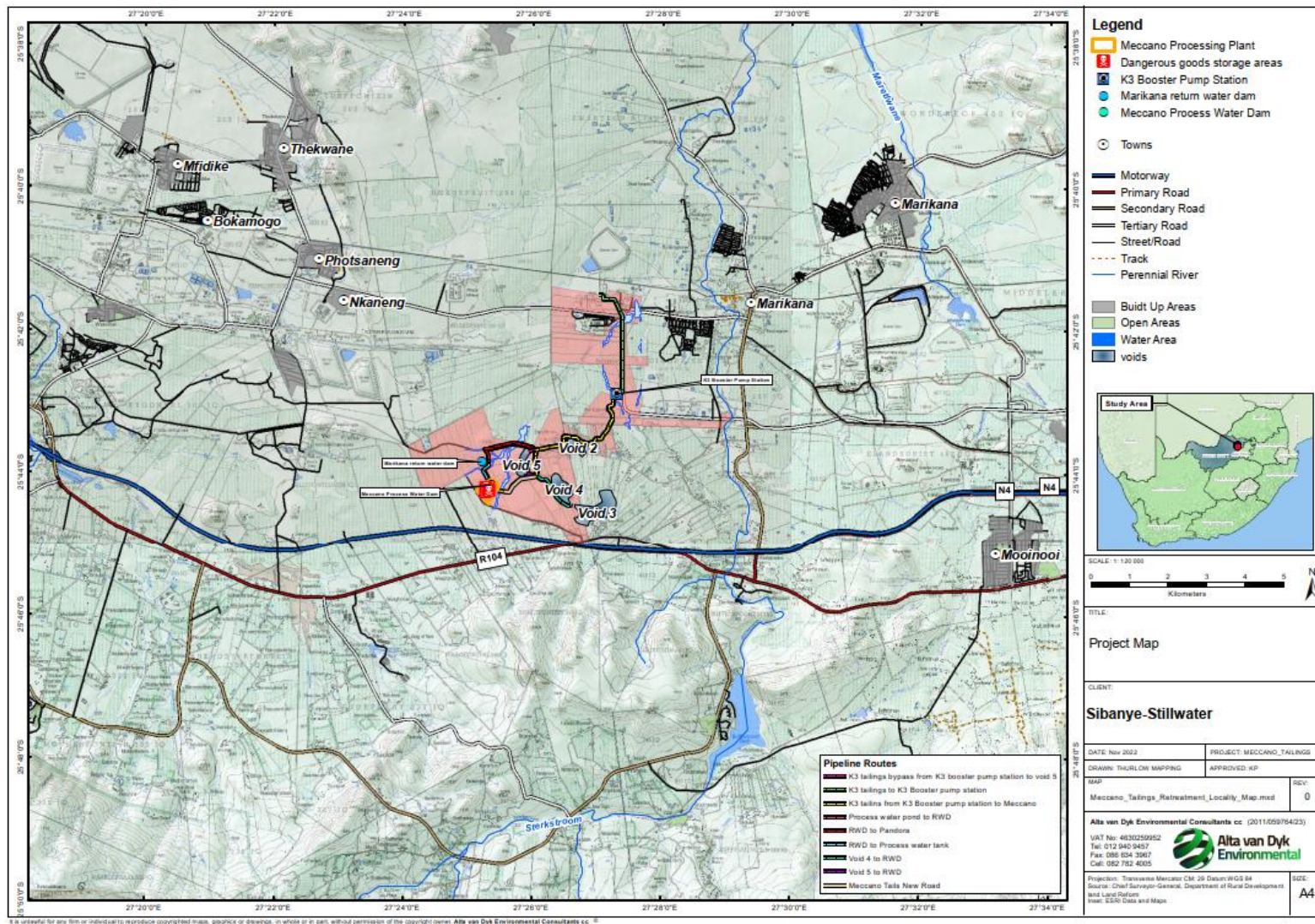


Figure 3-1: Locality Map

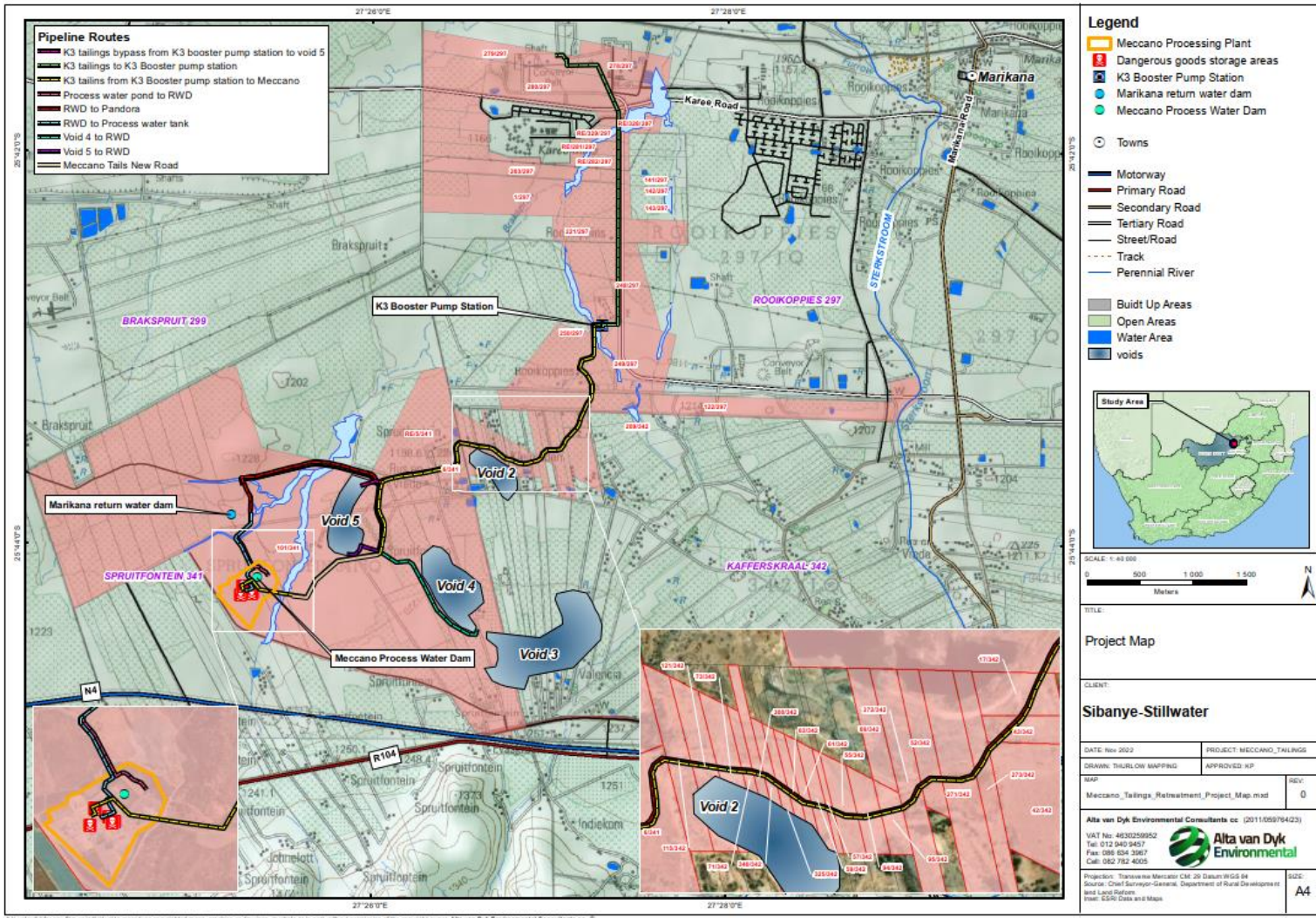


Figure 3-2 Property Description Map

4 DESCRIPTION OF THE SCOPE OF THE ACTIVITY

4.1 Project Description

4.1.1 Sibanye-Stillwater Kroondal Operations Marikana Platinum Mine

Sibanye-Stillwater is a producer of Platinum Group Metals (PGMs). These metals are essential for many industrial applications, especially catalytic converters for internal combustion engine emissions, as well as their widespread use in jewellery and investment. Saleable by-products produced from PGM mining include Gold, Copper, Nickel, Chrome and Cobalt. The proposed project spans over two operations namely the Kroondal Marikana Platinum Mine and Western Platinum Limited. As previously indicated the applicant for the proposed project is Kroondal Operations Marikana Platinum Mine.

The Kroondal Marikana Platinum Mine operations is an existing opencast and underground mine which was previously owned by Aquarius Platinum South Africa (AQPSA). In 2016 Sibanye Stillwater Marikana Platinum Mine (Pty) Ltd (Marikana Mine) signed a Sale and Purchase Agreement (SPA), to acquire assets from the AQPSA Marikana Mine. Since the acquisition of the operations in 2016, no active mining has taken place. The Kroondal Marikana Platinum Mine operations comprised of the following:

- Mined out open pits (West West Pit, Voids 1, 2, 3, & 4). The voids are now referred to as the main pit;
- Current underground mining operations with five decline sections, namely the 1,2, M4, M5 and M6 shafts;
 - Decommissioning activities at 1, 2 and M6 Shaft have commenced
 - M4 shaft is covered under the Pooling and Sharing Agreement (PSA)
 - M5 shaft is under care and maintenance
- A concentrator plant and an associated chrome spiral plant
- A Tailings Storage Facility
- A Dense Media Separation (DMS) waste stockpile
- Seven ventilation shafts

As mining activities have ceased at the operations, it is the intention of Sibanye-Stillwater to roll-out the Meccano Tailings Retreatment project as well as the Marikana In-Pit Rehabilitation project by rehabilitating the opencast areas (voids) using the retreated tailings. Sibanye Stillwater intends to recover fine chrome and PGM's from various tailings stream and deposits from Sibanye-Stillwater tailings management. The Meccano project focusses on the recovery of chrome and PGM's from live tailings material from the Kroondal Operations (K2) and Karee (K3B) Concentrators as well as the re-mining of the dormant Tailings Storage Facilities (TSF's) where residual chrome and PGM tailings can be further processed before being deposited into a final tailing's facility at the Marikana main pit (Voids). The TSF's are K1, K150, and K2 (Kroondal Operations) and Marikana TSF (Kroondal Operations Marikana Platinum Mine).

4.1.2 Project Infrastructure

This application is associated with infrastructure to support the tailings retreatment and in-pit rehabilitation project. The associated project infrastructure is detailed in below.

4.1.2.1 Pipelines

The tailings that will be conveyed in the pipelines consist of process effluents that are generated in a mine processing plant. The unrecoverable and uneconomic minerals, organics and process water are discharged, normally as tailings. The tailings retreatment project includes the reprocessing of such process effluent at the Meccano plant.

The Meccano processing plant aims to extract chrome and PGM concentrate via a floatation metallurgical process. The final tailings material from the Meccano plant is conveyed to Voids 4 and 5 for final deposition.

In order to optimise process water management and distribution, a network of return water pipelines is proposed for re-use in the operations (Karee Operations and Meccano processing plant).

The proposed project includes the construction and operation of three (3) tailings pipelines and five (5) return water lines (Figure 4-1).

Table 4-1: Pipeline Description

Pipeline Reference	Length (km)	Coordinates	Design Specification
Tailings Pipeline			
K3 concentrator to the K3 booster pump Station	3.12	Start: 25°41'30.46"S; 27°27'1.38"E Middle: 25°42'18.27"S; 27°27'22.67"E End: 25°42'53.29"S; 27°27'17.92"E	Throughput capacity: 75l/s Diameter: 187.1mm Steel HDPE lined pipe
K3 booster pump station to the Meccano Processing Plant	5.75	Start: 25°42'53.53"S; 27°27'17.47"E Middle: 25°43'36.87"S; 27°26'24.85"E End: 25°44'14.26"S; 27°25'15.75"E	Throughput capacity: 75l/s Diameter: 187.1mm Steel HDPE lined pipe
K3 bypass line to void 5	0.21	Start: 25°43'41.10"S; 27°26'3.18"E Middle: 25°43'41.32"S; 27°25'59.48"E End: 25°43'42.27"S; 27°25'56.13"E	Throughput capacity: 75l/s Diameter: 187.1mm Steel HDPE lined pipe
Return Water Pipelines			
Void 4 to Marikana Return Water Dam	3.44	Start: 25°44'11.30"S; 27°26'21.88"E Middle: 25°44'2.29"S; 27°26'2.77"E End: 25°43'42.24"S; 27°25'16.70"E	Throughput capacity: 49l/s Diameter: 229.1mm HDPE pipeline
Void 5 to Marikana Return Water Dam	2.45	Start: 25°43'55.41"S; 27°25'47.83"E Middle: 25°43'39.75"S; 27°26'0.31"E End: 25°43'42.24"S; 27°25'16.70"E	Throughput capacity: 88l/s Diameter: 229.1mm HDPE pipeline
Marikana Return Water Dam to the Pandora Tank	5.24	Start: 25°43'50.25"S; 27°25'19.92"E Middle: 25°43'36.02"S; 27°26'28.12"E End: 25°42'52.86"S; 27°27'19.24"E	Throughput capacity: 41.3l/s Diameter: 204.5mm HDPE pipeline
Marikana Return Water Dam to the Meccano Process Water Tank	0.98	Start: 25°44'10.20"S; 27°25'24.78"E Middle: 25°44'7.85"S; 27°25'19.68"E End: 25°43'57.64"S; 27°25'14.27"E	Throughput capacity: 85.5l/s Diameter: 257.7mm HDPE pipeline
Meccano process water dam to Meccano Return Water Dam	0.54	Start: 25°44'14.15"S; 27°25'17.55"E Middle: 25°44'7.90"S; 27°25'19.56"E End: 25°43'50.36"S; 27°25'19.96"E	Throughput capacity: 68.7l/s Diameter: 204.5mm HDPE pipeline



Figure 4-1: Proposed Pipelines

As provided in **Table 4-1** the return water pipelines are all proposed to be HDPE pipelines. Due to the potential hazardous nature of tailings, the tailings pipelines will be steel HDPE lined. This is an environmentally beneficial solution whereby the HDPE liner provides the steel pipe with greater strength and protection from corrosion and a second line of defence for preventing and controlling a hazardous event. An example on a steel HDPE lined pipeline is provided in **Figure 4-2**.



Figure 4-2: Picture showing an example of a Steel HDPE lined pipeline

For pipelines adjacent to existing roads a narrow 1m wide per pipe area will be cleared of vegetation, which will be windrowed to one side. The existing clay vegetation rich material which was left behind from the clearing operation will be placed on top of the pipes to protect them and allow revegetation of the area (**Figure 4-3**).

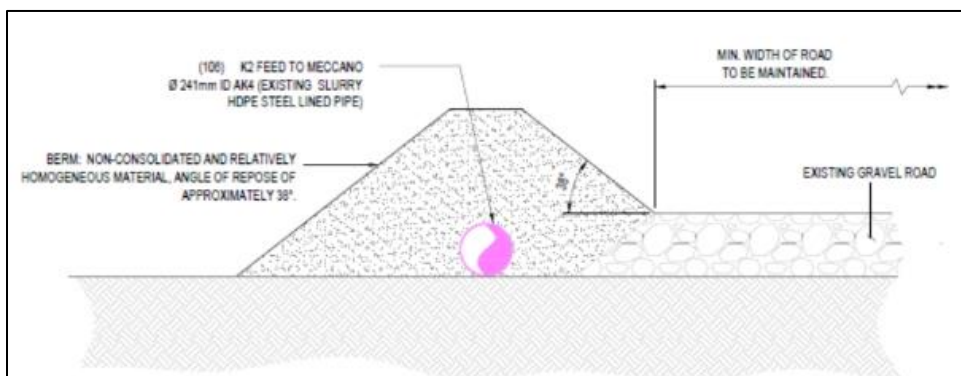


Figure 4-3: Typical Cross Section of the Proposed Pipelines

In instances where the pipeline crosses the watercourse, a previously designed steel gantry bridge which is supported by concrete piers with a gabion mattress protection will be utilised (**Figure 4-3**).

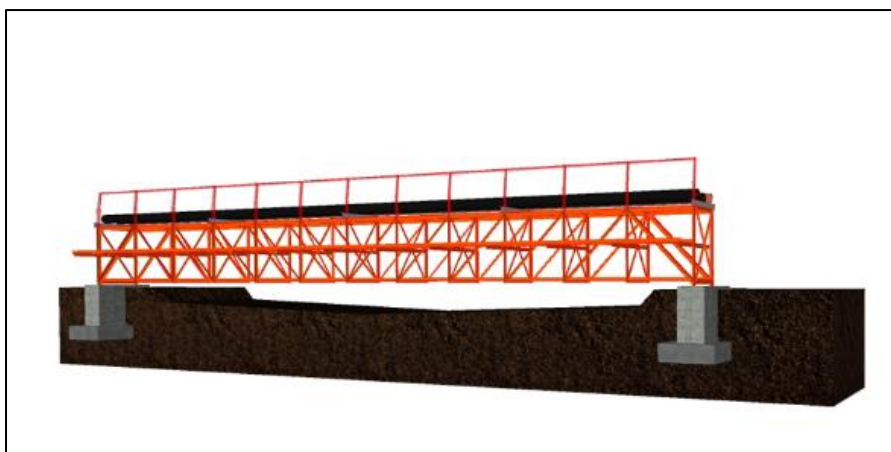


Figure 4-4: 3D view of a Typical Watercourse Crossing Conveyor Gantry with Concrete Foundations and Piers

4.1.2.2 Dangerous Goods Storage

Sibanye-Stillwater has identified the need for the storage of chemicals in support of tailings retreatment at the Meccano Plant. The Meccano plant previously known as the old Marikana Plant is existing and can be treated as a brownfield site as the plant was used as a processing plant in previous years when the mine was operational. Sections of the plant will be retrofitted to accommodate the retreatment activities. Details of the materials proposed to be stored and used at the Meccano plant are provided in **Table 4-2**. The plant plot plan of the Meccano plant is provided in **Figure 4-5**.

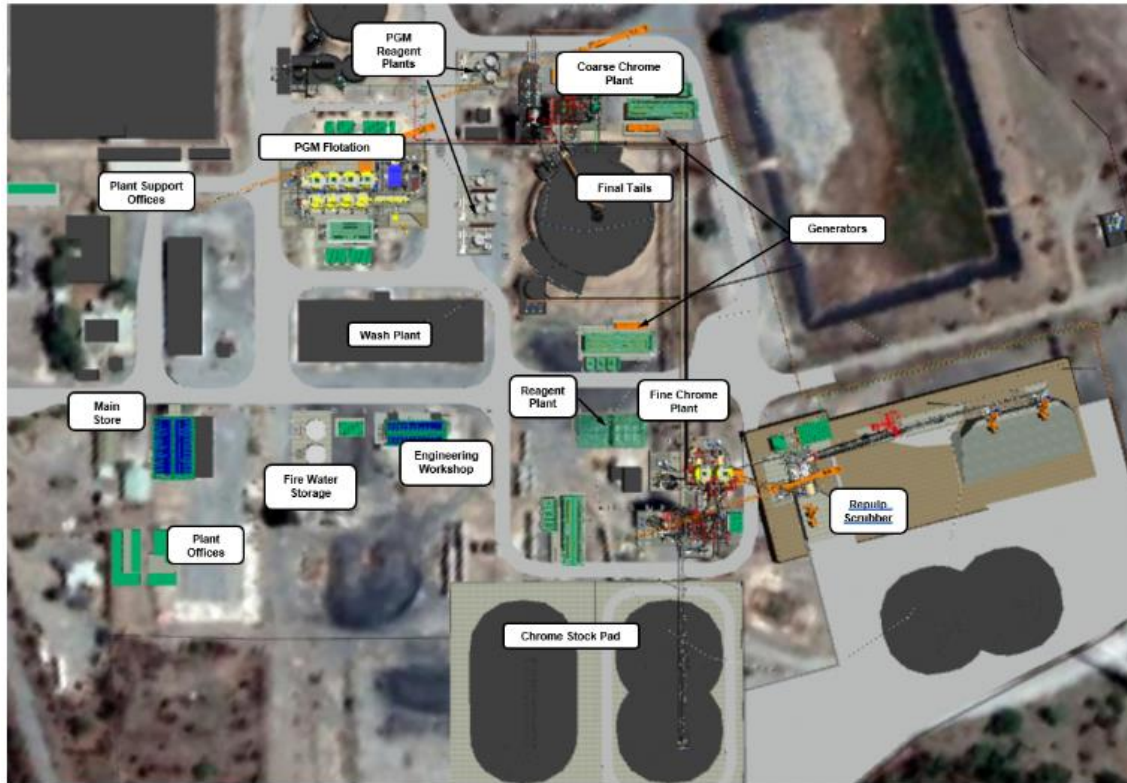


Figure 4-5: Meccano Plant Plot Plan

Table 4-2: Details of Material to be stored

Name of Material	Tank Name	Volume of material stored (m ³)	Approximate Coordinates	Utilisation
Sulphuric Acid (H ₂ SO ₄)	Reagents - H ₂ SO ₄ Sulphuric Acid 98%	96	25°44'15.05"S 27°25'19.81"E	For pH adjustment for optimal recovery of the product.
FLOTINOR V 2711	Reagent - Flotinator Storage	16.5	25°44'15.25"S 27°25'19.39"E	This reagent is utilised for optimal chrome recovery.
FLOTINOR V 2711	Reagent - Flotinator Dosing Tank Storage	1.25	25°44'15.27"S 27°25'19.30"E	
SASFROTH 200	Reagent - Frother Storage tank	44	25°44'12.90"S 27°25'16.36"E	PGM reagent commonly used for the recovery of PGM's within the existing Sibanye Operations
SIBX Senkol 821	Reagent - Collector Storage tank	88	25°44'13.12"S 27°25'16.44"E	
SIBX Senkol 821	Reagent - Collector Mixing tank	44	25°44'13.09"S 27°25'16.60"E	
SIBX Senkol 822	Reagent - Collector Dosing tank	12.5	25°44'13.28"S 27°25'16.50"E	
Diesel	Diesel Fuel Tank Supply Generator 1	1.87	25°44'10.83"S 27°25'18.25"E	Energy source
Diesel	Diesel Fuel Tank Supply Generator 1	1.87	25°44'13.77"S 27°25'19.14"E	
Diesel	Fire system 1 Emergency diesel pump Tank	1.35	25°44'16.77"S 27°25'15.80"E	
Repulp Plant Scrubber	Hydraulic Oil	2.7	25°44'14.66"S 27°25'22.00"E	Hydraulic lubrication system commonly used within the Sibanye Operations and required for the scrubber drive mechanisms at the Meccano plant.
Total		272		

The location of the dangerous goods with the existing plant is provided in **Figure 4-6**.



Figure 4-6: Dangerous Goods Storage Area

Illustrations of the material storage areas are provided in Figure 4-7 and Figure 4-8.

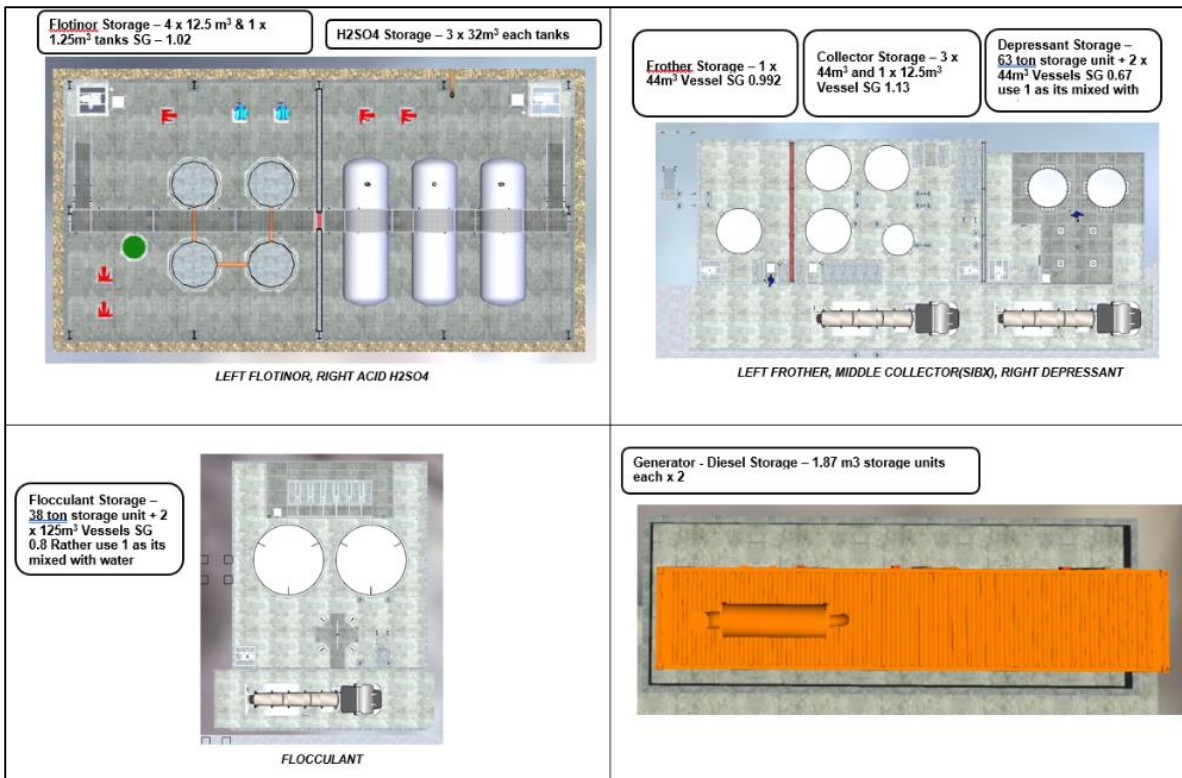


Figure 4-7: Reagents Images

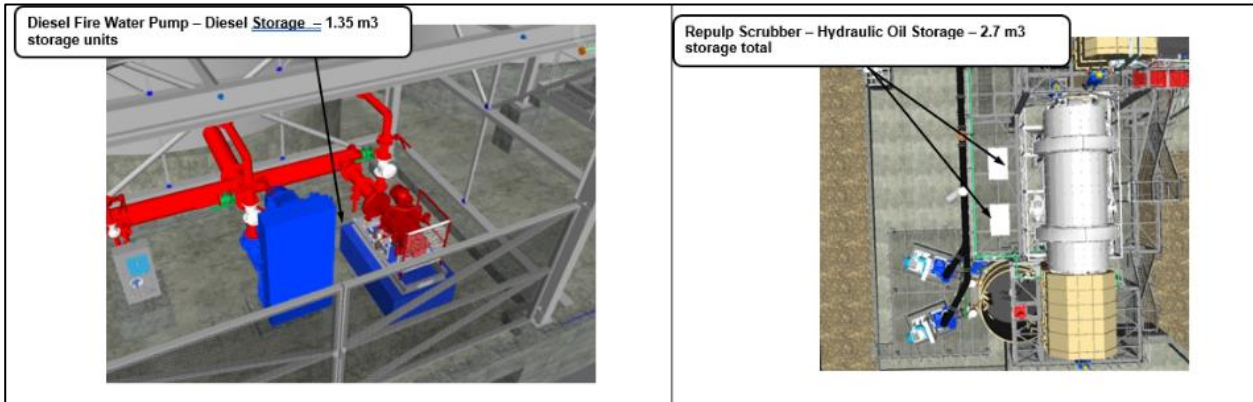


Figure 4-8: Diesel and Hydraulic Oil Images

The flow diagrams for the reagents has been included in **Appendix F**.

4.1.2.3 Proposed K3 Booster Pump Station

A pump station is proposed between the K3 Concentrator and the Meccano Plant. The pump station will receive feed from the K3 concentrator and subsequently pumped to Meccano Processing Plant. The site centre coordinates for the pump station is 25°42'53.31"S; 27°27'17.77"E and it is proposed to have an approximate footprint of 1200m². A layout of the pump station is provided in **Figure 4-9**.

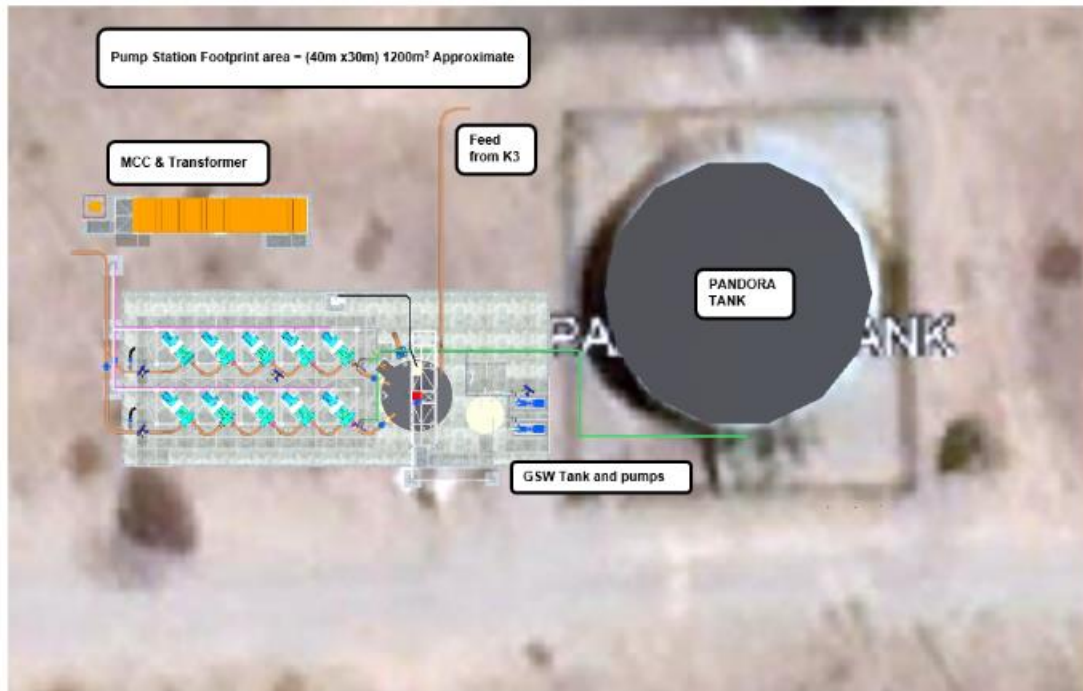


Figure 4-9: Proposed Pump Station Layout

4.1.2.4 Proposed Access Road

Access for construction and operational activities will be gained through existing access roads. However, a single access road is proposed in support of this project (**Figure 4-10**). **Table 4-3** provides details of the access road.

Table 4-3: Details of the Proposed Access Road

Coordinates	Start: 25°44'15.76"S; 27°25'33.55"E Middle: 25°44'8.67"S; 27°25'44.66"E End: 25°44'3.55"S; 27°26'2.01"E
Design Specifications	Length of road: 980m Width of road: 3.5 m



Figure 4-10: Proposed Access Road

Suitable material of G6 -G5 quality will be imported, placed and compacted in 150mm layers for the full width of the section including the area under the pipes. The final layer works for the roadway will be shaped and cambered.

4.1.2.5 Stormwater Management

The proposed access road will typically have a camber of between 1% -2% to allow drainage of the roads but small enough to prevent scouring. Side drains will be cut to ensure the natural flow of storm water and where required precast culverts will be installed to allow the natural drainage of the area and prevent any damming of water.

In terms of the pipelines and steep embankments stormwater berms will be constructed on top of the embankment to divert stormwater away from the pipeline. The watercourse crossings will include rock mattress gabions for erosion prevention of the pier footings.

As previously mentioned, the proposed dangerous goods area will be constructed within the existing Meccano Plant and stormwater trenches are already in place. Each material storage container will be situated in a bunded area.

4.1.2.6 Services Required

Waste Management

All waste generated during the construction phase of the project will be temporarily stored at suitable locations (eg in receptacles/skips) and will be removed at regular intervals and disposed of appropriately at a licensed municipal waste site or acceptable disposal facility. The nearest landfill is the Waterval Landfill situated within the jurisdiction of the local municipality. It is anticipated that no waste will be generated during the operational phase

Water and Sanitation

Sanitation services will be required for onsite personnel during the construction phase of the project. Chemical toilets will be used and serviced regularly by a registered waste contractor. Potable water will be provided by the appointed contractor. The pipelines will have expansion loops at 400m intervals, piping will be fixed to pre-cast plinths in these areas.

4.2 Listed and specified activities

NEMA is the environmental framework legislation promulgated to ensure that the environmental rights contemplated in Section 24 of the Constitution of South Africa (Act 108 of 1996) are realized. NEMA sets out:

- The fundamental principles that need to be incorporated in the environmental decision making process;
- The principles that is necessary to achieve sustainable development;
- Provides for duty of care to prevent, control and rehabilitate the effect of significant pollution and environmental degradation; and
- It allows for the prosecution of environmental crimes.

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an Environmental Authorisation issued by the competent authority (in this case the DMRE). In this context, the Environmental Impact Assessment (EIA) Regulations, 2014, promulgated in terms of NEMA, govern the process, methodologies and requirements for the undertaking of EIAs in support of EA applications. Listing Notices 1-3 in terms of NEMA list activities that require EA (NEMA listed activities). The EIA Regulations, 2014, lay out two alternative authorisation processes. Depending on the type of activity that is proposed, either a BA process or a Scoping and Environmental Impact Reporting (S&EIR) process is required to obtain EA. Listing Notice 1, lists activities that require a BA process, while Listing Notice 2 lists activities that require S&EIR. Listing Notice 3 lists activities in certain sensitive geographic areas that also require a BA process. **Table 4-4** provides the listed activities triggered for the proposed project.

Table 4-4 Listed and specified activities

NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)/NOT LISTED
In some instances, pipelines will traverse the watercourses.	Approximately 819 m ²	The development of 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 (c) If no development setback exists, within 32 metres of a watercourse, measured from the edge of the watercourse.	Listing Notice 1 Activity 12
A combined volume of 272 cubic meters of dangerous goods will be stored at the existing Meccano processing plant.	Approximately 2120m ²	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	Listing Notice 1, Activity 14
The proposed pipelines will traverse wetlands. Hence construction of the pipeline plinth will require excavation and removal of soil.	Approximately 819m ²	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;	Listing Notice 1, Activity 19
Natural vegetation will be removed in certain instances for the pipeline, pump station, and access road construction	Approximately 7.6ha	The clearance of an area of more than 300m ² or more of indigenous vegetation h. North West iv Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority vi Areas within a watercourse or wetland, or within 100 metres from the edge of a watercourse or wetland.	Listing Notice 3, Activity 12

NAME OF ACTIVITY (All activities including activities not listed) (E.g. Excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)	Aerial extent of the Activity Ha or m ²	LISTED ACTIVITY Mark with an X where applicable or affected.	APPLICABLE LISTING NOTICE (GNR 544, GNR 545 or GNR 546)/NOT LISTED
Sections of the pipelines are proposed to be constructed within watercourses	Approximately 819 m ²	The development of infrastructure or structures with a physical footprint of 10m ² or more within a (a) watercourse, (b) in front of a development setback or (c) if no development setback has been adopted within 32m of a watercourse measured from the edge of the watercourse h. North West iv Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority	Listing Notice 3, Activity 14

5 POLICY AND LEGISLATIVE CONTEXT

Table 5-1 Policy and Legislative Context

Applicable Legislation and guidelines used to compile the report	Reference where applied
<p>Constitution of the Republic of South Africa Act, 1996 (Act No. 108 of 1996)</p> <p>Under Section 24 of the Constitution of the Republic of South Africa, 1996 (the Constitution) it is clearly stated that: Everyone has the right to:</p> <p>(a) an environment that is not harmful to their health or well-being; and</p> <p>(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:</p> <p>(i) Prevent pollution and ecological degradation;</p> <p>(ii) Promote conservation; and (</p> <p>iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.</p>	<p>The issuing of an environmental authorisation or other permits or licence for any aspect of the proposed project will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and socio- economic environment. The abovementioned authorisations, permits, or licences will be largely based on the legislation outlined in this Chapter.</p> <p>Mitigation measures aim to ensure the project impacts are managed to acceptable levels to support the rights enshrined in the Constitution.</p>
<p>National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</p> <p>In order to bring section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) into realisation, the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) was promulgated to serve to <i>‘provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith’</i>.</p> <p>Chapter 5 of NEMA outlines the general objectives and implementation of Integrated Environmental Management (IEM), which provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of Environmental Authorisations. In order to give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed, and reported on to the competent authority.</p> <p>Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of the National Environmental Management Act</p>	<p>The proposed project triggers listed activities in terms of NEMA. The triggered activities has been provided in Table 4-4. Listed and specified activities</p>

Applicable Legislation and guidelines used to compile the report	Reference where applied
<p>(NEMA), Act 107 of 1998.. In terms of the 2014, EIA Regulations the triggered listed activities fall under Listing Notices 1, 2 and 3 which are further discussed as follows:</p> <ul style="list-style-type: none"> • <i>Listing Notice 1 (Regulation 983) define activities which will trigger the need for a Basic Assessment process.</i> • <i>Listing Notice 2 (Regulation 984) define activities which trigger a Scoping and Environmental Impact Assessment (EIA) process.</i> • <i>Listing Notice 3 (Regulations 985) refers to certain listed activities located in specifically defined geographical areas for which a Basic Assessment process would be required.</i> 	
<p>Department of Forestry, Fisheries and the Environment Screening Tool</p> <p>On 5 July 2019, The Department of Forestry, Fisheries and the Environment (DFFE) gave Notice of the Requirement to submit a Report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended. The submission of this report is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from 4 October 2019.</p>	<p>A copy of the DFFE Screening report is provided in Appendix B of this report and a summary of the findings of the report has been included in Section 11.</p>
<p>Mineral and Petroleum Resource Development Act. 2002 (Act No. 28 of 2002) (MPRDA)</p> <p>The MPRDA sets out the requirements relating to the development of South Africa’s mineral and petroleum resources. It also aims to ensure the promotion of economic and social development through exploration and mining related activities. In addition, the MPRDA requires that mining companies assess the socio-economic impacts of their activities from start to closure and beyond. Companies must develop and implement a comprehensive Social and Labour Plan (SLP) to promote socio-economic development in their host communities and to prevent or lessen negative social impacts</p>	<p>Kroondal Operations Marikana Platinum Mine holds a Mining Right and operates in line with the approved Environmental Management Programme (EMPr) and is regulated by the DMRE. This application will be linked to the mining right as the proposed activities fall within the mining right area.</p>
<p>National Water Act (Act No. 36 of 1998) (NWA)</p> <p>The purpose of the NWA is to ensure that the South Africa’s water resources are protected, used, developed, conserved, managed and controlled. Chapter 4 of the act regulates water use, while Section 21 lists eleven water use types that are regulated [Section 21 (a) – (k)]. Watercourses and wetlands are protected in terms of this section, as both are regarded as water resources. The regulated area of a watercourse can be defined as follows:</p>	<p>The proposed pipelines will traverse wetlands and a river system, the proposed pump station and access road are situated within 500m from the delineated wetland, hence within the Department of Water and Sanitation’s (DWS) regulated area. A General Authorisation application has been logged with DWS. The e-WULAAs reference number is WU23414. The Wetland Assessment and Delineation specialist report is attached to Appendix E4.</p>

Applicable Legislation and guidelines used to compile the report	Reference where applied
<ul style="list-style-type: none"> • The outer edge of the 1:100 year flood line and /or delineated riparian habitat whichever is the greatest measured from the middle of a river, spring, natural channel, lake or dam; • In the absence of a determined 1:100 year flood line or riparian area, the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); • 500m radius from the delineated boundary of any wetland or pan 	
<p>National Heritage Resources Act, (Act 25 of 1999).</p> <p>The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act. Section 38 of this Act pertains to Heritage resources management and Section 38(1) states the following</p> <p>Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—</p> <p>(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;</p> <p>(b) the construction of a bridge or similar structure exceeding 50 m in length;</p> <p>(c) any development or other activity which will change the character of a site—</p> <p>(i) exceeding 5 000 m² in extent; or</p> <p>(ii) involving three or more existing erven or subdivisions thereof; or</p> <p>(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or</p> <p>(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;</p> <p>(d) the re-zoning of a site exceeding 10 000 m² in extent; or</p> <p>(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development</p>	<p>The proposed pipelines are greater than 300m in length and triggers Section 38 of the National Heritage Resources Act (25 of 1999), which means that a Heritage Impact Assessment (HIA) must be carried out prior to any construction activities commencing. According to the HIA undertaken for the study, a fenced off graveyard is situated north of the Marikana Return Water Dam, however the proposed project will not have an impact on the existing graveyard. Further details on the heritage resources have been provided in Section 10 and the Specialist report has been provided in Appendix E3.</p>

Applicable Legislation and guidelines used to compile the report	Reference where applied
<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA)</p> <p>The NEM:BA regulates the management and conservation of the biodiversity of South Africa within the framework provided under NEMA. This Act also regulates the protection of species and ecosystems that require national protection and also takes into account the management of alien and invasive species.</p>	<p>A Vegetation Assessment has been undertaken by The Biodiversity Company (Appendix E1) to identify any Species of Conservation Concern (SCC). No SCC were identified in the study area.</p>
<p>National Forests Act, 1998 (Act No 84 of 1998)</p> <p>The purpose of the Act is to promote the sustainable management and development of forests and to provide protection for certain forests and trees in terms of:</p> <ul style="list-style-type: none"> • Section 15 (1) of the National Forest Act (Act 84 of 1998), any person wishing to cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree must apply for a license from the Minister or any delegated institution or authority. • Government Notice 38215, Notice of the List of Protected Tree Species under the National Forests Act, 1998 (Act No 84 of 1998) was gazetted in November 2014. 	<p>According to the Vegetation Assessment (Appendix E1), one specimen of protected tree species in terms of the National Forests Act (Act No. 84 of 1998), namely <i>Sclerocarya birrea</i> subsp. <i>caffra</i> was recorded within the greater study area associated with the access road. However, the protected tree species will not be impacted on in terms of the construction of the road. Further details are provided in Section 10.</p>
<p>National Environmental Management: Waste Act 59 of 2008 (Act No. 59 of 2008)</p> <p>This Act aims to regulate waste management to protect human health and the environment by putting measures in place to prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources. The Applicant shall ensure compliance with this Act by implementing practical measures to avoid or reduce unnecessary generation of waste and where the waste is generated measures such as re-using, recycling and recovery of waste shall be encouraged.</p>	<p>A waste licence is not required for the proposed project. The general principles of responsible waste management will be incorporated in the EMP to manage waste related activities during construction and operational phase of the project.</p>
<p>Mine Health and Safety Act (Act No. 29 of 1996) (MHSA)</p> <p>The Mine Health and Safety Act (Act No. 29 of 1996) (MHSA) aims to provide for protection of the health and safety of all employees and other personnel at the mines of South Africa. The purpose is to promote a culture of health and safety; to provide for the enforcement of health and safety measures.</p>	<p>The applicant must ensure compliance to all requirements of the MHSA for the duration of the project.</p>
<p>Bonjanala Platinum District Municipality Integrated Development Plan (2020/2021)</p> <p>Section 25 of the Municipal System Act requires that an Integrated Development Plan (IDP) must be compatible with national and provincial development plans and planning requirements. The</p>	<p>The proposed development falls under the jurisdiction of the Bonjanala District Municipality. The need and desirability of the project is in line with the municipality's IDP.</p>

Applicable Legislation and guidelines used to compile the report	Reference where applied
<p>promulgation of integrated development planning is a tool for development in district and local municipal IDP reports.</p> <p>According to the Bojanala Platinum District Municipality IDP, various industries make up the municipalities economy. The mining sector contributes 51.1% (based on 2016 results) to the Gross Value Add (GVA). It is therefore a priority sector for the municipality. It is widely recognised that investment within the mining industry is important for the creation of social and economic upliftment within the district.</p>	
<p>Rustenburg Local Municipality Integrated Development Plan (2022/2027)</p> <p>The municipality is the largest producer of platinum, with approximately 70% of the world's platinum production, followed by Russia and Canada. Rustenburg's economy is largely concentrated in the platinum mining industries, which contributed 76.6% to provincial GVA in 2020.</p> <p>The performance of the mining industry will continue to influence local economic prospects for the foreseeable future. Mining has been identified as a Prioritised sector as a potential to encourage or drive growth and or for their ability to create employment.</p>	<p>The proposed development falls under the jurisdiction of the Rustenburg Local Municipality. The need and desirability of the project is in line with the municipality's IDP.</p>

6 NEED AND DESIRABILITY OF THE PROJECT

The project need and desirability has been set out in this section of the report.

6.1 Project Need

As previously mentioned, the proposed project forms part of the greater Meccano tailings retreatment project. The Meccano project provides Sibanye-Stillwater with the opportunity to increase its environmental, social and corporate governance (ESG) in a positive way by cleaning tailings material, rehabilitating existing mining pits and providing additional tailings storage capacity for Sibanye. The Meccano project focusses on the recovery of chrome and PGM's from live tailings material from the Kroondal (K2) and Karee (K3B) Concentrators as well as reining of the dormant Tailings Storage Facilities (TSFs) where residual chrome and PGM tailings can be further processed before being deposited into a final tailing's facility at the Marikana Open Pits (Voids). It has been identified that Marikana is running out of TSF capacity and therefore the project provides an opportunity to not only recover chrome and PGM but also to increase the TSFs capacities and aid the closures of the Voids and Existing TSFs. The ESG opportunities the project provides for Sibanye-Stillwater are provided in **Table 6-1**.

Table 6-1 ESG opportunities for Sibanye-Stillwater (SS, 2021)

Activity	Description
Void Rehabilitation	The voids within the operations are dormant platinum reef mining pit excavations, with fractured vertical rock faces on some sides. The pits contain pools of water at the base. The pits provide a potential hazard risk for trespassers. The depositions of tailings to fill up the pits provides an opportunity to remove the hazard as well as to facilitate the environmental rehabilitation of the voids.
Clearing of tailings	The Meccano processing plant cleans the tailings material by removing a percentage of the chrome and PGMs from existing tailings material, providing a cleaner tailings source for final deposition.
Clearing out of the existing tailings dams	The Meccano project aims to reining the existing K1, K150, K2 and Marikana TSFs. The reining of the TSFs removes most of the minerals, making these TSFs easier to rehabilitate as part of the mine closure.
Increasing Existing Storage Capacity Over Existing Footprint	The existing TSFs at the Kroondal sites are reaching maximum capacity and to extend the Life of Mine (LOM) of the Kroondal operations, new tailings storage facilities will need to be constructed. The use of the pits to store tailings together with the Surface TSFs constructed on top of filled Voids provides the opportunity to build within an existing disturbed area, rather than having to construct the TSF in a new/greenfield area.

A map showing the respective operations in terms of the Meccano project is provided in **Figure 6-1**. As previously mentioned only the pipelines, dangerous goods storage, pump station and access road are applicable to this Basic Assessment process.

6.2 Project Desirability

6.2.1 National

In terms of the National Development Plan (2030), Minerals underpin the economic strength of many countries. Africa holds 95 percent of the world's reserves of platinum group metals and South Africa holds large global shares in Platinum Group Metals, gold, diamonds, manganese, coal iron ore. However, over the past decade domestic mining has not met the global growth trend in mineral exports due to the poor infrastructure. The proposed project can be seen as an improvement of infrastructure for the Sibanye Stillwater, ensuring continued production and an

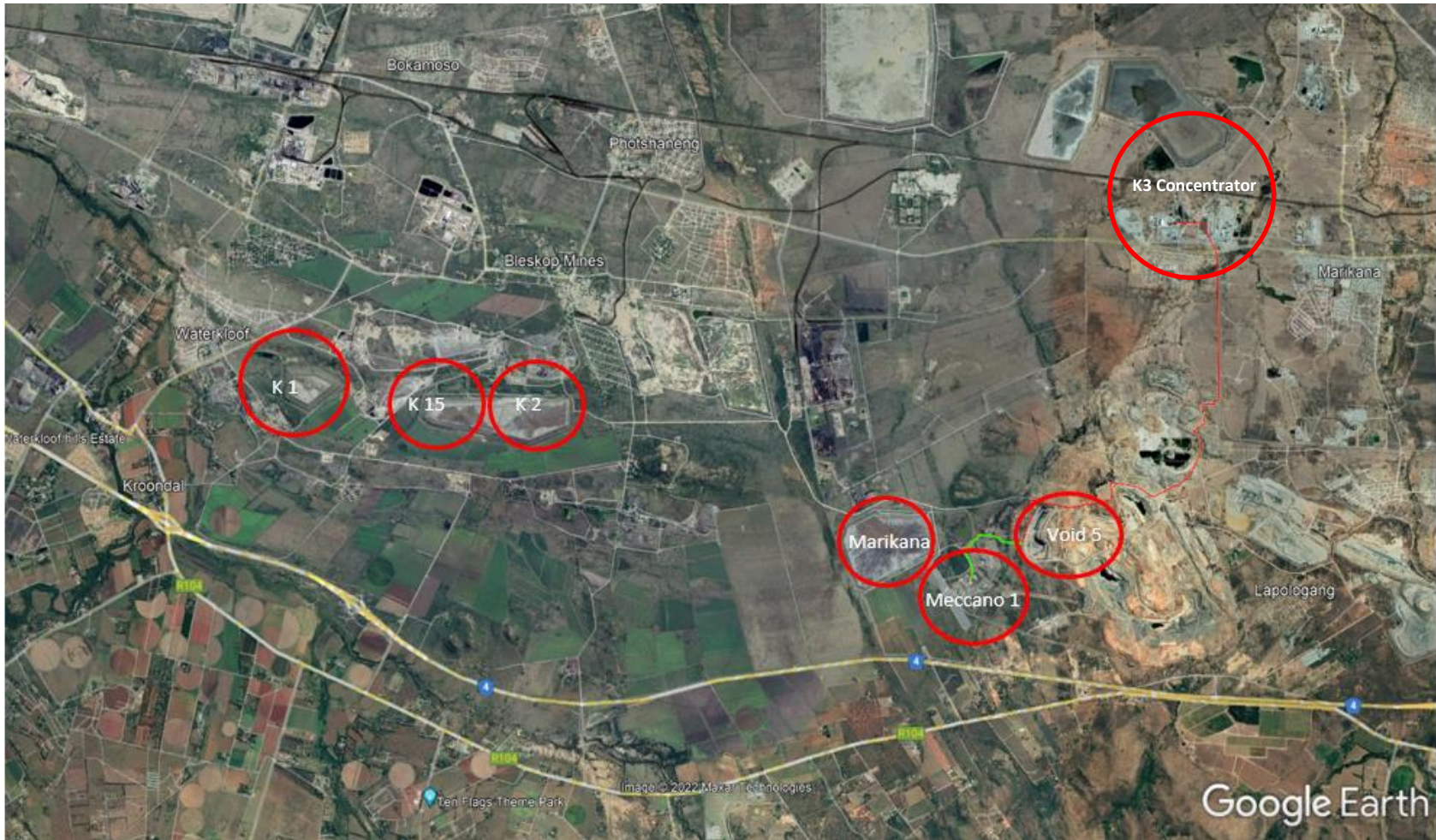
opportunity to match global growth trends. Improving infrastructure will enable Sibanye-Stillwater to deploy skills allowing government to raise much more tax revenue which will have a positive spin off on the economy.

6.2.2 Provincial

The mining sector plays a crucial role in the North West economy. Mining contributes more than a quarter (39%) to the total provincial economy. As a result, the provincial economy is somewhat dependent on the demand for metals and minerals from foreign economies and the subsequent fluctuation in commodity prices. The mining sector has been noted as one of the economic sectors to achieve employment and economic growth due to proven potential for growth and employment creation without institutional support. Sibanye-Stillwater Sibanye of which Kroondal Operations is a subsidiary, employs more than 90 000 people making them the country's largest employer outside of government. Should the proposed new infrastructure not be realised in support of the Meccano project, the revenue and jobs associated with the operations of the mine will be lost which could potentially impact the provinces ability to meet the GVA targets.

6.2.3 Local

The mainstay of the economy of Bojanala Platinum District is mining, which generates more than half of the District's Gross Domestic Product (GDP) with the bulk of the platinum mining activity being located in the Rustenburg Local Municipality. It is widely recognised that investment within the mining industry is important for the creation of social and economic upliftment within the district. In terms of the Rustenburg Local Municipality's IDP 2022/2027, Rustenburg's economy is largely concentrated in the platinum mining industries, which contributed 76.6% to provincial GVA in 2020, followed by the community services sector at 6.4 % in the same period. Mining has been identified as a Prioritised sector as a potential to encourage or drive growth and or for their ability to create employment. The proposed project in support of the Meccano Tailings Retreatment Project will allow for continued production at the Kroondal Operations which ensures employment and local economic prospects.



Operations in terms of the Meccano Project

Figure 6-1

Figure 6-1 Operations in terms of the Meccano Project

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

The proposed pipeline route is the only preferred location based on the following reasons:

- The pipelines and associated infrastructure fall within the mining right area of Sibanye-Stillwater. The surface ownership of the potentially affected properties vests with Sibanye-Stillwater.
- The proposed pipelines are situated within close proximity of the existing facilities from which tailings will be conveyed. An alternative route could potentially have significant cost implications associated with the transport of the tailings.
- Majority of the pipeline routes are along existing roads, and adjacent to existing operational pipelines, hence the receiving environment has already been disturbed to some extent.
- The project area is highly disturbed due to the long history of mining activities. The proposed activity is therefore anticipated to have less of an environmental impact in a disturbed environment compared to other areas where the environment is less disturbed.
- The proposed pump station has been aligned with the tailings pipeline from the K3 concentrator to lift and convey the tailings to the Meccano processing plant.
- The proposed access road will run parallel to the proposed pipelines which will serve as support infrastructure for the undertaking of maintenance activities.

In terms of the dangerous goods area, the Meccano Plant is existing, and the plant areas have been custom designed to meet the offloading tanker volumes which aligns with the plant's consumption requirements of the reagents. The design of the plant incorporates direct offloading from taker to storage area. Mobile contained storage was avoided due to the large volumes required and due to the risk of handling containers on site.

8 FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

8.1 Details of the development footprint alternatives considered

8.1.1 *The property on which or location where it is proposed to undertake the activity*

The proposed pipelines will support the greater Meccano Tailings Retreatment Project which is for the reclamation of existing tailings storage facility. The most viable location of the proposed activity was considered to be southeast of the K3 Concentrator along the route where pipelines already exist thus enlarging the already disturbed footprint and not disturb new undeveloped areas.

8.1.2 *The type of activity to be undertaken*

During the reclamation process, tailings and return water are required to be conveyed to the Meccano Plant and retreated tailings to the voids and associated return water pipelines. There was no alternative mode of transport as pipeline conveyance was considered the most feasible mode.

8.1.3 *The design or layout of the activity*

As the proposed pipelines will convey tailings that includes constituents from a series of chemical processing, the tailings can be regarded as hazardous. The advantages and disadvantages of above ground and below ground pipelines have been assessed as part of this Basic Assessment Process and provided in **Table 8-1** and **Table 8-2**.

Table 8-1 Below ground tailings pipelines

Advantages	Disadvantages
<ul style="list-style-type: none"> • Out of site and the risk of vandalism drops significantly • Completely impervious to weather changes 	<ul style="list-style-type: none"> • Excavations required for the placement of the pipelines resulting in modification of surface topography and removal of vegetation for the entire pipeline length. • Loss of the fertile topsoil layer

Advantages	Disadvantages
<ul style="list-style-type: none"> The surrounding bedrock will serve as an protection barrier 	<ul style="list-style-type: none"> Costly exercise which could potentially include cost for excavators, blasting (if required) Increased risk of the tailings leaching into the surrounding soil and groundwater Installation of a leak detection system as leaks and spills are not easily detected

Table 8-2 Above ground tailings pipelines (covered with soil)

Advantages	Disadvantages
<ul style="list-style-type: none"> Is a financially feasible option as excavations for the entire pipeline route will not be required Excavation is limited to the plinths that the pipeline will be placed on (where necessary only as the pipeline will be placed on the ground) Offers easy access (in comparison to a below ground pipeline) when troubleshooting is required or when repairs need to be undertaken. Lesser risk of tailings leaching into the surrounding soil and groundwater Less risk to fire damage Protection from the sun more specifically applicable to the HDPE pipelines Out of site and the risk of vandalism drops significantly 	<ul style="list-style-type: none"> The proposed pipelines will be above ground but covered, which could still potentially be a risk as leaks and spillages are not easily spotted.

The **Preferred Option**, which has been included as part of the design is the above ground covered pipeline.

8.1.4 The technology to be used in the activity

As Sibanye-Stillwater Kroondal Operations Marikana Platinum Mine is a mining operation and the proposed activities are in support of the current mining activities. The proposed pipelines will support the greater retreatment and reclamation projects. As such the activities cannot be substituted by any other means than a pipeline as it is not financially viable or practical.

8.1.5 The operational aspects of the activity

The concept of alternative operational aspects does not apply to the pipelines as the conveyance of tailings and slurry is not financially viable and or practical by other means other than a pipe. The only feasible operational option is for the pump stations to be automated to ensure that the pump stations automatically start when the cut in capacity is reached and stop when the cut out capacity is reached. This will mean the pump stations operate efficiently and reliably. Manual operation of pump stations is not a feasible alternative.

8.1.6 The option of not implementing the activity

The option of the project not proceeding would mean that the environmental and social status would remain the same as current. This implies that both negative and positive impacts would not take place. The no-go option would assume that the proposed pipeline would not go-ahead, consequently this alternative entails that the status quo or baseline environment remain as it (no environmental impacts on the natural environment or surrounding communities).

As the proposed pipeline project fits into the greater Sibanye-Stillwater Meccano Tailings Retreatment Project, the no-go option will result in the following Environmental, Social and Corporate Governance (ESG) opportunities not being met:

- The Meccano processing plant cleans the tailings material by removing a percentage of the chrome and PGM's from existing tailings material. Providing a cleaner tailings source for final deposition.
- The Meccano project aims to re-mine the existing K1, K150, K2 and Marikana TSFs. The re-mining of the TSFs removes most of the stored material from the current TSFs, making these TSFs easier to rehabilitate as part of the mine closure.
- The existing TSFs at the Kroondal sites are reaching maximum capacity and to extend the LOM of the Kroondal operations new tailings storage facilities will need to be constructed. The use of the pits to store tailings together with the Surface TSFs constructed on top of the filled Voids provides the opportunity to build within an existing disturbed area, rather than having to construct the TSF in a new/greenfield area.

The no-go alternative in the context of this proposed operations will severely impact on the continued feasibility of continued operations at the mine. From an operational perspective the no-go alternative is not feasible.

9 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

The NEMA (1998) EIA Regulations, 2014, as amended, prescribe that the Basic Assessment process include the undertaking of Public Participation in accordance with Chapter 6 of the Regulations. The purpose of the Public Participation process is to provide all potential and/or registered Interested and Affected Parties (I&APs hereafter), including the Competent authority and any other stakeholder or organ of state, an opportunity to become involved in the Basic Assessment process and provide comments during the various phases of the project. Involvement by I&APs is critical, as it contributes to a better understanding of the proposed project among I&APs, raises important issues that need to be assessed and provides local insight that will enhance the Basic Assessment process. This Section of the report provides details on the Public Participation Process followed during the Basic Assessment for the proposed project.

9.1 Pre-application

A pre-application meeting was held with the DMRE North West Regional Office on the 14th of January 2022. During this meeting the project was introduced, and the DMRE official was requested to confirm the department's requirements for the applicant and raise any comments or concerns about the proposed project. Minutes of the pre-application meeting held is provided in **Appendix D1**.

9.2 Project announcement

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

- Bonjanala Platinum District Municipality
- Rustenburg Local Municipality
- Bapo Tribal Authority
- Department of Water and Sanitation North West
- North West Department of Economic Development, Environment, Conservation and Tourism
- Provincial Heritage Authority: North West
- South African Heritage Resources Agency
- North West Department of Agriculture and Rural Development
- Department of Rural Development and Land Reform

The proposed project was announced as follows:

- Distribution of Background Information Documents (BID) via email to the, commenting authorities and all identified stakeholders (refer to list in Appendix D3) on 28 October 2022. Refer to Appendix D4 for a copy of the BID and Appendix D5 for emails sent;
- Placing site notices on site and within close proximity of site. Refer to Appendix D6 for proof of site notices placed; and

9.3 Newspaper Advert

A newspaper advertisement was placed in the **Rustenburg Herald** on the **XXX**, advertising the availability of the Draft BAR for public comment. The tear sheet is provided in **Appendix D7**.

9.4 Availability of the Draft Basic Assessment Report

The Draft BAR is currently available for public comment for a period of 30 days from **Date to Date**. The availability of the report for comment was advertised in the Rustenburg Herald on **Date**. The report is available at the following public places:

- Rustenburg Public Library - c/o Thabo Mbeki and Heystek streets, Rustenburg
- Alta van Dyk Environmental Consultants Office
- **Sibanye-Stillwater Kroondal Offices**

The Draft BAR is also available electronically on the AVDE website:

<https://www.altavandykenvironmental.co.za/public-documents/>

In addition, the Draft BAR is available on the data free app ULWAZI: <https://ulwazi.datafree.co>

Comments received during the comment period of the Draft BAR will be included in the Comment and Response Report (CRR) and will be submitted with the Final BAR to the DMRE for decision making. The comments and response report is provided in Appendix D2.

9.5 Final Basic Assessment Report

All comments obtained from stakeholders during the pre-application, announcement and Draft BAR comment periods, will be captured and addressed in Final BAR.

9.6 Decision

Once a decision regarding the environmental authorisation has been received from DMRE, all registered stakeholders will be informed via email.

10 ENVIRONMENTAL ATTRIBUTES OF THE PROJECT AREA

10.1 Climate

The Rustenburg area has a temperate humid subtropical climate according to the Köppen classification. It has very warm summers (from December to February) and mild winters (from June to August). Due to the altitude, summers are not quite as hot as one might expect. Precipitation occurs mainly in summer with a maximum (approximately 68 mm) encountered during January and a minimum (approximately 1 mm) encountered during July (**Figure 10-1**). The average daily temperatures ranges from a minimum of 11°C to a maximum of 17°C with the highest temperatures recorded during January and December and the lowest recorded during June and July (**Figure 10-1**).

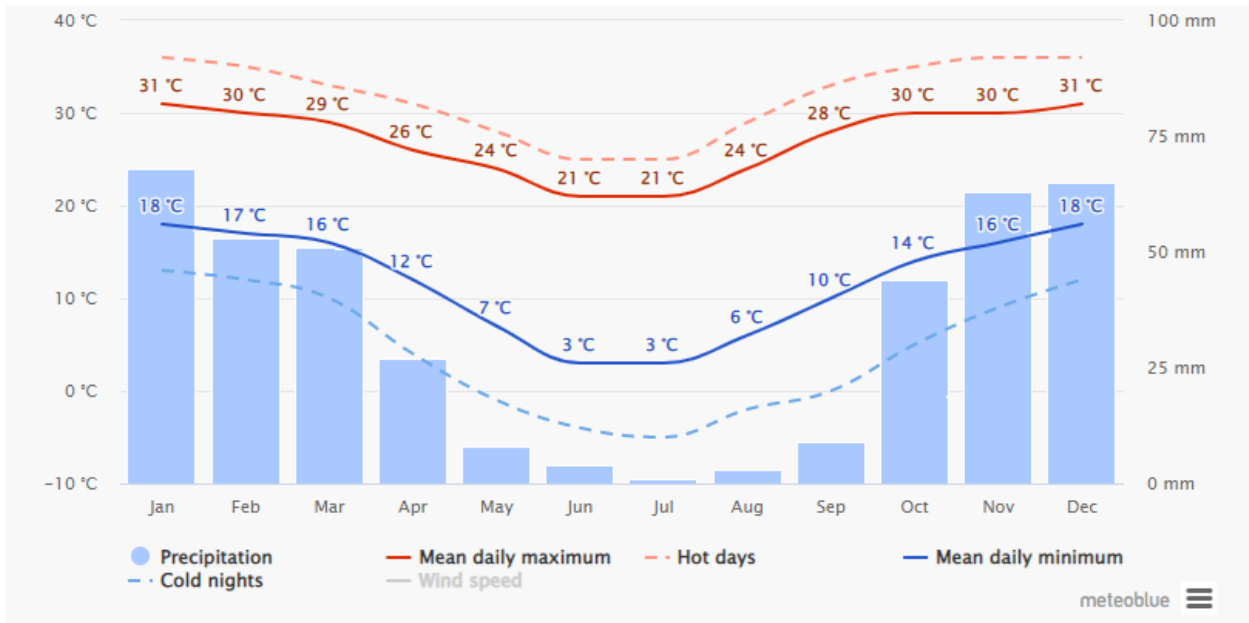


Figure 10-1: Rustenburg Monthly Temperatures, & Precipitation (Meteoblu, 2022)

10.2 Topography

The North West province is typically flat or has gently undulating plains within its central and western regions, whilst the eastern region varies in topography. The altitude of the North West province ranges from 920-1782m above sea level. The topography is flat to undulating with the north (K3 concentrator) being 1163m above sea level, with high lying areas, 1213m above sea level in the south. The project area is surrounded by existing mining infrastructure that has largely transformed topography.

10.3 Soils and land capability

A Soil and Agricultural assessment was undertaken by TerraAfrica (2022). The report is provided in **Appendix E2** of this report. Information provided in this section has been sourced from the Soil and Agricultural Assessment

10.3.1 Land Types

The study areas have mainly two land types, Bc8 and Ea3. Land type Bc consists of Red and yellow, eutrophic, apedal soils with plinthic subsoils (plinthic soils comprise >10% of land type, red soils comprise >33% of land type), while land type Ea consists of Black or red clays comprise >50% of land type (**Figure 10-2**).

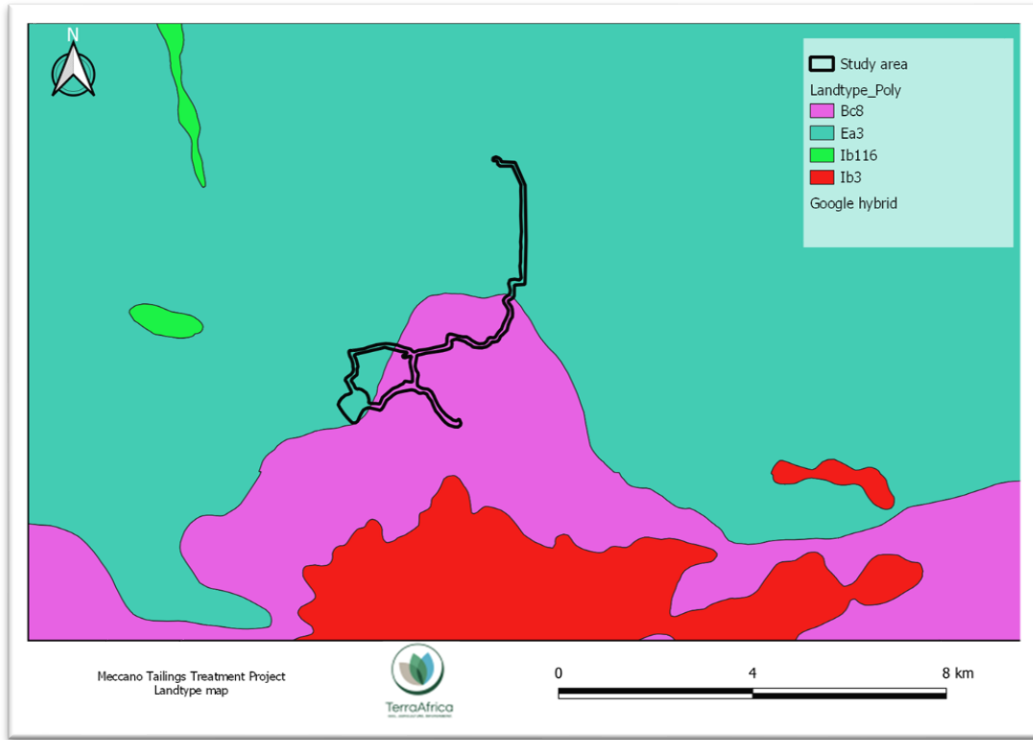


Figure 10-2: Land Types of the Study Area (TerraAfrica, 2022)

10.3.2 Soil Properties

The soil profiles classified within the proposed project consists of natural soil profiles (undisturbed by human activities) and Technosols (disturbed by human activity). The positions of the different soil forms are depicted in Figure 10-3.

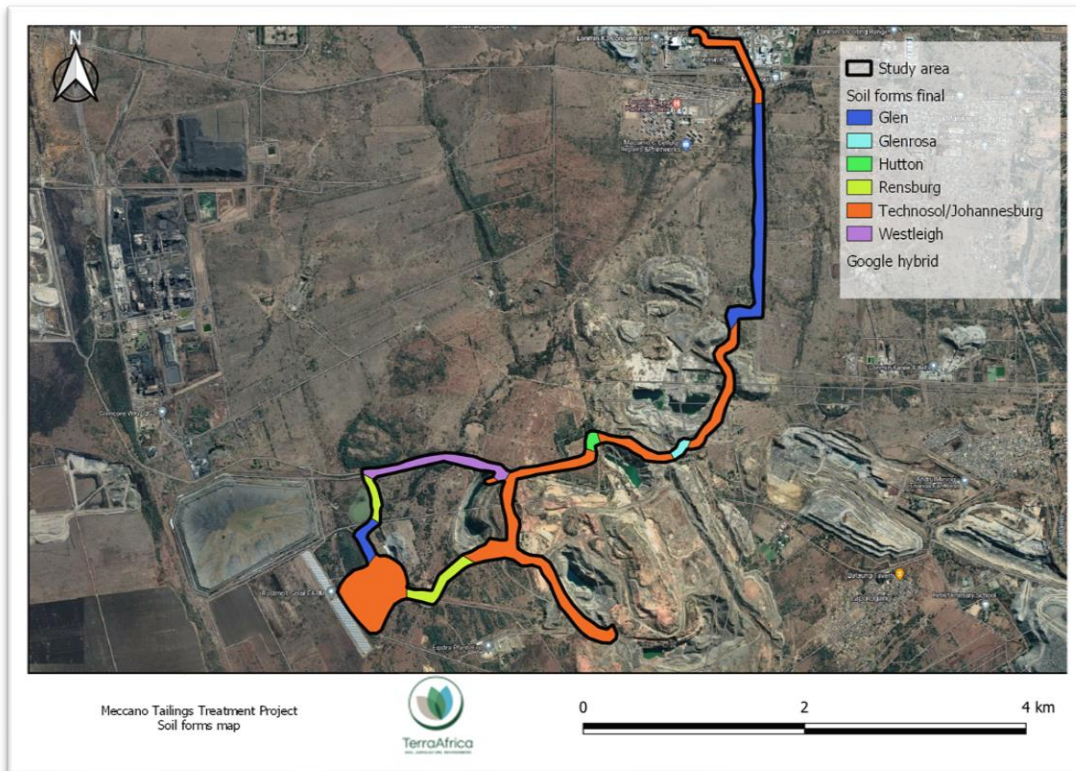


Figure 10-3: Soil Classification Map (TerraAfrica, 2022)

10.3.2.1 Natural Soil Forms

a) Glen

The Glen soils have a vertic horizon with a soil depth of 100-400 mm. The effective soil depth of the Glen soils is 1200 mm. The Glen consists of a vertic horizon overlying a pedocutanic horizon. The pedocutanic has a moderate to strong structure and cutans were prominent. The Glen is found in the Northern parts of the study area and covered 26.58ha. The K3 tailings to K3 booster pump station falls within this soil form.

b) Glenrosa

The Glenrosa is found just between the technosols and only cover a very small area (1.88ha), the soil form is found in the centre area, and only occurs once. Soil depths reached 200 mm. The Glenrosa soils consist of chromic topsoil overlying a saprolithic horizon. The road to Pandora tank leads through the Glenrosa.

c) Hutton

The Hutton consists of an orthic horizon overlying a red apedal. The soil form is only found on a very small part of the area, covering 1.89 ha. The red apedal is deep reaching 1200 mm in depth. The red apedal is luvic, indicating an increase in clay with depth. The Hutton has a moderate land capability due to the lower climate, terrain, and soil capabilities, as well as the absence of crop field.

d) Westleigh

Westleigh soil form consists of an orthic A, overlying a soft plinthic horizon. The soil form is found only on a small part of the study area (12.35 ha). The soft plinthic horizon had clear mottling of iron and manganese as well as grey colors as defined for the gley horizon.

e) Rensburg

The Rensburg soil covers approximately 10.8 ha of the total area. The Rensburg soil form consist of a vertic horizon overlying a gley horizon. The gley horizon has clear grey colors as defined for the gley horizon. The gley horizon reaches depths of 1200 mm. The Meccano tails new road and K3 tailings from K3 booster pump station to Meccano goes through the Rensburg soil form.

f) Johannesburg

Johannesburg are urban technosols consisting of material present in an urban environment where significant areas are disturbed or covered by means of constructions including but not limited to, roads, buildings, sport fields and waste dumps. These areas are classified as other urban uses.

10.3.3 Chemical Soil Properties

The soil chemical results are presented in **Table 10-1**.

Table 10-1: Soil Chemical Results (TerraAfrica, 2022)

Observation	Soil form	Diagnostic horizon	Phosphorous	pH KCl	CEC	% Clay	% Silt	% Sand
			mg/kg		cmol(+)/kg			
R3 A	Hutton	orthic	7,20	5,30	2,95	19,87	11,72	69,64
R8 A	Technosol		17,32	5,55	4,42	17,91	9,91	72,69
R11 A	Glen	vertic	3,52	6,31	48,44	47,41	29,43	23,19
R31 A	Technosol		4,12	6,46	48,88	62,50	24,10	14,11

The chemical results show that phosphorous (P) in the samples (excluding sample R8-A) are low as the required P for maize is 17mg/kg. Phosphorous is pH dependent as pH below 5.5 could cause P to be immobile. The pH for the samples varies from acidic (5.30) to slightly acidic (6.46) which could indicate the low P. The CEC of the soil indicate

that samples R11-A and R31-A has a high fertility whereas samples R3-A and R8-A would need additional fertilization, should crops be planted.

As for the textural results, the soil varies from a clay % of 17.91% to 48.88 %. The high clay content soils are associated with the Glen soil forms whereas the lower clay content can be attributed to the Hutton soil form.

10.3.4 Land Capability

The position of the different land capability classes with the proposed project is provided in **Figure 10-4**.

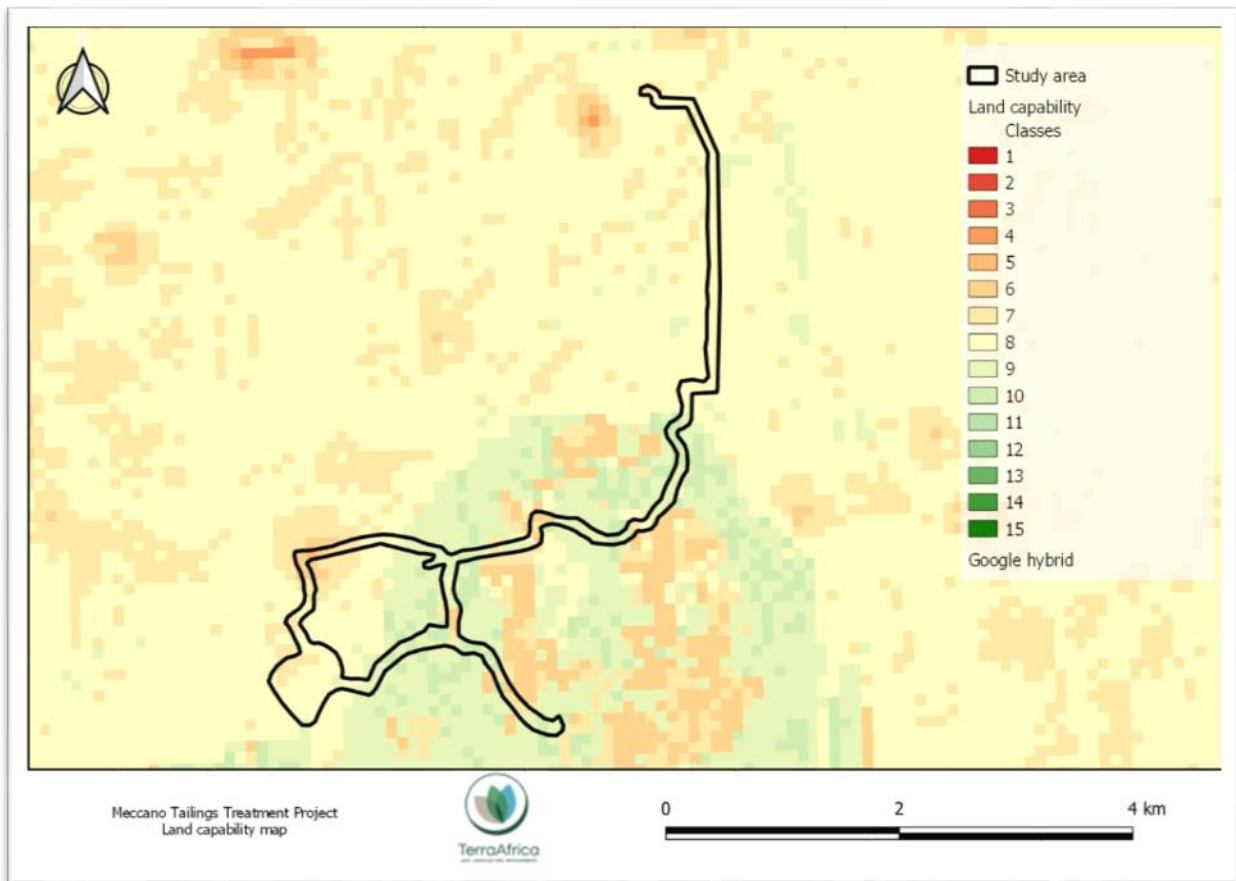


Figure 10-4: Land capability classification of the Meccano Tailings Retreatment Project. (data source: DALRRD, 2016) (TerraAfrica, 2022)

The dominant land capability class within the proposed project, is Moderate (Class 08). The highest land capability class within this area is Moderate-High (Class 10) which is in the centre and south side of the study area. A small part is also found in the northern part of the study area. The higher land capability largely agrees with the areas where the Glen, Westleigh and Technosol soils were identified.

Land adjacent and further away from the project area consists of a similar mixture of land capability class than that within study area.

10.3.5 Calculated Land Capability

Following the classification of the soil and the consideration of other factors (soil, terrain, and climate capabilities) that influence rainfed crop production, the land capability of the study area was determined. The calculated land capability (30% terrain, 30% soil and 40% climate) of the area is depicted in **Figure 10-5**.

The largest part of the study area has Very low (2) land capability (90.54 ha) and included the Technosol/Johannesburg soil forms. Low-Moderate (6) classes were assigned to the Glen and Glenrosa soil forms, while Low (5) land capability classes were assigned to the Westleigh and Rensburg soil forms which was found in the southwestern parts of the study area. The Hutton soil covered only 1.89 ha and had a Moderate (8) land capability.

The Very low (2), Low (5) and Low-Moderate (6) land capabilities of the soils within the development area is confirmed by the absence of crop field boundaries within the study area (Figure 10-5). On the southwestern outside part of the study area, old field are found, while rainfed annual crop cultivation is found to the far eastern and southwestern outside parts of the study area.

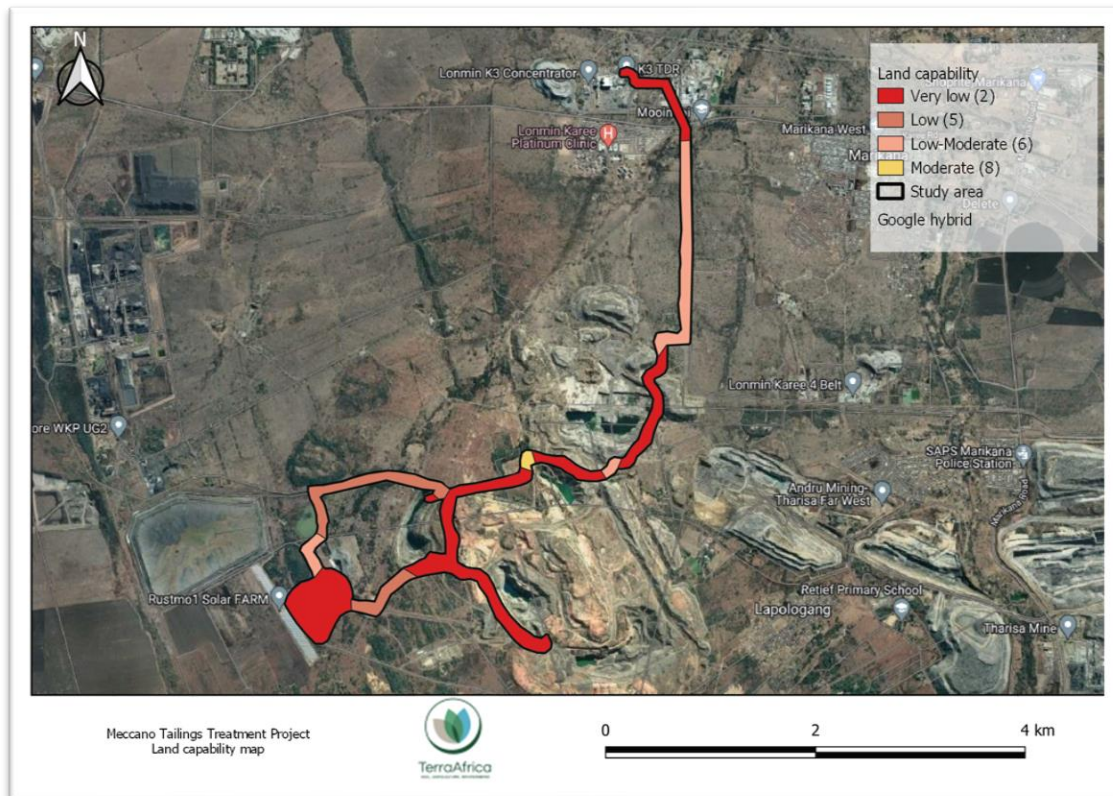


Figure 10-5: Land Capability of the Study Area (TerraAfrica, 2022)

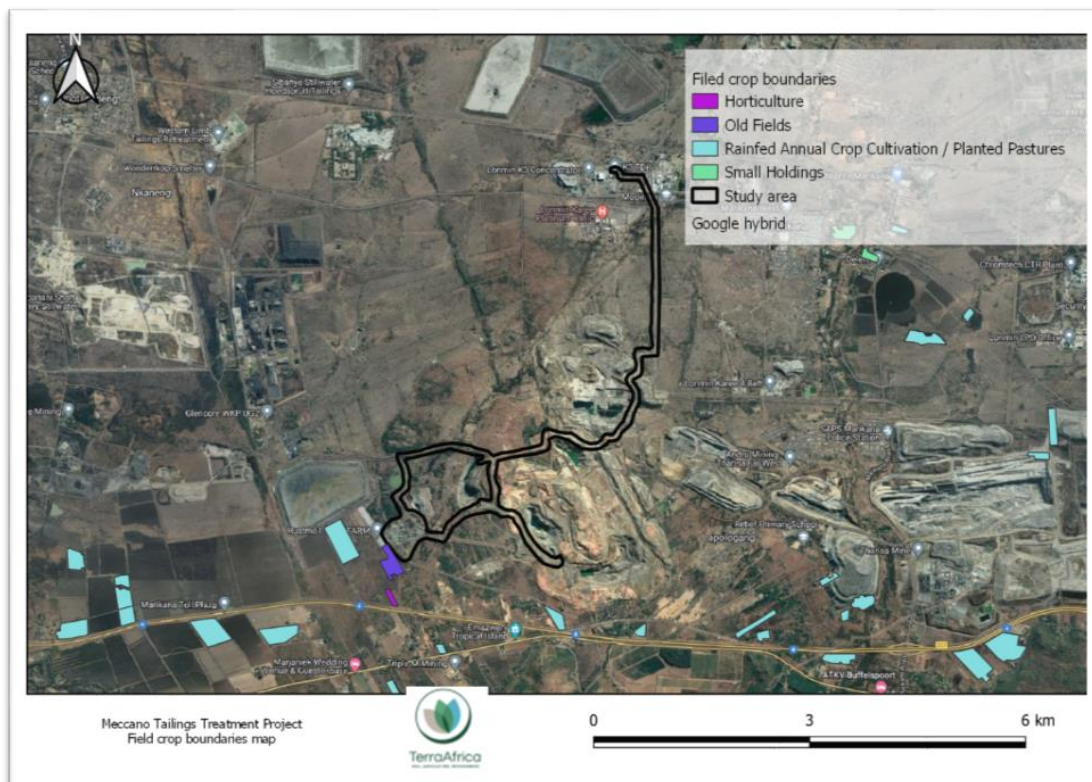


Figure 10-6: Location of field crop boundaries around the Meccano Tailings Treatment Project (data source: DALRRD, 2019) (TerraAfrica, 2022)

Following the metadata layer obtained from DALRRD, the long-term grazing capacity of the entire Tailings Treatment Project is 10 ha/LSU (Figure 10-7).

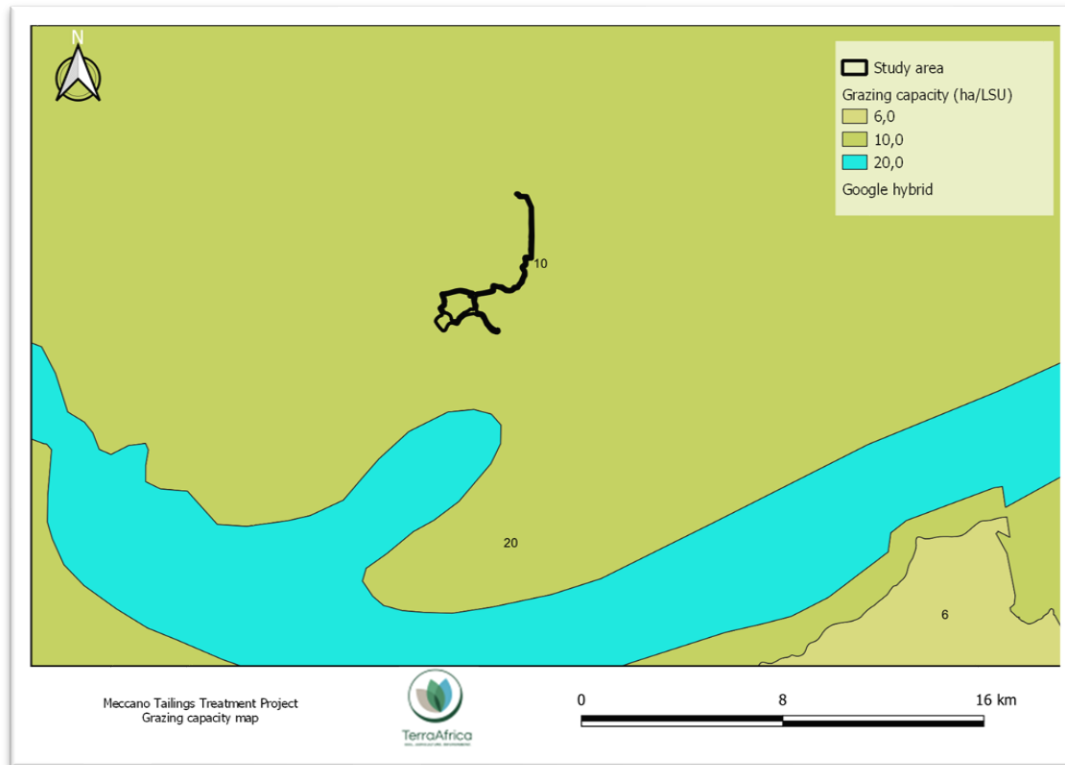


Figure 10-7: Grazing capacity of the Meccano Tailings Treatment Project (data source: DALRRD, 2018) (TerraAfrica, 2022)

The ideal grazing capacity is an indication of the long-term production potential of the vegetation layer growing in an area. More specifically, it relates to its ability to maintain an animal with an average weight of 450 kg (defined as 1 Large Stock Unit (LSU)), with an average feed intake of 10 kg dry mass per day over the period of approximately a year. This definition includes the condition that this feed consumption should also prevent the degradation of the soil and the vegetation. The grazing capacity is therefore expressed in a number of hectares per LSU (ha/LSU).

The study area is currently used as mining practices with most of the area being disturbed or falling in urban areas. Using the long-term grazing capacity of 10 ha/LSU, the study area can hold 14 head of cattle. The grazing capacity is low-moderate.

10.4 Biodiversity

A Vegetation Assessment was undertaken by The Biodiversity Company (2022). The report is provided in **Appendix E1** of this report. Information provided in this section has been sourced from the Vegetation Assessment. **Table 10-2** provides spatial features of the study area.

Table 10-2: Spatial Features of the Study Area (TBC, 2022)

Desktop Information Considered	Relevant/Not relevant
Conservation Plan	The study area overlaps with Critical Biodiversity Area (CBA2): Important and an Ecological Support Area (ESA 1 and 2) areas
Terrestrial Ecosystem Threat Status	The study area falls within an ecosystem which is listed as Endangered (EN) (Marikana Thornveld) and Least Concern (LC) (Moot plains Bushveld) ecosystems.

Desktop Information Considered	Relevant/Not relevant
Terrestrial Ecosystem Protection Level	The study area falls in a “Poorly Protected” area (Marikana Thornveld and Moot plains Bushveld)
Protected area	Irrelevant: The study area occurs within the Magaliesberg Biosphere Reserve, part of the transitional zone. Transition Areas are areas of stakeholder co-operation within the Magaliesberg Biosphere, which contain diversity of economic activities, settlements and other land uses and in which stakeholders work together to manage and sustainably develop the area's resources. It is an essential component of the economic viability of the Magaliesberg Biosphere.
National Protected Areas Expansion Strategy (NPAES)	The study area overlaps with an NPAES area, the area corresponds to CBA 2 area.
Vegetation Type	The study area occurs in two types: the Soweto Highveld Grassland which is Endangered and Moot Plains Bushveld which is Vulnerable (VU).

10.4.1 Vegetation

The Study area is associated with two (2) vegetation types (**Figure 10-8**).

a) Marikana Thornveld (MT)

The MT consists of open Vachellia karroo woodland, occurring in valleys and slightly undulating plains, and some lowland hills. Shrubs are denser along drainage lines, on termitaria and rocky outcrops or in other habitats protected from fire. Marikana Thornveld occurs on plains from the Rustenburg area in the west, through Marikana and Brits to the Pretoria area in the East.

According to Mucina & Rutherford (2006), this vegetation type is classified as EN. The conservation target is 19% but only approximately 1% of this vegetation community is statutorily conserved, in the Magaliesberg Nature Area for example but is more conserved in addition in other reserves, mainly in De Onderstepoort Nature Reserve (Mucina & Rutherford, 2006). Transformation of this vegetation type was estimated at 48% in 2006, mainly cultivated and urban or built-up areas.

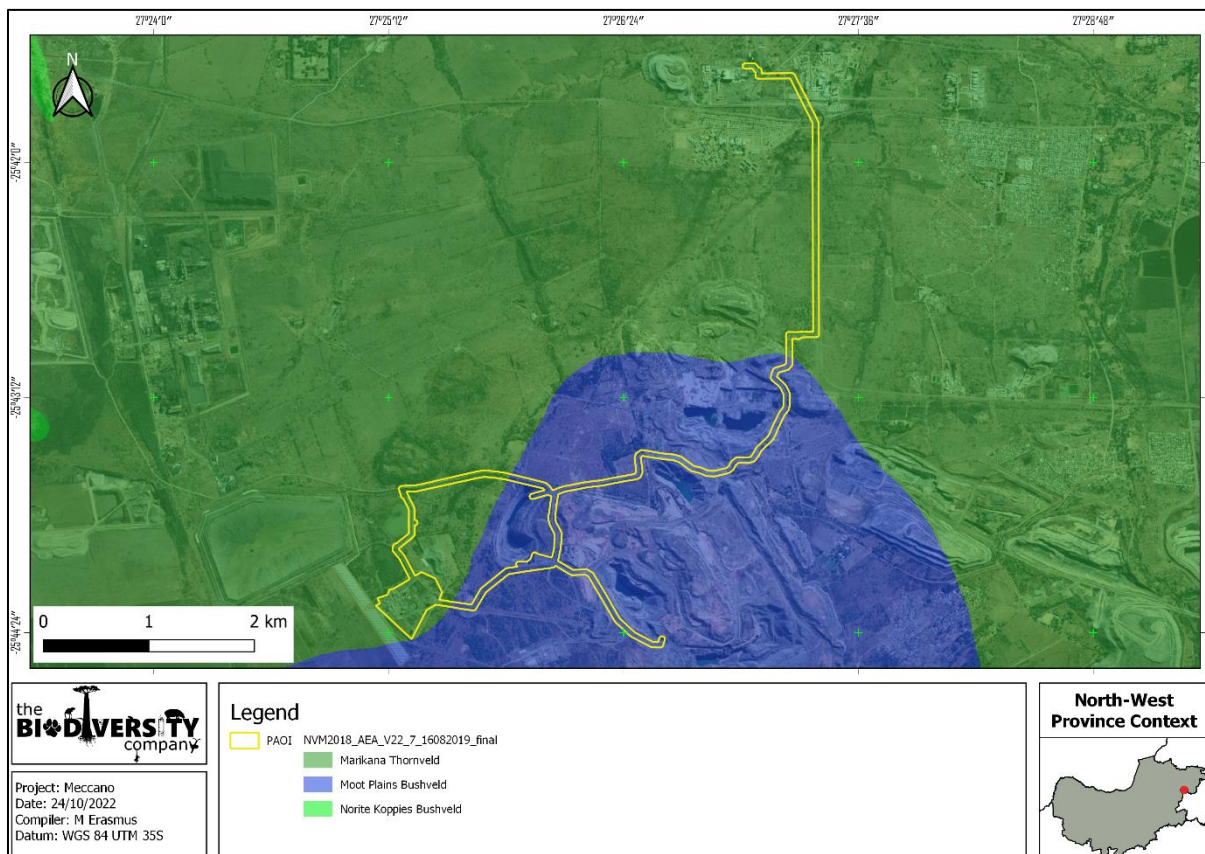


Figure 10-8: The Study Area in Relation to the Vegetation Types (TBC, 2022)

b) Moot Plains Bushveld

Moot Plains Bushveld is found in the North-West and Gauteng Provinces. This vegetation type consists of open to closed, low, often thorny savanna dominated by various species of *Acacia* in the bottomlands and plains as well as woodlands of varying height and density on the lower hillsides. The herbaceous layer is dominated by grasses.

According to Mucina & Rutherford (2006), this vegetation type is classified as Vulnerable. The national target for conservation protection is 19%, but only 13% are statutorily conserved mainly in the Magaliesberg Nature Area. About 28% has been transformed mainly by cultivation and urban and built-up areas. Some dense patches of various alien plants including *Cereus jamaicaru*, *Eucalyptus species*, *Jacaranda mimosifolia*, *Lantana camara*, *Melia azedarach* and *Schinus* species occur in this vegetation type.

10.4.2 North West Biodiversity Sector Plan

The North-West Department of Rural, Environment, and Agricultural Development (READ), as custodian of the environment in the North-West, is the primary implementing agent of the Biodiversity Sector Plan. The spatial component of the Biodiversity Sector Plan is based on systematic biodiversity planning undertaken by READ. The purpose of a Biodiversity Sector Plan is to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land use planning and decision-making guidelines.

CBAs are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems as well as the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met.

ESAs are terrestrial and aquatic areas that are not essential for meeting biodiversity representation targets (thresholds), but which play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree or extent of restriction on land use and resource use in these areas may be lower than that recommended for CBAs.

The study area falls across both CBA2 and ESA 1 & 2 classified area (**Figure 10-9**). The status of these classifications was found to be modified and no longer accurate during the field assessment.

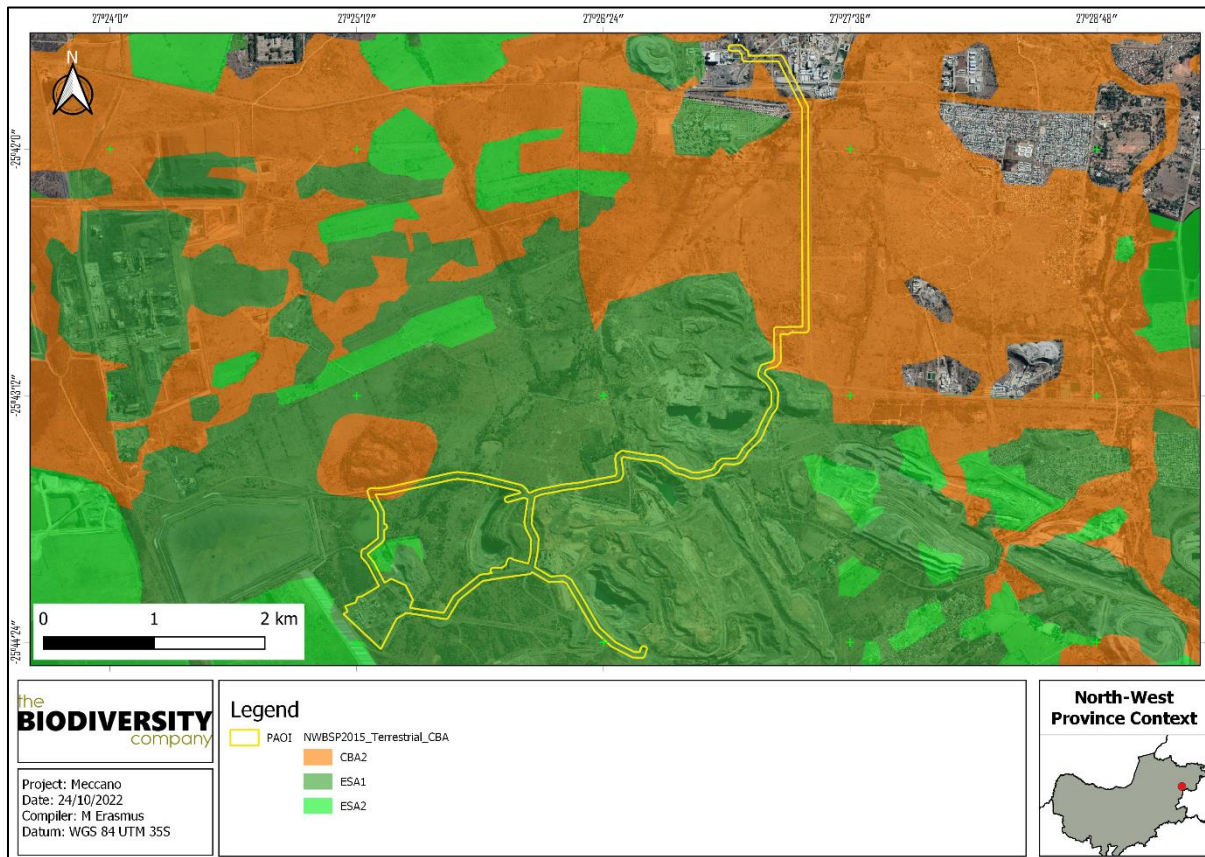


Figure 10-9: The Study Area in Relation to the Biodiversity Sector Plan (TBC, 2022)

10.4.3 Habitat Units

Three (3) habitat types were identified and delineated for the study area (**Figure 10-10**), these include transformed, disturbed areas and wetland systems. This was determined by the degree and extent of the impacts, most arising from an anthropogenic source, this source being the associated mining activities. Certain areas were transformed from the original state where other areas were regarded as disturbed grassland. Most of the study area occurs in close relation to existing pipelines and road servitudes, thus being mainly modified. Transformed areas represent all areas of mining area and infrastructure such as buildings, pits and roads (**Figure 10-11** and **Figure 10-12**) These habitats are regarded as transformed due to the nature of the modification of the area to such a point where it is not feasible to rehabilitate the area to the pre-transformed condition. These areas are considered to have a very low sensitivity.

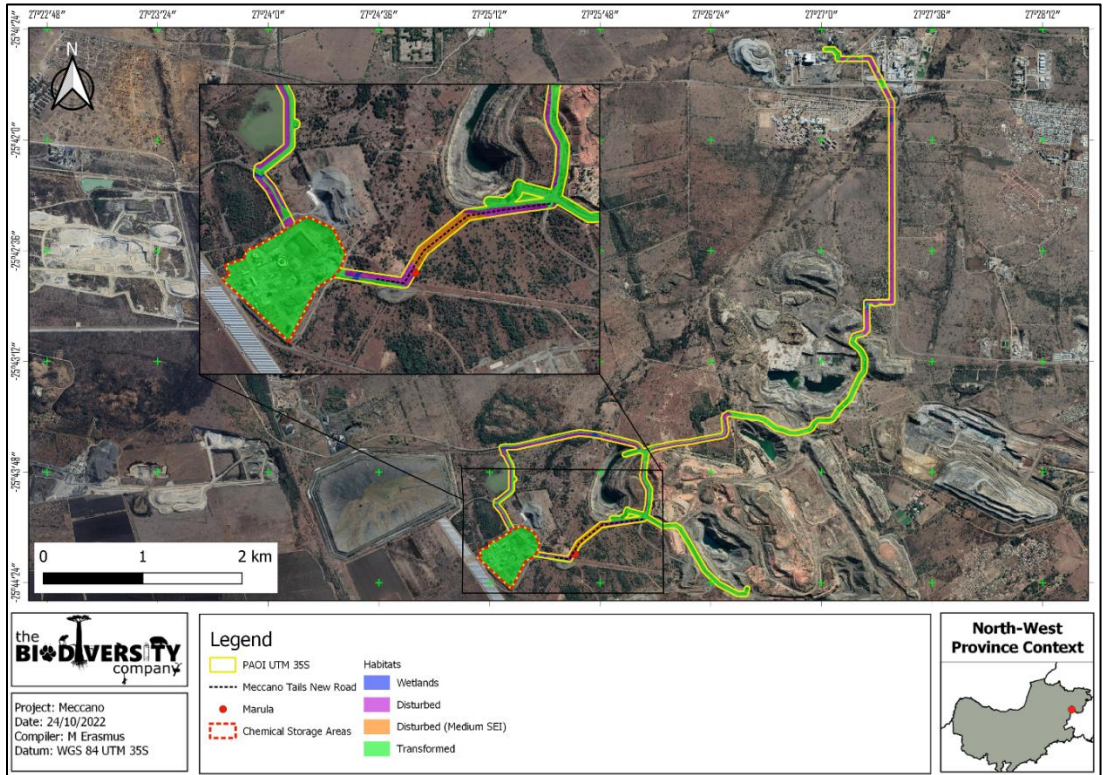


Figure 10-10: Habitats within the Study Area (TBC, 2022)



Figure 10-11: Transformed area within the Study Area



Figure 10-12: Transformed Area within the Study Area

Disturbed areas are regarded as areas that have been predominantly impacted by existing servitudes (edge effects), mining infrastructure, historic overgrazing, mismanagement and human land use (Figure 10-13 and Figure 10-14). The disturbed areas contain indigenous vegetation but have been and are currently being impacted which has resulted in these areas being fragmented from more natural areas. These areas will not recover to a more natural state without intervention and will most likely continue to degrade due to the surrounding land use. It is the opinion of the specialists that the study area does not support species of conservation concern anymore as the habitat has been altered. These areas are considered to have a low/medium sensitivity, depending on the degree of disturbance.



Figure 10-13: Disturbed habitat within the Study Area



Figure 10-14: Disturbed habitat within the Study Area

The wetland habitats are typically regarded as the more sensitive areas and avoidance and/or management of these areas should be informed by the relevant specialist. Despite the level of disturbance, the ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and an important habitat for various fauna and flora. The preservation of these systems is the most important aspect to consider for the proposed pipeline (Figure 10-15).



Figure 10-15: Wetland Habitat within the Study Area

10.4.4 Protected Species

During the field assessment 1 species of protected tree was observed: *Sclerocarya birrea*. subsp. *caffra* (Marula). The protected trees observed are protected by the List of Protected Tree Species under the National Forests Act, 1998 (Act No. 84 of 1998), no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Contravention of this declaration is regarded as a first category offence. The location of the single tree observed was 25°44'14.71"S 27°25'39.89"E (Figure 10-16). The proposed access road will accommodate the protected species, hence a permit for destruction will not be required.

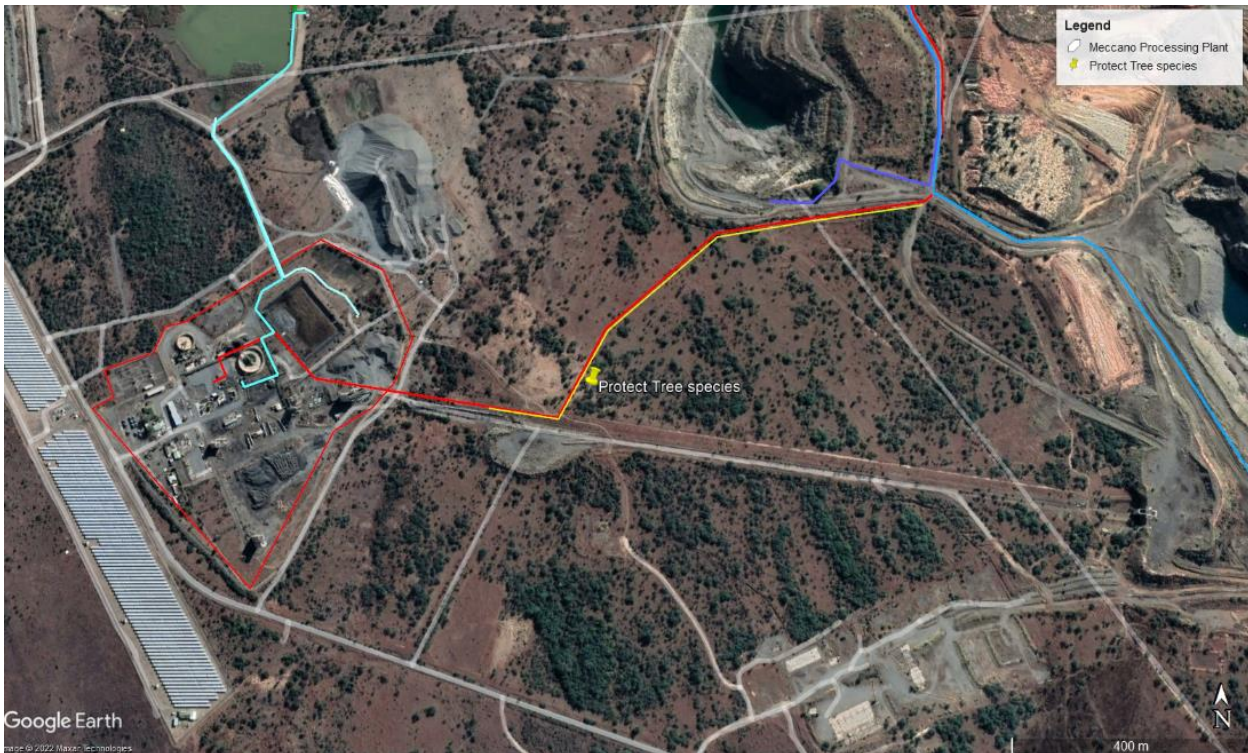


Figure 10-16: Location of the Protected Tree

10.4.5 Habitat Summary and Sensitivity

The study area is transformed/disturbed due to human influence and has been assigned a very low/low, medium sensitivity, whereas the wetlands were assigned a high sensitivity (Figure 10-17). A change to the current land use, namely mining (and associated activities) has caused the current predominantly transformed/disturbed state of the area. The study area does represent the low plant sensitivity. The CBA 2 and ESA status of the area has been determined to not be accurate as the area has been modified by the existing land use and infrastructure.

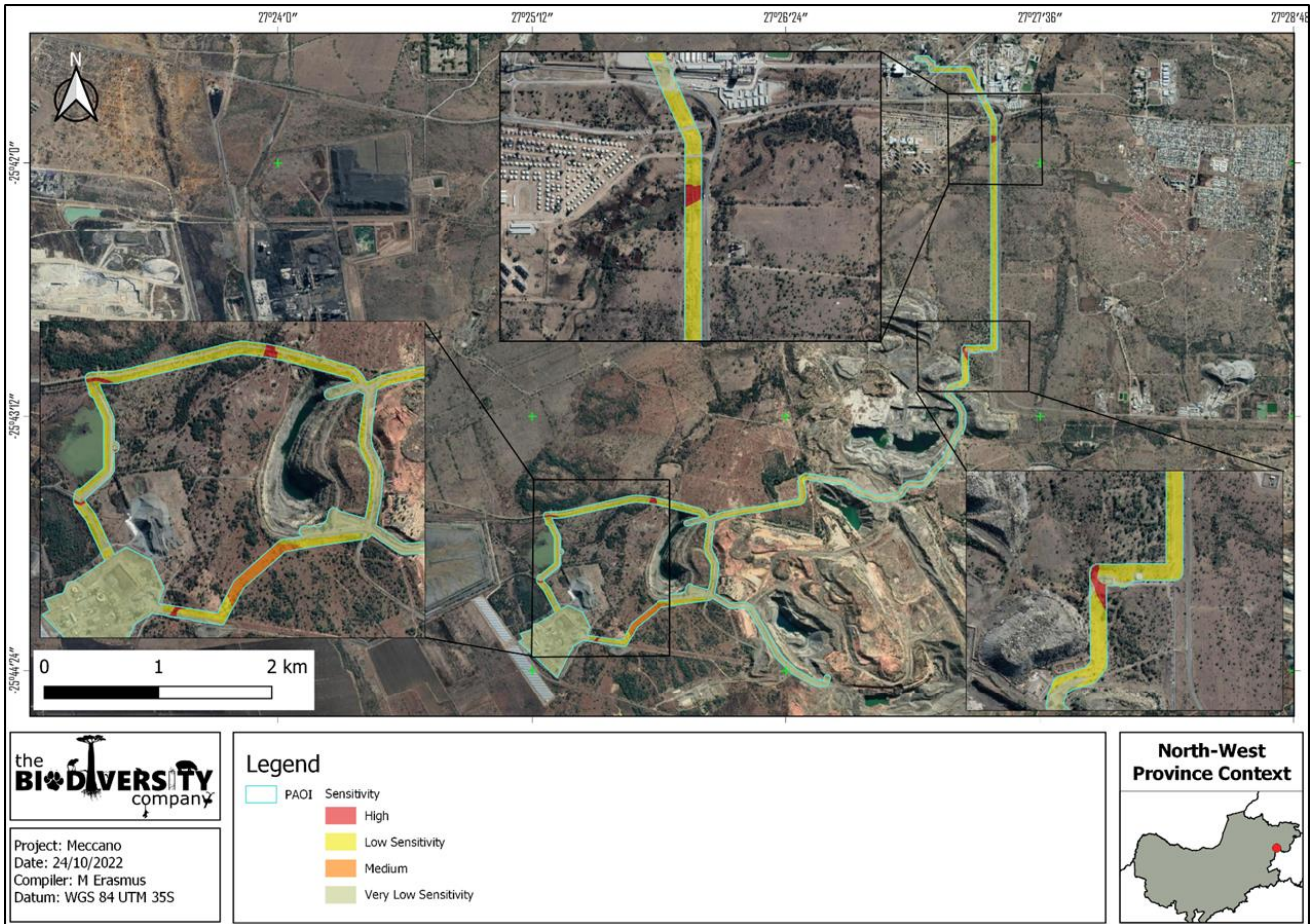


Figure 10-17: The Sensitivity of the Study Area (TBC, 2022)

10.4.6 Fauna

High levels of anthropogenic activity in the study area and surrounding area have led to a high level of transformation of natural faunal habitat throughout the study area. Thus the transformed faunal habitat and open veld habitat units are considered to be of low ecological sensitivity and conservation importance.

10.5 Surface water

A Wetland Delineation and Assessment was undertaken by WCS Scientific (Pty) Ltd. The report is provided in Appendix E4. The information provided in this section has been sourced from the specialist report.

10.5.1 Catchment

The study area is located within Primary Catchment A and within quaternary catchment A21K. Catchment A21K is drained by the Sterkstroom and Gwathle River, which drain into the Crocodile River to the north. A map showing the study area in relation to the quaternary catchment is provided in **Figure 10-18**.

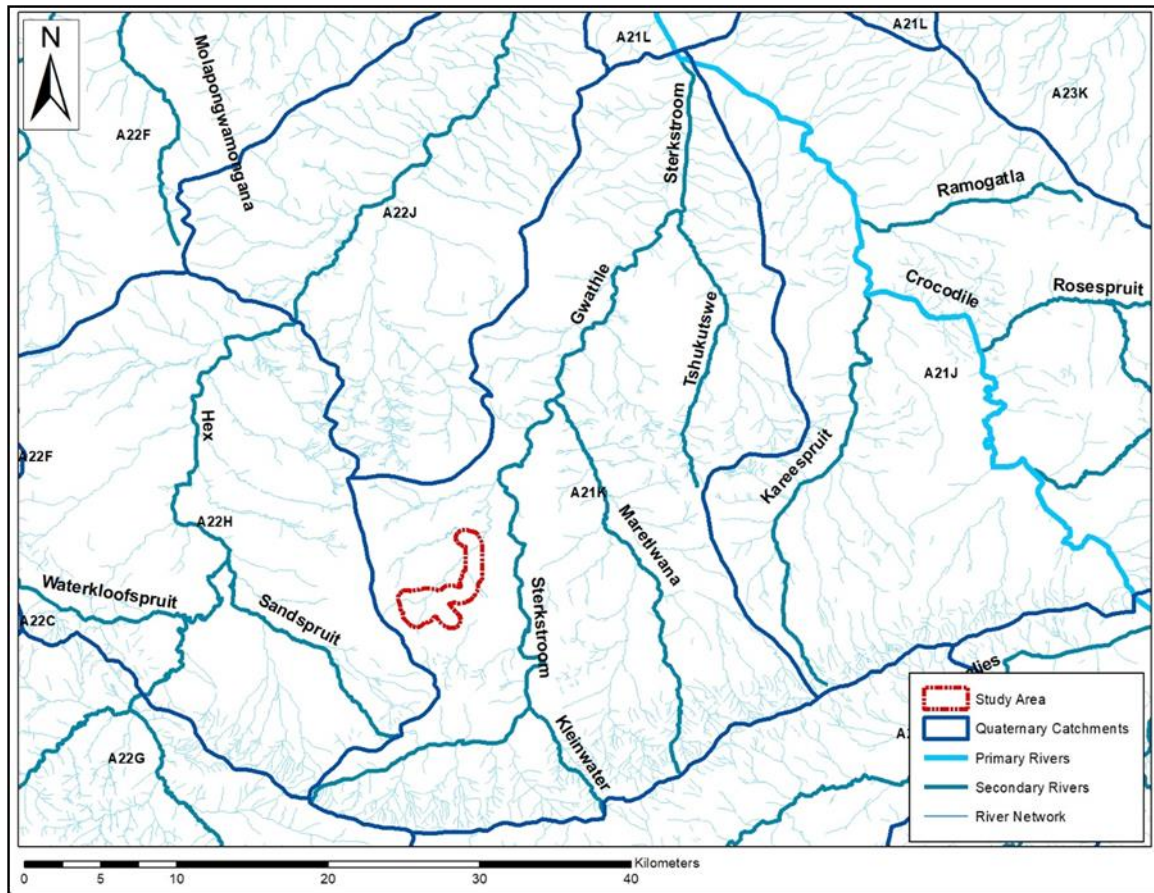


Figure 10-18: Map Showing the Study Area in Relation to the Quaternary Catchment (WCS Scientific, 2022)

10.5.2 Freshwater Ecosystem Priority Area

The Atlas of Freshwater Ecosystem Priority Areas (FEPA) in South Africa (Nel et al, 2011) which represents the culmination of the National Freshwater Ecosystem Priority Areas project (NFEPA), a partnership between SANBI, CSIR, WRC, DEA, DWA, WWF, SAIAB and SANParks, provides a series of maps detailing strategic spatial priorities for conserving South Africa’s freshwater ecosystems and supporting sustainable use of water resources. FEPA’s were identified through a systematic biodiversity planning approach that incorporated a range of biodiversity aspects such as ecoregion, current condition of habitat, presence of threatened vegetation, fish, frogs and birds, and importance in terms of maintaining downstream habitat.

According to the NFEPA database, no FEPA wetlands or rivers occur within the study area. However, the Sterksroom River, which flows just to the east of the study area, is categorised as a Phase 2 FEPA which were “identified in moderately modified rivers (C ecological category), only in cases where it was not possible to meet biodiversity targets for river ecosystems in rivers that were still in good condition (A or B ecological category). The river condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once FEPAs in good condition (A or B ecological category) are considered fully rehabilitated and well managed

10.5.3 Wetland Delineation

The delineation and classification of wetlands and watercourses was made challenging by the nature of the vertic clay soils, the high levels of disturbance of the vegetation across the site, and significant alterations to the hydrology and geomorphology of the watercourses. These alterations have largely been brought about by mining-related activities such as river diversions, and flow inputs from mine dams, Tailings Storage Facilities (TSFs), and other surface infrastructures. These additional flows impact the receiving watercourses by increasing the flow volumes and extending the period of saturation (from ephemeral/seasonal to seasonal/permanent), thereby supporting the establishment and persistence of wetland-typical, hydrophytic plant species in situations where it is suspected that, under natural conditions, the nature of the soils and the local climate would not support the widespread establishment of wetland conditions. Dams and other flow impounding features, such as roads and other linear

infrastructure crossings, also create conditions upstream that support the establishment of wetland habitat. It is thought that under natural conditions, the Marikana area, where it is characterised by heavy clay soils, would more typically support rivers and a network of smaller watercourses and drainage lines, with limited wetland habitat. With this in mind, it should be noted that the watercourses on site have been split into HGM units and classified based on the current situation, which reflects significant change from the assumed reference state.

Within the study area a number of aquatic ecosystems were identified and delineated, including, but not limited to wetland habitats. The hydro-geomorphic (HGM) types identified include:

- Unchannelled valley bottom wetlands;
- Channelled valley bottom wetlands;
- Rivers; and
- Diverted watercourse (River diversion channel).

The map of the delineated and classified wetlands, riparian habitat and watercourses within the Study Area is provided in **Figure 10-19**.

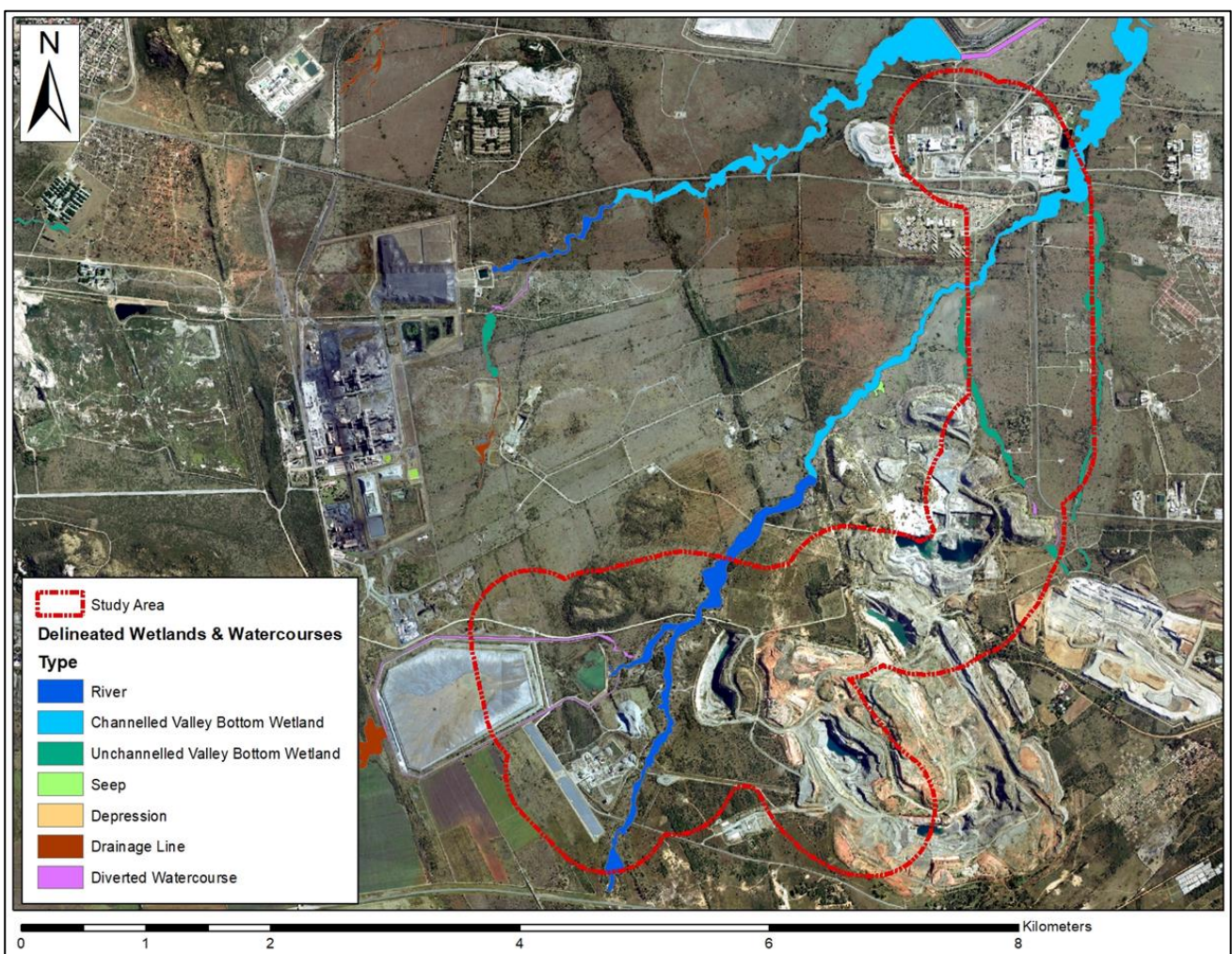


Figure 10-19: Map of the delineated and classified wetlands, riparian habitat, and watercourses within the study area (WCS Scientific, 2022)

Unchanneled and Channelled Valley Bottom Wetlands

Valley bottom wetlands can be channelled or unchannelled. A channelled valley bottom will have a river channel running through it, whereas unchannelled valley bottom wetlands lack a defined channel. The latter can form when a river channel loses confinement and spreads out over a wider area, causing the concentrated flow associated with the river channel to change to diffuse flow. The valley bottom wetlands within the study area vary in the degree of channelisation observed. In some cases, a clearly defined channel is present, and flows are predominantly limited

to the channel, while in others, a channel is clearly absent and the valley bottom is easily identifiable as unchannelled and exhibits very diffuse longitudinal flow. However, many of the valley bottom wetlands were observed to be less easily classified and could at best be described as weakly channelled, whereby one or more poorly defined channels are present, or may appear and disappear along the wetland's course. In such cases, the dominant characteristic along the length of wetland – channelled or unchannelled – was applied in the classification. Therefore, in some instances, wetlands classified as unchannelled valley bottoms may display intermittent channelling (often due to erosion) or the presence of a weak channel in places, however, the larger HGM unit is dominated by diffuse flows. Similarly, systems classified as channelled may display short, unchannelled sections, but again, the larger wetland HGM unit is dominated by a channel.

Valley bottom wetlands are the second most dominant HGM type present within the study area, based on area covered. The valley bottom wetlands delineated range from temporarily to permanently saturated, with the larger channelled system displaying seasonal to permanent saturation. In many cases, these valley bottom wetlands receive additional flows from various artificial sources (as discussed previously) which may be supporting greater permanence in the wetland saturation regime. The valley bottom wetlands are typically characterised by a short to medium height vegetation community and a mix of grasses and sedges. Plant species observed frequently within the valley bottom wetlands and used as indicators of wetland habitat included the sedge *Cyperus sexangularis*, the bulrush *Typha capensis*, and grass species such as *Phragmites australis*, *Paspalum distichum*, and *Dicanthium anulatum*.



Figure 10-20: Channelled and Unchannelled Valley Bottom Wetlands on site

Rivers

Rivers share certain features with channelled valley bottom wetlands, in that they are linear features, that carry concentrated flow of water within a channel. However, rivers differ from channelled valley bottom wetlands in that channelled valley bottoms experience saturation or flooding for prolonged periods which supports the establishment of wetland conditions beyond the active channel. Rivers often support riparian habitat adjacent to the active channel, which differs in vegetation composition and structure from adjacent terrestrial vegetation, however, many riparian areas are well drained and would not be defined as wetlands (according to the South African National Water Act), especially in the upper reaches of rivers (Ollis *et al.* 2013).

Rivers are the most abundant HGM type within the study area and consist of two sections of river channel. The river channels on site lack a consistent or well-defined riparian zone and appear to flow only ephemerally or seasonally. However, they have been classified as rivers, as they technically meet the definition of a river as stated above and lack the characteristics necessary to be classified as channelled valley bottom wetlands.

Where riparian vegetation occurs, it is dominated by species such as *Searsia lancea*, and *Vachellia karroo*.



Figure 10-21: River HGM units classified on site dominated by smaller, seasonal channels with limited or poorly developed riparian fringes (WCS Scientific, 2022)

Other Permanent Watercourse Features

This category includes two river diversions present on site. One that diverts flow around the TSF in the southwest and the other that diverts flow around a dump/stockpile in the southeast. These systems have replaced the naturally occurring wetlands or watercourses, where these have been destroyed within mining surface infrastructure, opencast mining, dumps, stockpiles, etc., and although not natural in origin, they are permanent watercourse features within the landscape. Where these watercourse reconstructions or diverted watercourses lie clearly within a larger HGM type, they have been considered as part of that HGM unit. However, in some cases, the diverted watercourses could not be easily associated with another HGM unit and have been considered as a separate watercourse.

10.5.4 Wetland Present Ecological State

The wetland and watercourses within the study area are located within a landscape that has become highly modified as a result of mining and mining-related activities. . As part of the PES assessment, landuse with the wetlands and watercourses was mapped on recent aerial imagery and based on the findings of the site visit. This information was integrated with the 2020 landcover dataset to produce a landuse map for the larger wetland and watercourse catchments. The results of the landuse mapping exercise are illustrated in Figure 13 and were used to inform the outcomes of the PES assessments for each of the watercourses. Each landuse is associated with a degree of impact to the components of wetland ecology, namely, hydrology, geomorphology, vegetation, and water quality. The study area is heavily dominated by mining-related activities, including opencast voids, river diversions, stockpiles and dumps, roads and pipelines, a TSF and associated return water dam (RWD), office/shaft/plant complexes, and residential settlements. These infrastructures have impacted on the wetlands and rivers. Significant impacts noted during the site visit included the following:

- Significant alterations to the natural hydrology supporting and characterising the wetlands as a result of flow impoundment and diversion around surface mining infrastructure.
- Loss of wetland habitat within the footprint of mining infrastructures.
- Inputs of additional flows to the wetlands from various discharge locations, both on site and within the catchment.

- Altered vegetation composition and structure, both within the wetland and its catchment, resulting from past landuse changes. The vegetation within the Marikana area is extensively disturbed and modified, with limited examples remaining of intact Marikana Thornveld or Moot Plains Bushveld.

The above impacts and various landuses within the catchments have resulted in the present ecological state of the wetland and watercourses on site departing significantly from the reference condition or un-impacted state. This is reflected in the results of the PES assessment which classes the wetland and river habitat as being moderately to largely modified (PES C to D). The table showing the rating scale used for the PES is provided in **Table 10-3**.

Table 10-3: Rating Scale Used for the PES Assessment

Description	Combined impact score	PES Category
Unmodified, natural.	0-0.9	A
Largely natural with few modifications. A slight change in ecosystem processes is discernable and a small loss of natural habitats and biota may have taken place.	1-1.9	B
Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact	2-3.9	C
Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4-5.9	D
The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6-7.9	E
Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8 - 10	F

The results of the PES assessment are provided **Figure 10-22**.

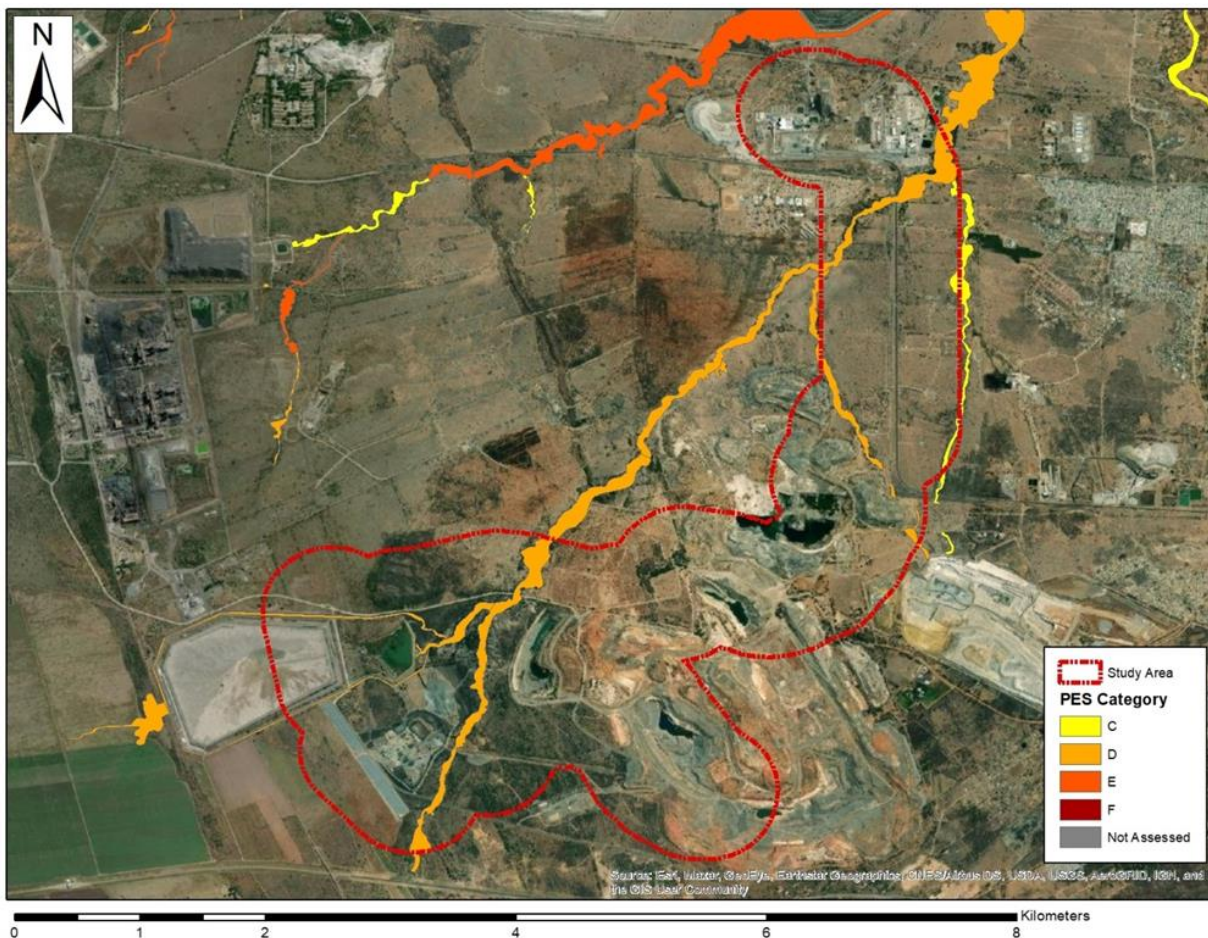


Figure 10-22: Map showing the results of the PES assessment (WCS Scientific, 2022)

10.5.5 Wetland Functional Assessment

Wetlands have been shown to perform a wide range of functions related to water quality improvement, flood attenuation, resource provision and erosion control, among others. However, each wetland is unique in the extent to which it is able to perform these functions. Many of the functions and services attributed to a wetland are inferred from the HGM classification of the wetland, as well as the levels of disturbance, cultural importance, and potential for the wetland to perform various functions. The nature of the functions that the wetlands perform and the services they provide were assessed using the Wet-Ecoservices tool, whereby both existing information and a field assessment were required.

The results of the assessment are detailed in **Table 10-4**. The valley bottom wetlands obtained generally Moderate scores for the Regulating and Supporting ecosystems services, with the water quality enhancement functions such as phosphate trapping, nitrate trapping and toxicant removal highlighted as especially important. These scores are a consequence of the ability of the wetland to supply these services (the unchannelled and diffuse nature of flows through the wetland allow for extended contact time between flows and wetland sediments, though the seasonal nature of the wetland limits this somewhat) as well as a demand for these services (presence of the surcharging sewer, as well as urban runoff entering the wetland). The wetland further plays a role in flood attenuation and erosion control, both ecosystem services whose importance is amplified by the presence of nearby expanding urban areas and the discharge of stormwater into the wetland.

Scores obtained for the Provisioning and Cultural ecosystem services were generally low, though it must be pointed out that limited information was available on the cultural significance of these features. The wetlands do however provide important grazing for livestock.

Table 10-4: Results of the WET-EcoServices Assessment for the Wetland HGM type

ECOSYSTEM SERVICE		Channelled Valley Bottom Wetland				Unchannelled Valley Bottom Wetland			
		Supply	Demand	Importance Score	Importance	Supply	Demand	Importance Score	Importance
REGULATING AND SUPPORTING SERVICES	Flood attenuation	2.3	0.6	1.1	Low	1.2	0.6	0.0	Very Low
	Stream flow regulation	2.7	0.7	1.5	Moderately Low	2.3	0.7	1.2	Low
	Sediment trapping	2.8	2.0	2.3	Moderate	3.0	2.0	2.5	Moderately High
	Erosion control	1.6	1.8	1.0	Low	1.3	1.8	0.7	Very Low
	Phosphate assimilation	2.6	2.0	2.1	Moderate	3.0	2.0	2.5	Moderately High
	Nitrate assimilation	2.7	2.0	2.2	Moderate	2.8	2.0	2.3	Moderately High
	Toxicant assimilation	2.6	3.0	2.6	Moderately High	3.0	3.0	3.0	High
	Carbon storage	1.8	2.7	1.6	Moderately Low	0.8	2.7	0.7	Very Low
	Biodiversity maintenance	2.7	3.0	2.7	High	2.8	3.0	2.8	High
PROVISIONING SERVICES	Water for human use	1.6	1.3	0.8	Very Low	1.0	0.0	0.0	Very Low
	Harvestable resources	2.5	0.7	1.3	Moderately Low	2.0	0.7	0.8	Low
	Food for livestock	1.5	2.0	1.0	Low	2.3	2.0	1.8	Moderate
	Cultivated foods	1.3	1.0	0.3	Very Low	1.7	1.0	0.7	Very Low
CULTURAL SERVICES	Tourism and Recreation	0.2	0.0	0.0	Very Low	0.1	0.0	0.0	Very Low
	Education and Research	0.3	0.3	0.0	Very Low	0.3	0.3	0.0	Very Low
	Cultural and Spiritual	1.0	0.0	0.0	Very Low	1.0	0.0	0.0	Very Low

10.5.6 Wetland Importance and Sensitivity

In terms of assessing the importance and sensitivity of the wetlands and watercourses, the following factors were considered:

- The wetland habitats delineated fall within areas considered to be Critical Biodiversity Areas and Ecological Support Areas according to the North West Province's Biodiversity Sector Plan (READ, 2015), which means that these areas are necessary in meeting the provinces' biodiversity targets.
- Marikana Thornveld, which covers large sections of the study area, is considered Vulnerable according to the published National List of Ecosystems that are Threatened and in Need of Protection (GN1002 of GG34809, NEMBA 2004), and therefore intact areas of habitat should be maintained to limit further losses.
- The wetland vegetation type of the area, Central Bushveld Bioregion (Valley Bottom), is Critically Endangered.
- The moderately to seriously modified state of the wetlands within the study area.
- The importance of the valley bottom wetlands ecological corridors in a moderately to largely transformed rural landscape.

Given the above points, the wetland habitat on site can be considered important from both a functional and conservation perspective and should be properly managed and prevented from deteriorating further. Within this context an IS assessment was conducted for every hydro-geomorphic wetland unit identified within the study area. The results of the IS assessment indicate that the channelled and unchannelled valley bottom wetlands are of moderate importance and sensitivity. The results of the assessment are illustrated in **Figure 10-23**.

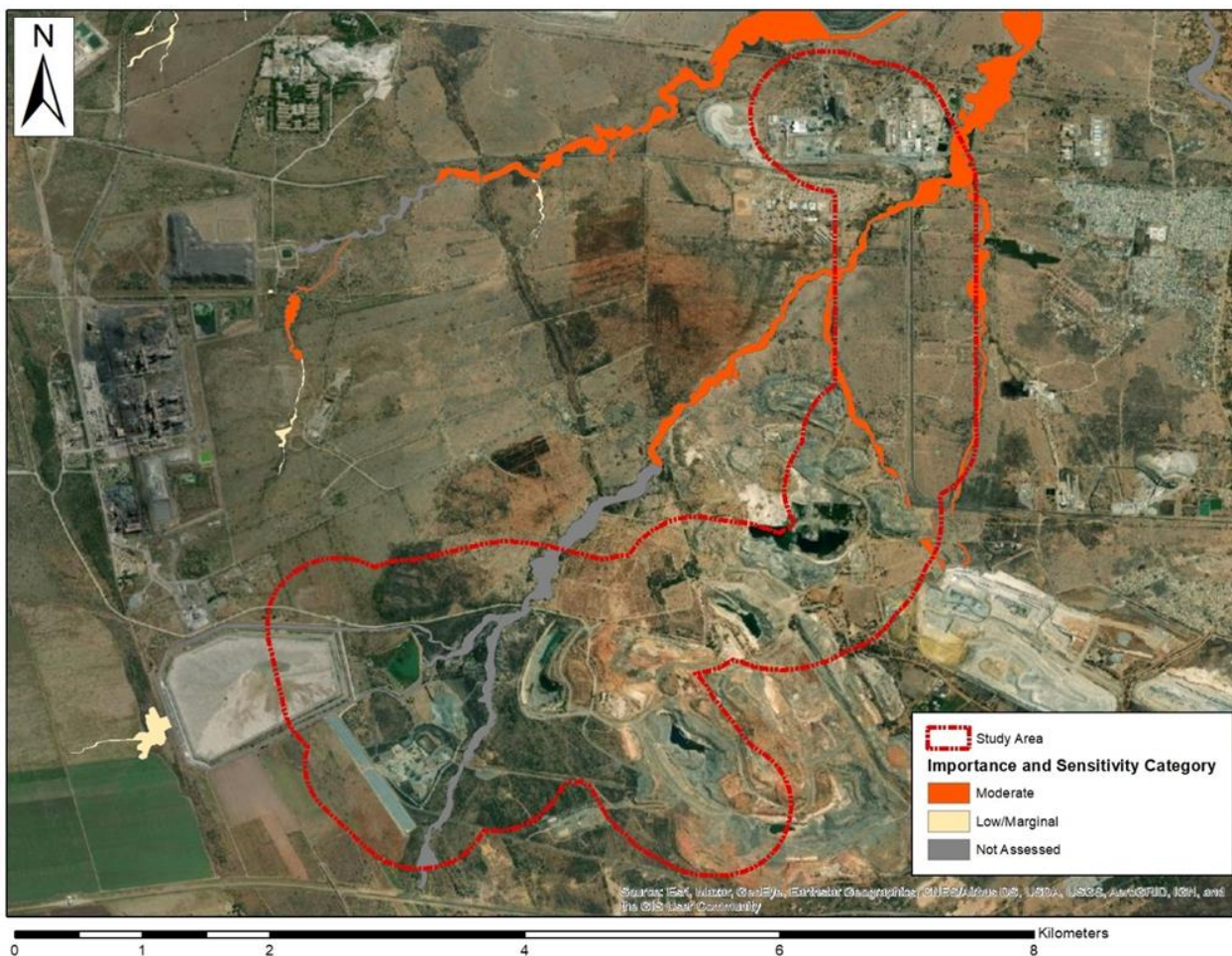


Figure 10-23: Wetland Importance and Sensitivity Assessment (WCS Scientific, 2022)

10.5.7 Functional Importance of the Riparian Habitat

The riparian habitat can play an important role through the following functions:

- It provides habitat and migratory pathways for terrestrial and aquatic fauna within a transformed landscape.
- Buffers the aquatic environment (when surface flow is present) from increasing surface runoff and noise pollution.
- The rooting system of the trees (and other vegetation) helps to stabilise the soil and limit erosion.
- The plants provide a refuge for species utilizing the habitat, and also create a mosaic of habitats which encourage greater diversity.

In terms of importance, the riparian habitats delineated fall within areas considered to be Ecological Support Areas according to the North-West Province’s Biodiversity Sector Plan Terrestrial and Aquatic layers, which indicates that these riparian habitats play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The vegetation unit that encompasses the majority of the riparian habitat – Marikana Thornveld – is considered Vulnerable according to the published National List of Ecosystems that are Threatened and in Need of Protection (GN1002 of GG34809, NEMBA 2004), and therefore intact areas of habitat should be maintained to limit further losses.

Given the above points, the riparian habitat on site can be considered important from both a functional and conservation perspective and should be properly managed and prevented from deteriorating further.

10.5.8 Watercourse Crossing Points

Six crossing points were identified **Figure 10-24**.

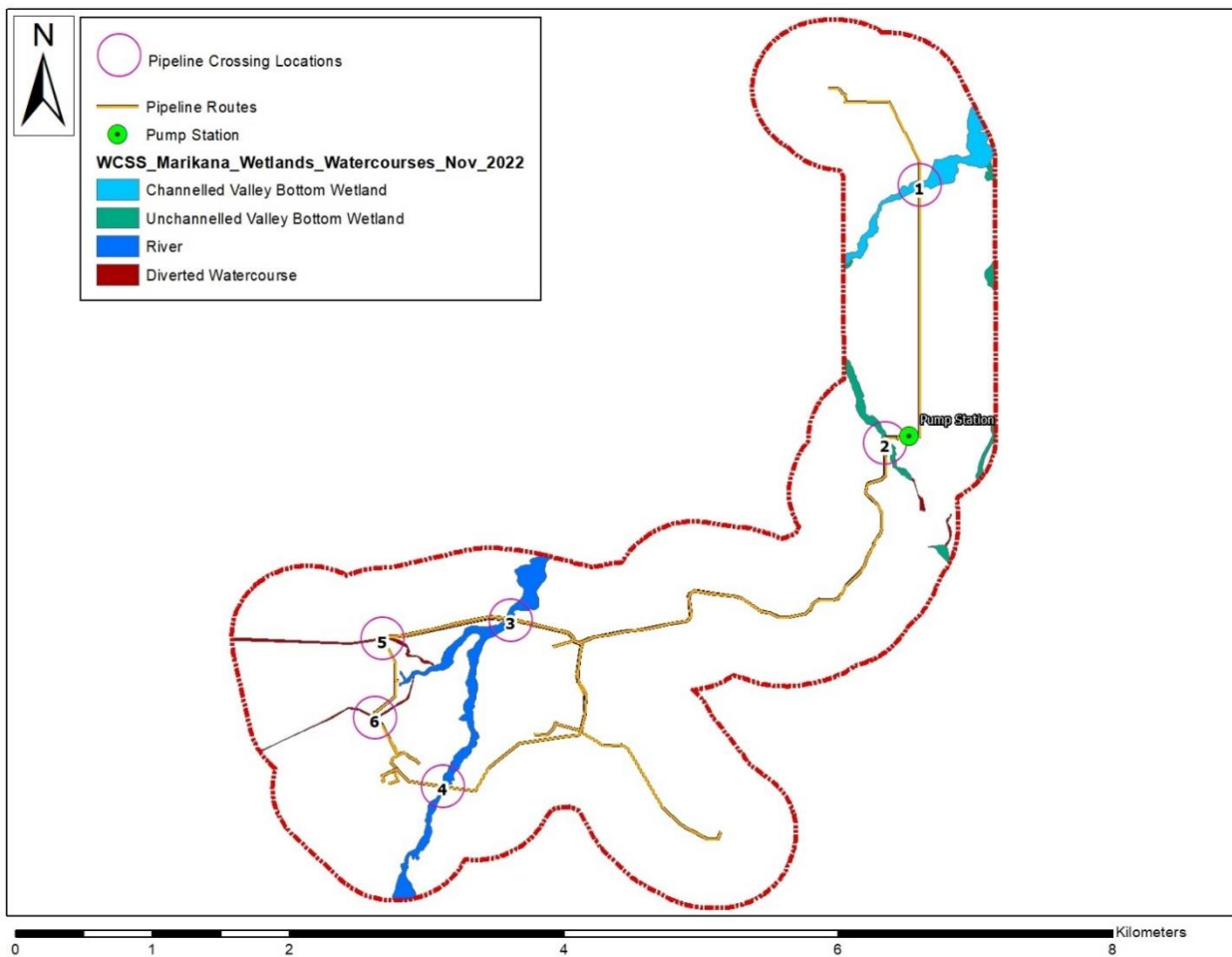


Figure 10-24: Watercourse crossing points

10.6 Heritage

A Phase 1 Heritage Impact Assessment was undertaken by Dr Julius CC Pistorius. The report has been provided in **Appendix E3**.

The Heritage Impact Assessment revealed the following types and ranges of heritage resources as outlines in Section 3 of the National Heritage Resources Act (No 25 of 1999)

- A large graveyard (GY01) situated north of the existing haul road along which pipelines are proposed (**Figure 10-25 & Figure 10-26**).

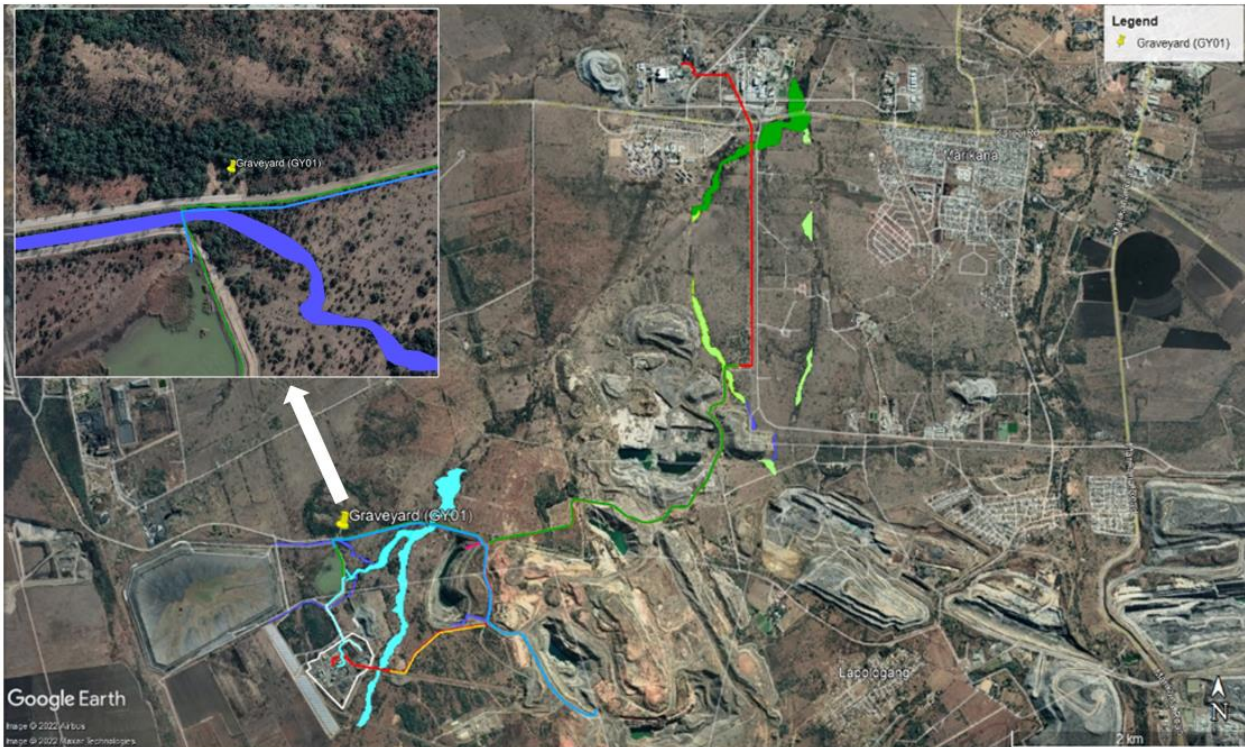


Figure 10-25: Map Showing the Location of the Graveyard



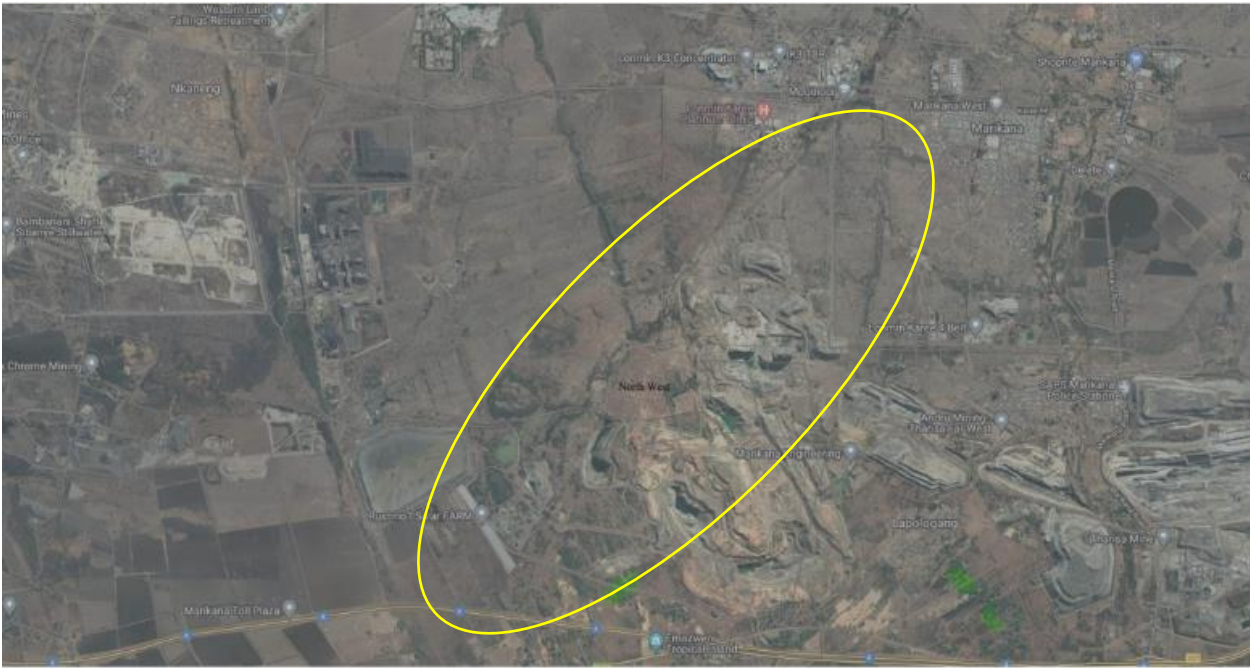
Figure 10-26: Graveyard (GY01) situated on the Northern Shoulder of the Haul Road

The graveyard has more than 50 and perhaps as many as 100 graves. Most of the graves are undecorated and without headstones with inscriptions. However, it can be expected that many of the graves may be older than sixty years.

According to the layout of the proposed project, the graveyard will not be impacted on by the proposed project, as the proposed pipelines will be constructed along the southern shoulder of the haul road.

10.7 Palaeontological Features

According to the South African Heritage Resources Agency Paleontological map the paleontological sensitivity of the study area is insignificant/Zero. Refer to **Figure 10-27**.



Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study; a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map

Figure 10-27: Paleontological Sensitivity of the Study Area as Indicated on the SAHRA Palaeontological Sensitivity Map

10.8 Socio-economic setting

The proposed project falls within Wards 45 & 32 of the Rustenburg Local Municipality, which forms part of the Bojanala District Municipality (BPDM) in the North West Province. The Rustenburg Local Municipality covers an area of 3442.8 square kilometres and represents the core part of platinum mining in South Africa, and the N4 Platinum Development Corridor runs from east to west through the municipal area. The economic, social and physical characteristics of Rustenburg have been largely determined by the presence of mining activities within the Municipal Area. Mining activities are mainly concentrated along a geological belt, known as the Bushveld Complex.

Information on socio-economic aspects was obtained from the Rustenburg Local Municipality's Integrated Development Plan (2022-2027).

With 719 000 people, the Rustenburg Local Municipality housed 1.2% of South Africa's total population in 2020. Between 2010 and 2020 the population growth averaged 3.03% per annum which is about double than the growth rate of South Africa as a whole (1.59%). Based on the present age-gender structure and the present fertility, mortality and migration rates, Rustenburg's population is projected to grow at an average annual rate of 1.7% from 719 000 in 2020 to 782 000 in 2022.

Rustenburg Local Municipality's male/female split in population was 120.9 males per 100 females in 2020. In 2020, the Rustenburg Local Municipality's population consisted of 90.32% African (649 000), 7.65% White (55 000), 0.92% Coloured (6 630) and 1.11% Asian (8 000) people.

In 2010, the unemployment rate for Rustenburg was 21.7% and increased overtime to 30.8% in 2020. Rustenburg Local Municipality employs a total number of 216 000 people within its local municipality. In Rustenburg Local Municipality the economic sectors that recorded the largest number of employment in 2020 were the mining sector with a total of 68 200 employed people or 31.6% of total employment in the local municipality.

10.8.1 Free Basic Water

Rustenburg Local Municipality has a total number of 76 800 (or 31.14%) households with piped water inside the dwelling, a total of 130 000 (52.66%) households had piped water inside the yard and a total number of 1 700 (0.69%) households had no formal piped water.

10.8.2 Sanitation

Rustenburg Local Municipality has a total number of 153 000 flush toilets (61.92% of total households), 29 700 Ventilation Improved Pit (VIP) (12.02% of total households) and 57 900 (23.47%) of total households pit toilets. Households by type of sanitation.

10.8.3 Electricity

Rustenburg Local Municipality has a total number of 2 300 (0.93%) households with electricity for lighting only, a total of 212 000 (86.06%) households had electricity for lighting and other purposes and a total number of 32 100 (13.01%) households did not use electricity.

10.9 Description of current land uses

The current land use of the proposed study area can be described as mining or mining right areas. Some of the surrounding land uses are as follows:

- Mining, industry and degraded land
- Urban residential
- Agricultural
- Conservation areas
- Other uses (eg Solar Farm)

The proposed project therefore is in line with the existing current land use. The land use map is provided in **Figure 10-28**.

Currently the infrastructure located within close proximity of the study area includes the following:

- Power and water supply network,
- Access and haulage roads
- K3 concentrator and the K3 shaft
- Karee 1 million pump station
- UG2 pit previously used for open cast mining
- Various voids previously used for open cast mining
- Marikana Return Water Dam
- Void 5 (also known as the West West Pit)
- Meccano 1 plant (old Marikana concentrator)

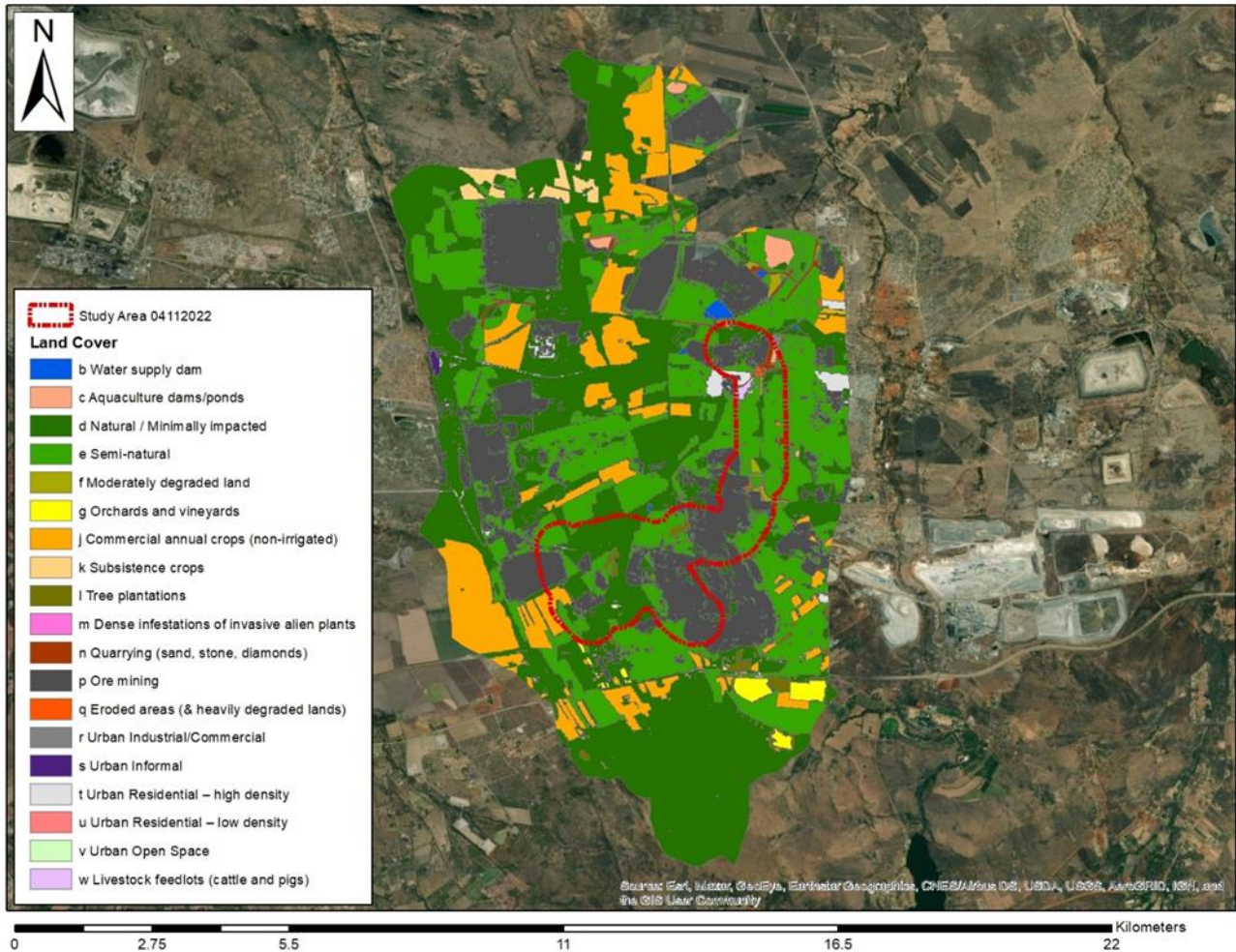


Figure 10-28: Map Showing the Landuse Mapping Results for the Larger Wetland Catchment (WCS Scientific, 2022)

10.10 Description of specific environmental features and infrastructure on site

According to the specialist assessments that have been commissioned as part of the Basic Assessment Process the following environmental features have been identified within the project footprint:

- Wetlands & watercourses
- Graveyard (Gy01)
- Protected tree Species, *Sclerocarya birrea*. subsp. *caffra* (Marula)
- Conservation areas in terms of the North West Biodiversity Sector Plan (2015)

An Environmental Sensitivity map is provided in Part B **Figure 3-1**.

11 IMPACTS AND RISKS IDENTIFIED

(including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated)

11.1 National Environmental Screening Tool

On 5 July 2019, The Department of Forestry, Fisheries and the Environment (DFFE) gave Notice of the requirement to submit a report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA and Regulation 16(1)(b)(v) of the EIA Regulations, 2014, as amended. The submission of this report is compulsory when submitting an application for environmental authorisation in terms of Regulation 19 and Regulation 21 of the Environmental Impact Assessment Regulations, 2014 (as amended).

This Site Sensitivity Verification has been compiled to provide a rationale for the specialist studies undertaken as part of the environmental authorisation process and appended to this Draft BAR. This section addresses the findings of the Screening Tool Report (**Appendix B**), generated from the National Web Based Environmental Screening Tool, and provides a motivation for the various specialist studies identified to be conducted.

Table 11-1 is a summary of the environmental sensitivities within the application project area as identified in the Environmental Screening report.

Table 11-1: Environmental Sensitivity of the Project Area

Theme	Very High Sensitivity	High Sensitivity	Medium Sensitivity	Low Sensitivity
Agricultural theme		X		
Animal species theme			X	
Aquatic biodiversity theme	X			
Archaeological and Cultural Heritage Theme		X		
Civil Aviation Theme		X		
Defence Theme				X
Palaeontology Theme			X	
Plant Species Theme				X
Terrestrial Biodiversity Theme	X			

11.1.1 Specialist Assessments Identified

Based on the environmental sensitivities of the proposed project area summarised in **Table 11-1**, the following list of specialist assessments were identified by the Screening Tool Report (**Table 11-2**). A motivation by the EAP has been provided where a study has not been undertaken.

Table 11-2: Specialist studies required as per the Screening Tool Report and relevant motivations

Specialist study	Included/not included	Motivation
Landscape Visual Impact Assessment	Not Included	The proposed infrastructure occurs in close relation to existing pipelines, road servitudes, built up areas, this being mainly modified. The proposed development will not alter the landscape and therefore a landscape/Visual Impact Assessment is not required.
Archaeological and Cultural Heritage Impact Assessment	Included	A Heritage Impact Assessment has been undertaken. The specialist report is provided in Appendix E3 .

Specialist study	Included/not included	Motivation
Palaeontology Impact Assessment	Not included	The proposed project area falls within the GREY category of SAHRA's Paleontological Sensitivity map, indicating insignificant/zero sensitivity thus no paleontological studies are required.
Terrestrial Biodiversity Impact Assessment	Included	A Vegetation Assessment has been undertaken. The Specialist report is provided in Appendix E1 .
Aquatic Biodiversity Impact Assessment	Included as part of Wetland Assessment and Delineation.	A Wetland Assessment and delineation has been undertaken and provided in Appendix E4 .
Socio-Economic Assessment	Not included	As the proposed project entails infrastructure associated with mining activities it is anticipated that the proposed project will blend with the existing activities within the project area. A socio-economic assessment has not been undertaken.
Plant Species Assessment	Included	A Vegetation Assessment has been undertaken. The Specialist report is provided in Appendix E1 .
Animal Species Assessment	Not included	Majority proposed pipelines will be constructed adjacent to existing roads and pipeline. The dangerous goods area is proposed to be situated within an already disturbed footprint. Due to existing mining activities within the study area, it is not anticipated that the proposed project will impact on the fauna. An animal species assessment has not been undertaken,

11.2 Methodology used in determining the significance of environmental impacts

The EIA Regulations requires the identification and assessment of risks and impacts as a result of the proposed project. This environmental impact assessment forms the basis for the Environmental Management Programme (EMP) which puts forth specific measures to reverse, avoid, manage, and mitigate anticipated risks. The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998. As with all impact methodologies, the impact is defined in a semi-quantitative way and will be assessed according to methodology prescribed in the following section.

Table 11-3: Scale utilised for the evaluation of the Environmental Risk rating

Evaluation Component	Rating	Scale	Description / criteria
MAGNITUDE of negative impact (at the indicated spatial scale)	10	Very high	Bio-physical and/or social functions and/or processes might be <i>severely</i> altered.
	8	High	Bio-physical and/or social functions and/or processes might be <i>considerably</i> altered.
	6	Medium	Bio-physical and/or social functions and/or processes might be <i>notably</i> altered.
	4	Low	Bio-physical and/or social functions and/or processes might be <i>slightly</i> altered.
	2	Very low	Bio-physical and/or social functions and/or processes might be <i>negligibly</i> altered.
	0	Zero	Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	10	Very high	Positive: Bio-physical and/or social functions and/or processes might be <i>substantially</i> enhanced.
	8	High	Positive: Bio-physical and/or social functions and/or processes might be <i>considerably</i> enhanced.
	6	Medium	Positive: Bio-physical and/or social functions and/or processes might be <i>notably</i> enhanced.
	4	Low	Positive: Bio-physical and/or social functions and/or processes might be <i>slightly</i> enhanced.

Evaluation Component	Rating	Scale	Description / criteria
	2	Very low	Positive: Bio-physical and/or social functions and/or processes might be <i>negligibly</i> enhanced.
	0	Zero	Positive: Bio-physical and/or social functions and/or processes will remain <i>unaltered</i> .
DURATION	5	Permanent	Impact in perpetuity. –
	4	Long term	Impact ceases after operational phase/life of the activity > 60 years.
	3	Medium term	Impact might occur during the operational phase/life of the activity – 60 years.
	2	Short term	Impact might occur during the construction phase - < 3 years.
	1	Immediate	Instant impact.
EXTENT (or spatial scale/influence of impact)	5	International	Beyond the National boundaries.
	4	National	Beyond provincial boundaries, but within National boundaries.
	3	Regional	Beyond 5 km of the site and within the provincial boundaries.
	2	Local	Within a 5 km radius of the site.
	1	Site-specific	On site or within 100 meters of the site boundaries.
	0	None	Zero extent.
IRREPLACEABLE loss of resources	5	Definite	Definite loss of irreplaceable resources.
	4	High potential	High potential for loss of irreplaceable resources.
	3	Moderate potential	Moderate potential for loss of irreplaceable resources.
	2	Low potential	Low potential for loss of irreplaceable resources.
	1	Very low potential	Very low potential for loss of irreplaceable resources.
	0	None	Zero potential.
REVERSIBILITY of impact	5	Irreversible	Impact cannot be reversed.
	4	Low irreversibility	Low potential that impact might be reversed.
	3	Moderate reversibility	Moderate potential that impact might be reversed.
	2	High reversibility	High potential that impact might be reversed.
	1	Reversible	Impact will be reversible.
	0	No impact	No impact.
PROBABILITY (of occurrence)	5	Definite	>95% chance of the potential impact occurring.
	4	High probability	75% - 95% chance of the potential impact occurring.
	3	Medium probability	25% - 75% chance of the potential impact occurring
	2	Low probability	5% - 25% chance of the potential impact occurring.
	1	Improbable	<5% chance of the potential impact occurring.
	0	No probability	Zero probability.
Evaluation Component	Rating scale and description / criteria		
CUMULATIVE impacts	<p>High: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Medium: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern.</p> <p>Low: The activity is localised and might have a negligible cumulative impact.</p> <p>None: No cumulative impact on the environment.</p>		

Once the Environmental Risk Ratings have been evaluated for each potential environmental impact, the Significance Score of each potential environmental impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential environmental impact as per **Table 11-4** below. The Environmental Significance rating process is completed for all identified potential environmental impacts both before and after implementation of the recommended mitigation measures.

Table 11-4: Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description / criteria
--------------------	----------------------------	------------------------

125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked at.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

11.3 Positive and negatives impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that me by affected

11.3.1 Positive Impacts

The following positive impact were identified and assessed as part of the Basic Assessment Process:

- As previously discussed in the report, the pipelines and associated infrastructure fall within the mining right area of Sibanye-Stillwater. The surface ownership of the potentially affected properties vests with Sibanye-Stillwater. Landowner consent is therefore not required as the applicant is the landowner. Privately owned land or state-owned land will not be affected by the proposed project, hence lease agreements will not be required.
- The proposed pipelines are situated within close proximity of the existing facilities from which tailings will be conveyed and is compatible with existing infrastructure.
- The project area is highly disturbed due to the long history of mining activities. The proposed activity is therefore anticipated to have less of an environmental impact in a disturbed environment compared to other areas where the environment is less disturbed.
- Mining has been identified as a prioritised sector as a potential to encourage or drive growth and or for their ability to create employment. The construction of the pipelines in support of the Meccano Tailings Retreatment Project will allow for continued production at Kroondal Operations Marikana Platinum Mine which ensures employment and local economic prospects.

11.3.2 Negative Impacts

The findings of the Basic Assessment Report indicated that the proposed pipelines and associated infrastructure would pose minimal and short term negative environmental impacts if adequate and appropriate mitigation measures are implemented, and positive long term environmental impacts when the project has been completed. The potential negative impacts are as follows:

- Increase in sedimentation on downstream watercourses due to exposed surfaces resulting in siltation of surface water resources.
- Potential of flooding of the pipeline structures at the watercourse crossing.
- Potential loss of wetland habitat.
- Alien plant infestation due to site clearing and disturbance.
- Pipeline could pollute the watercourse if failure of the pipeline occurs.

11.4 Possible mitigation measures that could be applied and the level of risk

The potential impacts and mitigation measures have been assessed as part of the Basic Assessment process. The impact assessment table is included on Error! Reference source not found..

11.5 Motivation where no alternatives were considered

Not applicable, alternatives have been considered and details are provided in **Section 8**.

11.6 Statement motivating the alternative development location within the overall site

The proposed pipelines are situated within close proximity of the existing facilities from which tailings and return water will be conveyed and is compatible with existing infrastructure. The project area is highly disturbed due to the long history of mining activities. The proposed activity is therefore anticipated to have less of an environmental impact in a disturbed environment compared to other greenfield areas where the environment is less disturbed. In addition, an environmental management programme will be implemented to mitigate the identified environmental impacts.

11.7 Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site through the life of the activity

The methodology used for the undertaking of the impact assessment is provided in Section 11.2. In addition, the following steps were undertaken to identify the potential impacts associated with the proposed project:

- A literature review was undertaken to identify and collate available information relevant to the proposed project and its environmental and social impacts (both positive and negative)
- Specialist studies were commissioned to provide baseline environmental conditions as well as the potential impacts of the proposed project on the receiving environment
- The public participation process is currently ongoing, which allows stakeholders to provide their input on the project. The Draft Basic Assessment Report has been made available for comment. Stakeholders were requested to provide their views on the project, and to state any potential concerns they may have. All comments and responses provided will be collated into the Comments and Responses Report, which will be attached to the Final Basic Assessment Report (FBAR) and will also be considered during the final impact assessment process.

11.8 Assessment of each identified potentially significant impact and risk

Refer to **Table 11-5** and **Table 11-6**.

Table 11-5 Assessment of Identified Potential Impacts of the Proposed Project During the Construction Phase

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Soils																				
Soil Compaction	Earthworks required for the pipeline, pump station, and access road, deliberate compaction to stabilize the surface.	6	4	1	3	4	5	90		Medium	Negative	<ul style="list-style-type: none"> Soil compaction is part of the construction to stabilise the surface against future subsidence-very little or no mitigation is possible. Demarcate the pipelines, access road and pump station footprint areas. Vegetation clearing and removal of topsoil to be limited to the demarcated area. Avoid construction during times of excessive wetness (rainfall episodes) as wet soil is more easily compacted. 	6	4	1	3	4	5	90	
Soil Erosion	Removal of the first 150mm of soil for laying of the pipelines. Removal of vegetation for the pipelines, access road and pump station	6	4	1	4	5	4	80		Medium	Negative	<ul style="list-style-type: none"> The project footprint area must be demarcated and vegetation clearing limited to the demarcated area. Regular checks along the pipeline routes to ensure that erosion does not occur. Signs of erosion must be addressed immediately to prevent further erosion. Stripping of vegetation should be conducted just prior to construction of a specific section of pipeline, pump station, not earlier than required. Once the pump station, return water and tailings pipelines have been established, vegetation establishment should be promoted by either shallow ripping of the compacted soil to ensure the natural seedbank will germinate or through active rehabilitation of the surface through soil amendment and seeding of natural veld grass. 	6	3	1	3	5	4	72	
Soil Chemical Pollution	Possible fuel and oil spills from vehicles and equipment as well as waste generated by construction workers and off-cut materials from the construction process	6	4	1	3	4	4	72		Low	Negative	<ul style="list-style-type: none"> Losses of fuel and lubricants from oil sumps and steering racks of vehicles and equipment used during construction should be contained using a drip tray filled with absorbent material. Vehicles and equipment should be parked in demarcated areas where vehicles can regularly be checked for oil leaks during the construction activities. Waste disposal at the construction sites should be avoided wherever possible by segregating, trucking out, and recycling waste. 	2	1	1	1	2	2	14	
Terrestrial Biodiversity																				
Destruction, fragmentation and degradation of habitats and ecosystems	Vegetation clearance for construction, construction vehicle and staff movement. Dust, erosion and soil compaction.	4	4	2	3	3	4	64		Low	Negative	<ul style="list-style-type: none"> All high sensitivity areas should be avoided, and development must be prioritized in very low and low areas. As much as possible, the direct footprint must be within or right next to existing servitudes/roads to reduce impacting secondary communities. Areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. Existing access routes and pipeline servitudes, especially roads must be made use of. All laydown, chemical toilets etc. should be restricted to very low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the study area once the construction phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project area. Compile and implement a rehabilitation plan from the onset of the Project. Progressive rehabilitation as the construction of the pipeline continues as well as any cleared areas will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. All structure footprints to be rehabilitated and landscaped after the development is complete. Rehabilitation of the disturbed areas existing in the study area must be made a priority. Topsoil must also be utilized, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. 	2	2	1	2	2	2	18	

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Loss of protected tree species	Construction of new tails access road	5	5	2	2	4	4	72		Low	Negative	<ul style="list-style-type: none"> Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to within the very low/low sensitivity areas and should be limited to the existing pipeline/road servitude. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. Should removal of any protected tree species be planned, a permit from the Department of Forestry Fisheries and Environment be obtained. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. 	4	2	1	2	2	2	22	
Spread and/or establishment of alien and/or invasive species	Vegetation clearance for construction, construction vehicle and staff movement.	5	4	2	3	4	4	72		Low	Negative	<ul style="list-style-type: none"> A pre-construction walk down should be conducted to identify and geolocate tree species for permitting purposes. No protected tree may be affected, removed, excavated, relocated or impacted in any manner, except under a valid permit. The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths. Compilation of and implementation of an alien vegetation management plan Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the study area, especially areas that have been recently re-planted. Use of Locally indigenous plant species for landscaping purposes is strongly recommended. Under no circumstances shall exotic and invasive plants be used. 	4	3	1	2	2	2	24	
Watercourses																				
Destruction of wetland/Watercourse Habitat	Construction of pipeline infrastructure	4	4	1	4	4	5	85		Medium	Negative	<ul style="list-style-type: none"> The extent of vegetation cleared within the wetlands/watercourses, if necessary, must be kept to an absolute minimum. Any areas within the wetlands/watercourses to be cleared must be demarcated at the start to ensure no areas of the wetlands/watercourses are accidentally and unnecessarily cleared. If it is necessary to cut/clear vegetation within the wetlands to facilitate installation of the pipelines, this must be done by hand or using small, hand-held implements (weed eater, chainsaw or similar). Cut vegetation or brush must be removed from the wetland/watercourse by hand. No heavy machinery or vehicles to enter the wetland boundaries to assist in vegetation clearing. The ECO and/or a wetland ecologist must do a walk down of the potentially affected wetland and watercourse habitats prior to the start of construction and again immediately after construction and any construction-related rehabilitation has been completed. An Environmental Control Officer (ECO) must be appointed to oversee the project and manage onsite compliance to the method statements and these (and any other) mitigation and rehabilitation measures put forward. As part of the induction process, all construction staff must be made aware of the wetlands and watercourses present within the vicinity of construction – including their location and boundaries, and what the limitations are with regards to working in and around these habitats (as per these mitigation measures). 	2	4	1	4	4	5	75	
Disturbance of Wetland/Watercourse habitat	Construction of pipeline infrastructure	6	2	1	3	3	3	45		Medium	Negative	<ul style="list-style-type: none"> As far as possible, all vehicle or pedestrian traffic across the wetlands/watercourses must make use of the existing road crossings, except for as necessary for the construction of the pipeline crossings. No vehicles, machinery or personnel are permitted to enter the demarcated wetland/watercourse areas except as specifically permitted as part of these mitigation measure or as necessary in executing construction of the pipeline crossings. It is recommended that construction related activities required within wetland habitat or watercourse habitat be limited to the dry season (where possible), particularly in watercourses that seasonally or permanently carry surface flows. 	4	2	1	3	1	3	33	

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Alteration of flow patterns	Construction of pipeline infrastructure	4	2	2	2	3	4	52		Medium	Negative	<ul style="list-style-type: none"> The accumulation of large volumes of water and concentrated flow along the pipeline berms storm events must be avoided. The berms placed to cover the pipelines should be revegetated along their full course, but must, as a minimum, be revegetated adjacent to the wetlands/watercourses on pipeline sections sloping towards the wetlands/watercourses. No pipelines should cross wetlands/watercourses in such a way that they impound flow. All pipeline crossings over wetlands/watercourses should span the entirety of the watercourse and allow free flow of water beneath. The pipelines must be elevated, with only required cement plinths footed into the wetlands/watercourses. 	4	2	1	2	1	3	30	
Increased risk of erosion and sedimentation	Construction of pipeline infrastructure and access road	6	2	2	3	3	4	64		Low	Negative	<ul style="list-style-type: none"> The construction process should be phased to limit the extent of exposed, bare soils at any one time, and so that for any specific area, the time between initial disturbance and completion of construction is as short as possible. Any temporary sediment or material stockpiles required in the covering of the pipelines or construction of the pump station, or access road near to the wetlands/watercourses, that are at risk of erosion or mobilization, should include sediment barriers along the downslope edges to minimize the risk of sediment/material transport into the wetlands/watercourses. No construction camps or the storage of equipment, materials, pipeline/pump station component parts, vehicles, potentially polluting materials or waste, or placement of stockpiles of any kind is permitted within the wetlands/watercourses habitat or within a 30m buffer of the wetlands/watercourses. Vegetation clearing within the regulated area should also be kept to a minimum as far as possible to limit exposure of bare soils and the risk of erosion and sediment mobilization. 	2	2	1	3	2	3	30	
Water Quality deterioration	Construction of pipeline infrastructure, and access road	4	2	2	2	3	4	52		Low	Negative	<ul style="list-style-type: none"> All equipment, materials, waste material and litter should be removed from the site following construction. Carefully control all on-site operations that involve the use of cement and concrete. Limit cement and concrete mixing to single sites where possible. Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground. Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste). No mixing or storage of cement or concrete within the wetlands or a 30m buffer of the wetlands. In the case of accidental spills or leaks from vehicles or machinery within the construction footprint, absorbent materials used, and contaminated soil should be disposed of at a registered hazardous waste site. All hydrocarbons, such as diesel and oil, should be stored in a way that will allow any spillages to be easily and quickly isolated (e.g., stored on plastic sheeting or on impermeable bunded areas), and spills should be cleaned-up with approved absorbent materials. To prevent spillages, no diesel or oil should be stored on site outside of designated construction camps. A detailed spill management and rehabilitation plan (as part of the Standard Operating Procedure – SOP - for each activity) must be compiled by a suitably qualified specialist or specialist team in advance of the construction and operation phase to deal with possible spill scenarios (from pipelines, pump station and the dangerous goods storage areas). All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment. If spills or leaks are possible during storage or transport to and from the storage areas, appropriate secondary containment measures must be put in place to prevent any spills or leaks of hazardous materials from reaching the wetlands/watercourses. 	2	2	1	2	1	2	16	
Heritage Resources																				
Destruction of graveyard (GY01)	Construction of pipeline infrastructure and access road	6	4	1	4	5	3	60		Low	Negative	<ul style="list-style-type: none"> GY01 is demarcated with a fence on all its sides. However, the front fence bordering on the haul road has collapsed. This fence with its entrance gate must be repaired before the construction of the pipelines commences. Red cautionary barrier tape must be draped along the fence together with signposts with the following warning: 'Cautious Graveyard. Protected by law. Damage caused will lead to prosecution'. Visitor hours should be arranged for family members and friends of the deceased during the construction process which comply with the mine's health and safety policy. Contact numbers should also be provided for any enquiries or complaints which may be raised by any family members or friends of the deceased during the construction process. 	2	5	1	1	2	2	22	

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Expose or damage features of heritage and cultural value beneath the surface	Construction of pipeline infrastructure and access road	4	2	1	1	1	4	36		Low	Negative	<ul style="list-style-type: none"> Chance-find procedures must be implemented should any heritage resources be discovered. The chance-find procedures apply to all contractors, subcontractors, subsidiaries, or service providers. If any of these institutions' employees find any heritage resources during any developmental activity all work at the site must be stopped and kept on hold. The identifier must immediately inform the senior on-site manager of the discovery and the ECO shall be informed. 	2	5	1	1	2	2	22	
Groundwater																				
Contamination of groundwater resources	Deterioration of water quality may occur from the infiltration from contaminants including hydrocarbons due to spillage	2	3	2	2	1	3	30		Low	Negative	<ul style="list-style-type: none"> Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground. Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste). No mixing or storage of cement or concrete within the wetlands or a 30m buffer of the wetlands. In the case of accidental spills or leaks from vehicles or machinery within the construction footprint, absorbent materials used, and contaminated soil should be disposed of at a registered hazardous waste site. All hydrocarbons, such as diesel and oil, should be stored in a way that will allow any spillages to be easily and quickly isolated (e.g., stored on plastic sheeting or on impermeable bunded areas), and spills should be cleaned-up with approved absorbent materials. To prevent spillages, no diesel or oil should be stored on site outside of designated construction camp. All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment 	2	2	1	1	1	2	14	
Noise																				
General rise in ambient noise levels	Noise generated from the construction vehicles and the construction activities	4	2	1	1	1	4	36		Low	Negative	<ul style="list-style-type: none"> Construction may only occur during the day. All machinery and equipment must be maintained in good working order. The Contractor shall take preventative measures where practical to minimize complaints regarding noise and vibration nuisance from sources. All equipment shall be turned off when not in use. Assess and manage all noise complaints. 	2	2	1	1	1	2	14	
Air Quality																				
Change in ambient air quality	Vehicular movement and disturbance associated with construction activities may lead to generation of dust and exhaust gases from construction vehicles working on site will compromise the ambient air quality.	4	2	1	1	1	4	36		Low	Negative	<ul style="list-style-type: none"> The Contractor must provide and maintain a method statement for dust control. The method statement must provide information on the proposed source of water to be utilized and the details of the licenses and permits required. The construction site must be watered during the dry and windy conditions to control dust fallout. Dust production must be controlled by regular watering of access roads and working areas, should the need arise. Other dust suppressant methods must also be considered to conserve water. Construction vehicles must adhere to low speeds to avoid the generation of dust on the construction site. All construction vehicles must be maintained to avoid adverse impacts on air quality as a result of a lack of maintenance. 	2	2	1	1	1	2	14	
Waste Management																				
Increase waste generation due to construction activities	Construction of pipeline infrastructure and access road	4	2	2	2	1	3	33		Low	Negative	<ul style="list-style-type: none"> Remove all waste, including cleared vegetation from site as soon as possible unless the material will be reused on site. A dedicated area for the placement of waste must be identified and demarcated. Waste skips must be covered and emptied regularly. No overflowing to be allowed. 	2	2	1	1	1	2	14	
Social																				
Benefits resulting from employment and income opportunities created by the proposed project.	Construction of pipeline infrastructure and access road	4	2	2	2	1	3	33		Low	Positive	<ul style="list-style-type: none"> Develop a clear and concise employment policy prioritizing local employment. Employ local works if qualified applicants with the appropriate skills are available. Purchase goods and services at a local level if available. 	4	2	2	2	1	3	33	

Table 11-6: Assessment of Identified Potential Impacts of the Proposed Project During the Operational Phase

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Soils																				
Soil Erosion	Wherever the soil surface remains bare and vegetation has not re-established, soil erosion could occur	4	2	1	2	4	3	39		Low	Negative	<ul style="list-style-type: none"> Use Shallow ripping where necessary as well as seeding of indigenous veld and grass to ensure vegetation cover is re-established to prevent erosion. Regular checks along the pipeline should also be done and areas affected should be restocked with soil. 	6	4	1	3	4	5	90	
Soil Compaction	Compaction remains and may be aggravated in areas where repairs along the pipeline are required.	4	2	1	2	4	3	39		Low	Negative	<ul style="list-style-type: none"> Only disturb areas where maintenance is required and avoid driving and parking vehicles and equipment outside of the affected area. 	4	3	1	2	4	2	28	
Soil Chemical Pollution	Chemical spills from vehicles as well as storage and tailings pipeline spills could occur.	6	2	1	3	3	3	45		Low	Negative	<ul style="list-style-type: none"> Check vehicles and equipment used on site for possible fuel and oil spills and avoid waste disposal on site. Any waste generated on site should be transported away from site. Storage units and tailing pipeline should be maintained to ensure no leaks occur. 	2	1	1	1	2	2	14	
Terrestrial Biodiversity																				
Spread of alien/or invasive species	No rehabilitation, vehicle and staff movement	5	4	3	2	4	4	72		Low	Negative	<ul style="list-style-type: none"> Compilation of and implementation of an alien vegetation management plan. 	4	2	1	2	2	2	22	
Environmental pollution due to water/mine drainage runoff from dangerous goods area	Storage of dangerous materials	7	4	3	4	4	4	88		Medium	Negative	<ul style="list-style-type: none"> Keep the surface & sub-surface water as well as storm water away that may run off from the storage areas from the low laying areas, such as wetlands as well as the surrounding areas, from leaving the study area in an uncontrolled manner. Clean and dirty water must be separated. Incorporate green /soft engineering storm water measures. Avoid unnecessary vegetation clearing and avoid preferential surface flow paths 	4	3	1	2	2	2	24	
Watercourses																				
Alteration of flow patterns	Operation of pipeline infrastructure	4	3	2	2	3	3	42		Medium	Negative	<ul style="list-style-type: none"> Regular inspections for erosion damage along the pipeline berms must be undertaken for at least the first rainfall season after construction and any identified problem areas addressed. 	4	3	1	2	3	3	39	
Increased risk of erosion and sedimentation	Operation of pipeline infrastructure and access road	6	3	2	3	3	4	68		Medium	Negative		2	3	1	3	2	3	33	
Water Quality deterioration	Operation of pipeline infrastructure. Accidental spillages and/or leaks of stored dangerous goods	10	3	2	3	3	4	84		Medium	Negative	<ul style="list-style-type: none"> All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment. If spills or leaks are possible during storage or transport to and from the storage areas, appropriate secondary containment measures must be put in place to prevent any spills or leaks of hazardous materials from reaching the wetlands/watercourses. Any potentially polluting substances on site should be strictly controlled and only handled in designated areas under supervision of competent and trained personnel. The pipeline berms will make leak detection more challenging as the pipeline will not be visible. Therefore, there will need to be increased emphasis on the use of technology to detect pipeline leaks and failure. In addition, regular visual inspections of all pipeline routes should be included in the operational monitoring of this infrastructure to ensure rapid identification and repair of any faults or leaks. The pipeline routes should be considered for inclusion in the mine's water monitoring strategy and biomonitoring plans to ensure potentially affected watercourses are adequately covered in these monitoring plans. 	10	3	1	3	2	3	57	
Heritage Resources																				
Operation of the pipeline, pump station and access road. No impacts on heritage resources are expected during the operational phase																				
Groundwater																				

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Contamination of groundwater resources	Operation of the pipeline, pumpstation and access road.	10	3	2	3	3	4	84		?	Negative	<ul style="list-style-type: none"> All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment. If spills or leaks are possible during storage or transport to and from the storage areas, appropriate secondary containment measures must be put in place to prevent any spills or leaks of hazardous materials from reaching the wetlands/watercourses. Any potentially polluting substances on site should be strictly controlled and only handled in designated areas under supervision of competent and trained personnel. The pipeline berms will make leak detection more challenging as the pipeline will not be visible. Therefore, there will need to be increased emphasis on the use of technology to detect pipeline leaks and failure. In addition, regular visual inspections of all pipeline routes should be included in the operational monitoring of this infrastructure to ensure rapid identification and repair of any faults or leaks. The pipeline routes should be considered for inclusion in the mine's water monitoring strategy and biomonitoring plans to ensure potentially affected watercourses are adequately covered in these monitoring plans. 	10	3	1	3	2	3	57	
Noise																				
Operation of the pipeline, pumpstation and access road. No impacts on heritage resources are expected during the operational phase																				
Air Quality																				
Change in ambient air quality	Vehicular movement making use of the access road.	2	2	1	1	1	2	14		High	Negative	<ul style="list-style-type: none"> Dust reducing mitigation measures must be put in place and must be strictly adhered to. Set speed limits to minimize the creation of fugitive dust within the project boundary. 	2	2	1	1	1	2	14	
Waste Management																				
Increase waste generation due to operational activities	Construction of pipeline infrastructure and access road	4	2	2	2	1	3	33		Low	Negative	<ul style="list-style-type: none"> Adequate bins must be provided on site and cleared regularly. General waste and hazardous waste must be stored separately. Skips must be covered and designated to be impermeable. 	2	2	1	1	1	2	14	
Storage of Dangerous Goods																				
Risk to people and property The storage and handling of dangerous goods material could potentially cause safety risks to personnel handling the material, or pose risks to other buildings and infrastructure in close proximity to the storage areas	Storage and handling of dangerous goods	10	4	2	4	4	4	96		Medium		<ul style="list-style-type: none"> Strict access control to the dangerous goods storage area must be implemented. No unauthorised persons may enter the area. Design of the production facility must be undertaken in accordance with risk management standards which determine the appropriate spacing between substance storage areas and operations with the aim of minimizing risks. Develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information. Operating procedures must provide clear instructions not only to specify the steps for normal operations, but also for upset conditions, temporary operations, start-up, and emergency shutdown. Important safety information that includes the basic hazards encountered or that could be encountered in the process must also be addressed in the operating procedures. Identification of hazard areas and limitations on the number of authorized personnel in the hazard area will ensure that the minimum numbers of personnel are exposed to the hazard. All dangerous goods must be stored on covered (roofed), concrete lined areas. Clear signage of areas storing dangerous goods must be placed, indicating the hazards and appropriate PPE to be worn. MSDS sheets for each dangerous good must be developed and placed at the storage area on site. Emergency response Plan must be developed and include as a minimum. 	10	4	1	2	2	2	38	
Fire Risk																				

POTENTIAL ENVIRONMENTAL IMPACT	ACTIVITY	ENVIRONMENTAL SIGNIFICANCE BEFORE MITIGATION								CUMULATIVE	STATUS	RECOMMENDED MITIGATION MEASURES / REMARKS	ENVIRONMENTAL SIGNIFICANCE AFTER MITIGATION							
		M	D	S	I	R	P	TOTAL	SS				M	D	S	I	R	P	TOTAL	SS
Increased risk of on-site fires	Storage and use of dangerous goods	4	4	1	4	3	4	64		High	Negative	<ul style="list-style-type: none"> All chemicals and hazardous substances (flammable) must be stored in dry areas and locked. Smoking is prohibited near flammable substances. Dedicated smoking areas must be made available for personal. No open fires to be allowed on site. Fire extinguishers and other firefighting equipment deemed suitable must be available on site at all times 	2	2	1	1	1	2	14	

12 SUMMARY OF SPECIALIST REPORT FINDINGS

Table 12-1 provides a summary of the specialist report findings.

Table 12-1: Summary of Specialist Report Findings

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
Heritage Impact Assessment	<ul style="list-style-type: none"> • GY01 is demarcated with a fence on all its sides. However, the front fence bordering on the haul road has collapsed • This fence with its entrance gate must be repaired before the construction of the pipelines commences. Red cautionary barrier tape must be draped along the fence together with signposts with the following warning: 'Cautious Graveyard. Protected by law. Damage caused will lead to prosecution'. • Visitor hours should be arranged for family members and friends of the deceased during the construction process which comply with the mine's health and safety policy. • Contact numbers should also be provided for any enquiries or complaints which may be raised by any family members or friends of the deceased during the construction process. 	All relevant specialist recommendations are included in this Basic Assessment under Section 11, as well as attached in the full specialist studies as appendices to this report.	
Soil and Agricultural Assessment	<ul style="list-style-type: none"> • Avoid creating a larger footprint around the pipeline area than necessary. • Avoid construction during times of excessive wetness (rainfall episodes) as wet soil is more easily compacted. • Stripping of vegetation should be conducted just prior to construction of a specific section of pumpstation, not earlier than required. • Once the storage area, pumpstation, water return and tailings pipeline has been established, vegetation establishment should be promoted by either shallow ripping of the compacted soil to ensure the natural seedbank will germinate or through active rehabilitation of the surface through soil amendment and seeding of natural veld grass. 	All relevant specialist recommendations are included in this Basic Assessment under Section 11, as well as attached in the full specialist studies as appendices to this report.	
Vegetation Assessment	<ul style="list-style-type: none"> • All high sensitivity areas should be avoided, and development must be prioritised in very low and low areas. Areas where high sensitivity occurs due to water resources, 	All relevant specialist recommendations are included in this Basic Assessment under Section 11,	

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>the pipeline may only be constructed on top or within the existing servitude. As much as possible, the direct footprint must be within or right next to existing servitudes/roads to reduce impacting secondary communities.</p> <ul style="list-style-type: none"> • Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted too within the very low/low sensitivity areas and should be limited to the existing pipeline/road servitude. No further loss of high sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. • All laydown, chemical toilets etc. should be restricted to very low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the study area once the construction phase has been concluded. No permanent construction phase structures should be permitted. No storage of vehicles or equipment will be allowed outside of the designated study area. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the study area, especially areas that have been recently re-planted. • Compile and implement a rehabilitation plan from the onset of the Project. Progressive rehabilitation as the construction of the pipeline continues as well as any cleared areas will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. • All structure footprints to be rehabilitated and landscaped after the development is complete. Rehabilitation of the disturbed areas existing in the study area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. • A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. 	as well as attached in the full specialist studies as	appendices to this report.

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>The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the study area.</p> <ul style="list-style-type: none"> • It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the study area. No plant species whether indigenous or exotic should be brought into/taken from the study area to prevent the spread of exotic or invasive species or the illegal collection of plants. • Any individual of the protected trees that was observed needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. • Storm Water run-off & Discharge Water Quality monitoring. • A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas. 		
Wetland Delineation and Assessment	<ul style="list-style-type: none"> • Construction related activities required within wetland habitat or watercourse habitat be limited to the dry season, particularly in watercourses that seasonally or permanently carry surface flows • No pipelines should cross wetlands/watercourses in such a way that they impound flow. All pipeline crossings over wetlands/watercourses should span the entirety of the watercourse and allow free flow of water beneath. The pipelines must be elevated, with only required cement plinths footed into the wetlands/watercourses 	All relevant specialist recommendations are included in this Basic Assessment under Section 11, as well as attached in the full specialist studies as appendices to this report.	

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"> • The berms placed to cover the pipelines should be revegetated along their full course, but must, as a minimum, be revegetated adjacent to the wetlands/watercourses on pipeline sections sloping towards the wetlands/watercourses • The accumulation of large volumes of water and concentrated flow along the pipeline berms during storm events must be avoided • There will need to be increased emphasis on the use of technology to detect pipeline leaks and failure. In addition, regular visual inspections of all pipeline routes should be included in the operational monitoring of this infrastructure to ensure rapid identification and repair of any faults or leaks. • All construction staff must be made aware of the wetlands and watercourses present within the vicinity of construction – including their location and boundaries, and what the limitations are with regards to working in and around these habitats (as per these mitigation measures). • An Environmental Control Officer (ECO) must be appointed to oversee the project and manage onsite compliance to the method statements and these (and any other) mitigation and rehabilitation measures put forward. • The ECO and/or a wetland ecologist must do a walk down of the potentially affected wetland and watercourse habitats prior to the start of construction and again immediately after construction and any construction-related rehabilitation has been completed. • At the start of the construction phase, the wetland and watercourse boundaries must be clearly demarcated, particularly in the vicinity of proposed crossings or where infrastructure will be constructed in close proximity to a wetland/watercourse, with high visibility tape or similar • Vegetation clearing within the regulated area should also be kept to a minimum as far as possible to limit exposure of bare soils and the risk of erosion and sediment mobilisation. • Any temporary sediment or material stockpiles required in the burial of the pipelines or construction of the pump station, or access road near to the wetlands/watercourses, that are at risk of erosion or mobilisation, should include 		

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>sediment barriers along the downslope edges to minimise the risk of sediment/material transport into the wetlands/watercourses</p> <ul style="list-style-type: none"> • All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment. • A detailed spill management and rehabilitation plan (as part of the Standard Operating Procedure – SOP - for each activity) must be compiled by a suitably qualified specialist or specialist team in advance of the construction and operation phase to deal with possible spill scenarios (from pipelines, pump station and the dangerous goods storage areas). 		

13 ENVIRONMENTAL IMPACT STATEMENT

13.1 Summary of key findings

A summary of the significance of the potential environmental impacts associated with the proposed project is provided in **Table 13-1**. The mitigated assessment assumes that the design controls together with specialist mitigation measures included would be implemented during the construction and operation phase.

The impact assessment confirmed that certain proposed activities (without mitigation) are expected to have impacts of medium to high significance (before mitigation) and can be reduced to a lower significance rating with the implementation of mitigation measures, with the exception of Soil compaction, and the destruction of wetland habitat.

Table 13-1: Summary of significance of the Potential Impacts of the Proposed Project

Potential impact	Without mitigation	With mitigation	+/-
Impacts during construction phase			
Soil compaction	MH	MH	-
Soil erosion	MH	M	-
Soil chemical pollution	M	L	-
Destruction, fragmentation and degradation of habitats and ecosystems	M	L	-
Loss of protected tree species	M	L	-
Spread and/or establishment of alien and/or invasive species	M	L	-
Destruction of wetland/Watercourse Habitat	MH	MH	-
Disturbance of Wetland/Watercourse habitat	MH	L	-
Alteration of watercourse flow patterns	MH	L	-
Increased risk of erosion and sedimentation within watercourses	MH	L	-
Water Quality deterioration	MH	L	-
Destruction of graveyard (GY01)	M	L	-
Expose or damage features of heritage and cultural value beneath the surface	L	L	-
Contamination of groundwater resources	L	L	-
General rise in ambient noise levels	L	L	-
Change in ambient air quality	L	L	-
Increase waste generation due to construction activities	L	L	-
Benefits resulting from employment and income opportunities created by the proposed project	L	L	+
Impacts identified during the operational phase			
Soil erosion	L	L	-
Soil compaction	L	L	-
Soil chemical pollution	M	L	-
Spread of alien/or invasive species	M	L	-
Environmental pollution due to water/mine drainage runoff from dangerous goods area	MH	L	-
Alteration of watercourse flow patterns	M	L	-

Potential impact	Without mitigation	With mitigation	+/-
Increased risk of erosion and sedimentation	M	L	-
Water Quality deterioration	MH	M	-
Contamination of groundwater resources	MH	M	-
Change in ambient air quality	L	L	-
Increase waste generation due to operational activities	L	L	-
Risk to people and property The storage and handling of dangerous goods material could potentially cause safety risks to personnel handling the material, or pose risks to other buildings and infrastructure in close proximity to the storage areas	MH	L	-
Increased risk of on-site fires	M	L	-

13.2 Final site map

Refer to **Figure 3-1**.Figure 3-2 Property Description Map

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

14.1 Proposed management objectives and outcomes for environmental and socio-economic impacts

Impact management outcomes are included in Section B, Table 5-1.

The purpose of the EMPr is to provide relevant management measures to conduct activities with due care and diligence, as well as avoid/ limit any adverse impacts of the mining operation. The EMPr is compiled to help control impacts that may occur to meet acceptable standards, both as a legal and social responsibility to the environment within which the activities take place.

The objective of the EMPr is to create management structures that address the comments of stakeholders with regards to the development, establishes a method of monitoring and auditing environmental management practices during all phases of the activity and ensures that safety recommendations are complied with. Additionally, the EMP provides a method to ensure performance and compliance with all the relevant regulatory authority provisions and guidelines while monitoring of the commitments allows for continual feedback and opportunities to improve

15 ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

The following aspects should be included as conditions of the Environmental Authorisation:

- The EMPr for the construction and operational phase must be implemented for the duration of the proposed project.
- A Water Use License shall be obtained from the Department of Water and Sanitation.
- Sibanye-Stillwater is not negated from complying with any other statutory requirements that is applicable to the undertaking of the activity. All necessary permits, licences and approvals must be obtained prior to the commencement of construction.
- Sibanye-Stillwater must appoint a suitably experienced Environmental Control Officer (ECO) for the construction ,operational and rehabilitation phases of the development that will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations are implemented and to ensure compliance with the provisions of the EMPr.
- All development activities must be monitored to ensure that the footprint areas do not exceed approved areas.

- All dangerous goods must be handled using systems designed and operate in accordance with the relevant legislative requirements.
- Undertake biennial (once every two years) external auditing of environmental performance and provide a copy of the audit report to the DMRE;
- Implementation of the environmental awareness education to the contractor's during and prior to construction
- Should removal of any protected tree species be planned, a permit from the Department of Forestry Fisheries and the Environment be obtained.
- This fence with its entrance gate at Graveyard 01 must be repaired before the construction of the pipelines commences.

16 ASSUMPTIONS, UNCERTAINTIES, LIMITATIONS AND GAPS IN KNOWLEDGE

The following assumptions and limitations pertaining to this BAR are as follows:

- It is assumed that AVDE has been provided with all relevant project information and that it was correct and valid at the time it was provided.
- There will be no significant changes to the project description or surrounding environment between the completion of the Basic Assessment environmental authorisation process and implementation of the proposed project that could substantially influence findings and recommendations with respect to mitigation and management.
- The assessment of the mitigated scenario assumes that the design controls and recommended mitigation would be implemented adequately.

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

This Basic Assessment report has provided a comprehensive assessment of the potential environmental impacts associated with the proposed activity. These impacts have been identified by the EAP and the specialist studies undertaken for the proposed development. The key findings of the Basic Assessment Process are discussed in this report.

The study area includes three identified habitat units, these include transformed, disturbed area and wetland areas. This was determined by the degree and extent of the impacts, most arising from an anthropogenic source, this source being associated mining activities. Areas within the study area were transformed from the original state where other areas were regarded as disturbed grassland. The proposed infrastructure occurs in close relation to existing pipelines, road servitudes, built up areas, this being mainly modified.

The study area falls across both a CBA and ESA, however as previously mentioned, according to the Vegetation assessment these findings were found to be modified. As provided in Section 10, the sensitive habitat identified on site relates to the watercourses. The design allows for the pipeline to span the watercourse, however in instances where the allowable span length is exceeded, the pipeline will be supported by concrete foundations and plinths. Impacts associated with the watercourse crossings has been assessed as part of this report and the associated mitigation measures has been provided.

Taking into consideration the findings of the environmental impact assessment, the project benefits outweigh the negative impacts identified provided that mitigation measures are applied effectively. Impacts of high significance are not foreseen once proper mitigation measures have been implemented.

It is recommended by the EAP that the proposed project is allowed to proceed, on the assumption that the environmental and social management commitments included in the EMP are adhered to, the project description remains as per the description provided in this document and considering the positive social impacts associated with the project.

17.2 Conditions that must be included in the authorisation

Refer to Section 15 for the conditions to be included in the authorisation.

18 PERIOD FOR WHICH AUTHORISATION IS REQUIRED

Marikana Mine has a life of mine to the year 2043. Therefore, the period for which environmental authorisation is required for the proposed project is at least 21 years.

19 UNDERTAKING

The undertaking by the EAP is provided in Part B Section 11.

20 FINANCIAL PROVISION

20.1 Method to derive the financial provision

The liability for closure of the aspects associated with the proposed Meccano Tailings Retreatment project has been determined using the approach advocated in the Department of Minerals and Energy (DME) now the Department of Mineral Resources and Energy (DMRE) Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provisions Provided by a Mine (2005).

20.2 Confirm that the amount can be provided from operating expenditure

Sibanye-Stillwater will provide for the closure liability associated with the Meccano Tailings retreatment project through an updated Bank Guarantee.

21 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

Compliance with the provisions of sections 24(4)(a) and (b) read with section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998), the BAR report must include the:

- Impact on the socio-economic conditions of any directly affected person; and
- Impact on any national estate referred to in section 3 (2) of the National Heritage Resources Act (Act 25 of 1999).

The above requirements are addressed in Part A Section 11.8.

22 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) OF THE ACT

No other matters have been identified for inclusion to date.

PART B – ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1 DETAILS OF THE EAP

The details of the EAPs who undertook the Basic Assessment process and prepared this EMPr are provided in Part A, Section 2.

2 DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

The activities that are covered in the EMPr are included in Part A, Section 4.

3 COMPOSITE MAP

A map superimposing the proposed activity over the environmental sensitivities of the project area is included in **Figure 3-1**.

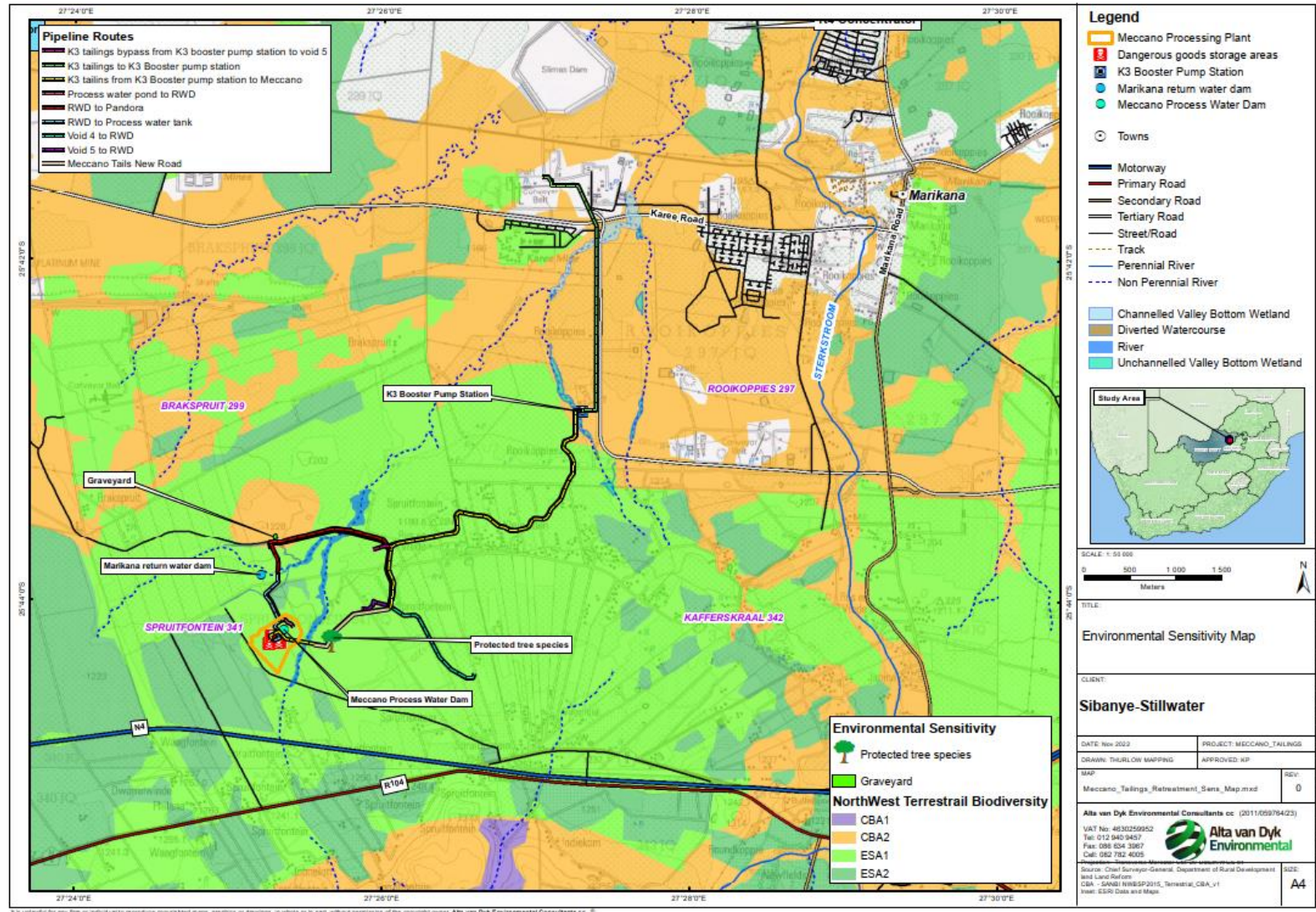


Figure 3-1: Composite Map

4 DESCRIPTION OF THE IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENT

4.1 Determination of closure objectives

According to the Kroondal Marikana Mine EMP (2015) the closure objectives are as follows:

- 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); and
- To limit the impact on personnel whose positions may become redundant on decommissioning of the operations.

4.2 Volumes and rate of water use for the operation

The Kroondal-Marikana operations Mine is conducting pilot testing on the Marikana Concentrator Plant (“Meccano Plant”). No active mining is being conducted on the site.

4.3 Has a Water Use Licence been applied for?

A Water Use Licence Application for a Section 21 (c) & (i) water use in terms of the National Water Act has been logged with the Department of Water and Sanitation. The e-wulaas reference number is WU23414.

5 IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASES

Table 5-1: Measures to Manage the Environment by the Undertaking of any Listed Activity Including Management Outcomes

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
Clearing of vegetation, removal of topsoil and stockpiling of topsoil	7.6 ha	Soils	Soil compaction	<ul style="list-style-type: none"> Restrict movement Reduce Footprint area Remedy disturbances Implement Rehabilitation 	<ul style="list-style-type: none"> Soil compaction is part of the construction to stabilise the surface against future subsidence-very little or no mitigation Demarcate the pipelines, access road and pump station footprint areas. Vegetation clearing and removal of topsoil to be limited to the demarcated area Avoid construction during times of excessive wetness (rainfall episodes) as wet soil is more easily compacted 	Construction	Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331). Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Throughout entire construction phase
Clearing of vegetation for the access road, Operation of access road	7.6 ha	Soils	Soil Erosion	<ul style="list-style-type: none"> Storm water management Remedy disturbances 	<ul style="list-style-type: none"> The project footprint area must be demarcated and vegetation clearing limited to the demarcated area. Regular checks along the pipeline routes to ensure that erosion does not occur. Signs of erosion must be addressed immediately to prevent further erosion. Stripping of vegetation should be conducted just prior to construction of a specific section of pipeline, pump station, not earlier than required. Once the, pump station, water return and tailings pipeline has been established, vegetation establishment should be promoted by either shallow ripping of the compacted soil to ensure the natural seedbank will germinate or through active rehabilitation of the surface through soil amendment and seeding of natural veld grass. 	Construction, Operational and Decommissioning and Closure	Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331). Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Throughout entire life of project including construction, operation and decommissioning and closure phases
Clearing of vegetation for the access road, Operation of access road, pipeline	7.6 ha	Soils	Soil chemical pollution	<ul style="list-style-type: none"> Remedy spills Control vehicle/machinery operation and services 	<ul style="list-style-type: none"> Losses of fuel and lubricants from oil sumps and steering racks of vehicles and equipment used during construction should be contained using a drip tray filled with absorbent material. Vehicles and equipment should be parked in demarcated areas where vehicles can regularly be checked for oil leaks during the construction activities. Waste disposal at the construction sites should be avoided wherever possible by segregating, trucking out, and recycling waste. 	Construction, Operational and Decommissioning and Closure	Manage soils in line with the requirements of the National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (GN 37603 No 331). Conservation of Agricultural Resources Act (Act No. 43 of 1983)	Throughout entire construction phase

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
Clearing of vegetation, removal of topsoil and stockpiling of topsoil, construction vehicle and staff movement	7.6 ha	Terrestrial Biodiversity	Destruction, fragmentation and degradation of habitats and ecosystems	<ul style="list-style-type: none"> Reduce footprint Reduce vegetation clearance Remedy disturbances Implement training and awareness 	<ul style="list-style-type: none"> All high sensitivity areas should be avoided, and development must be prioritised in very low and low areas. As much as possible, the direct footprint must be within or right next to existing servitudes/roads to reduce impacting secondary communities. Areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. Existing access routes and pipeline servitudes, especially roads must be made use of. All laydown, chemical toilets etc. should be restricted to very low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the study area once the construction phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project area. Compile and implement a rehabilitation plan from the onset of the Project. Progressive rehabilitation as the construction of the pipeline continues as well as any cleared areas will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. All structure footprints to be rehabilitated and landscaped after the development is complete. Rehabilitation of the disturbed areas existing in the study area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type 	Construction	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Throughout entire construction phase
Clearing of vegetation, Construction of new access road	7.6 ha	Terrestrial Biodiversity	Loss of protected tree species	<ul style="list-style-type: none"> Control and/or prevent disturbances of protected trees 	<ul style="list-style-type: none"> Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted too within the very low/low sensitivity areas and should be limited to the existing pipeline/road servitude. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. Should removal of any protected tree species be planned, a permit from the Department of Forestry Fisheries and Environment be obtained. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program 	Construction	National Environmental Management: Biodiversity Act (Act No. 10 of 2004) National Forestry Act (Act No. 84 of 198) (NFA)	Prior to commencement of construction
Clearing of vegetation Construction of the access road, pump station and pipelines Operation and maintenance of the pipeline and access road	7.6 ha	Terrestrial Biodiversity	Spread and/or establishment of alien and/or invasive species	<ul style="list-style-type: none"> Control alien invasive species Implement training and awareness 	<ul style="list-style-type: none"> A pre-construction walk down should be conducted to identify and geolocate tree species for permitting purposes. No protected tree may be affected, removed, excavated, relocated or impacted in any manner, except under a valid permit. The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths. Compilation of and implementation of an alien vegetation management plan Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during 	Construction, Operational and Decommissioning and Closure	National Environmental Management: Biodiversity Act (Act No. 10 of 2004) National Forestry Act (Act No. 84 of 198) (NFA)	Throughout entire life of project including construction, operation and decommissioning and closure phases

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
					<p>flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.</p> <ul style="list-style-type: none"> All livestock must always be kept out of the study area, especially areas that have been recently re-planted. Use of Locally indigenous plant species for landscaping purposes is strongly recommended. Under no circumstances shall exotic and invasive plants be used. 			
Construction of pipeline infrastructure	6.5 ha	Surface water	Destruction of wetland/Watercourse Habitat	<ul style="list-style-type: none"> Reduce footprint Reduce vegetation clearance Remedy disturbances Implement training and awareness 	<ul style="list-style-type: none"> The extent of vegetation cleared within the wetlands/watercourses, if necessary, must be kept to an absolute minimum. Any areas within the wetlands/watercourses to be cleared must be demarcated at the start to ensure no areas of the wetlands/watercourses are accidentally and unnecessarily cleared. If it is necessary to cut/clear vegetation within the wetlands to facilitate installation of the pipelines, this must be done by hand or using small, hand-held implements (weed eater, chainsaw or similar). Cut vegetation or brush must be removed from the wetland/watercourse by hand. No heavy machinery or vehicles to enter the wetland boundaries to assist in vegetation clearing. The ECO and/or a wetland ecologist must do a walk down of the potentially affected wetland and watercourse habitats prior to the start of construction and again immediately after construction and any construction-related rehabilitation has been completed. An Environmental Control Officer (ECO) must be appointed to oversee the project and manage onsite compliance to the method statements and these (and any other) mitigation and rehabilitation measures put forward. As part of the induction process, all construction staff must be made aware of the wetlands and watercourses present within the vicinity of construction – including their location and boundaries, and what the limitations are with regards to working in and around these habitats (as per these mitigation measures). 	Construction, Operational and Decommissioning and Closure	<p>National Water Act (Act No. 36 of 1998)</p> <p>Compliance with the conditions in the Water Use Licence</p>	Throughout entire life of project including construction, operation and decommissioning and closure phases
Construction of pipeline infrastructure	6.5 ha	Surface water	Disturbance of Wetland/Watercourse habitat	<ul style="list-style-type: none"> Reduce footprint Reduce vegetation clearance Remedy disturbances Implement training and awareness 	<ul style="list-style-type: none"> As far as possible, all vehicle or pedestrian traffic across the wetlands/watercourses must make use of the existing road crossings, except for as necessary for the construction of the pipeline crossings. No vehicles, machinery or personnel are permitted to enter the demarcated wetland/watercourse areas except as specifically permitted as part of these mitigation measure or as necessary in executing construction of the pipeline crossings. It is recommended that construction related activities required within wetland habitat or watercourse habitat be limited to the dry season (where possible), particularly in watercourses that seasonally or permanently carry surface flows. 	Construction and Operational	<p>National Water Act (Act No. 36 of 1998)</p> <p>Compliance with the conditions in the Water Use Licence</p>	Throughout entire life of project including construction, operation and decommissioning and closure phases

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
Construction of pipeline infrastructure	6.5 ha	Surface water	Alteration of flow patterns	<ul style="list-style-type: none"> Storm water management Restrict locality 	<ul style="list-style-type: none"> The accumulation of large volumes of water and concentrated flow along the pipeline berms storm events must be avoided. The berms placed to cover the pipelines should be revegetated along their full course, but must, as a minimum, be revegetated adjacent to the wetlands/watercourses on pipeline sections sloping towards the wetlands/watercourses. No pipelines should cross wetlands/watercourses in such a way that they impound flow. All pipeline crossings over wetlands/watercourses should span the entirety of the watercourse and allow free flow of water beneath. The pipelines must be elevated, with only required cement plinths footed into the wetlands/watercourses. 	Construction and Operational	<p>National Water Act (Act No. 36 of 1998)</p> <p>Compliance with the conditions in the Water Use Licence</p>	Throughout entire life of project including construction, operation and decommissioning and closure phases
Construction of pipeline infrastructure	6.5 ha	Surface water	Increased risk of erosion and sedimentation	<ul style="list-style-type: none"> Stormwater management Restrict locality 	<ul style="list-style-type: none"> The construction process should be phased to limit the extent of exposed, bare soils at any one time, and so that for any specific area, the time between initial disturbance and completion of construction is as short as possible. Any temporary sediment or material stockpiles required in the covering of the pipelines or construction of the pump station, or access road near to the wetlands/watercourses, that are at risk of erosion or mobilisation, should include sediment barriers along the downslope edges to minimise the risk of sediment/material transport into the wetlands/watercourses. No construction camps or the storage of equipment, materials, pipeline/pump station component parts, vehicles, potentially polluting materials or waste, or placement of stockpiles of any kind is permitted within the wetlands/watercourses habitat or within a 30m buffer of the wetlands/watercourses. Vegetation clearing within the regulated area should also be kept to a minimum as far as possible to limit exposure of bare soils and the risk of erosion and sediment mobilisation 	Construction and Operational	<p>National Water Act (Act No. 36 of 1998)</p> <p>Compliance with the conditions in the Water Use Licence</p>	Throughout entire life of project including construction, operation and decommissioning and closure phases
Construction of pipeline infrastructure	6.5 ha	Surface water	Water Quality deterioration	<ul style="list-style-type: none"> Surface water monitoring Improve education and training Remedy pollution incidents Reduce waste Maintenance 	<ul style="list-style-type: none"> All equipment, materials, waste material and litter should be removed from the site following construction. Carefully control all on-site operations that involve the use of cement and concrete. Limit cement and concrete mixing to single sites where possible. Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground. Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste). No mixing or storage of cement or concrete within the wetlands or a 30m buffer of the wetlands. In the case of accidental spills or leaks from vehicles or machinery within the construction footprint, absorbent materials used, and contaminated soil should be disposed of at a registered hazardous waste site. All hydrocarbons, such as diesel and oil, should be stored in a way that will allow any spillages to be easily and quickly isolated 	Construction and Operational	<p>National Water Act (Act No. 36 of 1998)</p> <p>Compliance with the conditions in the Water Use Licence</p>	Throughout entire life of project including construction, operation and decommissioning and closure phases

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
					<p>(e.g., stored on plastic sheeting or on impermeable bunded areas), and spills should be cleaned-up with approved absorbent materials.</p> <ul style="list-style-type: none"> To prevent spillages, no diesel or oil should be stored on site outside of designated construction camps. A detailed spill management and rehabilitation plan (as part of the Standard Operating Procedure – SOP - for each activity) must be compiled by a suitably qualified specialist or specialist team in advance of the construction and operation phase to deal with possible spill scenarios (from pipelines, pump station and the dangerous goods storage areas. All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment. If spills or leaks are possible during storage or transport to and from the storage areas, appropriate secondary containment measures must be put in place to prevent any spills or leaks of hazardous materials from reaching the wetlands/watercourses 			
Construction of pipeline infrastructure	6.5 ha	Heritage resources	Destruction of graveyard (GY01)	<ul style="list-style-type: none"> Avoid disturbances Implement measures for it sites are uncovered Remedy disturbances 	<ul style="list-style-type: none"> GY01 is demarcated with a fence on all its sides. However, the front fence bordering on the haul road has collapsed. This fence with its entrance gate must be repaired before the construction of the pipelines commences. Red cautionary barrier tape must be draped along the fence together with signposts with the following warning: ‘Cautious Graveyard. Protected by law. Damage caused will lead to prosecution’. Visitor hours should be arranged for family members and friends of the deceased during the construction process which comply with the mine’s health and safety policy. Contact numbers should also be provided for any enquiries or complaints which may be raised by any family members or friends of the deceased during the construction process. 	Construction	National Heritage Resources Act (Act No. 25 of 1999)	Throughout the construction phase
Construction of pipeline infrastructure, pump station and access road	7.6ha	Heritage resources	Expose or damage features of heritage and cultural value beneath the surface	<ul style="list-style-type: none"> Avoid disturbances Implement measures for it sites are uncovered Remedy disturbances 	<ul style="list-style-type: none"> Chance-find procedures must be implemented should any heritage resources be discovered. The chance-find procedures apply to all contractors, subcontractors, subsidiaries, or service providers. If any of these institutions’ employees find any heritage resources during any developmental activity all work at the site must be stopped and kept on hold. The identifier must immediately inform the senior on-site manager of the discovery and the ECO shall be informed 	Construction	National Heritage Resources Act (Act No. 25 of 1999)	Throughout the construction phase
Construction of pipeline infrastructure, pump station and access road Operation of dangerous goods storage area, pipeline, pumpstation and access road	8ha	Groundwater	Deterioration of water quality may occur from the infiltration from contaminants including hydrocarbons due to spillage	<ul style="list-style-type: none"> Remedy spills Control handling Improve training 	<ul style="list-style-type: none"> Use plastic trays or liners when mixing cement and concrete: Do not mix cement and concrete directly on the ground. Dispose of all visible remains of excess cement and concrete after the completion of tasks. Dispose of in the approved manner (solid waste concrete may be treated as inert construction rubble, but wet cement and liquid slurry, as well as cement powder must be treated as hazardous waste). 	Construction and Operational	National Water Act (Act No. 36 of 1998) Compliance with the conditions in the Water Use Licence	Throughout entire life of project including construction, operation and decommissioning and closure phases

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
					<ul style="list-style-type: none"> No mixing or storage of cement or concrete within the wetlands or a 30m buffer of the wetlands. In the case of accidental spills or leaks from vehicles or machinery within the construction footprint, absorbent materials used, and contaminated soil should be disposed of at a registered hazardous waste site. All hydrocarbons, such as diesel and oil, should be stored in a way that will allow any spillages to be easily and quickly isolated (e.g., stored on plastic sheeting or on impermeable bunded areas), and spills should be cleaned-up with approved absorbent materials. To prevent spillages, no diesel or oil should be stored on site outside of designated construction camp. All dangerous goods must be stored in containers or buildings appropriate for the nature of the goods being stored and with the aim of preventing leakages or spillages to the environment 			
Noise generated from the construction vehicles and the construction activities	8 ha	Noise	General rise in ambient noise levels	<ul style="list-style-type: none"> Control maintenance of machines and vehicles Issue PPE Reduce vehicle speed 	<ul style="list-style-type: none"> Construction may only occur during the day. All machinery and equipment must be maintained in good working order. The Contractor shall take preventative measures where practical to minimize complaints regarding noise and vibration nuisance from sources. All equipment shall be turned off when not in use. Assess and manage all noise complaints. 	Construction	SASN 10103 – Acceptable ambient noise levels	Throughout the construction phase
Vegetation clearing Vehicle movement Construction of pipelines, pump station and access road Operation of the pipelines, pump station, dangerous goods storage area and access road	8 ha	Air Quality	Change in ambient air quality	<ul style="list-style-type: none"> Control vehicle and machinery services Implement dust suppression Control/reduce vehicle speeds 	<ul style="list-style-type: none"> The Contractor must provide and maintain a method statement for dust control. The method statement must provide information on the proposed source of water to be utilized and the details of the licenses and permits required. The construction site must be watered during the dry and windy conditions to control dust fallout Dust production must be controlled by regular watering of access roads and working areas, should the need arise. Other dust suppressant methods must also be considered to conserve water. Construction vehicles must adhere to low speeds to avoid the generation of dust on the construction site. All construction vehicles must be maintained to avoid adverse impacts on air quality as a result of a lack of maintenance. 	Construction and Operational Phase	National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Throughout entire life of project including construction, operation and decommissioning and closure

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
Construction of pipeline infrastructure and access road Operations pipeline infrastructure ,pump station, dangerous goods storage area and access road	8 ha	Waste management	Increase waste generation due to construction and operation activities	<ul style="list-style-type: none"> Modify storage facilities Waste management procedures Control disposal/storage Prohibit littering and illegal dumping 	<ul style="list-style-type: none"> Remove all waste, including cleared vegetation from site as soon as possible unless the material will be reused on site. A dedicated area for the placement of waste must be identified and demarcated. Waste skips must be covered and emptied regularly. No overflowing to be allowed. 	Construction and Operation	National Environmental Management: Waste Act (Act No. 59 of 20087)	Throughout entire life of project including construction, operation and decommissioning and closure
Construction of pipeline infrastructure and access road Operation of the pipelines, pump station, dangerous goods storage area and access road	8ha	Fire Risk	Increased risk of on-site fires	<ul style="list-style-type: none"> Personal Protective Equipment Implement Fencing/access control 	<ul style="list-style-type: none"> All chemicals and hazardous substances (flammable) must be stored in dry areas and locked. Smoking is prohibited near flammable substances. Dedicated smoking areas must be made available for personal. No open fires to be allowed on site. Fire extinguishers and other firefighting equipment deemed suitable must be available on site at all times 	Construction and Operation	National Veld and Forest Fire Act (Act No. 101 of 1998)	Throughout entire life of project including construction, operation and decommissioning and closure
Construction of the pipelines, pump station, dangerous goods storage area and access road	8 ha	Social	Benefits resulting from employment and income opportunities created by the proposed project.	<ul style="list-style-type: none"> Implement employment policy 	<ul style="list-style-type: none"> Develop a clear and concise employment policy prioritizing local employment Employ local works if qualified applicants with the appropriate skills are available. Purchase goods and services at a local level if available. 	Construction Phase	Basic Conditions of Employment Amendment Act (Act NO. 7 of 2018) Labour Relations Amendment Act (Act No. 8 of 2018) National Minimum Wage Act (Act No. 9 of 2018) Labour Laws Amendment Act (Act No. 10 of 2018) Employment Equity Act (Act 55 of 1998)	Throughout the construction phase
Storage and handling of dangerous goods	8 ha	Storage and handling of dangerous goods	Risk to people and property The storage and handling of dangerous goods material could potentially cause safety risks to personnel handling the material, or pose risks to other buildings and infrastructure in close proximity to the storage areas	<ul style="list-style-type: none"> Control/remedy spills Establish Emergency procedures Undertake training Modify storage 	<ul style="list-style-type: none"> Strict access control to the dangerous goods storage area must be implemented. No unauthorised persons may enter the area. Design of the production facility must be undertaken in accordance with risk management standards which determine the appropriate spacing between substance storage areas and operations with the aim of minimising risks. Develop and implement written operating procedures that provide clear instructions for safely conducting activities involved in each covered process consistent with the process safety information. Operating procedures must provide clear instructions not only to specify the steps for normal operations, but also for upset conditions, temporary operations, start-up, and emergency shutdown. Important safety information that includes the basic hazards encountered or that could be encountered in the process must also be addressed in the operating procedures. Identification of hazard areas and limitations on the number of authorized 	Operational Phase	Mine Health and Safety Act (Act No. 29 of 1996)	Throughout operational phase

Activity	Size	Environmental aspect	Potential Impact	Mitigation Type	Mitigation Measure	Phase	Compliance with standards	Time period
					<p>personnel in the hazard area will ensure that the minimum numbers of personnel are exposed to the hazard.</p> <ul style="list-style-type: none"> • All dangerous goods must be stored on covered (roofed), concrete lined areas. • Clear signage of areas storing dangerous goods must be placed, indicating the hazards and appropriate PPE to be worn. • MSDS sheets for each dangerous good must be developed and placed at the storage area on site. • Emergency response Plan must be developed and include as a minimum 			

6 FINANCIAL PROVISION

6.1 Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the regulation

Refer to Part B Section 4.1.

6.2 Confirmation specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties

As part of the Public Participation process, this Draft Basic Assessment is currently available for public review and comment for a period of 30 days, from **DATE to DATE**.

6.3 Provide a rehabilitation plan

Rehabilitation will take place as part of the overall Marikana Platinum Mine rehabilitation Plan. Rehabilitation specifically related to this Basic assessment process is provided below (SRK, 2012).

Demolition of Infrastructure

- All pipelines and pumpstations to be disconnected and certified as safe prior to commencement of any demolition work.
- Salvageable equipment will be removed and transported offsite prior to the commencement of any demolition works.
- All above ground electrical, and other service infrastructure and equipment to be removed and at designated salvage yards.
- Concrete slabs and footings will be removed to a depth of 500 mm below ground surface. This concrete (and metal) will be broken up and disposed of in the designated landfill.
- Topsoil to be replaced at the following thickness depending on final planned land capability:
 - Arable – 750 mm
 - Grazing – 250 mm
 - Wilderness – 100-250 mm
- Establish appropriate vegetation.

Contaminated soils

- Undertake soil investigations to characterise the nature of possible contaminants and design a site-specific soil remediation strategy.
- Identify appropriate risk-based guideline levels against which to assess contamination.
- If contamination is primarily hydrocarbon, with soil concentrations exceeding an appropriate risk-based guideline, the following will be undertaken:
 - Volumes less than 100 m³ – On site bioremediation will be undertaken by collecting the affected soils and transporting them to a dedicated bioremediation facility
 - Isolation by installation of physical barrier
 - Immobilisation by either pH or redox adjustment
 - Extraction through enhancing solubility and then extracting contaminated solution
 - Where risk-based assessment indicates that residual contamination is unlikely to present an unacceptable human or ecological risk, contaminated soils to be covered with a soils suitable as a plant growth media and vegetation

Roads:

Roads not needed for closure and post-closure uses at the site will be closed by ripping compacted surfaces, re-grading as needed to promote proper surface drainage, covered with growth media where needed and re-vegetated.

6.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The rehabilitation actions that Sibanye-Stillwater intends on undertaking at the end of the life of project are designed to comply with the requirements of the closure objectives.

Using available baseline and operational information, as well as identifying the opportunities and constraints imposed by the project on the environment and vice versa, the intention of Sibanye-Stillwater is to progressively reinstate a post-mining landscape that improves local spatial development patterns and maximises socio-economic opportunities, by supporting sustainable agricultural production, while maintaining essential ecosystem services.

6.5 Calculate and state the quantum of the financial provision required to manage the rehabilitate the environment in accordance with the applicable guideline

The closure cost assessment for proposed project is provided in Appendix G. The current financial closure liability associated with the proposed project is R14 337 832.32.

6.6 Confirmation that the financial provision will be provided

Refer to **Part A Section 20.2**.

7 MECHANISMS FOR MONITORING COMPLIANCE AND PERFORMANCE AGAINST THE EMPR

Table 7-1 Mechanisms for monitoring compliance with and performance assessment against the Environmental Management Programme

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Spills, contamination.	Surface water quality	Variables as defined by the Water Use License must be monitored for.	The responsibility for compliance is vested with the applicant. The applicant must appoint an Environmental Control Officer to oversee the mechanisms for monitoring compliance.	It is recommended that the monitoring frequency as per the Water Use License be adhered to.
Spills, contamination.	Ground water quality			
Vehicular movement	Nuisance dust	Dust monitoring is carried out at areas posing high risk such as roads to determine if additional dust suppression measures are required. This must be extended to the Block L Opencast.		It is recommended that dust fall monitoring is undertaken on a monthly basis.
Storm water management	Surface water quality	Storm water infrastructure integrity, functionality and capacity must be inspected.		It is recommended that the Environmental Control Officer undertake monthly inspections on all storm water infrastructure.
Alien and invasive species	Establishment of alien and invasive species	Inspections must be carried out to identify and eradicate alien and invasive species. Special attention must be given to disturbed areas and previously rehabilitated areas.		It is recommended that the Environmental Control Officer undertake monthly inspections for alien and invasive species.
Waste handling	Increased litter, soil contamination, surface and ground water contamination.	Waste must be separated into general and hazardous streams, appropriately stored and disposed of.		Monthly inspections must be undertaken by the Environmental Control Officer on waste skips to determine whether general and hazardous waste is separated.

8 FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT/ENVIRONMENTAL AUDIT REPORT

Unless otherwise instructed by the Competent Authority (DMRE) or as a condition to the environmental authorisation, internal environmental compliance audits on the EMPr will be undertaken annually, and the resultant audit reports will be submitted to the DMRE. External environmental compliance audits on the EMPr will be undertaken biennial (once every two years) by an independent EAP, and a copy of the external audit report will be submitted to the DMRE.

The auditing process, as well as report format will comply with the requirements as contained in the EIA Regulations, GN R982, dated December 2014, as amended.

9 ENVIRONMENTAL AWARENESS PLAN

9.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work

Environmental awareness must be included as part of the induction process to the site. Further to this, environmental risks and responsibilities must be communicated through to contractors and subcontractors. It is recommended that monthly awareness talks are given by the Environmental Control officer in order to inform employees and contractors of the risks associated with each task.

9.2 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

All potential risks will be managed, and potential environmental impacts prevented or minimised through the implementation of mitigation measures and the EMPr. The mitigation measures are provided in **Table 5-1**. The appropriate implementation of the EMPr would be monitored through regular environmental monitoring by the appointed Environmental Control Officer.

10 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

To date, no specific information has been requested by the Competent Authority.

11 UNDERTAKING

The EAP herewith confirms:

- a) The correctness of the information provided in the reports;
- b) The inclusion of comments and inputs from stakeholders and I&APs;
- c) The inclusion of inputs and recommendations from the specialist reports where relevant; and
- d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein

Signature of the EAP

Name of Company: Alta van Dyk Environmental Consultants cc

Date

12 REFERENCES

Dr Julius CC Pistorius, 2022. Phase I Heritage Impact Assessment (HIA) Study for Sibanye Stillwater's Proposed Meccano Tailings Retreatment Project Near Marikana in the North West. November 2022

SRK, 2012. Amendment to the Existing Aquarius Platinum South Africa's Marikana Mine Environmental Management Programme to include the proposed West-West Open Pit Rehabilitation and Surface Tailings Storage Facility Project. Document Number: 411508. August 2012

TerraAfrica, 2022. Soil and Agricultural Assessment for the proposed Meccano Tailings Retreatment Project

The Biodiversity Company, 2022. The Vegetation Assessment for the Proposed Meccano Tailings Retreatment Project. November 2022

WCS Scientific (Pty.) Ltd, 2022. Wetland Delineation and Assessment Proposed Meccano Tailings Retreatment Project. November 2022

APPENDIX A: CURRICULUM VITAE OF THE EAP

APPENDIX B: SCREENING TOOL REPORT

APPENDIX C: MAPS

APPENDIX D: PUBLIC PARTICIPATION

APPENDIX D1: MINUTES OF PRE-APPLICATION MEETING

APPENDIX D2: COMMENTS AND RESPONSE REPORT

APPENDIX D3: STAKEHOLDER REGISTER

APPENDIX D4: BACKGROUND INFORMATION DOCUMENT

APPENDIX D5: NOTIFICATION EMAILS

APPENDIX D6: SITE NOTICE

APPENDIX D7: NEWSPAPER ADVERT

APPENDIX D8: COMMENTS RECIEVED

APPENDIX E: SPECIALIST STUDIES

APPENDIX E1: VEGETATION ASSESSMENT

APPENDIX E2: SOILS AND AGRICULTURAL ASSESSMENT

APPENDIX E3: HERITAGE IMPACT ASSESSMENT

APPENDIX E4: Wetland Delineation and Assessment

APPENDIX F: Design Layout

APPENDIX G: FINANCIAL PROVISION