



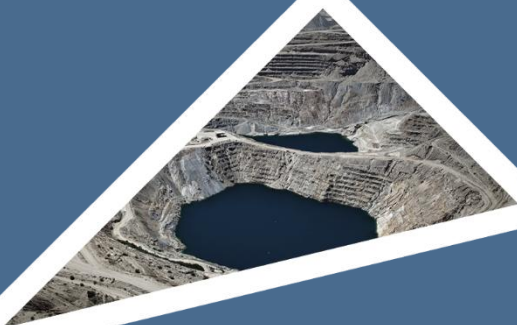
ENVIRONMENTAL
IMPACT
MANAGEMENT
SERVICES

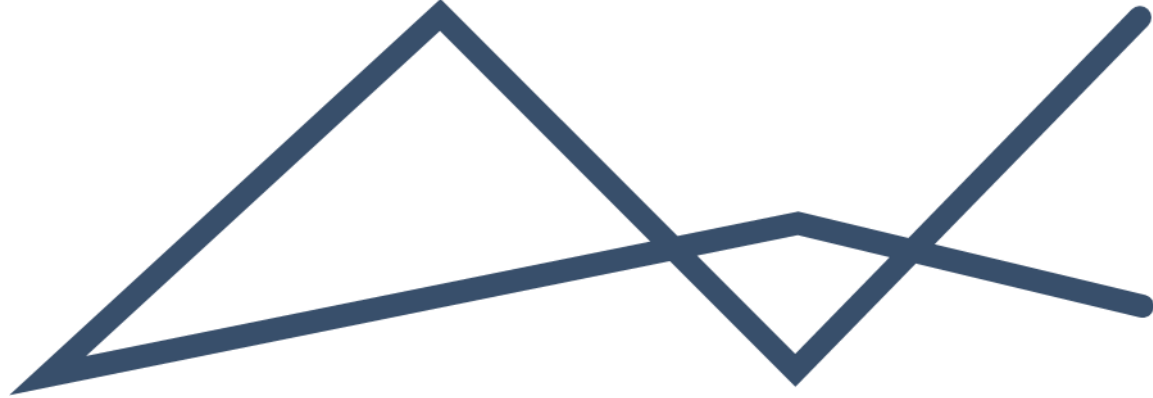
T 011 789 7170 E info@eims.co.za W www.eims.co.za

SCOPING REPORT

HARMONY GOLD:
MPONENG LOWER COMPARTMENT TAILING STORAGE FACILITY
(REDEPOSITION)
(GP) 30/5/1/2/2 (01) MR

SEPTEMBER 2025





DOCUMENT DETAILS

EIMS REFERENCE: 1658

DOCUMENT TITLE: Scoping Report – Proposed Recommencement of Deposition on Mponeng Lower Compartment Tailing Storage Facility

DOCUMENT CONTROL

	NAME	SIGNATURE	DATE
COMPILED:	Vukosi Mabunda	Not Signed – Sent Electronically	2025/07/21
CHECKED:	John von Mayer	Not Signed – Sent Electronically	2025/09/05
AUTHORIZED:	Liam Whitlow	Not Signed – Sent Electronically	2025/09/05

REVISION AND AMENDMENTS

REVISION DATE:	REV #	DESCRIPTION
2025/07/21	ORIGINAL DOCUMENT	Draft for internal review
2025/09/29	REVISION 1	Final for Public Review



Table of Contents

Acronyms and Abbreviations.....	1
Glossary of Terms	4
Executive Summary	1
1 Introduction	1
1.1 Report Structure	4
1.2 Assumptions and Limitations	7
1.3 Purpose of the Report	7
1.4 The Scoping and EIA Requirements	7
1.5 The Scoping Phase.....	8
1.6 Details of the EAP.....	8
1.7 Expertise of the EAP	9
1.8 Specialist Consultants	10
1.9 Description of the Property.....	11
2 Description and Scope of the Proposed Project	15
2.1 Project Description.....	15
2.2 Description of Activities to be Undertaken	17
2.2.1 Recommencement of deposition on Mponeng Lower Compartment TSF	17
2.2.2 Construction of Slurry and Return Water Pipelines.....	23
2.2.3 Construction of Pipeline Bridge	24
2.2.4 Construction of Pipeline Culvert	24
2.2.5 Installation of Clean Water Diversion System - Spring Diversion	25
2.2.6 Installation of Dirty Water Systems	26
2.2.7 Upgrade of Return Water Dam (RWD)	29
2.3 Listed and Specified Activities Triggered.....	33
3 Need and Desirability of the Proposed Activity	37
4 Policy and Legislative Context.....	48
4.1 Applicable National Legislation	48
4.1.1 Constitution of the Republic of South Africa	48
4.1.2 The National Environmental Management Act, 1998	48
4.1.3 NEMA Environmental Impact Assessment Regulations, 2014 as Amended	51
4.1.4 The Mineral and Petroleum Resources Development Act, 2002.....	52
4.1.5 The Mining and Biodiversity Guidelines, 2013	52
4.1.6 National Radioactive Waste Disposal Institute Act 53 Of 2008	53
4.1.7 The National Water Act, 1998	54
4.1.8 The National Environmental Management Waste Act (NEMWA)	60
4.1.9 National Radioactive Waste Disposal Institute Act 53 of 2008.....	63
4.1.10 The Hazardous Substances Act, 1973 (Act No. 15 of 1973)	63



4.1.11	The National Environmental Management Biodiversity Act, 2004	63
4.1.12	The National Environmental Management Air Quality Act, 2004	65
4.1.13	The National Heritage Resources Act (NHRA).....	66
4.1.14	The National Noise Control Regulations, 1992	67
4.1.15	The National Web-Based Environment Screening Tool, 2019	68
4.1.16	The National Veld and Forest Fire Act, 1998	76
4.1.17	The National Forests Act, 1998.....	76
4.1.18	The Sub-Division of Agricultural Land Act, 1970.....	76
4.1.19	The Conservation of Agricultural Resources Act (CARA)	76
4.1.20	The Spatial Planning and Land Use Management Act (SPLUMA)	77
4.2	Other Applicable Acts and Guidelines.....	77
4.2.1	Interim Guidance on The Management of NORM Tailings and Waste Rock from the National Nuclear Regulator	77
4.2.2	The Global Industry Standard on Tailings Management (Gistm) and Social Performance	78
4.2.3	Provincial Conservation Plan – The Gauteng Conservation Plan	80
4.2.4	The Gauteng Environmental Management Framework Tool	81
4.2.5	The Gauteng Ridges Guideline.....	82
4.2.6	West Rand District Municipality Regional Growth and Development Strategy	87
4.2.7	Merafong Municipal Spatial Development Framework.....	87
4.2.8	Integrated Waste Minimisation Plans	88
5	Project Alternatives	89
5.1	Design Alternatives	92
5.1.1	Wall Construction Designs	92
5.1.2	Design Lining Options	95
5.1.3	Pipeline Designs	100
5.2	Process Alternatives	101
5.2.1	Conventional Disposal Methods	101
5.2.2	Alternative Tailings Disposal Dethods.....	104
5.3	Pipeline Routing Alternatives	105
5.4	No Go Alternative.....	107
6	Stakeholder Engagement	108
6.1	Pre-Consultation with the Competent Authority.....	108
6.2	General Approach to Scoping and Public Participation	108
6.2.1	List of Pre-identified Key Stakeholders / I&APs	109
6.2.2	Initial Notification	110
6.3	Availability of Scoping Report	111
6.4	Public Meeting / Focus Group Meeting	111
6.5	Public Participation Progress.....	112
6.6	Review of the Scoping Report by Competent Authorities	112



6.7	Public Participation Process for EIA Phase	112
6.8	Appeal Period	112
7	Environmental Attributes and Baseline Environment	114
7.1	Location	114
7.2	Topography and Landscape	114
7.3	General Site Conditions / Land-Uses	115
7.4	Climate	119
7.4.1	Current Climatic Conditions	119
7.4.2	Climate Change / Risk Profile	120
7.5	Geology	122
7.5.1	Witwatersrand Supergroup	122
7.5.2	Ventersdorp Supergroup	122
7.5.3	Transvaal Supergroup	123
7.5.4	Karoo Supergroup	124
7.6	Soils and Agricultural Potential	126
7.7	Terrestrial Biodiversity and Vegetation	131
7.7.1	Ecologically Important Landscape Features	132
7.7.2	The National Biodiversity Assessment	133
7.8	Surface Water and Wetlands	138
7.8.1	Hydrology	138
7.8.2	Topographical River Lines and Inland Water Areas	139
7.8.3	National Freshwater Priority Area	139
7.8.4	National Protected Areas Expansion Strategy	139
7.8.5	South African Inventory of Inland Aquatic Ecosystems	139
7.8.6	Wetlands Survey	140
7.9	Geohydrology - Groundwater	147
7.9.1	Borehole Information	147
7.9.2	Aquifer Type	147
7.9.3	Aquifer Parameters	151
7.9.4	Aquifer Recharge	152
7.9.5	Groundwater Gradients and Flow	152
7.9.6	Groundwater Quality	154
7.9.7	Aquifer Classification	157
7.10	Air Quality	157
7.10.1	Atmospheric Dispersion Potential	158
7.10.2	Existing Sources of Air Pollution	161
7.10.3	Project Activities from an Air Quality Perspective	161
7.11	Visual Landscape	163



7.11.1	Landscape Character.....	163
7.11.2	Visual Resource Value, Scenic Quality, and Landscape Sensitivity	167
7.11.3	Assessing Potential Visual Impact.....	167
7.11.4	Sensitive Receptors.....	168
7.11.5	High-Level Identification of Potential Visual Impact.....	168
7.12	Socio-Economic	171
7.12.1	Municipal Profile.....	171
7.12.2	Demographic and Socio-Economic Characteristics.....	171
7.13	Cultural Heritage Resources.....	177
7.13.1	Regional Heritage.....	178
7.13.2	Heritage Screening.....	178
7.13.3	Site-Specific Heritage.....	179
7.14	Palaeontology	183
8	Environmental Impact Assessment.....	188
8.1	Impact Assessment Methodology.....	188
8.1.1	Determination of Environmental Risk	188
8.1.2	Impact Prioritisation	191
8.2	Impacts Identified	193
8.3	Description and Preliminary Assessment of Impacts	197
9	Sensitivity Mapping.....	212
10	Plan of Study for Environmental Impact Assessment	215
10.1	Description of Alternatives to be Considered in EIA Phase.....	215
10.2	Description of the Aspects to be Assessed as part of the EIA process.....	215
10.3	Aspects to be Assessed by Specialists	215
10.4	Proposed Method of Assessing Environmental Aspects.....	222
10.5	Proposed Method for Assessing Duration and Significance	222
10.6	Stages at Which Competent Authorities will be Consulted	222
10.7	Proposed Method of EIA Phase Public Participation	222
10.8	Description of Tasks that will be Undertaken During the EIA Process	222
10.9	Measures to Avoid, Reverse, Mitigate, or Manage Impacts	223
11	Undertaking Regarding Correctness of Information.....	224
12	Undertaking Regarding Level of Agreement.....	224
13	References	225



List of Figures

Figure 1: Aerial imagery locality map indicating the location of the proposed Mponeng Lower Compartment TSF and associated infrastructure.	13
Figure 2: Locality map indicating the location of the proposed Mponeng Lower Compartment TSF and cadastral information.	14
Figure 3: Tailings Storage Facility Process (International Council on Mining and Metals, 2023).	17
Figure 4: Aerial view of Mponeng Tailings Storage Facility and proposed infrastructure at the Harmony West Wits Region Operations (Google Earth, 2025)	18
Figure 5: Groundwater level map (GCS, 2025)	19
Figure 6: Proposed Inverted Barrier System (Eco Elementum, 2025)	22
Figure 7: View existing aboveground residue deposition pipeline on site (left) and view of typical slurry and return water pipes taken from a different Harmony plant (right).....	23
Figure 8: Example of a typical Harmony pipeline bridge proposed for the project at the water crossing	24
Figure 9 Example of a typical Harmony pipeline culvert proposed for the project at the road crossing	25
Figure 10: Potential stormwater and leachate collection system (Eco Elementum, 2025).....	26
Figure 11: Schematic Detail a potential spring capturing system (GCS, 2025)	26
Figure 12: Typical Trapezoidal Concrete-lined Channel Detail (Eco Elementum, 2025).....	27
Figure 13: Typical Leachate Drain Detail (Eco Elementum, 2025)	28
Figure 14: Typical Toe Drain Detail (Eco Elementum, 2025)	28
Figure 15: Typical Detail of the Interface drain (Eco Elementum, 2025).....	29
Figure 16: Proposed RWD layout and liner detail. (Eco Elementum, 2025)	32
Figure 17: EIA process diagram	50
Figure 18: Map illustrating the Mining Biodiversity Importance/Risk (The Biodiversity Company, 2025).....	53
Figure 19: Authorisation processes for new water uses	55
Figure 20: Topographical inland water areas and river lines that intersect the Project Area of Influence (The Biodiversity Company, 2025)	57
Figure 21: Summary of Global Industry Standard on Tailings Management (Joyce & Kemp, 2020)	79
Figure 22: Map illustrating the study area in relation to the Gauteng Conservation Plan (The Biodiversity Company, 2025)	81
Figure 23: Map illustrating the study area in relation to the Gauteng Ridges	85
Figure 24: Aerial view map illustrating transformed state of the affected Class 2 Ridge.....	86
Figure 25: Downstream Tailing Storage Facility design (Yanama Gold, 2023)	93
Figure 26: Upstream Tailing Storage Facility design (Yanama Gold, 2023)	93
Figure 27: Centreline Tailing Storage Facility design (Yanama Gold, 2023)	94
Figure 28: Filtered / Dry Stacking Tailing Storage Facility design (Yanama Gold, 2023).....	94
Figure 29: Example of spigot deposition. Spigot at a pre-constructed embankment crest (left) and spigot pipes laid along the main wall (right) (Goldfields, 2023).....	102



Figure 30: Example of daywall deposition. An open-ended discharge at one end of the paddock daywall (left) and small impoundments with dried-out tailings (right) (Goldfields, 2023)	102
Figure 31: Example of cyclone deposition (Goldfields, 2023).....	103
Figure 32: Sketch diagram showing the working principle of a hydrocyclone in close circuit classification (Haldar, 2018)	104
Figure 33: Aerial view of the pipeline route alternatives	106
Figure 34: General topography of the study area	114
Figure 35: Mponeng Upper Compartment TSF immediately west of Mponeng Lower Compartment TSF	115
Figure 36: View of the Mponeng Lower TSF from the Mponeng Upper Compartment TSF.	115
Figure 37: View of the current holding dam on the Mponeng Lower TSF.....	116
Figure 38: View of the existing landfill site on the Mponeng Lower TSF.....	116
Figure 39: Steep embarkment of the Mponeng Lower TSF with alien vegetation and maintained gravel access road.....	116
Figure 40: Current conditions of Mponeng Lower TSF Return Water Dam.....	116
Figure 41: Natural (aquatic) dam approximately 150m southeast of the Mponeng Lower TSF (Young, 2025). The image also shows some of the grazing activities in the area.	117
Figure 42: Google Earth view showing the close proximity of the (aquatic) dam southeast of the Mponeng Lower TSF. The dam is fed by the Elandsfonteinspruit.....	117
Figure 43: Northern boundary of the Mponeng Lower TSF showing the steep embarkment and vegetation including alien invasive trees and a potential wetland.....	117
Figure 44: Northern view of the pipeline section showing a channelled valley bottom wetland, uniform vegetation of low-lying grass and sections of trees and shrubs within the rocky ridge.	117
Figure 45: Current conditions of the rocky ridge.....	118
Figure 46: Average climatic conditions (Hydrological Consulting, 2025)	119
Figure 47: Regional surface geology (MvB Consulting, 2025)	125
Figure 48: Land type associated with the proposed project area (The Biodiversity Company, 2025)	126
Figure 49: Illustration of land type Fb 5 terrain units (Land Type Survey Staff, 1972 – 2006)	126
Figure 50: Illustration of land type Fb 15 terrain units (Land Type Survey Staff, 1972 – 2006)	127
Figure 51: Soil forms found within the proposed project area (The Biodiversity Company, 2025)	129
Figure 52: Soil forms found within the proposed project area; A) Carolina soil form; B) Glenrosa soil form; and C) Mispah soil form (The Biodiversity Company, 2025)	129
Figure 53: Anthrosols and Technosols; A and B) Stilfontein; C) Johannesburg; D to F) Witbank (The Biodiversity Company, 2025)	130
Figure 54: Land Potential of the proposed project area (The Biodiversity Company, 2025)	131
Figure 55: Site Vegetation Map	134
Figure 56: Hydrological setting of the site (Hydrologic Consulting, 2025)	141
Figure 57: Topographical inland water areas and river lines that intersect the Project Area of Influence (The Biodiversity Company, 2025)	142
Figure 58: The study area in relation to the National Protected Area Expansion Strategy (The Biodiversity Company, 2025).....	143



Figure 59: Map illustrating the SAIIE threat status of rivers and wetland systems within the study area (The Biodiversity Company, 2025)	144
Figure 60: Wetland features identified within the study area (The Biodiversity Company, 2025)	145
Figure 61: Delineation of watercourses within the study area (The Biodiversity Company, 2025)	146
Figure 62: Monitoring boreholes in the vicinity of the Mponeng TSF (MvB Consulting, 2025)	148
Figure 63: Graphical illustration of the aquifers in the study area (Van Biljon, 2018)	150
Figure 64: Regional groundwater gradient and borehole locations in relation to the TSF site (MvB Consulting, 2025)	153
Figure 65: Sulphate concentration distribution in the groundwater monitoring boreholes (MvB Consulting, 2025)	156
Figure 66: Location of sensitive receptor areas surrounding the current Savuka and Mponeng Mining Operations (Airshed Planning Professionals, 2025)	159
Figure 67: Period, day- and night-time wind roses (WRF data, January 2022 to December 2024)	160
Figure 68: Seasonal wind roses (WRF data, January 2022 to December 2024)	160
Figure 69: Landscape character - Views 1, 2 and 3 (Graham Young Landscape Architect, 2025)	164
Figure 70: Landscape character - Views 4, 5 and 6 (Graham Young Landscape Architect, 2025)	165
Figure 71: Landscape sensitivities (Graham Young Landscape Architect, 2025)	166
Figure 72: Mponeng Lower Compartment TSF Viewshed Analysis (Graham Young Landscape Architect, 2025)	170
Figure 73: Merafong population groups (Statssa, Census 2022)	172
Figure 74: Map indicating the study Project Baseline Social and Land Use Assessment (Equispectives, 2020)	174
Figure 75: Sector Output Growth (IHS Markit, 2022; Draft IDP Merafong City 2025-26)	177
Figure 76: Map of relative archaeological and cultural heritage theme sensitivity (DFFE, 2025)	179
Figure 77: View of MPnr1 (top) and MPnr2 (bottom) (PGS Heritage, 2025)	180
Figure 78: Identified heritage resources within the Mponeng TSF development area (PGS Heritage, 2025)	181
Figure 79: Stone-walled sites both within the Mponeng TSF development area and adjacent to the study area (PGS Heritage, 2025)	182
Figure 80: Extract of the 1:250 000 West Rand 2626 (1986) Geological Map (Council for Geosciences, 1986; Banzai Environmental, 2025)	185
Figure 81: Extract of the SAHRIS PalaeoMap indicating the High (orange), Moderate (green) and Zero (grey) Palaeontological Sensitivity of the proposed study area (Banzai Environmental, 2025)	186
Figure 82: Map of relative palaeontology theme sensitivity (DFFE, 2025)	187
Figure 83: Desktop scoping sensitivity map	214



List of Tables

Table 1: Glossary of terms	4
Table 2: Report structure.....	4
Table 3: Details of the Environmental Assessment Practitioner.	9
Table 4: Specialist details for the Mponeng Lower Compartment TSF	10
Table 5: Locality details	11
Table 6: Summary of proposed activities	15
Table 7: Relevant NEMA listed activities relevant to the proposed development	33
Table 8: Applicable NEMWA Activities relevant to the proposed development.....	35
Table 9: Needs and desirability analysis for the proposed TSF	38
Table 10: Summary of the South African EIA regulations from inception to date	51
Table 11: Environmental Sensitivity of Project Area	69
Table 12: Specialist Assessments/themes and Sensitivity Ratings identified by DFFE’s Web-based Screening Tool	70
Table 13: Summary of discussions regarding the undertaking of specialist Assessments	73
Table 14: Gauteng Provincial Environmental Management Framework Zones	81
Table 15: Project alternatives as per NEMA EIA Regulations, 2014 as amended	90
Table 16: Advantages and disadvantages different TSF Designs (ICCM, 2022 & Yanama Gold, 2023)	94
Table 17: Advantages and disadvantages Lined, Unlined TSF and Unlined TSF with Phytoremediation	98
Table 18: Advantages and disadvantages Pipelines Design.....	100
Table 19: Advantages and disadvantages of pipeline routes	106
Table 20: Rainfall Summary (MvB Consulting, 2025).....	119
Table 21: Soils expected at the respective terrain units within the Fb 5 land type (Land Type Survey Staff, 1972 - 2006)	127
Table 22: Soils expected at the respective terrain units within the Fb 15 land type (Land Type Survey Staff, 1972 - 2006)	127
Table 23: Desktop and background spatial features examined.....	132
Table 24: Threatened flora species that are expected to occur within the extended study area (The Biodiversity Company, 2025)	135
Table 25: Threatened flora species that are expected to occur within the extended study area (The Biodiversity Company, 2025)	136
Table 26: Wetland classification as per SANBI guideline (The Biodiversity Company, 2025).....	140
Table 27: Mine monitoring boreholes (GCS, 2023)	149
Table 28: Transmissivity and hydraulic conductivity values in the weathered and fractured aquifers (GCS, 2019)	151
Table 29: Groundwater chemistry (MvB Consulting, 2025)	155
Table 30: Aquifer Classification (MvB Consulting, 2025).....	157



Table 31: Activities and associated air pollutants from the Savuka and Mponeng Operations (Airshed Planning Professionals, 2025).....	161
Table 32: Value of the Visual Resource (Graham Young Landscape Architect, 2025).....	167
Table 33: Magnitude of Visual Impact (Graham Young Landscape Architect, 2025)	169
Table 34: Breakdown of households according to geo types (source: Census 2011; Equispectives, 2020)	175
Table 35: Selected Poverty Indicators (source: Draft IDP Merafong City 2025-26).....	176
Table 36: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (SAHRIS, 2025).....	184
Table 37: Criteria for Determining Impact Consequence	188
Table 38: Probability Scoring / Likelihood Scoring	190
Table 39: Determination of Significance.....	190
Table 40: Significance Scores.....	191
Table 41: Criteria for Determining Prioritisation	191
Table 42: Determination of Prioritisation Factor.....	192
Table 43: Final Environmental Significance Rating	192
Table 44: Identified potential environmental impacts	194
Table 45: Impact identification matrix	196
Table 46: Preliminary impact assessment	198
Table 47: Sensitivity rating and weighting.....	212
Table 48: Details of specialist input during the EIA phase.....	216

Appendices

Appendix A: Site Maps and Layout

Appendix B: Curriculum Vitae of Environmental Assessment Practitioner

Appendix C: Public Participation

Appendix D: DFFE Screening Tool Report

Appendix E: Site Sensitivity Screening Report

Appendix F: Baseline Specialist Reports

Appendix G: Preliminary Impact Assessment Matrix



ACRONYMS AND ABBREVIATIONS

APPA:	Air Pollution Prevention Act
AQSR:	Air Quality Sensitive Receptors
ASTM:	American Standard Testing Methodology
CA:	Competent Authority
CARA:	Conservation of Agricultural Resources Act, 1983
CBA:	Critical Biodiversity Area
CCAM:	Conformal-Cubic Atmospheric Model
CMA:	Catchment Management Agency
CO ₂ :	Carbon Dioxide
C-Plan:	Conservation Plan
DAFF:	Department of Agriculture, Forestry and Fisheries (now DFFE)
DEA:	Department of Environmental Affairs (now DFFE)
DFFE:	Department of Forestry, Fisheries and the Environment
DMPR:	Department of Mineral and Petroleum Resources
DMRE:	Department of Mineral Resources and Energy (now DMPR)
DSO:	Dam Safety Office
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Environmental Assessment Practitioner
EC:	Electrical Conductivity
ECA:	Environmental Conservation Act
EIA:	Environmental Impact Assessment
EIMS:	Environmental Impact Management Services (Pty) Ltd
ELWU:	Existing Lawful Water Use
EMPr:	Environmental Management Programme
EN:	Endangered
ESA:	Ecological Support Areas
GA:	General Authorisation
GCM:	Conformal-Cubic Atmospheric Model
GDARD	Gauteng Department of Agriculture and Rural Development
GHG:	Greenhouse Gasses
GN:	Government Notice
GNR:	Government Notice Regulation
GQM:	Groundwater Quality Management
Ha:	hectare



HIA:	Heritage Impact Assessment
I&AP:	Interested and Affected Party
IDP:	Integrated Development Plan
IEM:	Integrated Environmental Management
IPCC:	Intergovernmental Panel on Climate Change
IWML:	Integrated Waste Management Licence
km:	kilometre
ktpm:	kilotonnes per month
LC:	Leachable Concentration
LED:	Local Economic Development
LOM:	Life of Mine
m:	meters
MAE:	Mean Annual Evaporation
mamsl:	meters above mean sea level
MAP:	Mean Annual Precipitation
MAR:	Mean Annual Runoff
MCLC:	Merafong City Local Municipality
mm:	millimetres
MPRDA:	Minerals and Petroleum Resources Development Act, 2002
MR:	Mining Right
Mt:	Megatonne
µm:	micrometres
NAAQS:	National Ambient Air Quality Standards
NAEIS:	National Atmospheric Emissions Inventory System
NB:	Nominal Bore
NDP:	National Development Plan
NEMA:	National Environmental Management Act, 1998
NEM:AQA:	National Environmental Management: Air Quality Act, 2004
NEM:WA:	National Environmental Management: Waste Amendment Act, 2008
NEMBA:	National Environmental Management: Biodiversity Act, 2004
NGDB:	National Groundwater Database
NGO:	Non-Governmental Organization
NHRA:	National Heritage Resources Act, 1999
NNR:	National Nuclear Regulator
NORM:	Naturally Occurring Radioactive Material
NT:	Near Threatened



NWA:	National Water Act, 1998
ONAs:	Other Natural Areas
PHRAG:	Provincial Heritage Resources Authority Gauteng
PSDF:	Provincial Spatial Development Framework
PIA:	Palaeontological Impact Assessment
PM:	Particulate Matter
PM ₁₀ :	Particulate Matter with an aerodynamic diameter of 10 micrometers or smaller
PM _{2.5} :	Particulate Matter with an aerodynamic of 2.5 micrometers or less
PPP:	Public Participation Process
PPR:	Public Participation Report
RCP:	Representative Concentration Pathways
RE:	Remaining Extent / Remainder
RWD:	Return Water Dam
SAHRA:	South African Heritage Resources Agency
SANS:	South African National Standards
SCC:	Species of Conservation Concern
SDF:	Spatial Development Framework
SLP:	Social & Labour Plan
SPLUMA:	Spatial Planning and Land Use Management Act
SWMP:	Stormwater Management Plan
TC:	Total concentration
TDS:	Total Dissolved Solids
TSF:	Tailings Storage Facility
TSP:	Total Suspended Particulates
WMA:	Water Management Area
WML:	Waste Management License
WRDM:	West Rand District Municipality
WULA:	Water Use License Application
WUL:	Water Use Licence



GLOSSARY OF TERMS

This section provides a catalogue of terms and definitions, which may be used in this report and, or other documents drafted for the project.

Table 1: Glossary of terms

Term	Definition
Alien Invasive Species	Species of plants, animals or other organisms that are not indigenous to a region and which easily spread and destroy the indigenous plant species, taking over an area and causing biological and socio-economic harm.
Applicant	A person who has submitted an application for an environmental authorisation to the competent authority and has paid the prescribed fee.
Buffer	A strip of land surrounding a wetland or riparian area in which activities are controlled or restricted
Basic Assessment Process	An environmental assessment process that is undertaken in line with Listing Notices 1 and 3 in terms of the NEMA EIA Regulations with the aim of obtaining Environmental Authorisation.
Clearing/Clearance	Clearing/Clearance refers to the removal of vegetation through permanent eradication and in turn no likelihood of regrowth. 'Burning of vegetation (e.g. fire-breaks), mowing grass or pruning does not constitute vegetation clearance, unless such burning, mowing or pruning would result in the vegetation being permanently eliminated, removed or eradicated'.
Competent Authority	An organ of state charged by the National Environmental Management Act (NEMA) with evaluating the environmental impact of an activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.
Conservation Plan Areas (C-Plan Areas)-	<p>A tool developed by the Environmental Provincial Department to identify sensitive areas. The main purposes of this tool is to:</p> <ul style="list-style-type: none"> • serve as the primary decision support tool for the biodiversity component of the Environmental Impact Assessment (EIA) process. • inform protected area expansion and biodiversity stewardship programmes in the province; and serve as a basis for development of Bioregional Plans in municipalities within the province. <p>Some of the aspects that inform the identification of C-Plan Areas include Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESA's), Watercourses, Ridges, Protected Areas, etc</p>
Critical Biodiversity Area	Areas that are deemed important to conserve ecosystems and species. For this reason, these areas require protection.
Cultural significance	Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance.
Development	Means the building, erection, construction or establishment of a facility, structure, or infrastructure, including associated earthworks or Quarries, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or quarries, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Development Footprint (also referred to as study area)	Any evidence of physical alteration as a result of the undertaking of any activity. For purposes of this report, it refers to actually area being assessed and will likely be altered / developed should the project proceed.



Decommissioning	Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily recommissioned.
Environment	the surroundings within which humans exist and that are made up of— (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Ecological Support Area	Areas that support the ecological functioning of protected areas or CBAs or provide important ecological infrastructure.
Environmental Assessment Practitioner	Individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Authorisation	This is a decision by a Competent Authority to authorise a listed activity in terms of the National Environmental Management Act (NEMA). The authorisation means that a project, either in totality or partially, can commence subject to certain conditions. The Competent Authority has a right to refuse to grant authorisation for a project in totality or partially.
Environmental Impact Assessment Process:	An environmental assessment process that is undertaken in line with Listing Notice 2 the NEMA EIA Regulations with the aim of obtaining Environmental Authorisation.
Environmental Management Programme:	A programme with set objectives and timeframes that seek to achieve a required end state and describes how activities that have or could have an adverse impact on the environment will be mitigated, controlled, and monitored.
Flora	Plant life that occurs in a specific geographical region and/habitat.
Fauna	Animal life that occurs in a specific geographical region and/habitat.
Heritage Resource	Means any place or object of cultural significance.
Indigenous Vegetation	Plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	In relation to an application for Environmental Authorisation, this refers to an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the NEMA EIA Regulations. This party will ideally be interested in the development but also affected by the proposed application and have a certain interest in the application.
Listed Activity	The activities listed in Appendix 1, identified in terms of section 24(2) (a) of the Act as activities that may not commence without an environmental authorisation from the competent authority
Particulate Matter	Refers to a complex mixture of microscopic solid particles and liquid droplets suspended in the air, including dust, smoke, and soot. It is categorized by size, with the most hazardous being fine particles (PM _{2.5}) that are 2.5 micrometers or smaller in diameter, and inhalable particles (PM ₁₀) that are 10 micrometers or smaller.
Public Participation Process	In relation to the assessment of the environmental impact of any application for an environmental authorisation, means a process by which potential Interested and Affected Parties are given opportunity to comment on, or raise issues relevant to, the application.



Regulated area of a watercourse:	<p>Refers to:</p> <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.
Return Water Dam	A return water dam is a purpose-built facility, often on a mine, that stores and controls process water, which is then pumped back to the plant or to a reclamation site.
Ridge	A ridge is a long, narrow, elevated geomorphologic landform, structural feature, or a combination of both separated from the surrounding terrain by steep sides.
Riparian Area	A Habitat that includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.
Slurry	In mining, a slurry is a thick, fluid mixture of solids and liquid, usually water, that is used to transport extracted ore and waste materials like tailings from one place to another.
Species of Conservation Concern	IUCN Red List definition: Threatened species, and other species of significant conservation importance: Extinct, Extinct in the Wild, Near Threatened, Data Deficient. In South Africa, the following additional categories are added: Rare, Critically Rare.
Tailings	Tailings are the leftover, finely-ground rock, minerals, and water that remain after the valuable components have been extracted from mined ore. These waste materials are typically processed into a slurry and pumped into surface storage facilities, called tailings dams or Tailings Storage Facilities where they are stored as fine-grained residue.
Tailings Storage Facility	Tailings Storage Facility are specially engineered structures, often large dams, designed to contain the liquid or slurry waste (tailings) from mining operations, which consist of crushed rock, water, and trace chemicals.
Threatened or Protected Species	These refers to either plants or animals that are at a threat of Extinction or are protected due to their high conservation value or national importance.
Urban Edge	A demarcated edge of an area that is used as land use management tool to manage, direct and control the outer limits of development growth around an urban area. The aim is to control urban sprawl due to its associated adverse impacts.
Watercourse	<p>Refers to:</p> <p>(a) a river or spring;</p> <p>(b) a natural channel in which water flows regularly or intermittently;</p> <p>(c) a wetland, lake or dam into which, or from which, water flows; and</p> <p>(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.</p>



Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.
----------------	--



EXECUTIVE SUMMARY

Golden Core Trade and Invest (Pty) Ltd -Mponeng Operations (a subsidiary of Harmony Gold Mining Company Limited), hereafter referred to as Golden Core Trade and Invest / “the applicant”, has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the independent Environmental Assessment Practitioner (EAP) to undertake the necessary environmental authorisation and associated consultation processes for a proposed redeposition on Mponeng Lower Compartment Tailings Storage Facility (TSF) and associated infrastructure located at 26°27'10.53"S; 27°24'39.93"E (central TSF point), near Carletonville in the Merafong City Local Municipality (West Rand District Municipality) in Gauteng Province. The Mponeng Lower Compartment Tailings Storage Facility (hereafter referred to as Mponeng Lower Compartment TSF) was an existing TSF with a footprint of approximately 102ha, however, the Mponeng Lower Compartment TSF is no longer in operation and is currently utilised as a Holding Dam and an approximately 200m² portion of the TSF has been converted and is currently used as an authorized General Waste Landfill Facility (Gaut 002-09-10-W0011). Further thereto, the approved 2012 EMPr states that the Mponeng Lower Compartment TSF will no longer be used for tailings storage but rather be used as a Holding Dam. The facility is further included in the Water Use Licence as a Holding Dam.

The applicant holds an approved Mining Right (MR) and Environmental Management Programme (EMPr), in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002, as amended) (MPRDA), for the mining of gold at various operations in the West Wits Region in the Gauteng Province. The Savuka Plant currently deposits tailings onto the Savuka 5a, 5b, 7a & 7b TSFs. However, these facilities are approaching their final and approved height, and the current planned Life of Mine (LOM) for the West Wits Region exceed the available deposition capacity of these TSFs. The Savuka tailings facility has reached the end of its lifecycle and is undergoing a short-term extension of two years. Following this period, tailings from Savuka will need to be diverted to an alternative facility. The Mponeng Lower Compartment has been identified as a viable solution to accommodate tailings until the end of life of the Savuka plant and thereafter accommodate tailings from the Mponeng plant. Tailings were deposited up to 25m on the southern half of the footprint, but deposition was ceased after a natural spring was identified within the footprint. Harmony plans to re-commission the Lower Compartment after the spring is diverted to reduce groundwater contamination.

The Mponeng Lower Compartment TSF will store approximately 43 megatonne (Mt) of tailings material. It is anticipated to accommodate tailings deposition for a period of 10 years at a rate of 350 kilotonnes per month (ktpm). The end-of-life limiting factors considered were a rate of rise below 4 meters per annum and a final facility height of 60 meters, ensuring safe and sustainable deposition over the operational life of the facility. In order to redeposit on the Mponeng Lower Compartment TSF from the Savuka Plant, slurry pipelines will need to be constructed, either from the Savuka Plant to the TSF, or from the Kuasalethu Plant to the TSF. The residue deposition pipelines will have a Nominal Bore (NB) diameter of more than 360mm with a peak throughput of more than 120 l/s. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths.

The proposed main activities are as follows:

- Recommencement of deposition on Mponeng Lower Compartment TSF;
- Construction of slurry and return water pipelines;
- Construction of pipeline bridge;
- Construction of pipe culvert;
- Upgrade of Return Water Dam (RWD);
- Installation of Clean Water Diversion System (Spring Diversion);
- Installation of Dirty Water Systems;
- Installation of sub-surface drainage system; and
- Undertaking of ground improvement.



EIMS will compile and submit the required documentation in support of applications for:

- Environmental Authorisation (EA) and Waste Management License (WML) in accordance with the National Environmental Management Act – NEMA (Act 107 of 1998)- Listed activity: **Listing Notice 1, Activities 10, 12, 19, 21D, 21F; Listing Notice 2, Activity 6, and 15; and Listing Notice 3, Activities 12, 14, and 23** as well as the National Environmental Management: Waste Act – NEMWA (Act 59 of 2008) – *Activities B7, B10 and B11; and*
- Water Use Licence (WUL) in accordance with the National Water Act – NWA (Act 36 of 1998). Water uses: Section 21 (a), (c), Section 21 (i) and Section 21 (g). A separate application for a Water Use Licence (WUL) will be lodged with the Department of Water and Sanitation (DWS) for the water use triggers.

PURPOSE OF THE SCOPING REPORT

The purpose of the scoping process is to:

- Identify the policies and legislation that are relevant to the activity;
- To motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- To identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking;
- Where appropriate, to identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process including cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- To identify the key issues to be addressed in the assessment phase;
- To agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required, as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- To identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

PUBLIC PARTICIPATION PROCESS

According to Section (2)(4)(f) of NEMA, the participation of all Interested and Affected Parties (I&APs) must be promoted and all potential I&APs must be informed early and in an informative and proactive way regarding applications that may affect their lives or livelihood. To give effect to the above sections, it is essential to ensure that there is an adequate and appropriate opportunity for Public Participation (PP) in decisions that may affect the environment. The Public Participation Process (PPP) for the proposed project has been undertaken in accordance with the requirements of NEMA in line with the principles of Integrated Environmental Management (IEM). The PPP commenced on the 15th of August 2025 with an initial notification and call to register as interested and affected parties (I&APs). The comments received from I&APs during the initial call to register and commenting period so far have been captured in Public Participation Report in **Appendix C**.

Comments received during this Scoping Report review period will also be collated and added to the Public Participation Report which will be submitted to the Competent Authority (CA). Should the CA accept the Scoping Report, an Environmental Impact Assessment (EIA) Report including an Environmental Management Programme (EMPr), will also be compiled and presented for public comment as part of this EIA process during which time further stakeholder engagement will take place.



This Scoping Report has been made available for public review and comment for a period of 31 days from the **30th of September 2025 to 31st October 2025**. Contact details are provided below:

- Environmental Impact Management Services (Pty) Ltd (EIMS)
- P.O. Box 2083 Pinegowrie 2123
- Phone: 011 789 7170 / Fax: 011 787 3059
- Contact: Mbali Tshabalala
- EIMS Reference No: 1658
- Email: mponengtsf@eims.co.za

PROJECT ALTERNATIVES AND ENVIRONMENTAL IMPACT ASSESSMENT

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended, feasible and reasonable alternatives must be identified and considered within the EIA process. According to the above-mentioned, an alternative is defined as “...in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

(a) property on which or location where it is proposed to undertake the activity;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity;

(e) operational aspects of the activity; and

(f) includes the option of not implementing the activity.”

The alternatives discussed in this report are the No-Go Option; Route Alternative, Layout or Design Alternatives, and Process Alternatives. The preferred option under each category of alternatives is discussed in detail in **Section 5** of this report.

Each of the identified risks and impacts at the various project phases were assessed. The assessment criteria include the nature, extent, duration, magnitude / intensity, reversibility, probability, public response, cumulative impact, and irreplaceable loss of resources.

The most significant risks and impacts identified were those that remain high in terms of significance even post mitigation measures being considered. The following preliminary identified impacts were determined to have a potentially moderate final significance at this stage:

- Negative impact on groundwater during construction, operation and closure phases;
- Negative impact on identified hydrology, wetlands and aquatic species during construction and operation and closure phases;
- Negative visual impact during operation;
- Negative impact on air quality and climate change during the operation phase;
- Negative impact on the health and safety during the operation phase;
- Negative impact on natural habitats, flora and fauna during the planning and construction phases;
- Mortality / disturbance of potential Species of Conservation Concern (SCC);
- Negative impact on archaeological and cultural heritage during the construction phase; and



- Positive socio-economic impact through employment opportunities.

The negative impacts will be further interrogated and assessed during the EIA phase of the project. Potential preliminary mitigation measures have been identified and will be refined based on input from the Environmental Assessment Practitioner (EAP), public consultation, and specialist assessments during the EIA phase of the project. The associated EMPr will identify appropriate mitigation mechanisms for avoidance, minimisation and / or management of the negative impacts and enhancement of the positive aspects.

The following EIA-phase specialist studies are to be conducted:

- Soils and Agricultural Compliance Assessment;
- Air Quality Impact Assessment;
- Surface Water (Hydrological) Assessment;
- Geohydrological (groundwater) Impact Assessment;
- Aquatic Ecology and Wetland Impact Assessment;
- Terrestrial Biodiversity Assessment;
- Cultural and Heritage Resources Assessment;
- Visual Impact Assessment;
- Health Risk & Radiological Impact Assessment; and
- Palaeontology Assessment.

In addition to the above specialist studies, Engineering Designs and Closure and Rehabilitation Plan will also be undertaken to inform the EIA.



1 INTRODUCTION

Golden Core Trade and Invest (Pty) Ltd -Mponeng Operations (a subsidiary of Harmony Gold Mining Company Limited), hereafter referred to as Golden Core Trade and Invest / “the applicant”, has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the independent Environmental Assessment Practitioner (EAP) to undertake the necessary environmental authorisation and associated consultation processes for a proposed redeposition on Mponeng Lower Compartment Tailings Storage Facility (TSF) and associated infrastructure located at 26°27'10.53"S; 27°24'39.93"E (central TSF point), near Carletonville in the Merafong City Local Municipality (West Rand District Municipality) in Gauteng Province. The Mponeng Lower Compartment Tailings Storage Facility (hereafter referred to as Mponeng Lower Compartment TSF) was an existing TSF with a footprint of approximately 102ha, however, the Mponeng Lower Compartment TSF is no longer in operation and is currently utilised as a Holding Dam and an approximately 200m² portion of the TSF has been converted and is currently used as an authorized General Waste Landfill Facility (Gaut 002-09-10-W0011). Further thereto, the approved 2012 EMPr states that the Mponeng Lower Compartment TSF will no longer be used for tailings storage but rather be used as a Holding Dam. The facility is further included in the Water Use Licence as a Holding Dam.

The applicant holds an approved Mining Right (MR) and Environmental Management Programme (EMPr), in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002, as amended) (MPRDA), for the mining of gold at various operations in the West Wits Region in the Gauteng Province. The Savuka Plant currently deposits tailings onto the Savuka 5a, 5b, 7a & 7b TSFs. However, these facilities are approaching their final and approved height, and the current planned Life of Mine (LOM) for the West Wits Region exceed the available deposition capacity of these TSFs. The Savuka tailings facility has reached the end of its lifecycle and is undergoing a short-term extension of two years. Following this period, tailings from Savuka will need to be diverted to an alternative facility. The Mponeng Lower Compartment has been identified as a viable solution to accommodate tailings until the end of life of the Savuka plant and thereafter accommodate tailings from the Mponeng plant. Tailings were deposited up to 25m on the southern half of the footprint, but deposition was ceased after a natural spring was identified within the footprint. Golden Core Trade and Invest plans to re-commission the Lower Compartment after the spring is diverted to reduce groundwater contamination.

The Mponeng Lower Compartment TSF will store approximately 43 megatonne (Mt) of tailings material. It is anticipated to accommodate tailings deposition for a period of 10 years at a rate of 350 kilotonnes per month (ktpm). The end-of-life limiting factors considered were a rate of rise below 4 meters per annum and a final facility height of 60 meters, ensuring safe and sustainable deposition over the operational life of the facility. In order to redeposit on the Mponeng Lower Compartment TSF from the Savuka Plant, slurry pipelines will need to be constructed, either from the Savuka Plant to the TSF, or from the Kuasalethu Plant to the TSF. The residue deposition pipelines will have a Nominal Bore (NB) diameter of more than 360mm with a peak throughput of more than 120 ℓ/s. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths.

The precise dimensions and details of the proposed new Mponeng Lower Compartment TSF are not known at this stage as the engineering designs are still being completed however, it should be emphasised that the deposition and storage of slurry (TSF) itself will be on the existing Mponeng Lower Compartment TSF footprint. These details will be presented in the EIA phase report once this information becomes available. **Mponeng Lower Compartment TSF design details are still being determined through the engineering designs and will be provided in the EIA Phase.** Some of the design information was provided by the applicant while other preliminary information is indicated in the Mponeng Lower Compartment Tailings Storage Facility Pre-Feasibility Study - Pre-Feasibility Design Report by Eco Elementum and Engineering (Pty) Ltd (2025) which includes:

- Mponeng Lower Compartment TSF: the TSF will cover a total area of approximately 102 hectares (ha). The Mponeng Lower Compartment TSF will store approximately 43 Mt. The facility is expected to accommodate tailings deposition for a period of 10 years at a rate of 350 ktpm. The end of life limiting factors considered a rate of rise below 4 meters per annum and a final facility height of 60m. Hydrocyclone deposition method is proposed. The TSF barrier system will be determined in



consultation with the authorities and will be in compliance with relevant norms and standards for determination of liner requirements.

- The residue deposition pipelines will have a NB diameter of more than 360mm with a peak throughput of more than 120 ℓ/s. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths.
- Construction of pipeline bridge (designs still in progress) is likely to make use of two concrete pillars (beams) approximately 100m apart on either side of the channelled valley bottom wetland with the pipelines running from one end to the other on top of an approximately 5m wide steel trusses framework.
- Construction of pipeline culvert (designs still in progress): the culvert will approximately 12m long and 10m wide arch, circular or box culvert made of concrete or corrugated metal.
- Upgrade of Return Water Dam (RWD) to a Class C lined, earth fill embankment RWD with a capacity of 327,000m³. This capacity is sufficient to contain all dirty water inflows without the dam spilling more than once in 50 years.
- Installation of Clean Water Diversion System (Spring Diversion): the spring water currently daylighting in the northern portion of the proposed footprint will require diversion around the TSF. A dedicated spring capturing and diversion system will be required prior to the installation of sub-surface drains.
- Installation of Dirty Water Systems: to achieve both Government Notice 704 (GN704) regulatory compliance and cost efficiency, trapezoidal concrete-lined channels are planned to be installed within the existing, unlined paddocks.
- Installation of sub-surface drainage system: in addition to the TSF barrier (should it be required), a sub-surface drainage network below the liner would need to be installed to prevent accumulation of pore water pressure beneath the TSF liner. The sub-surface drainage network for the TSF comprises a series of 110mm and 160mm perforated High-Density Polyethylene (HDPE) sub-soil drainage pipes installed within a graded gravel drainage layer, all enclosed in a geotextile separation fabric to prevent the migration of the tailings fines.
- Undertaking of ground improvement: in addition to the presence of a spring, there is also a landfill site located on the northern portion of the TSF that poses a significant geotechnical and environmental risk as it contains heterogeneous and potentially compressible waste materials, which introduces the possibility of uneven settlement over time. To mitigate this risk, long-term ground improvement measures are necessary. Ground improvement, such as dynamic compaction, is recommended to densify the underlying landfill material, reduce voids, and improve uniformity in stiffness and bearing capacity across the area.

EIMS will compile and submit the required documentation in support of applications for:

- Environmental Authorisation (EA) in accordance with the National Environmental Management Act – NEMA (Act 107 of 1998)- Listed activity:
 - **GNR983 Listing Notice 1**, Activities 10, 12, 19, 21D, 21F.
 - **GNR984 Listing Notice 2**, Activity 6, and 15.
 - **GNR985 Listing Notice 3**, Activities 12, 14, and 23.
- National Environmental Waste Act (Waste Act 59 of 2008) - Listed activity:
 - **GNR921** Categories, B7, B10 and B11; and
- Water Use Licence (WUL) in accordance with the National Water Act – NWA (Act 36 of 1998). Water uses:



- **Section 21** (a), (c), (i) and (g).

It must be noted that a separate application for a Water Use Licence (WUL) will be lodged with the Department of Water and Sanitation (DWS).



1.1 REPORT STRUCTURE

This report has been compiled in accordance with the 2014 NEMA EIA Regulations, as amended. A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in **Table 2** below.

Table 2: Report structure.

Environmental Regulation	Description – NEMA Regulation 982 (2014) as amended	Section in Report
Appendix 2(1)(a):	Details of – <ul style="list-style-type: none"> i. The Environmental Assessment Practitioner (EAP) who prepared the report; and ii. The expertise of the EAP, including a curriculum vitae; 	Section 1.2 Appendix B
Appendix 2(1)(b):	The location of the activity. Including – <ul style="list-style-type: none"> i. The 21-digit Surveyor General code of each cadastral land parcel; ii. Where available, the physical address and farm name; iii. Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; 	Section 1.9
Appendix 2(1)(c):	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – <ul style="list-style-type: none"> i. A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii. On a land where the property has not been defined, the coordinates within which the activity is to be undertaken; 	Section 1.9 Section 2.2 Section 2.3
Appendix 2(1)(d):	A description of the scope of the proposed activity, including – <ul style="list-style-type: none"> i. All listed and specified activities triggered; ii. A description of the activities to be undertaken, including associated structures and infrastructure; 	Section 2.2 Section 2.3
Appendix 2(1)(e):	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 3



Environmental Regulation	Description – NEMA Regulation 982 (2014) as amended	Section in Report
Appendix 2(1)(f):	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 4.2
Appendix 2(1)(g):	<p>A full description of the process followed to reach the proposed preferred activity, site and location within the site, including –</p> <ul style="list-style-type: none"> i. Details of all alternatives considered; ii. Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. The impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts – <ul style="list-style-type: none"> a. Can be reversed; b. May cause irreplaceable loss or resources; and c. Can be avoided, managed or mitigated; vi. The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives; vii. Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; viii. The possible mitigation measures that could be applied and level of residual risk; ix. The outcome of the site selection matrix; x. If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and xi. A concluding statement indicating the preferred alternatives, including preferred location of the activity; 	Sections 5, 6, 7 and 7.12
Appendix 2(1)(h):	<p>A plan of study for undertaking the environmental impact assessment process to be undertaken, including –</p> <ul style="list-style-type: none"> i. A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; ii. A description of the aspects to be assessed as part of the environmental impact assessment process; iii. Aspects to be assessed by specialists; 	Section 9



Environmental Regulation	Description – NEMA Regulation 982 (2014) as amended	Section in Report
	<ul style="list-style-type: none"> iv. A description of the proposed method of assessing the environmental aspects, including a description of the proposed method assessing the environmental aspects to be assessed by specialists; v. A description of the proposed method of assessing duration and significance; vi. An indication of the stages at which the competent authority will be consulted; vii. Particulars of the public participation process that will be conducted during the environmental impact assessment process; and viii. A description of the tasks that will be undertaken as part of the environmental impact assessment process; ix. Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored; 	
Appendix 2(1)(i)	An undertaking under oath or affirmation by the EAP in relation to – <ul style="list-style-type: none"> i. The correctness of the information provided in the report; ii. The inclusion of comments and inputs from stakeholders and interested and affected parties; and iii. Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties; 	Section 11 Section 12
Appendix 2(1)(j):	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Section 12
Appendix 2(1)(k):	Where applicable, any specific information required by the competent authority; and	None
Appendix 2(1)(l):	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	None



1.2 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations relating to this scoping phase assessment should be noted:

- The application is limited to the proposed Mponeng Lower Compartment TSF and associated infrastructure near Carletonville within the Merafong City Local Municipality, Gauteng Province;
- The information provided by the applicant is considered accurate, adequate, unbiased, and no information that could change the outcome of the scoping process has been withheld;
- The preliminary site sensitivity verification and desktop assessments are sufficient for the scoping phase and the information that will be obtained from the specialist studies for this project during the EIA Phase will be accurate, objective and sufficient for the level of assessment required;
- Detailed assessment of the positive and negative environmental impacts of the proposed project will be undertaken during the Environmental Impact Assessment phase;
- In determining the significance of impacts, with mitigation, it is assumed that mitigation measures proposed in the report are correctly and effectively implemented and managed throughout the life of the project;
- This study is not based on preliminary engineering information with minimal designs as these designs are still being completed. The designs will be made available to all stakeholders and I&APs during the EIA phase of the project;
- In accordance with the Protection of Personal Information Act (Act 4 of 2013), personal information (emails, contact numbers, address) are blanked out and/or excluded during the Public Participation and only provided to the competent authority officials;
- Personal information of I&APs made available to the competent authority will only be used by the authorities to confirm or obtain information regarding this specific project; and
- The information presented in this report was the most accurate and relevant at the time of compilation of the report.

1.3 PURPOSE OF THE REPORT

The purpose of the scoping phase is to gather information on the proposed site and establish an understanding of the study area and the receiving environment. This phase will also determine how the proposed activities will potentially impact on the environment. The Assessment of alternatives e.g., activity, location, design, etc. will be considered in this report. The report will further identify any Interested and Affected Parties in the study area, engage with such parties and relevant authorities and identify environmental issues and potential impacts. This Scoping report is intended to guide the EIA process and the required specialist studies by:

- Providing an overview of the legal requirements with regards to the proposed Mponeng Lower Compartment TSF project;
- Provide a project description of the proposed Mponeng Lower Compartment TSF project as well as the anticipated environmental and social impacts that will be further investigated in the EIA phase;
- Setting the scope for the EIA process as well as the Terms of Reference (ToR) for the proposed specialist studies; and
- Outlining the approach and methodologies to be used in the Scoping and EIA phase including the impact assessment methodology.

1.4 THE SCOPING AND EIA REQUIREMENTS

The list of activities applied for in terms of the NEMA EIA Regulations 2014 as amended are discussed in **Section 2.3**. These listed activities triggered by the proposed development of Mponeng Lower Compartment TSF facility



must follow the required Environmental Impact Assessment process as required by the NEMA EIA Regulations 2014, as amended, as set out in Government Notice Regulations 982 in Government Gazette No. 40772 of 7 April 2017. Based on these Regulations, a Scoping and EIA process must be followed. The Application Form will be submitted to the competent authority, the Department of Mineral and Petroleum Resources (DMPR) Gauteng Region. The DMPR is the relevant Competent Authority stipulated in the 2014 NEMA EIA Regulations application procedures as the applicant is a private company and the proposed redeposition onto Mponeng Lower Compartment TSF is a mining application within the Gauteng Province, thus, is in line with the identified activities which the Member of the Executive Council of the National Department of Forestry, Fisheries and the Environment (DFFE) has delegated to the DMPR provincial departments.

1.5 THE SCOPING PHASE

The Scoping and EIA process must be undertaken in accordance with the 2014 EIA Regulations No. 982, as amended. The main objectives of the current Scoping Phase, in terms of the regulatory requirements stipulated in *Appendix 2* of the 2014 EIA Regulations, are to:

- a) identify the relevant policies and legislation relevant to the activity;
- b) motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- c) identify and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
- d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- e) identify the key issues to be addressed in the assessment phase;
- f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
- g) identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Once the Draft scoping process is complete, a Final Scoping Report must be prepared detailing the scope of the EIA required for the proposed activities. This Scoping Report has been compiled in accordance with the requirements set out in *Appendix 2* of the 2014 EIA Regulations, as amended, which outlines the contents of a Scoping Report and provides the requirements necessary for undertaking the Public Participation Process. A final Scoping Report will be prepared and submitted to the competent authority (DMPR) for review and decision making. The competent authority will communicate the decision within 45-days of submission of the Final Scoping Report. The decision can either be an acceptance or rejection of the Scoping Report. The process can only proceed into the EIA Phase upon the receipt of approval of the Scoping Report. It must be noted that the approval may be issued with recommendations and/or requirements for the EIA Phase.

1.6 DETAILS OF THE EAP

EIMS is appointed by Harmony as the independent EAP and to assist in preparing and submitting the EA and WUL applications, Scoping and EIA Reports, and undertaking a Public Participation Process (PPP) in support of the proposed redeposition on the Mponeng Lower Compartment TSF footprint. The contact details of the EIMS consultant and EAP who compiled this Report are indicated in **Table 3**.



Table 3: Details of the Environmental Assessment Practitioner.

EAP:	Mr. Vukosi Mabunda
Tel No:	+27 11 789 7170
Fax No:	+27 86 571 9047
E-mail:	vukosi@eims.co.za
Qualifications	<ul style="list-style-type: none"> • MSc Geography (University of Johannesburg, 2021). • BSc Honours in Geography (University of Johannesburg, 2017). • BSc Life & Environmental Sciences (University of Johannesburg, 2016). • Environmental Law – Short Course (North-West University, 2025). • ISO14001:2015 – Short Course (North-West University, 2025).
Professional Registrations:	<ul style="list-style-type: none"> • Registered Environmental Assessment Practitioner with Environmental Assessment Practitioner Association of South Africa – EAPASA (Reg. No: 2019/867). • Professional Natural Scientist with the South African Council for Natural Scientific Professions – SACNASP (Reg. No: 134178).

1.7 EXPERTISE OF THE EAP

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS is an independent specialised environmental consulting firm offering the full spectrum of environmental management services across all sectors within the African continent. EIMS has successfully completed many hundreds of assignments over the years with an excess of 28 years' experience in conducting EIA's for both the government and private sector. Please refer to the EIMS website (www.eims.co.za) for examples of EIA documentation currently available.

In terms of Regulation 13 of the EIA Regulations (GN R. 982) as amended, an independent EAP, must be appointed by the applicant to manage the application. EIMS is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations, as well as Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIA's;
- Comply with the NEMA, the environmental regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

This Scoping Report was prepared by Vukosi Mabunda, a Registered EAP employed by EIMS. His CV is included in **Appendix B** of this report. Mr Vukosi Mabunda is currently a Senior Environmental Assessment Practitioner (EAP) & Geographic Information Systems (GIS) Consultant with over seven (7) years' working experience. He is one of the few dual registered professionals with the South African Council for Natural Scientific Professions (SACNASP) as a Professional Geospatial Scientist and Professional Environmental Scientist. He is also a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Vukosi has dual professional background in Geographic and Environmental Sciences, having academic qualifications which focused on these disciplines as well as relevant work experience. Vukosi's highest qualification is a Master of Science Degree in Geography obtained from the University of Johannesburg in 2021. Vukosi has recently completed short courses on Environmental Law and ISO 14001:2015 Environmental Management Systems from



the North-West University in March 2025. Vukosi has experience in various environmental assessment projects ranging from Environmental Screening, Basic Assessments, Section 102 Amendments and Scoping & Environmental Impact Assessments processes. In addition, Vukosi has undertaken Water Use Authorisations applications through both the General Authorisation and Water Use Authorisation processes. Vukosi is also an Environmental Auditor who has experience in various Environmental Authorisations, Environmental Management Programmes, Waste Management License, and Water Use Authorisations as well as Legal & Environmental Performance Audits.

1.8 SPECIALIST CONSULTANTS

One of the objectives of a Scoping Report is to identify the required specialist assessment to be undertaken during the EIA Phase. Based on a review of the National Web-Based Environmental Screening Tool Report (DFFE Screening Tool), EAPs Site Sensitivity Verification and review of available information, the following specialist assessments have been pre-identified as necessary assessments required during the EIA phase. It must be noted that only Baseline Reports were compiled for the Scoping Phase (**Appendix F**) and full Impact Assessment Reports will be compiled and made available during the EIA Phase with the exception of the Heritage Assessment where the Heritage Impact Assessment Report has already been compiled and will only be updated where necessary.

Table 4: Specialist details for the Mponeng Lower Compartment TSF

Specialist Theme	Consultant / Company	Representative / Specialist
Agricultural Potential, Soils & Land Capability Compliance Assessment	The Biodiversity Company	Maletsatsi Mohapi / Matthew Mamera
Air Quality Impact Assessment	Airshed Planning Professionals	Reneé von Gruenewaldt
Aquatics and Wetland Impact Assessment	The Biodiversity Company	Divan van Rooyen / Namitha Singh
Archaeological and Cultural Heritage Impact Assessment	PGS Heritage	Wouter Fourie
Financial Provisions: Closure and Rehabilitation Plan	Minelock Environmental Engineers	Douglas Richards
Health Risk & Radiological Impact Assessment	AquiSim Consulting	Japie van Blerk
Noise Impact Assessment	Airshed Planning Professionals	Nick Grobler
Palaeontological Impact Assessment	Banzai Environmental	Elize Butler
Terrestrial Biodiversity Impact Assessment	The Biodiversity Company	Carami Burger / Martinus Erasmus
Geohydrological Impact Assessment	Hydrologic Consulting	Mark Bollaert
Visual Impact Assessment	Graham Young Landscape Architect	Graham Young

Engineering inputs will also be obtained to inform the design of the TSF. The specialist studies listed above will involve the gathering of data relevant to identifying and assessing preliminary environmental impacts that may occur as a result of the proposed project. These preliminary impacts were assessed according to pre-defined impact rating methodology (**Section 8.1**). Preliminary mitigation / management measures to minimise potential negative impacts or enhance potential benefits are put forward in this Scoping Report and will be adjusted where relevant during the EIA phase once detailed assessments are concluded and input from the public has been considered.



1.9 DESCRIPTION OF THE PROPERTY

Table 5 provides a description of the property details of the proposed Mponeng Lower Compartment TSF site as well as the distance to the nearest towns. See **Figure 1** and **Figure 2** for the locality of the proposed Mponeng Lower Compartment TSF as well as the associated pipeline routes.

Table 5: Locality details

Property	Mponeng Lower Compartment TSF (existing TSF) is located on Remainder of Portion 23 of the Farm Elandsfontein 115IQ. The pipelines traverses through Remainder (RE) of Portion 5 Farm Elandsfontein 115IQ, Portions 3, 4 and 5 of Farm Blyvooruitzicht 116 IQ, and the Remainder of Portion 27 of Farm Elandsfontein 144IQ.			
Property Name, 21-digit Surveyor General Code and Ownership	Farm Name	Portion	LPI Code	Ownership Type
	Farm Elandsfontein 115IQ	RE/23/115	T0IQ00000000011500023	Applicant
	Elandsfontein 115IQ	RE/5/115	T0IQ00000000011500005	Applicant
	Blyvooruitzicht 116 IQ	3	T0IQ00000000011600003	Applicant
	Blyvooruitzicht 116 IQ	4	T0IQ00000000011600004	Applicant
	Blyvooruitzicht 116 IQ	5	T0IQ00000000011600005	Applicant
	Elandsfontein 144IQ	RE/27	T0IQ00000000014400027	Private
Application Area (Ha)	<p>The approximate size of the infrastructure is as follows:</p> <ul style="list-style-type: none"> • Mponeng Lower Compartment TSF footprint is approximately 102ha; • Proposed residue pipeline route is approximately 3.36km long; • Proposed return water pipeline route is approximately 4.85km long; • Alternative residue and return water pipeline route is approximately 13.6km long; • Upgrading of return water dam to approximately 8.20ha • New pipe culvert approximately 20m long within an area of approximately 0.23ha; and • New pipe bridge approximately 100m long within an area of approximately 0.81ha. 			
Magisterial District	The project area falls within the West Rand District Municipality in Gauteng Province. Development area falls within Wards 11, 14 and 27 of Merafong City Local Municipality administrative area.			
Distance and direction from nearest towns	Mponeng Lower Compartment TSF is located at 26°27'10.53"S; 27°24'39.93"E (central coordinates) in Wadela, immediately north of the N12. The site is approximately 7km northwest of Fochville, 10km south of Carletonville central and 20km west of Westonaria (refer to Figure 1).			
Surrounding land uses	The study area (site) is mostly grassland with scattered areas that are disturbed and degraded due to anthropogenic activities, such as clearing of vegetation, presence of alien and invasive plant species, and fragmentation due to the presence of the mining infrastructure such as existing TSFs and access roads. Existing TSFs located to the west of the Mponeng Lower Compartment TSF (Mponeng Upper Compartment) and northwest of the pipelines start point (Savuka TFS). There is vacant land immediately north of the site characterised by a ridge elevating from 1546m above mean sea level (mamsl) at the Mponeng Lower Compartment TSF to 1706m amsl at the highest level before sloping down to around 1600m amsl at Western Deep Levels community, a change in elevation of 160m within a distance of 2.5km. There are several watercourses around the Mponeng Lower Compartment TSF site consisting of dams and drainage channels. Mponeng Water Treatment Works is located 400m east of the site. The Mponeng Hostel is the closest			



community to the site, located 800m east of Mponeng Lower Compartment TSF. The Wadela residential community is located 1.2km west of the site. It must be noted that the Mponeng Lower Compartment and Wadela community is separated by the Mponeng Upper Compartment. Western Deep Levels and Elandsrand residential communities are located further away from Mponeng Lower Compartment TSF, 2.6km north and 2.7km northwest of Mponeng Lower Compartment TSF respectively. There are established large-scale agricultural activities south of the site (approximately 3km) with a combination of pivot and horizontal farming techniques.

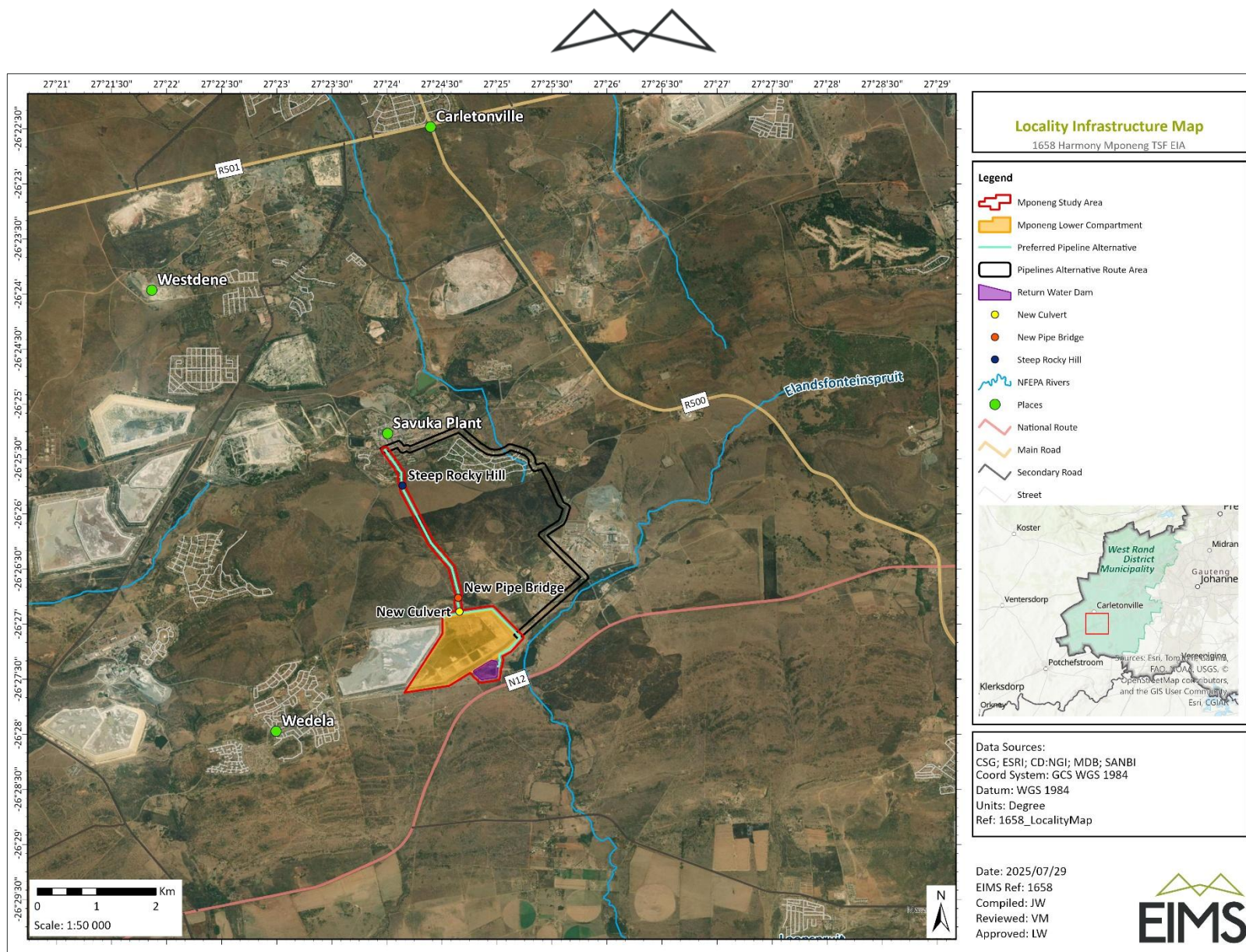


Figure 1: Aerial imagery locality map indicating the location of the proposed Mponeng Lower Compartment TSF and associated infrastructure.

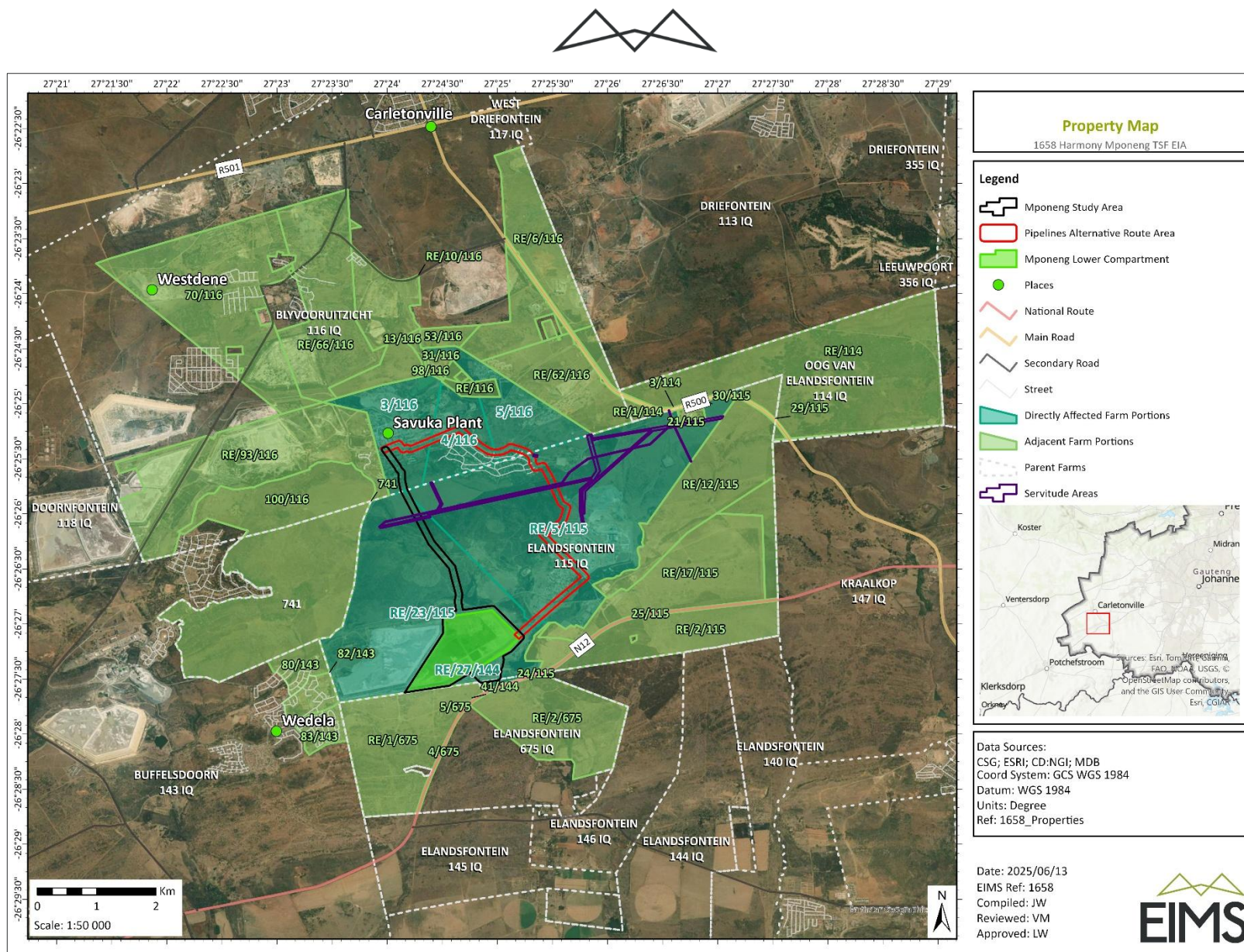


Figure 2: Locality map indicating the location of the proposed Mponeng Lower Compartment TSF and cadastral information.



2 DESCRIPTION AND SCOPE OF THE PROPOSED PROJECT

This section provides a detailed description for the proposed project. Most of the key information presented in this chapter was obtained from the applicant. The aim of the project description is to describe the proposed activities planned to take place at the Mponeng Lower Compartment TSF project area. Furthermore, the project description is designed to facilitate the understanding of the proposed project related activities which are anticipated to lead to the preliminary impacts identified and assessed in this Scoping Report, and for which management measures have been, or will be designed.

2.1 PROJECT DESCRIPTION

Golden Core Trade and Invest (the applicant) holds an approved MR and an EMPr, in terms of the MPRDA, for the mining of gold at various operations in the West Wits Region in the Gauteng Province. The Savuka Plant currently deposits tailings onto the Savuka 5a, 5b, 7a & 7b TSFs. However, these facilities are approaching their final and approved height, and the current planned Life of Mine (LOM) for the West Wits Region exceed the available deposition capacity of these TSFs. Accordingly, Golden Core Trade and Invest is undertaking a feasibility assessment to recommence deposition on the Mponeng Lower Compartment TSF. In order to redeposit on the Mponeng Lower Compartment TSF, from the Savuka Plant, slurry pipelines will need to be constructed from the Savuka Plant to the TSF. The Mponeng Lower Compartment TSF is an existing TSF, however, the Mponeng Lower Compartment TSF is no longer in operation and is currently utilised as a Holding Dam and a portion used as a Landfill Facility (authorised). Further thereto, the approved 2012 EMPr states that the Mponeng Lower Compartment TSF will no longer be used for tailings storage but rather be used as a Holding Dam. The facility is further included in the Water Use Licence as a Holding Dam. A summary of the proposed activities are indicated in **Table 6** below and discussed in detail in the sub-sections below.

Table 6: Summary of proposed activities

Activity	Description / Auxiliary Activity
Recommencement of deposition on Mponeng Lower Compartment TSF	The proposed Mponeng Lower Compartment TSF is proposed within an existing TSF footprint which extends 102ha wide. Approximately 200m ² of the TSF footprint was converted into a General Waste Landfill. The proposed Mponeng Lower Compartment TSF is proposed adjacent to the Mponeng Upper Compartment TSF. The Mponeng Lower Compartment TSF will be approximately 102ha wide and store approximately 43 megatonne (Mt). It is anticipated to accommodate tailings deposition for a period of 10 years at a rate of 350 kilotonnes per month (ktpm). The end-of-life limiting factors considered were a rate of rise below 4 meters per annum and a final facility height of 60 meters, ensuring safe and sustainable deposition over the operational life of the facility. An unlined facility is proposed due to the fact that tailings have already been deposited on the proposed footprint below the level that a liner can be safely installed. An inverted barrier system with equivalent performance to a Class C barrier can be motivated for implementation if the facility needs to be lined.
Construction of slurry and return water pipelines	In order to redeposit on the Mponeng Lower Compartment TSF from the Savuka Plant, slurry pipelines will need to be constructed from the Savuka Plant to the TSF. The proposed new residue pipeline route is approximately 3.36km long while the proposed new return water pipeline route is approximately 4.85km long. The pipelines will have a NB diameter of more than 360mm with a peak throughput of more than 120 l/s. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths.
Construction of pipeline bridge	In order for the pipes to connect Savuka Plant and the Mponeng Lower Compartment TSF, a new pipe bridge approximately 100m long and 5m wide will be required to cross the channelled valley bottom wetland. An



Activity	Description / Auxiliary Activity
	engineered solution to prevent spillages from the pipeline from entering the wetland are being investigated.
Construction of pipeline culvert	In order for the pipes to connect Savuka Plant and the Mponeng Lower Compartment TSF, a new pipeline culvert approximately 12m long and 10m wide will be required to cross the surfaced road immediately north of the Mponeng Lower Compartment TSF.
Upgrade of Return Water Dam (RWD)	The current RWD does not have sufficient capacity to accommodate both current and future operational demands. Therefore, the existing dam will need to be enlarged to provide adequate capacity to contain the 1:50-year, 24-hour storm event above the mean operating level. The proposed Mponeng Lower Compartment TSF RWD will be of the earth fill embankment type, with an upstream and downstream slope of 1:3 (V:H). The RWD will have a footprint is approximately 8.20ha with a capacity of 327,000m ³ . This capacity is sufficient to contain all dirty water inflows without the dam spilling more than once in 50 years. A Class C performance barrier system has been opted for the RWD.
Installation of Clean Water Diversion System - Spring Diversion	The spring water currently daylighting in the northern portion of the proposed footprint will also require diversion around the TSF. A dedicated spring capturing and diversion system will be required prior to the installation of sub-surface drains. This system may be implemented on the upstream side of the currently active spring located along the northern boundary of the proposed lower compartment footprint. The purpose of this spring capturing system is to intercept and manage any clean groundwater emerging from the surrounding higher-elevation areas before it enters the TSF footprint. Further investigations into the most appropriate options to capture and divert the spring water are being undertaken and will be presented in the EIA Phase report.
Installation of Dirty Water Systems	Regulations on Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources Government Notice 704 (GN704) requires that all dirty water collection and conveyance systems associated with mining-related activities be designed to prevent seepage of polluted water and promote the reuse of water. To achieve both regulatory compliance and cost efficiency, trapezoidal concrete-lined channels are planned to be installed within the existing, unlined paddocks. These channels will serve to collect and convey dirty water in a controlled manner, minimising seepage and preventing contamination of the surrounding environment. The channels will discharge into concrete silt traps before entering the RWD.
Installation of sub-surface drainage system	In addition to the inverted barrier, a sub-surface drainage network below the liner would need to be installed to prevent accumulation of pore water pressure beneath the liner. The sub-surface drainage network for the TSF has been designed as an integrated system aimed at effectively intercepting and conveying seepage. The system comprises a series of 110mm and 160mm perforated HDPE sub-soil drainage pipes installed within a graded gravel drainage layer, all enclosed in a geotextile separation fabric to prevent the migration of the tailings fines. The sub-surface drains connect to a network of secondary and main branches.
Undertaking of ground improvement	In addition to the presence of a spring within the footprint and the proposed groundwater-intercepting sub-surface drainage network designed to manage seepage and maintain slope stability, there is also a landfill site located on the northern portion of the facility that poses a significant geotechnical and environmental risk. The landfill site contains heterogeneous and potentially compressible waste materials, which introduces the possibility of uneven settlement over time, especially under the loading conditions imposed by the overlying tailings. To mitigate this



Activity	Description / Auxiliary Activity
	risk, long-term ground improvement measures are necessary. Ground improvement, such as dynamic compaction, is recommended to densify the underlying landfill material, reduce voids, and improve uniformity in stiffness and bearing capacity across the area. To further support the foundation and distribute applied loads evenly, a load-distribution platform should be constructed.

EIMS will compile and submit the required documentation in support of applications for of applications for:

- Environmental Authorisation (EA) and Waste Management License (WML) in accordance with the National Environmental Management Act – NEMA (Act 107 of 1998) - Listed activity: Listing Notice 1, Activities 10, 19, 21D; Listing Notice 2, Activity 6; and Listing Notice 3, Activities 12 and 14 as well as the National Environmental Management: Waste Act – NEMWA (Act 59 of 2008) – Activities B7, B10 and B11; and
- Water Use Licence (WUL) in accordance with the National Water Act – NWA (Act 36 of 1998). Water uses: Section 21 (a), Section 21 (c), Section 21 (i) and Section 21 (g). A separate application for a Water Use Licence (WUL) has been lodged with the Department of Water and Sanitation (DWS) for the water use triggers.

2.2 DESCRIPTION OF ACTIVITIES TO BE UNDERTAKEN

2.2.1 RECOMMENCEMENT OF DEPOSITION ON MPONENG LOWER COMPARTMENT TSF

Tailings are the mineral waste remaining after ore processing to extract mineral concentrates and are typically stored within an engineered containment structure known as a tailing storage facility or TSF. Tailings is a common by-product of the metals and minerals recovery process. It usually takes the form of a liquid slurry made of fine metal or mineral particles and water – created when mined ore is crushed and finely ground in a milling process (refer to **Figure 3**).

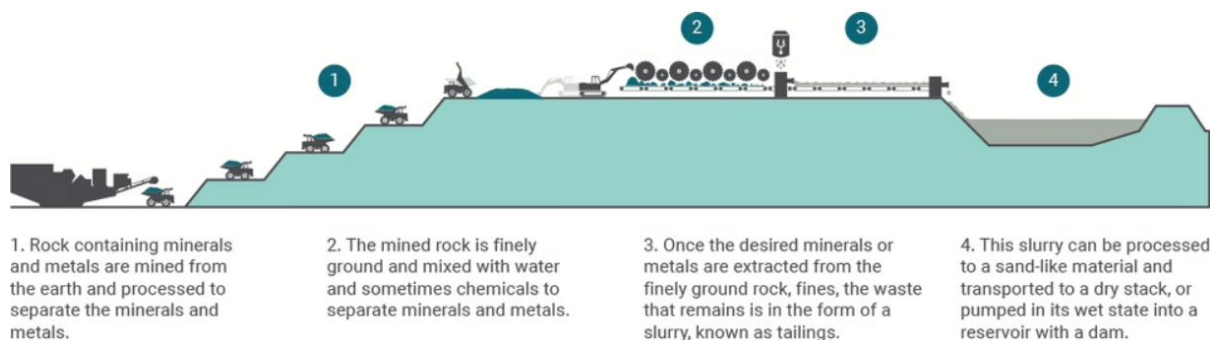


Figure 3: Tailings Storage Facility Process (International Council on Mining and Metals, 2023).

From the mill, the tailings are typically pumped to storage facilities (TSFs). As the sandy residue of tailings gradually drains and becomes compact and dry, grass and other vegetation can be planted to stabilise the environment through a reclamation process. Before the water in the tailings can be used again, or discharged into the local drainage system, it must be treated to remove harmful substances that would pollute the environment or risk the health and safety of local communities near the facility.

If not managed properly, tailings can have chronic adverse impacts on the environment and human health and safety, with pollution from effluent and dust emissions being potentially toxic to humans, animals or plants. Acute and potentially very damaging impacts can occur should a tailings storage facility physically fail. In such instances, flowable tailings materials can inundate and greatly impact the surrounding environment and even lead to loss of human life.

Tailings differ from overburden: the waste rock or material that overlies an ore or mineral body and is displaced unprocessed and stockpiled separately (or co-disposed with tailings) during mining. Tailings can be in the form



of liquid, solid, or a slurry of fine particles. The proposed Mponeng Lower Compartment TSF is a slurry TSF (refer to **Figure 4**) and will cover a footprint of approximately 102ha. Based on the Mponeng Lower Compartment Tailings Storage Facility Pre-Feasibility Study Report (Eco Elementum, 2025), the Mponeng Lower Compartment TSF was designed to meet the client's minimum capacity requirement of 40.3 million tonnes (Mt). The current design exceeds this target, providing a total storage capacity of approximately 43 Mt. This design was developed with operational and geotechnical constraints in mind, specifically aiming to limit the rate of rise to a maximum of 4 meters per annum and to cap the final facility height at 60 meters, ensuring safe and sustainable deposition over the operational life of the facility.

The facility will include a starter wall and a toe wall as part of its initial construction phase. The TSF will be raised in successive 8 m high lifts, each separated by 8 m wide benches. This stepped configuration not only aids in structural stability and erosion control but also provides access for construction and inspection activities as the facility is developed over time. At this stage the proposed delivery system is expected to consist of hydrocyclones. The underflow material (coarse, dewatered tailings) is separated from the slurry by the hydrocyclones and deposited at the outer core. The overflow material (fine tailings and slurry water) is deposited in the basin. The facility will be served by hydrocyclones on three sides (north, east, and south) with a proposed spigot system to deposit tailings at the interface of the upper and lower compartments.

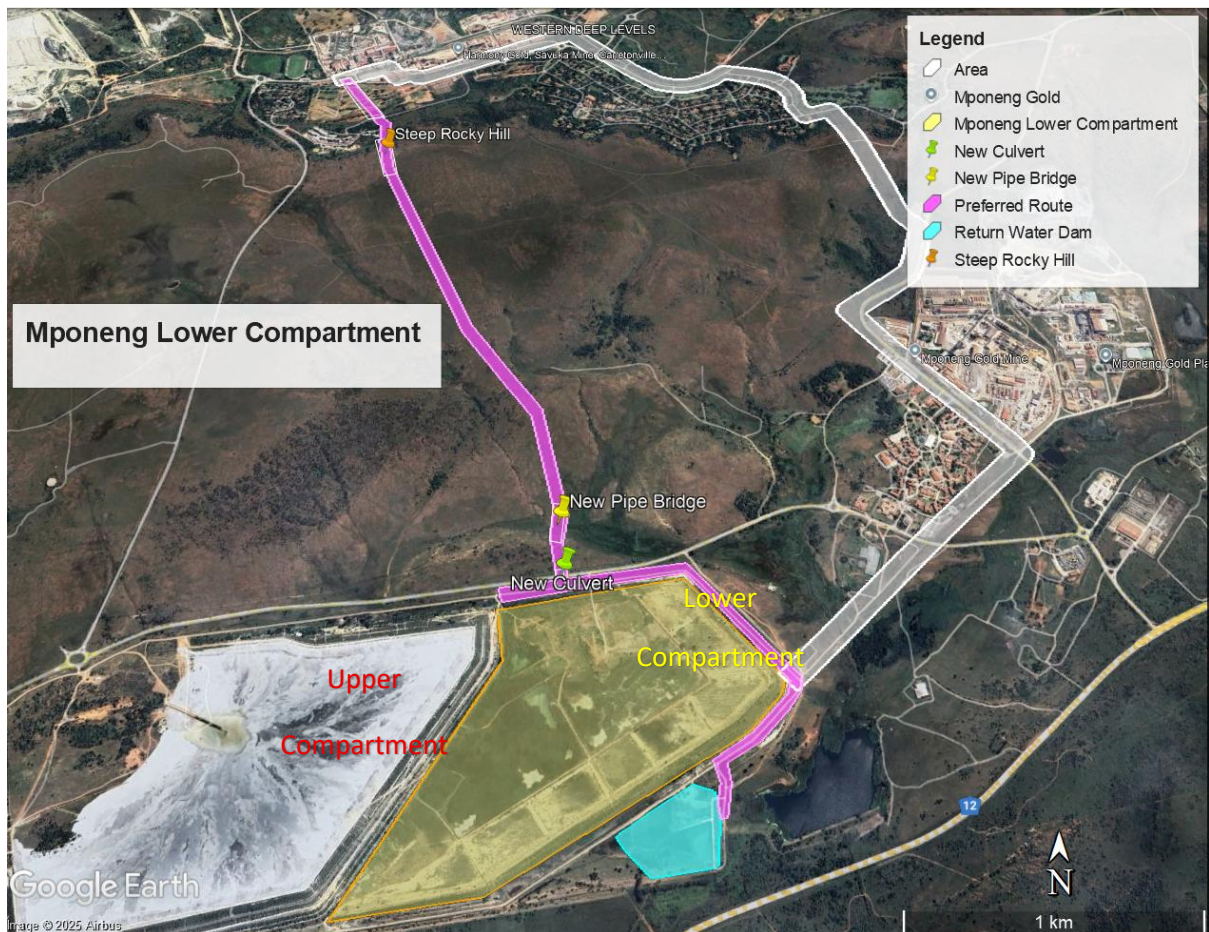


Figure 4: Aerial view of Mponeng Tailings Storage Facility and proposed infrastructure at the Harmony West Wits Region Operations (Google Earth, 2025)

Supernatant water (the liquid that remains above a solid residue after a mixture has been allowed to settle or has been centrifuged to separate components) is decanted by a gravity penstock system through a flanged steel pipe encased in concrete beneath the pollution control barrier. The penstock outfall pipe discharges water into the solution trench from where the water is conveyed via the concrete-lined dirty canal system and silt trap to the RWD.



2.2.1.1 UNLINED OPTION

This option would entails a process where the Mponeng Lower Compartment TSF remains unlined. The only mitigation is the rehabilitation and decommissioning of the TSF during the closure (decommissioning) phase.

GCS Water & Environmental Consultants conducted hydrogeological investigations for the Mponeng TSF in January 2019 and April 2025 to support designs for water management. The investigations focused on identifying the source of a spring at the northeastern corner, characterising the underlying hydrogeological regime, commenting on the hydrogeological impact and management options, reviewing methods to manage the spring in terms of water quality and flow and informing seepage management strategies.

The January 2019 report concluded that seepage rates are currently low—ranging from 12 to 20 mm/year—but are expected to increase moderately with the proposed elevation of the TSF. Seepage rates will remain fairly low for gold tailings, due the foundation geology (shales and andesites) and characteristics of the tailings material. Furthermore, most monitoring points show sulphate levels below 100 mg/L, with only two boreholes exceeding 500 mg/L. A calibrated groundwater model predicted a sulphate plume of 200-600 mg/L remaining largely confined to the TSF and return water dam areas by the year 2060. However, the Aquatic Dam is already showing elevated sulphate levels, which could rise further if seepage is not effectively managed.

The April 2025 report recommended three key mitigation strategies:

- Implementing a spring capture system to divert clean groundwater away from the TSF;
- Diverting clean stormwater runoff from the northern area to prevent it from entering the seepage control infrastructure;
- And installing a series of scavenger boreholes along the TSF's southern toe to intercept contaminated seepage caused by groundwater mounding.

These interventions aim to significantly reduce the environmental impact of the TSF during both operational and post-closure phases. The groundwater profile was subsequently modelled from the available data and is illustrated in **Figure 6**.

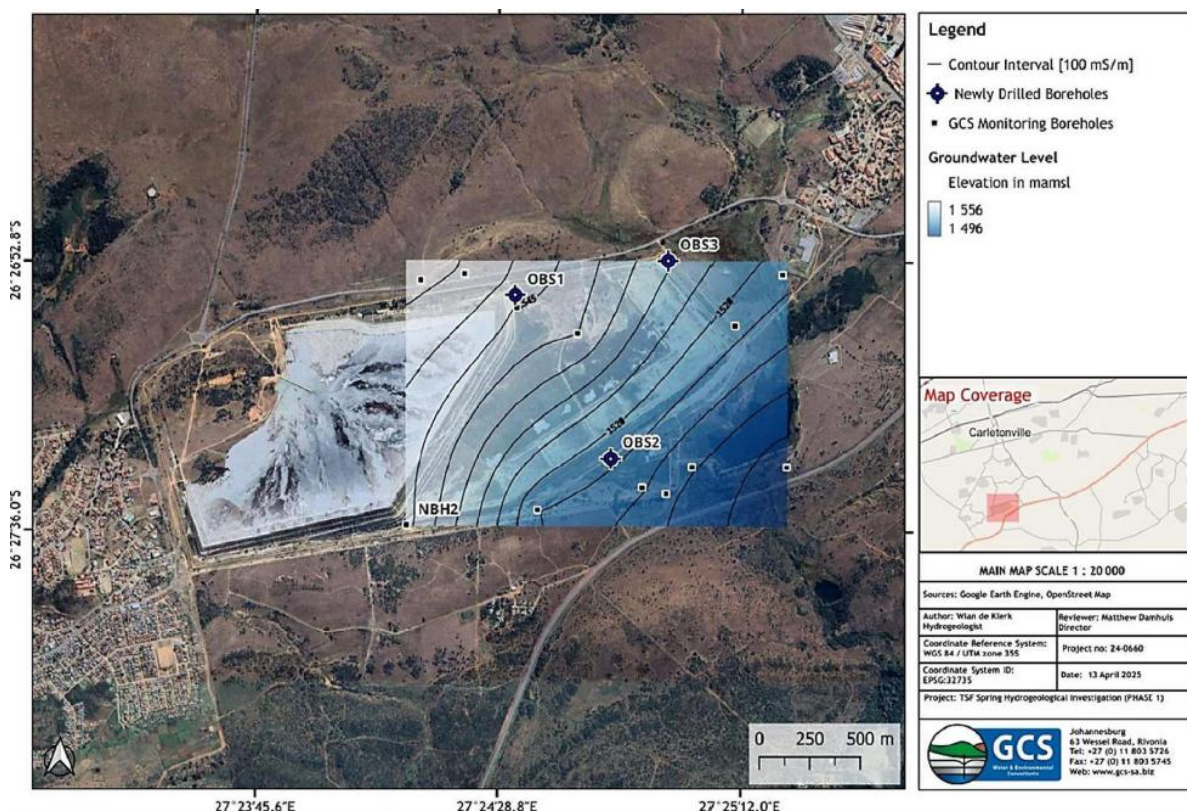


Figure 5: Groundwater level map (GCS, 2025)



The previous hydrogeological studies have indicated very low seepage rates beneath and around the facility, primarily due to the low permeability of the bedrock and the presence of artesian conditions. Additionally, tailings have already been deposited on the proposed footprint below the level that a liner can be safely installed. For these reasons, Golden Core Trade and Invest prefers an unlined facility. The Baseline Geohydrological Assessment (MvB Consulting, 2025), found that most test pits on the original ground level showed no seepage during the geotechnical investigation, except TP32, which may be influenced by the upper compartment's embankment. Moderate to strong seepage was observed at the base of the landfill site due to its permeable waste material, though downstream test pits showed no seepage, suggesting localized infiltration. Additionally, significant seepage was found at the southeast corner of the starter wall, potentially sourced from the lower compartment's catchment area or along bedrock lineations. Due to the very low seepage rates beneath and around the facility and the facility already largely existing (102ha x 20m high deposition), this option could be a viable option which will be further assessed in the EIA Phase. There is, however, a cumulative impact from the existing TSF and the aim of the numerical modelling in the EIA Phase is to quantify the benefit of installing a liner.

2.2.1.2 BARRIER DESIGN (LINED OPTION)

Under current environmental legislation in South Africa, tailings are viewed as potentially hazardous waste that needs to be disposed of in compliance with the appropriate minimum requirements. Traditionally, tailings in South Africa have been built on top of the *in-situ* soils. The use of composite liners is relatively new in tailings dam construction in South Africa and brings with it its own set of challenges. The requirement for a barrier system in South Africa regulations were promulgated under the National Environmental Management Act - Regulations 632, 634, 635 and 636. These are currently administered by the Department of Water and Sanitation (DWS). Under these regulations waste, including tailings, is assessed under Waste Acceptance Criteria for Disposal to Landfill, which determines the requirements for disposal of different types of waste. Under these regulations, many mineral residue deposits are found to require a barrier system, which typically includes a geomembrane. It is usually not practical, and currently not mandatory, to retrofit a barrier system to existing tailings dams such as the existing Mponeng Lower Compartment footprint. However, there is an increase in the number of new tailings dams being constructed to include a barrier system.

The Department (DWS) no longer condones South Africa's philosophy of the past 20 years, in terms of which dilution of water contamination and dispersion relying on attenuation was regarded as acceptable (Legge, 2019). Protection of water resources, and prevention of contamination in the first place (source) is now being sought in preference to mitigating contamination spread (pathway) and pollution cleanup (receptor). Apart from preventing polluted leachate from seeping into the groundwater, an additional benefit of lining a tailings dam is that more water in the tailings system can be captured and returned to the plant. This is useful in a water-scarce country such as South Africa. Since the tailings industry has not always included barrier systems in design or construction, there are learnings to be acquired, even by seasoned tailings consultants and contractors, on how to work with these systems. A proposed amendment to Regulation 632 (2016) has been drafted whereby there could in future be a relaxation of the regulations on a case-by-case basis, following a risk-based approach. However, such regulations have yet to be promulgated into law. In the meantime, the current regulations apply to the disposal of tailings in the same way they apply to the disposal of any other waste to landfill.

The alternatives relate to the liner design for the TSF. However, the liner requirements are based on the waste classification of the material, geohydrological modelling and risk assessment. Tailings use liners to prevent the release of concentrated mine chemicals into the environment. Many regulatory agencies request lined TSFs in hopes of better protecting groundwater resources. Liners are not always desirable, however, tailings solution containment is critical to meeting environmental requirements and the necessary assessments and measures must be undertaken to ensure best environmental practices. The necessity of liners for TSF are subject to the type, nature and surrounding geohydrological conditions in consultation with the 2013 regulations published in terms of the National Environmental Management: Waste Act, notably GN R. 634 to GN R. 636 relevant to Waste Classification and Management, National Norms and Standards for the Assessment of Waste for Landfill Disposal and National Norms and Standards for Disposal of Waste to Landfill.



For important reasons, hazardous waste landfills are the most closely regulated and structured landfills. They are specifically designed to hold hazardous wastes in a way that virtually eliminates the chance of it being released into the environment. Some of the design requirements for hazardous waste landfills include:

- Double liners;
- Double leachate collection and removal systems;
- Leak detection systems;
- Run on, runoff and wind dispersal controls; and
- Construction quality assurance programs.

Once the waste has been assessed and waste type determined, the Norms and Standards can be used to determine the minimum requirements for the landfill and containment barrier design. This will distinguish between Class A, Class B, Class C, or Class D landfills and the associated containment barrier requirements. Although the National Norms and Standards for the Assessment of Waste for Landfill Disposal and National Norms and Standards for Disposal of Waste to Landfill prescribe the containment barrier or liner design for each determined waste type, the recent amendments in chapter 3 of the regulations to the planning and management of residue stockpiles and residue deposits, a competent person must recommend the pollution control measures suitable for a specific residue stockpile or residue deposit on the basis of a risk analysis as contemplated in regulations 4 and 5 of the regulations. The recommendation should be founded on a risk analysis based on the characteristics and classification in regulation 4 and 5 of these Regulations, towards determining the appropriate mitigation and management measures.

In determining the Waste Type for Landfill Disposal, the following are important to note:

- If a chemical substance is not listed in the Norms and Standards and the waste is classified as hazardous according to South African National Standards (SANS) 10248 it is considered a TYPE 1 waste
- Wastes listed in (2)(b) of the Regulations are considered to be TYPE 1 waste unless determined otherwise
- If Total Concentration (TC) of an element/substance is above Total Concentration Threshold of Category 2 and cannot be reduced but the LC is < LCT 3 the waste is TYPE 1
- If the Leachable Concentration (LC) for all metal ions and inorganic anions in the waste are equal or less to Leachable Concentration Threshold Limits Category 0 such wastes are TYPE 3 irrespective of the TC of the elements provided:
 - The concentration of the chemical substances are below the limits for the organics and pesticides listed;
 - The waste is stable and won't change over time; and
 - The waste will be disposed of to landfill without any other waste.

Under the current requirements of the National Water Act (NWA) and associated regulations, TSFs are classified as facilities intended for the storage or disposal of Type 3 waste. Therefore, TSFs must be designed and constructed with a Class C equivalent barrier system. At the time of writing this report, no formal waste classification information has been made available. In the absence of this data, the waste material is assumed to fall under Type 3 waste, in accordance with the National Environmental Management: Waste Act (NEM:WA) classification system. This assumption is based on similarities with tailings produced by other gold mining operations, which typically exhibit geochemical and physical characteristics consistent with Type 3 waste.

An inverted barrier system with equivalent performance to a Class C barrier can be motivated for implementation if the facility needs to be lined. It is important to note that this barrier system will reduce



contamination from newly deposited tailings on the Lower Compartment but will not reduce contamination from the tailings already placed on the facility nor from the existing Upper Compartment. The inverted barrier system, shown in **Figure 6**, substantially reduces the seepage areas as well as the seepage rate by changing the seepage flow from orifice flow to Darcian flow. This is achieved by placing the geomembrane on top of a SANS 10409 (2020) compliant receiving face of reworked foundation soil (consisting of existing tailings) instead of a clay layer and sliming fine tailings over the geomembrane.

Seepage losses through a traditional Class C barrier is primarily determined based on the number of holes intersecting wrinkles as reflected in the Casagrande lecture 2012 by RK Rowe. For the inverted barrier, seepage losses change from orifice flow controlled by the Bernoulli equation at wrinkles (with Darcian flow through the area beneath the wrinkle) to Darcian flow through the tailings at the discontinuity in the geomembrane. Furthermore, this barrier system substantially reduces the risk of damage to the liner when placing above liner ballast and gravel by mechanical means and increases stability by eliminating the low strength expansive clay and its interface with the geomembrane in the outer wall zone between the toe wall and starter wall (Eco Elementum, 2025).



Figure 6: Proposed Inverted Barrier System (Eco Elementum, 2025)

2.2.1.3 INSTALLATION OF SUB-SURFACE DRAINAGE SYSTEM

In addition to the inverted barrier (should it be required), a sub-surface drainage network below the liner would then need to be installed to prevent accumulation of pore water pressure beneath the liner. Elevated pore pressures could result from seepage originating in the upper TSF compartment, as well as existing interstitial water within the tailings caused by continuous recharging from the holding dam. If such pore pressures are allowed to build up, they could lead to saturated conditions with elevated hydraulic gradients, significantly increasing the risk of foundation instability.

The sub-surface drainage network for the TSF lower compartment has been designed as an integrated system aimed at effectively intercepting and conveying seepage. The system comprises a series of 110mm and 160mm perforated High-Density Polyethylene (HDPE) sub-soil drainage pipes installed within a graded gravel drainage layer, all enclosed in a geotextile separation fabric to prevent the migration of the tailings fines. The sub-surface drains connect to a network of secondary and main branches. The main perforated trunk lines run longitudinally through the footprint, ultimately discharging into the lined concrete dirty water channels, which are designed to direct collected flows toward the return water dam (Eco Elementum, 2025).

2.2.1.4 UNDERTAKING OF GROUND IMPROVEMENT

In addition to the presence of a spring within the footprint and the proposed groundwater-intercepting sub-surface drainage network designed to manage seepage and maintain slope stability, there is also a landfill site located on the northern portion of the facility that poses a significant geotechnical and environmental risk. The landfill site contains heterogeneous and potentially compressible waste materials, which introduces the possibility of uneven settlement over time, especially under the loading conditions imposed by the overlying tailings. To mitigate this risk, long-term ground improvement measures are necessary.

Ground improvement, such as dynamic compaction, is recommended to densify the underlying landfill material, reduce voids, and improve uniformity in stiffness and bearing capacity across the area. To further support the foundation and distribute applied loads evenly, a load-distribution platform should be constructed. This platform



should incorporate a high-strength geogrid (at least 100KN/m) to provide tensile reinforcement and interlock with the granular material, combined with a 1m thick rockfill layer to act as a bridging and load-spreading medium. Together, these measures will help ensure structural stability and reduce the potential for differential settlement (Eco Elementum, 2025).

2.2.2 CONSTRUCTION OF SLURRY AND RETURN WATER PIPELINES

To allow for slurry deposition on Mponeng Lower Compartment TSF from the Savuka plant, new slurry and return water pipes will be required (refer to **Figure 7**) as described below:

- Savuka Plant to Mponeng Lower Compartment TSF pipeline route:
 - The proposed slurry and return water pipes extend from the south of Savuka Plant at starting point 26°25'24.95"S; 27°23'58.94"E, extending southwards, parallel to each other until reaching the northern extent of Mponeng TSF where they split. Thereafter, the slurry pipeline extends to west before connecting to Mponeng TSF while the return water pipeline extends east then south around the TSF to the return water dam.
 - The slurry pipeline is approximately 3.36km long extending from the Savuka Plant at 26°25'24.77"S; 27°23'58.84"E and ending at the Mponeng Lower Compartment TSF northern edge at 26°26'57.60"S; 27°24'31.59"E.
 - The return water pipeline is approximately 4.85km long extending from the Savuka Plant at 26°25'24.77"S; 27°23'58.84"E and ending at the Mponeng Lower Compartment TSF return water at 26°27'23.09"S; 27°25'0.37"E.
- Savuka Plant to Mponeng Lower Compartment TSF pipeline route alternative 1:
 - There alternative slurry and return water pipeline route extends to the east through Western Deep Levels then south along Mponeng Gold Mine before heading to the west where it connects to Mponeng.
 - The alternative slurry and return water pipelines route follow the same path. Both commence at the Savuka Plant at 26°25'24.77"S; 27°23'58.84"E and connect to the Mponeng Lower Compartment TSF on the southeastern section at 26°27'6.62"S; 27°25'10.61"E where the slurry pipeline ends while the return water pipeline extends slightly further to connect to the return water dam at 26°27'23.09"S; 27°25'0.37"E. Subsequently, the alternative slurry pipeline is 6.73km long while the alternative return water pipeline is 7.4km long.

The pipelines will have a NB diameter of more than 360mm with a peak throughput of more than 120 ℓ/s. The exact diameter and throughputs will be confirmed in the EIA phase once detailed designs are available. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths (see **Figure 7**).



Figure 7: View existing aboveground residue deposition pipeline on site (left) and view of typical slurry and return water pipes taken from a different Harmony plant (right)



2.2.3 CONSTRUCTION OF PIPELINE BRIDGE

In order for the pipes to connect Savuka Plant and the Mponeng Lower Compartment TSF, a new pipe bridge approximately 100m long and 5m wide will be required to cross the channelled valley bottom wetland. The bridge will have two concrete pillars (beams) on either side of the channelled valley bottom wetland identified on site with the pipelines running from one end to the other on top of a steel trusses framework (see **Figure 8**). Detailed designs will be provided in the EIA Phase once the engineering designs have been completed.



Figure 8: Example of a typical Harmony pipeline bridge proposed for the project at the water crossing

2.2.4 CONSTRUCTION OF PIPELINE CULVERT

In order for the pipes to connect Savuka Plant and the Mponeng Lower Compartment TSF, a new pipeline culvert of approximately 12m long and 10m wide will be required to cross the surfaced road immediately north of the Mponeng Lower Compartment TSF. The culvert will either be an arch, circular or box culvert. The culvert will be made of concrete or corrugated metal (see **Figure 9**). Detailed designs will be provided in the EIA Phase once the engineering designs have been completed.



Figure 9 Example of a typical Harmony pipeline culvert proposed for the project at the road crossing

2.2.5 INSTALLATION OF CLEAN WATER DIVERSION SYSTEM - SPRING DIVERSION

In addition to the repurposed clean water channels and berms discussed in **Section 2.2.1**, the spring water currently daylighting in the northern portion of the proposed footprint will also require diversion around the TSF. A dedicated spring capturing and diversion system will be required prior to the installation of sub-surface drains. This system may be implemented on the upstream side of the currently active spring located along the northern boundary of the proposed lower compartment footprint (as shown in **Figure 10**). The purpose of this spring capturing system is to intercept and manage any clean groundwater emerging from the surrounding higher-elevation areas before it enters the TSF footprint. By doing so, it prevents this clean water from contributing to groundwater recharge beneath the tailings facility, which could otherwise elevate pore water pressures and compromise the integrity of not only the proposed lower compartment but also the foundation of the upper compartment toe.

GCS Water and Environmental Consultants investigated the origin of the spring and provided preliminary recommendations for capturing and diverting the water around the facility. These measures include vertical shafts with horizontal drains (as shown in **Figure 11**). It was recommended by GCS in the January 2019 report that trial study be initiated where the spring is intercepted by borehole MB20 and a potential 2nd borehole about 20 to 50m to the north-east. Once these have been established, further investigation will be necessary to determine the optimal placement of the capture system to effectively drain and redirect clean water away from the facility.

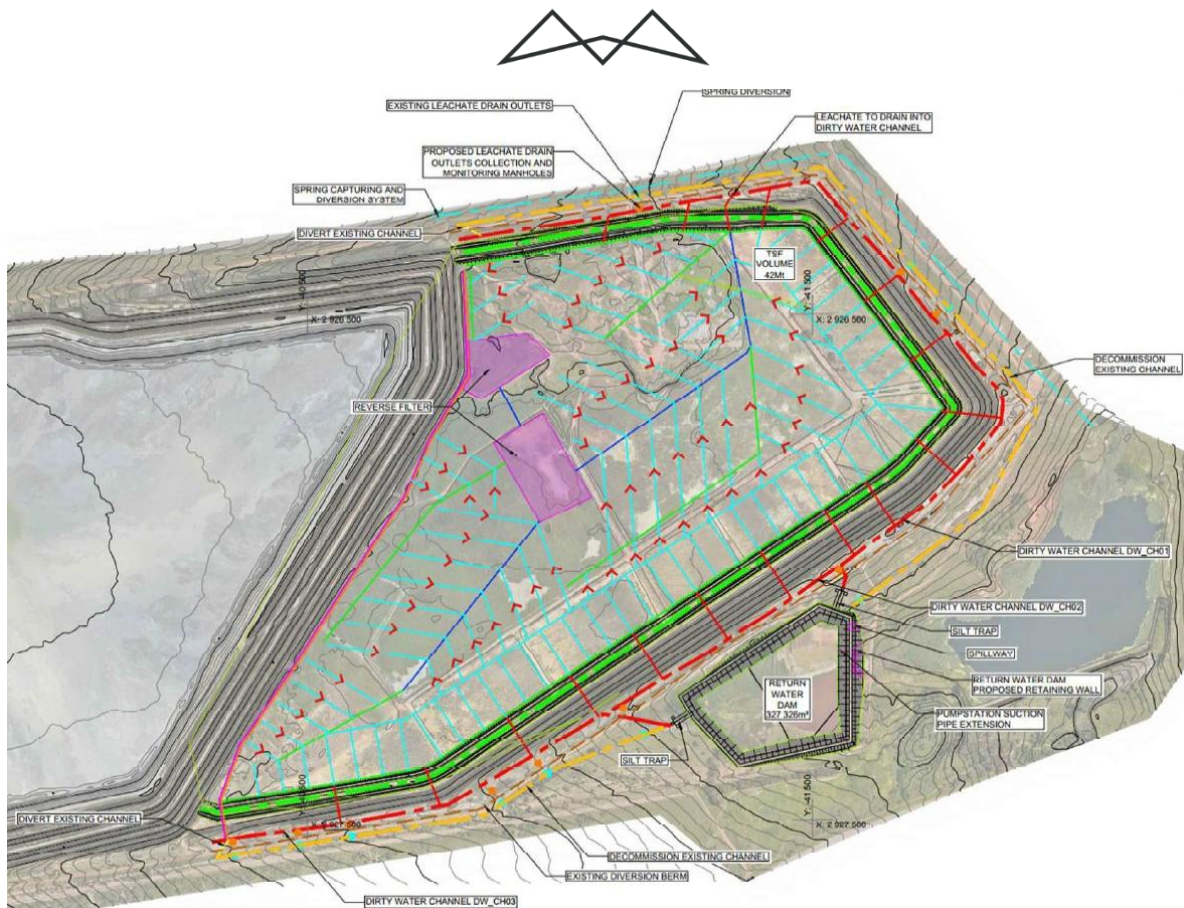


Figure 10: Potential stormwater and leachate collection system (Eco Elementum, 2025)

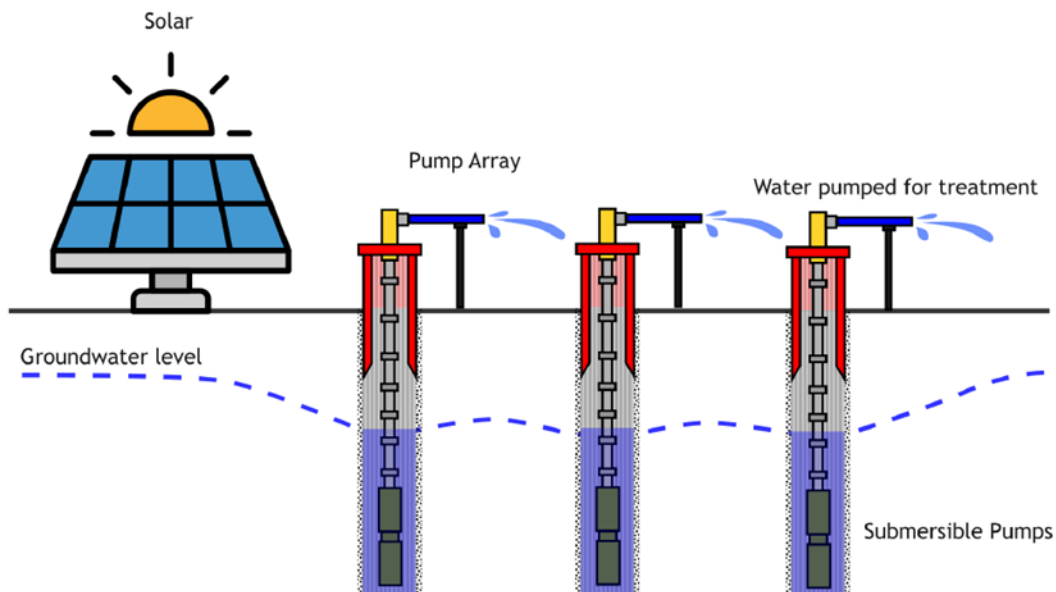


Figure 11: Schematic Detail a potential spring capturing system (GCS, 2025)

2.2.6 INSTALLATION OF DIRTY WATER SYSTEMS

2.2.6.1 SURFACE WATER CONVEYANCE

In support of the potential Water Use Licence Application (WULA) for the re-commissioning of the lower compartment, this study focuses solely on the direct infrastructure upgrades required on the lower TSF compartment to ensure regulatory compliance, particularly with respect to water management systems as prescribed under Government Notice 704 (GN704) of the National Water Act. GN704 requires that all dirty water



collection and conveyance systems associated with mining-related activities be designed to prevent seepage of polluted water and promote the reuse of water. To achieve both regulatory compliance and cost efficiency, trapezoidal concrete-lined channels (**Figure 12**) are planned to be installed within the existing, unlined paddocks. These channels will serve to collect and convey dirty water in a controlled manner, minimising seepage and preventing contamination of the surrounding environment. The channels will discharge into concrete silt traps before entering the RWD.

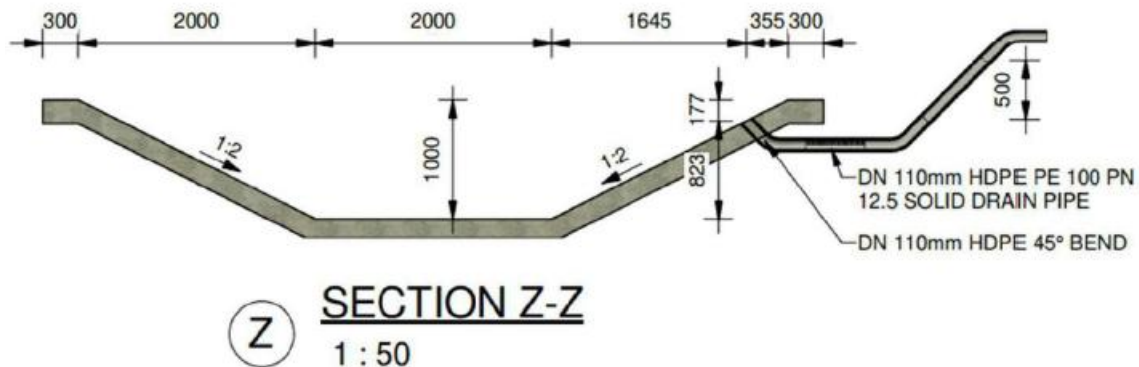


Figure 12: Typical Trapezoidal Concrete-lined Channel Detail (Eco Elementum, 2025)

Importantly, this proposed system strategically utilises existing infrastructure to minimise capital expenditure. The outer paddock bund wall and the existing earth-lined solution trench, both of which are already in place and in suitable condition with minor repairs, will be repurposed to function as components of the clean and dirty water separation system. The bund wall acts as a physical barrier, delineating clean runoff areas from the TSF, while the existing solution trench will continue to serve as a means of intercepting and directing water away from the facility (Eco Elementum, 2025).

2.2.6.2 LEACHATE COLLECTION

The leachate collection system has been set out to efficiently capture and convey leachate generated within the impoundment area, thereby reducing hydraulic head buildup and minimise seepage of contaminated water. This system plays a critical role in the environmental performance and geotechnical stability of the facility by promoting unsaturated conditions in the outer structural zone. The leachate collection system comprises a high-permeability drainage layer, consisting of a network of perforated HDPE collector pipes embedded in free-draining gravel (as shown in **Figure 13**).

In addition to the leachate drainage network, the Lower Compartment of the TSF is equipped with a toe blanket drain (**Figure 14**) at the downstream toe of the facility. This drain serves as a secondary seepage control measure, capturing any leachate or seepage that migrates toward the outer limits of the impoundment. The toe blanket drain enhances the overall seepage control capacity of the TSF by providing an additional pathway for water interception before it can accumulate or emerge at the downstream slope, thereby reducing pore pressures and improving long-term slope stability.

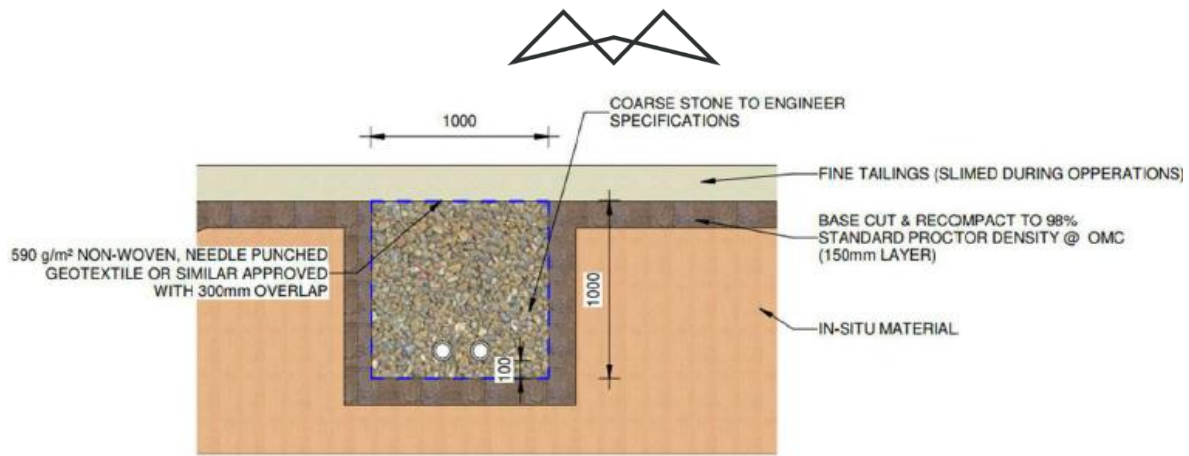


Figure 13: Typical Leachate Drain Detail (Eco Elementum, 2025)

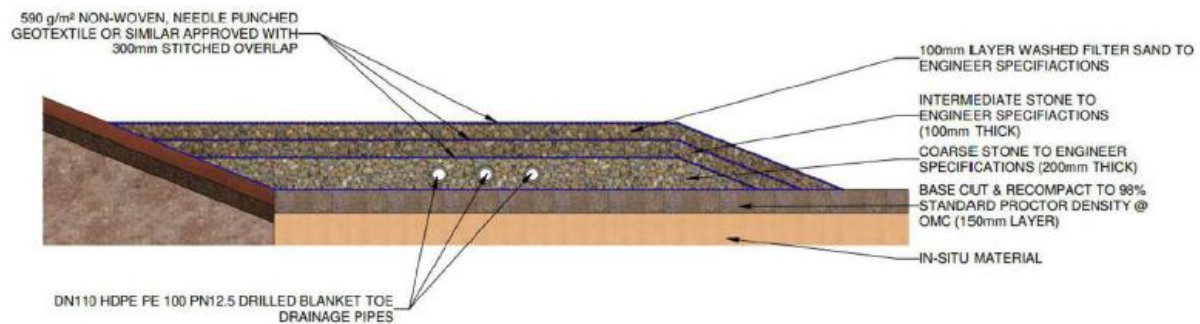
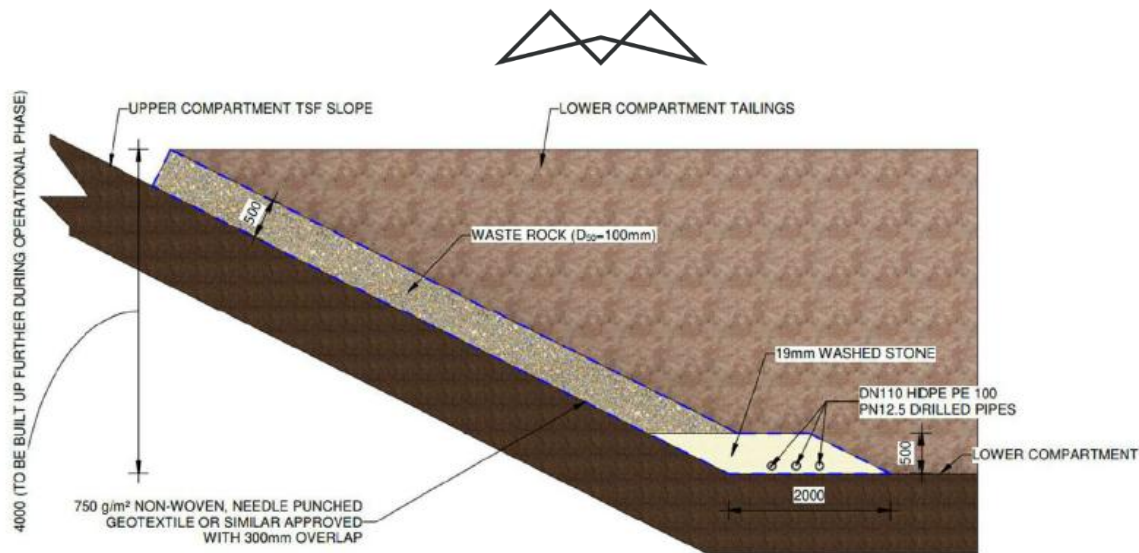


Figure 14: Typical Toe Drain Detail (Eco Elementum, 2025)

To maintain geotechnical stability and minimise the risk of seepage-induced failure, an interface curtain drain will be installed along the slope separating the Upper Compartment from the proposed Lower Compartment of the TSF. The curtain drain (as shown in **Figure 15**) has been designed to intercept and convey seepage emerging from the advancing Lower Compartment tailings before it can migrate laterally into the previously deposited, more permeable materials of the Upper Compartment. The interface drain will reduce the risk of increased pore water pressures within the coarser tailings Zone, reducing effective stress and possibly triggering localised instability. It is envisaged that the initial construction will establish a 4-meter-high curtain drain at the slope interface. However, because tailings deposition in the Lower Compartment will continue throughout the TSF's operational life, the curtain drain will need to be progressively extended upward by the operational contractor.

At the upstream side of the footprint, two reverse filter packs are strategically positioned at the current existing spring and holding dam locations to serve as seepage interception points. These reverse filters comprise a thick waste rock layer with non-woven needle-punched geotextile encapsulating the drain. If the Lower Compartment footprint is be dried out, and time is allowed for the subsurface water to dissipate, before construction works begin then the necessity of the filter packs will be reassessed. It should also be noted that the lower compartment currently has ten leachate collection outlet pipes that discharge into the existing unlined solution trenches. However, based on data from the Heavy-Medium Separation (HMS), no measurable flow has been recorded from these outlets for over a year. Therefore, it is proposed that these outlet points be intercepted and fitted with monitoring manholes. These manholes will be designed to either overflow or allow for controlled pumping into the solution trenches in the event that leachate accumulates within them. **Figure 15** below illustrates the proposed leachate and dirty surface water management system (Eco Elementum, 2025).



6 TSF INTERFACE CURTAIN DRAIN DETAIL 1 : 50

Figure 15: Typical Detail of the Interface drain (Eco Elementum, 2025)

2.2.7 UPGRADE OF RETURN WATER DAM (RWD)

2.2.7.1 RWD DESIGN

The current RWD does not have sufficient capacity to accommodate both current and future operational demands. Therefore, the existing dam will need to be enlarged to provide adequate capacity to contain the 1:50-year, 24-hour storm event above the mean operating level. The RWD is designated for the runoff, TSF pool drawdown, leachate, and sub-surface water of both the upper and lower compartments of the TSF. The RWD will be equipped with two silt traps (on the eastern and western sides of the dam, respectively) and an emergency spillway. The RWD will be of the earth fill embankment type, with an upstream and downstream slope of 1:3 (V:H). To prevent seepage and groundwater contamination, the RWD will be constructed with a Class C performance barrier system. The RWD will also be provided with a minimum freeboard of 800mm and an overflow spillway capable of safely passing the 1:100-year flood event.

A Class C performance barrier system has been opted for the RWD. The geomembrane was changed from a general Class C 1.5 mm HDPE to a 2 mm HDPE to improve the liner performance as well as to negate the use of a clay layer below. Due care should be taken when installing the barrier on top of the founding soil, which is to comply to SANS 10409 (2020), receiving face of reworked foundation soil. Soilcrete as a ballast layer and soilcrete-filled geocells are to be placed on the floor and wall area, respectively. Care should be taken when placing these layers above the liner. An Electric Leak Location (ELL) survey has been specified for the covered geomembrane in the RWD by means of Dipole testing according to ASTM D7007 to ensure that no damage has been caused to the barrier system after installation. Refer to the detailed information and schematic representation of the RWD and liner (**Figure 16**) (Eco Elementum, 2025).

EMBANKMENT CONSTRUCTION SPECIFICATIONS	
1.	STRIP TOPSOIL 150mm TO 300mm FOR ENTIRE FOOTPRINT OF RWD AND STOCKPILE AS PER MINE REQUIREMENT FOR STOCKPILING AND TOP SOIL MAINTENANCE
2.	EXCAVATE MATERIALS TO RESIDUAL SOIL OCCURRING AT A DEPTH OF 0.4m TO 2m.
3.	RIP AND COMPACT IN-SITU MATERIAL BELOW EMBANKMENTS TO 93% OF MOD AASHTO DENSITY
4.	CONSTRUCT EMBANKMENT WITH RESIDUAL SOIL MATERIAL FROM EXCAVATIONS AND COMPACT TO 93% MOD AASHTO DENSITY AT OMC IN LAYERS NOT EXCEEDING 150mm.

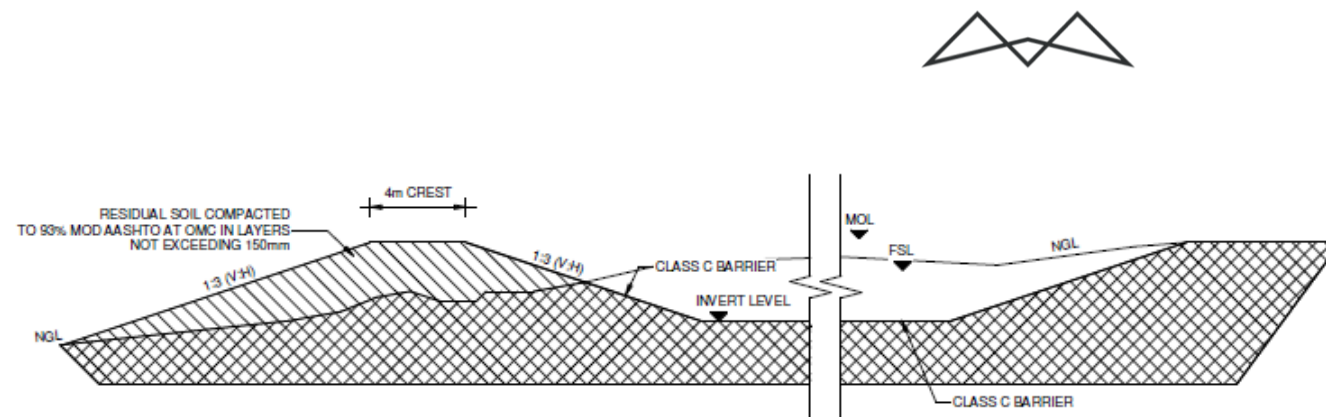


T-LOCK NOTE

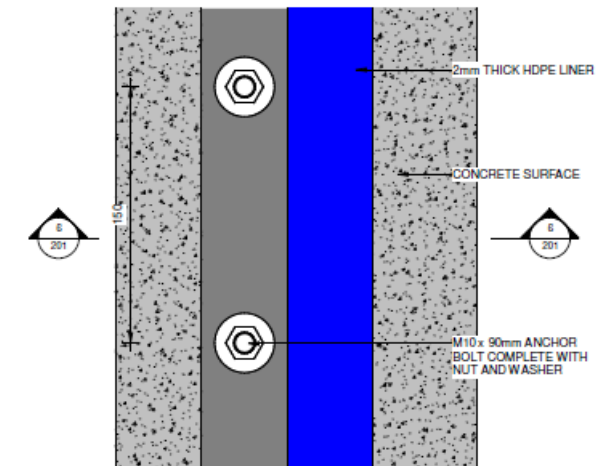
1. INSTALL "T-LOCK" TO MANUFACTURES SPECIFICATIONS

CLASS C BARRIER PROTECTION AND SURFACE PREPARATION

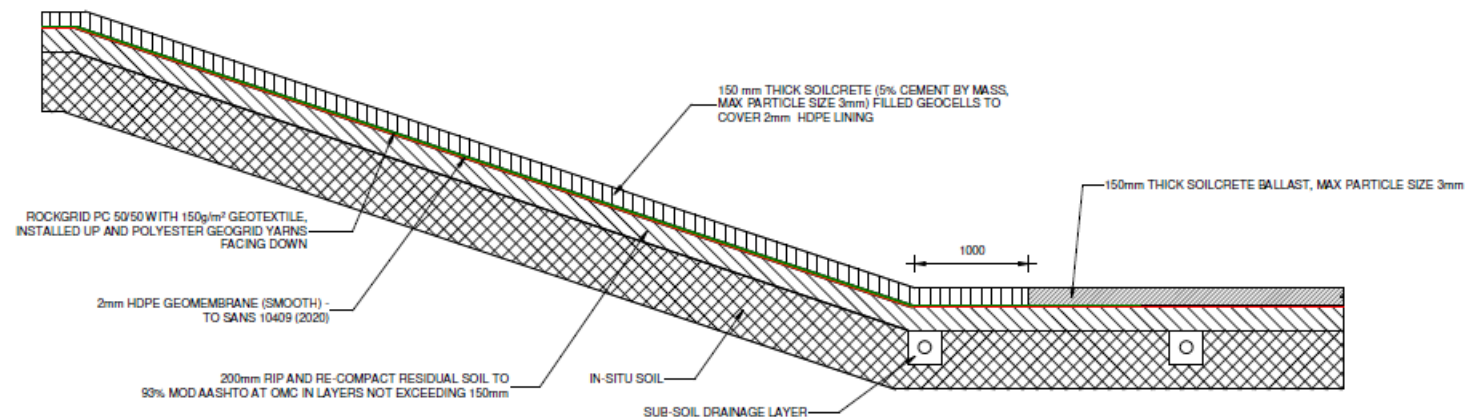
1. EXCAVATE RWD TO 300mm BELOW FINAL INVERT LAYER
2. EXCAVATE SUBSOIL DRAINAGE TRENCHES TO INSTALL SUB-SURFACE DRAINAGE PIPES. SUPPLY AND PLACE GEO-FABRIC (230g/m² NON-WOVEN NEEDLE PUNCHED GEOTEXTILE) IN SUB-SURFACE DRAINS AND BELOW FLOORS. PLACE 26mm AGGREGATE ON TRENCH FLOOR TO FORM PIPE BEDDING. SUPPLY, LAY AND BED 110mm DIAMETER HDPE SLOTTED SUB-SURFACE DRAINAGE PIPES. SUPPLY AND PLACE 19mm CRUSHED STONE IN SUBSOIL DRAIN.
3. FOUNDING SOIL TO COMPLY TO SANS 10409(2020) RECEIVING FACE OF REWORKED MATERIAL.
4. SUPPLY AND INSTALL 2mm HDPE GEOMEMBRANE TO SANS 10409(2020) BY SPECIALIST SUPPLIER (TO BE APPROVED BY ENGINEER) TO DAM FLOOR AND EMBANKMENTS
5. SUPPLY AND INSTALL ROCKGRID BY SPECIALIST SUPPLIER (TO BE APPROVED BY ENGINEER) TO DAM FLOOR AND EMBANKMENTS
6. ANCHOR LINER IN TRENCH 1300mm WIDE AND 500mm DEEP ON TOP OF EMBANKMENT AS SHOWN ON DRAWING.
7. ELL SURVEY TO BE PERFORMED FOR COVERED GEOMEMBRANE BY MEANS OF DIPOLE TESING ACCORDING TO ASTM D7007.



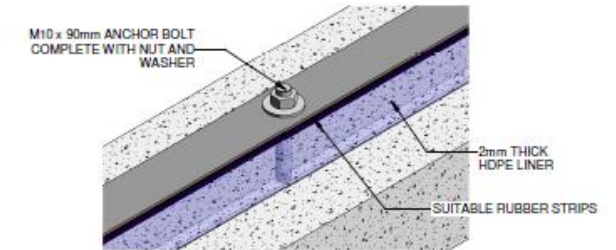
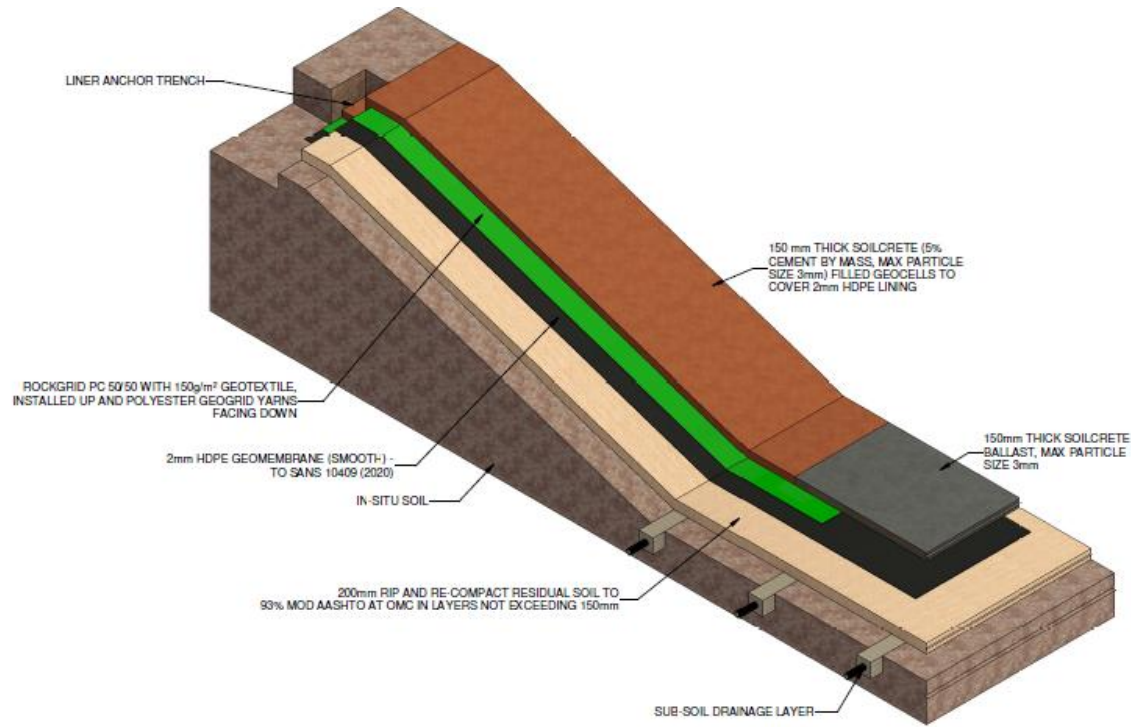
1 TYPICAL SECTION THROUGH EMBANKMENT
1 : 200



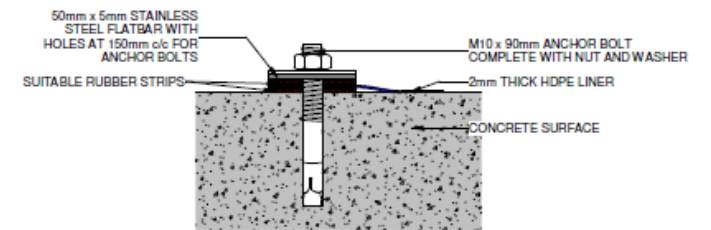
3 LINER TO CONCRETE FIXING PLAN VIEW
1 : 2



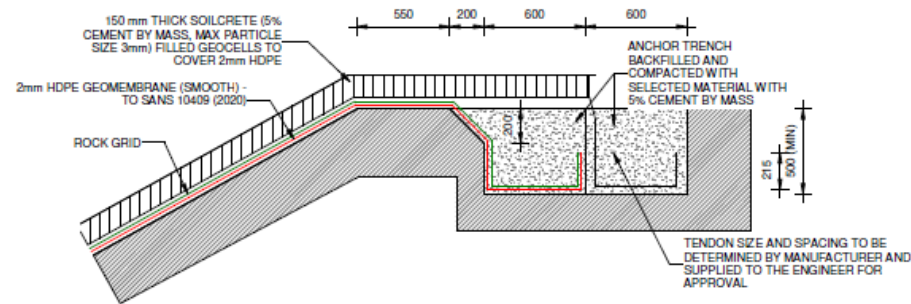
2 CLASS C DAM LINING DETAIL - EMBANKMENT
1 : 30



5 LINER TO CONCRETE FIXING ISOMETRIC



6 LINER TO CONCRETE FIXING SECTION
1 : 2



7 ANCHOR TRENCH DETAIL
1 : 20

Figure 16: Proposed RWD layout and liner detail. (Eco Elementum, 2025)



2.2.7.2 RWD SIZING (WATER BALANCE)

A water balance was conducted to ensure that the size of the dirty water management infrastructure is adequate and that the mine complies with the requirements set out in the National Water Act (NWA), Act 36 of 1998, as well as the regulations on water usage for mining activities stated in Government Notice Nr. GN704 dated June 1999. The results of the water balance model are summarized below:

- Excess water in the RWD is at risk of overflowing into the downstream environment when both the Upper and Lower TSFs are operational, with the potential to degrade the surface and groundwater qualities of surrounding areas. Excess water from Mponeng operations must be sent to the Savuka Operations to ensure that the proposed RWD is adequately sized to accommodate all the dirty water inflows.
- The proposed capacity of Mponeng TSF RWD is 327,000m³. This capacity is sufficient to contain all dirty water inflows without the dam spilling more than once in 50 years.
- Average of 3.03 Ml/day needs to be pumped back to the Savuka plant.
- Average of 6.16 Ml/day needs to be pumped back to the Mponeng plant.
- Roughly 40% of the RWD capacity was allowed for the operating level of the RWD.

2.3 LISTED AND SPECIFIED ACTIVITIES TRIGGERED

In terms of Section 24(2) of NEMA, the Minister and/or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in 2014 and amended in 2021 in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 and consist of the following:

- *Government Notice Regulation (GNR) 982* provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process (also referred to as the EIA Regulations);
- *GNR 983 Listing Notice 1* (Regulation 983, as amended) defines activities which will trigger the need for a Basic Assessment process;
- *GNR 984 Listing Notice 2* (Regulation 984, as amended) defines activities which trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required; and
- *GNR 985 Listing Notice 3* (Regulations 985, as amended) defines certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were assessed to determine whether the proposed project will trigger any of the above listed activities, and if so, which Environmental Authorisation Process would be required. The triggered listed activities presented in **Table 7** and the applicant will require an Environmental Authorisation (EA) and Waste Management License (WML) in terms of GNR 983 Listing Notice 1, GNR 984 Listing Notice 2 and GNR 985 Listing Notice 3 of the NEMA EIA Regulations 2014 as amended. A Scoping and EIA process is required in line with all the requirements of the NEMA EIA Regulations, 2014, as amended.

Table 7: Relevant NEMA listed activities relevant to the proposed development

Activity No(s):	Activity	Portion of the proposed project to which the applicable listed activity relates.
GN983, Activity 10	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-	In order to allow for slurry deposition on Mponeng from either of the operational plants (Kusasaletu or Savuka), new residue deposition pipelines will be required. The residue



Activity No(s):	Activity	Portion of the proposed project to which the applicable listed activity relates.
	(i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more.	deposition pipelines will have a NB diameter of more than 0.36m with a peak throughput of more than 120 ℓ/s. The exact diameters and flow rates are to be confirmed in the EIA phase.
GN983, Activity 12	The development of (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs (a) within a watercourse or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	The proposed TSF and associated infrastructure such as RWD upgrade, pipelines, drainage systems, culvert and bridge exceed the 100m ² threshold and are located within a natural spring, channelled valley bottom, aquatic dam and proximity of the Elandsfontein spruit
GN983, Activity 19	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.	The proposed pipelines and maintenance road will likely intersect wetlands and may require infilling of more than 10m ³ to ensure structural integrity.
GN983, Activity 21D	Any activity including the operation of that activity for which the Minister responsible for mineral resources has issued an exemption in a Government Notice in terms of section 106(1) of the Mineral and Petroleum Resources Development Act, as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required for the exercising of such exempted activity	Amendment of the approved Mining Right EMPr through a MPRDA Section 102 application may be required.
GN983, Activity 21F	Any activity including the operation of that activity required for the reclamation of a residue stockpile or a residue deposit as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required for the reclamation of a residue stockpile or a residue deposit	The residue stockpile may eventually be reclaimed once deposition has been completed and the reclamation process is considered a viable process.
GN984, Activity 6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent.	Proposed Mponeng Lower Compartment TSF will involve the disposal of waste with potential to cause pollution, thus, requiring a Water Use Licence in terms of Section 21g.
GN984, Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation.	There will be clearance requirements of indigenous vegetation which may exceed 20ha to allow for the necessary stabilization and installation/upgrades of associated infrastructure required for the recommencement of deposition on Mponeng Lower Compartment TSF.
GN985, Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of vegetation in the preparation of the construction footprint will result in a potential impact on Critical Biodiversity Areas



Activity No(s):	Activity	Portion of the proposed project to which the applicable listed activity relates.
	<p>c. Gauteng</p> <p><i>ii. Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans.</i></p>	(CBA) 2 and Ecological Support Areas (ESA) 1.
GN985 Activity 14	<p>The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>c. Gauteng</p> <p><i>ii. National Protected Area Expansion Strategy Focus Areas;</i></p> <p><i>iii. Gauteng Protected Area Expansion Priority Areas;</i></p> <p><i>iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;</i></p> <p><i>vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority.</i></p>	The proposed footprint for the TSF, pipelines and access roads is located within 32m of wetlands, will exceed 10 square metres and will result in a potential impact on Critical Biodiversity Areas (CBA) 2 and Ecological Support Areas (ESA) 1.
GN985 Activity 23	<p>The expansion of—</p> <p>(i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback adopted in the prescribed manner; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.</p> <p>c. Gauteng</p> <p><i>ii. National Protected Area Expansion Strategy Focus Areas;</i></p> <p><i>iii. Gauteng Protected Area Expansion Priority Areas;</i></p> <p><i>iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in bioregional plans;</i></p> <p><i>vi. Sensitive areas identified in an environmental management framework adopted by the relevant environmental authority.</i></p>	The RWD requires an upgrade to a Class C lined, earth fill embankment RWD with a capacity of 327,000m ³ . This capacity is sufficient to contain all dirty water inflows without the dam spilling more than once in 50 years.

The listed activities that are triggered by the project in terms of GN921 (as amended) promulgated under the National Environmental Management Waste Act (Act 59 of 2008 - NEMWA) are specified in **Table 8** below:

Table 8: Applicable NEMWA Activities relevant to the proposed development



Activity No(s):	Activity	Portion of the proposed project to which the applicable listed activity relates.
Category A, Activity A14	The decommissioning of a facility for a waste management activity listed in Category A or B of this Schedule.	The current licensed Mponeng Landfill Site located on the Mponeng Lower Compartment TSF needs to be decommissioned from site and relocated to a different area.
Category B, Activity B7	The disposal of any quantity of hazardous waste to land.	TSF operations
Category B, Activity B10	The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).	TSF construction
Category B, Activity B11	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	TSF establishment

As previously indicated, The Mponeng Lower Compartment TSF was an existing TSF with a footprint of approximately 102ha, however, the Mponeng Lower Compartment TSF is no longer in operation and is currently utilised as a Holding Dam and an approximately 200m² portion of the TSF has been converted and is currently used as an authorized General Waste Landfill Facility (Gaut 002-09-10-W0011). The current licensed Mponeng Landfill Site located on the Mponeng Lower Compartment TSF will be discontinued for the purposes of the TSF construction. The License Holder intends to surrender the Waste Management License to allow for the recommencement of tailings deposition on the facility through Regulation 57 of the National Environmental Management: Waste Act 59 of 2008 (NEMWA). Any comments / concerns regarding the proposed process of surrendering the Mponeng General Waste Management License should be submitted to EIMS as part of the comments and/or concerns of this Scoping Report.

The Department of Mineral Resources and Energy (DMRE) has been identified as the CA for both the NEMA and NEM:WA listed activities triggered by the project. A separate application for a Water Use Licence (WUL) will also been lodged with the Department of, Water and Sanitation (DWS) for the water use triggers namely:

- a) Section 21a: Taking water from a water resource (to be confirmed by DWS with respect to the spring capture and diversion options);
- b) Section 21 c: Impeding or diverting the flow of water in a watercourse;
- c) Section 21 g: Disposing of waste in a manner which may detrimentally impact on a water resource;
- d) Section 21 i: Altering the bed, banks, course or characteristics of a watercourse.



3 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

The needs and desirability analysis component of the “Guideline on need and desirability in terms of the EIA Regulations (Notice 819 of 2014)” includes, but is not limited to, describing the linkages and dependencies between human well-being, livelihoods and ecosystem services applicable to the area in question, and how the proposed development’s ecological impacts will result in socio-economic impacts (e.g., on livelihoods, loss of heritage site, opportunity costs, etc.). This section of the report provides the need and desirability for the proposed Mponeng Lower Compartment TSF.

The applicant holds an approved Mining Right (MR) and Environmental Management Programme (EMPr), in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002, as amended) (MPRDA), for the mining of gold at various operations in the West Wits Region in the Gauteng Province ((GP 30/5/1/2/2 (01)) MR. The Savuka Plant currently deposits tailings onto the Savuka 5a, 5b, 7a & 7b TSFs. However, these facilities are approaching their final and approved height, and the current planned Life of Mine (LOM) for the West Wits Region exceed the available deposition capacity of these TSFs. The Savuka tailings facility has reached the end of its lifecycle and is undergoing a short-term extension of two years. Following this period, tailings from Savuka will need to be diverted to an alternative facility. The Mponeng Lower Compartment has been identified as a viable solution to accommodate tailings until the end of life of the Savuka plant and thereafter accommodate tailings from the Mponeng plant. Tailings were deposited up to 25m on the southern half of the footprint, but deposition was ceased after a natural spring was identified within the footprint. Golden Core Trade and Invest plans to re-commission the Lower Compartment after the spring is diverted to reduce groundwater contamination. This process will allow for the operations to continue safely.

If the project was to not proceed, it would entail a situation where once the Mponeng Upper Compartment and Savuka TSFs reach their carrying capacity and approved height, deposition would stop which would mean the mining activities would come to a halt. That would negatively affect the future viability of Harmony’s West Wits mining operations and massive socio-economic impacts would emanate due to lack of deposition space. This would also negatively affect the company’s financial closure and rehabilitation plans. Subsequently, it would result in a significant negative financial impact on not only Harmony but also have a direct negative impact on the workforce on the mine and surrounding businesses and communities that are directly or indirectly linked to the operations. **Table 9** present the needs and desirability analysis undertaken for the project.



Table 9: Needs and desirability analysis for the proposed TSF

Ref No.	Question	Answer
1	Securing ecological sustainable development and use of natural resources	
1.1	How were the ecological integrity considerations taken into account in terms of: Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Systems, Conservation Targets, Ecological drivers of the ecosystem, Environmental Management Framework, Spatial Development Framework (SDF) and global and international responsibilities.	<p>Although the study area has been disturbed through the active mining operations, based on the proposed development and site sensitivity verification, several specialist studies form part of this environmental impact assessment including:</p> <ul style="list-style-type: none"> • Soils and Agricultural Impact Assessment; • Air Quality Impact Assessment; • Surface Water (Hydrological) Assessment; • Groundwater Impact Assessment; • Aquatic Ecology Impact Assessment; • Terrestrial Biodiversity Assessment; • Wetland Delineation and Assessment; • Cultural and Heritage Resources Assessment; • Visual Impact Assessment; • Health Risk & Radiological Impact Assessment; • Palaeontology Assessment; and • Closure and Rehabilitation Plan <p>These studies will assist in identifying any Threatened Ecosystems, Sensitive and vulnerable ecosystems, Critical Biodiversity Areas, Ecological Support Areas, Conservation Targets and Ecological drivers of the ecosystem. Where sensitive species or ecosystem drivers are identified, relevant mitigation measures will be put forward to prevent or minimise the impacts. The findings and impact assessment will be discussed during the EIA Phase,</p>
1.2	How will this project disturb or enhance ecosystems and / or result in the loss or protection of biological diversity? What measures were explored to avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	<p>The overall proposed development site inclusive of the TSF and RWD, pipelines and access roads is approximately 120ha. Based on the preliminary assessments, the study area is largely disturbed, it is not anticipated that there will be major areas of increased ecological importance that will be identified by the specialists. However, the proposed project entails the redeposition onto an existing footprint of a hazardous waste facility which can have detrimental environmental and health impacts. Therefore, should the specialists identify areas of species of conservation concern and/or major health risks, then best environmental practices will be recommended (mitigation hierarchy). As stipulated in the mitigation hierarchy, the EAP / specialist will recommend to first avoid adverse impacts, then minimize impacts that cannot be avoided, and lastly offset, or compensate for, unavoidable impacts.</p>
1.3	How will this development pollute and / or degrade the biophysical environment? What measures were explored to either avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	



Ref No.	Question	Answer
		Refer to baseline ecological statement in Section 7 and the impact assessment in Section 7.12 of this report.
1.4	What waste will be generated by this development? What measures were explored to avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and / or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	<p>This development will possibly generate various general and minor hazardous waste, the majority of which will be generated during the construction phase. The general waste will be stored in designated areas and through the process of recovery and recycling, the volume of general waste being disposed to landfill will be minimised. The hazardous portion of the waste stream will also be adequately stored prior to disposal at a suitably licenced hazardous waste disposal facility. Safe disposal certificates will be obtained from the disposal facility used.</p> <p>Waste during the operational phase will largely be from the tailings material which will be managed accordingly through an integrated waste and tailings storage facility management approach. Waste has been identified as an impact and assessed in Section 7.12. However, it is anticipated that the following measures can be utilised to reduce the impact of the waste on the receiving environment:</p> <p>Waste must be stored correctly. All hazardous waste such as oil must be stored separately and disposed of at a registered facility. Proof of disposal must be kept by the Applicant.</p>
1.5	How will this project disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	A heritage impact assessment is being conducted as part of the EIA to determine areas of archaeological and/or cultural heritage and associated mitigation measures. Based on the National Web-Based Screening Tool Report, the relative Archaeological and Cultural Heritage Theme relative sensitivity is <i>Low</i> . Therefore, the proposed project will likely not disturb or enhance landscapes and / or sites that constitute the nation's cultural heritage. However, a Chance Find Protocol procedure will likely be recommended by the specialist.
1.6	How will this project use and / or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy the impacts? What measures were explored to enhance positive impacts?	Refer to the impact assessment in Section 7.12 of this report. As a result of the fact that this project entails only a new TSF only it is anticipated that this project will not lead to a significant impact or depletion of non-renewable resources.
1.7	How will this project use and / or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and / or impacts on the ecosystem jeopardise the integrity of the resource and / or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?	It is anticipated that the project will have a low impact on the localised ecology. Refer to the impact assessment in Section 7.12 of this report.



Ref No.	Question	Answer
1.7.1	Does the proposed project exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e., de-materialised growth)?	The proposed project is only for additional deposition space required for Harmony's West Wits Region.
1.7.2	Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used?	The proposed project will not, at this stage, involve the use of the natural resources apart from the TSF footprint area to be cleared.
1.7.3	Do the proposed location, type and scale of development promote a reduced dependency on resources?	The proposed project is only for additional deposition space required for Harmony's West Wits Region.
1.8	How were a risk-averse and cautious approach applied in terms of ecological impacts:	
1.8.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	In order to prevent repetition, the reader is directed to the assumptions and limitations presented in Section 1.2 .
1.8.2	What is the level of risk associated with the limits of current knowledge?	The level of risk is considered low at this stage.
1.8.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	At this stage it is anticipated that this project will not lead to a significant impact on the receiving environment. Refer to the impact assessment in Section 7.12 of this report.
1.9	How will the ecological impacts resulting from this development impact on people's environmental right in terms following?	
1.9.1	Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	The proposed activities are anticipated to have low negative ecological impacts. Refer to the impact assessment in Section 7.12 in this report.
1.9.2	Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?	
1.10	Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?	A medium to low impact on third party wellbeing, livelihoods and ecosystem services is currently foreseen. Refer to the impact assessment in Section 7.12 of this report.



Ref No.	Question	Answer
1.11	Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives / targets / considerations of the area?	The proposed survey activities are anticipated to have generally low negative ecological impacts. Refer to the impact assessment in Section 7.12 in this report.
1.12	Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the “best practicable environmental option” in terms of ecological considerations?	As part of the scoping phase, suitable alternatives are being considered and will be finalised in the EIA phase once due consideration of alternatives has been completed. Refer to Section 5 for the details of the alternatives considered at this stage.
1.13	Describe the positive and negative cumulative ecological / biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?	Refer to Section 7.12 of this report for the identified impacts, their assessment and recommended mitigation measures. This aspect will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr
2	Promoting justifiable economic and social development	
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following:	
2.1.1	The IDP (and its sector plans’ vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks or policies applicable to the area	Refer to Section 7.12 of this report for a breakdown of the demographics and social environment in the project area. The Merafong City Local Municipality IDP and West Rand District Municipality IDP identifies Economic infrastructure and development as one of the key mayoral strategic priorities (IDP Merafong Municipality 2023/24 IDP and West Rand Municipality 2024/25 Reviewed IDP).
2.1.2	Spatial priorities and desired spatial patterns (e.g., need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),	It is anticipated that the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Wadela, Fochville and Carletonville.
2.1.3	Spatial characteristics (e.g., existing land uses, planned land uses, cultural landscapes, etc.), and	Refer to the baseline environment in Section 7 of this report.
2.1.4	Municipal Economic Development Strategy (“LED Strategy”).	Considering the location of the activities, it is not anticipated to significantly promote or facilitate spatial transformation and sustainable urban development.
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?	Refer to the impact assessment in Section 7.12 in this report.



Ref No.	Question	Answer
2.2.1	Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	It is anticipated that the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Wadela, Fochville and Carletonville. In addition, Harmony has various social and LED initiatives required under their Social & Labour Plan (SLP) commitments.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to the public participation process and feedback contained in Appendix C .
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	Refer to the impact assessment and mitigation measures in Section 7.12 of this report.
2.5	In terms of location, describe how the placement of the proposed development will:	
2.5.1	Result in the creation of residential and employment opportunities in close proximity to or integrated with each other.	It is anticipated that the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Wadela, Fochville and Carletonville.
2.5.2	Reduce the need for transport of people and goods.	The activities are not anticipated to have an impact on the transportation of goods and people.
2.5.3	Result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms of public transport),	The activities are not anticipated to have any significant impact on the public transport.
2.5.4	Compliment other uses in the area,	The surrounding area is impacted by existing TSF facilities.
2.5.5	Be in line with the planning for the area.	Refer to item 2.1.1 of this table (above).
2.5.6	For urban related development, make use of underutilised land available with the urban edge.	The proposed activity is only for additional deposition space required for the applicant's existing operations on an existing footprint, pipelines and access roads will be along existing pipeline routes and road, as such the activity will not require any additional land.
2.5.7	Optimise the use of existing resources and infrastructure,	Refer to Section 2 of this report.
2.5.8	Opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g., not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),	



Ref No.	Question	Answer
2.5.9	Discourage “urban sprawl” and contribute to compaction / densification.	The proposed activity is only for additional deposition space required for the applicant’s existing operations on an existing footprint, pipelines and access roads will be along existing pipeline routes and road, as such the activity will not require any additional land.
2.5.10	Contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,	Refer to items 2.5.7 – 2.5.9 of this table (above).
2.5.11	Encourage environmentally sustainable land development practices and processes	Refer to impact assessment in Section 7.12 of this report.
2.5.12	Take into account special locational factors that might favour the specific location (e.g., the location of a strategic mineral resource, access to the port, access to rail, etc.),	Refer to alternative analysis in Section 5 .
2.5.13	The investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential).	It is anticipated that the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Wadela, Fochville and Carletonville. In addition, Harmony has various social and LED initiatives required under their various SLP commitments. Potential number of employment opportunities will be provided in the EIA Phase.
2.5.14	Impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and	Refer to impact assessment in Section 7.12 of this report.
2.5.15	In terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?	Given the scale of the development it is not anticipated that the activities will contribute significantly to settlements or areas in terms of direct socio-economic returns however the development will allow operations at the Savuka and Kusasalethu plant and various Harmony West Wits Region mining operations to continue.
2.6	How was a risk-averse and cautious approach applied in terms of socio-economic impacts:	
2.6.1	What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?	Refer to Section 1.2 of this report.
2.6.2	What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?	The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions should the recommended mitigation and management measures be implemented and adhered to.



Ref No.	Question	Answer
2.6.3	Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?	The level of risk is low as the project is not expected to have far reaching negative impacts on socio-economic conditions (refer to Section 7.12) should the recommended mitigation and management measures be implemented and adhered to (refer to Section 8.3).
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:	
2.7.1	Negative impacts: e.g., health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?	Refer to the impact assessment in Section 7.12 of this report.
2.7.2	Positive impacts. What measures were taken to enhance positive impacts?	Refer to the impact assessment in Section 7.12 of this report.
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socioeconomic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	Refer to the impact assessment in Section 7.12 of this report.
2.9	What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?	Refer to the impact assessment in Section 7.12 of this report.
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	Refer to the impact assessment in Section 7.12 of this report.
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	By conducting an EIA Process, the applicant ensures that equitable access has been considered. Refer to the impact assessment in Section 7.12 of this report.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Refer to the impact assessment in Section 7.12 of this report. The EMPr will specify timeframes within which mitigation measures must be implemented.



Ref No.	Question	Answer
2.13	What measures were taken to:	
2.13.1	Ensure the participation of all interested and affected parties.	Refer to Section 6 of this report, describing the public participation process undertaken for the proposed project.
2.13.2	Provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,	Refer to Section 6 of this report, describing the public participation process undertaken for the proposed project. advertisement, notification letter and site notice have been made available in English, Afrikaans and Setswana to assist in understanding of the project. Further public consultation will be held during the review period of the Scoping / EIA report for the project.
2.13.3	Ensure participation by vulnerable and disadvantaged persons,	
2.13.4	Promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,	
2.13.5	Ensure openness and transparency, and access to information in terms of the process,	
2.13.6	Ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge,	
2.13.7	Ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	
2.14	Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	Refer to Section 6 of this report, describing the public participation process undertaken for the proposed project.
2.15	What measures have been taken to ensure that current and / or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Potential future workers will have to be educated on a regular basis as to the environmental and safety risks that may occur within their work environment. Furthermore, adequate measures will have to be taken to ensure that the appropriate personal protective equipment is issued to workers based on the conditions that they work in and the requirements of their job.
2.16	Describe how the development will impact on job creation in terms of, amongst other aspects:	
2.16.1	The number of temporary versus permanent jobs that will be created.	



Ref No.	Question	Answer
2.16.2	Whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area).	It is anticipated that the use of local labour will be utilised as far as possible. Labourers will mostly be sourced from surrounding towns and areas such as Wadela, Fochville and Carletonville. Details in terms of job figures and employment opportunities will be made available for the EIA-phase report.
2.16.3	The distance from where labourers will have to travel.	
2.16.4	The location of jobs opportunities versus the location of impacts.	
2.16.5	The opportunity costs in terms of job creation.	
2.17	What measures were taken to ensure:	
2.17.1	That there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment.	The EIA Process requires governmental departments to communicate regarding any application. In addition, all relevant departments are notified at various phases of the project by the EAP.
2.17.2	That actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures.	
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people’s common heritage?	Refer to Section 6 of this report, describing the public participation process implemented for the application, as well Section 7, the impact on any national estate.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Refer to the impact assessment and mitigation measures in Section 7.12 of this report.
2.20	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	The proposed survey activities are not anticipated to produce significant pollution, environmental damage or adverse health effects in the long term.
2.21	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Refer to Section 5 , description of the process followed to reach the proposed preferred site.



Ref No.	Question	Answer
2.22	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	Refer to the impact assessment and mitigation measures in Section 7.12 . The impacts will be further explored in the EIA phase and findings thereof presented in the EIA Report and EMPr.



4 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation identified which may relate to the proposed project. The primary legal requirement for this project stems from the need for an EA to be granted by the competent authority, which is the DMRE, in accordance with the requirements of the NEMA EIA Regulations 2014, as amended. In addition, there are numerous other pieces of legislation governed by many acts, regulations, standards, guidelines and treaties on an international, national, provincial and local level, which should be considered in order to assess the potential applicability of these for the proposed activity. The key legislation applicable to this project is discussed in the subsections below. The contents of this report are based on a review of the information that was available at the time of the compilation of the report. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the applicant in respect of environmental management for the proposed Mponeng Lower Compartment TSF project.

4.1 APPLICABLE NATIONAL LEGISLATION

The legal framework within which the proposed Mponeng Lower Compartment TSF operates is governed by many Acts, Regulations, Standards and Guidelines on a national level. Legislation applicable to the project includes (but is not limited to) those discussed below.

4.1.1 CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The constitution of any country is the supreme law of that country. The Bill of Rights in chapter 2 section 24 of the Constitution of South Africa Act (Act No. 108 of 1996) makes provisions for environmental issues and declares that: *“Everyone has the right -*

- a) to an environment that is not harmful to their health or well-being; and*
- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:*
 - i. prevent pollution and ecological degradation;*
 - ii. promote conservation; and*
 - iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.*

The State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate. The application for an Integrated Environmental Authorisation, Water Use Authorisation and any other licenses / permits for the proposed Mponeng Lower Compartment TSF will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and social environment.

4.1.2 THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998

The main aim of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) is to provide for co-operative governance by establishing decision-making principles on matters affecting the environment. In terms of the NEMA EIA Regulations, the applicant is required to appoint an EAP to undertake the EIA process, as well as conduct the public participation process towards an application for EA. In South Africa, EIAs became a legal requirement in 1997 with the promulgation of regulations under the Environment Conservation Act (ECA). Subsequently, NEMA was passed in 1998. Section 24(2) of NEMA empowers the Minister and any MEC, with the concurrence of the Minister, to identify activities which must be considered, investigated, assessed and reported on to the competent authority responsible for granting the relevant EA. On 21 April 2006, the Minister of Environmental Affairs and Tourism (now Department of Forestry, Fisheries and the Environment – DFFE) promulgated regulations in terms of Chapter 5 of the NEMA. These regulations, in terms of the NEMA, were



amended several times between 2010 and 2022. The NEMA EIA Regulations, 2014, as amended, are applicable to this project.

The objective of the EIA Regulations is to establish the procedures that must be followed in the consideration, investigation, assessment and reporting of the listed activities that are triggered by the proposed project. The purpose of these procedures is to provide the competent authority with adequate information to make informed decisions which ensure that activities which may impact negatively on the environment to an unacceptable degree are not authorised, and that activities which are authorised are undertaken in such a manner that the environmental impacts are managed to acceptable levels.

In accordance with the provisions of Sections 24(5) and Section 44 of the NEMA the Minister has published Regulations (GN R. 982) pertaining to the required process for conducting EIAs in order to apply for, and be considered for, the issuing of an EA. These EIA Regulations provide a detailed description of the EIA process to be followed when applying for EA for any listed activity (refer to **Figure 17**).

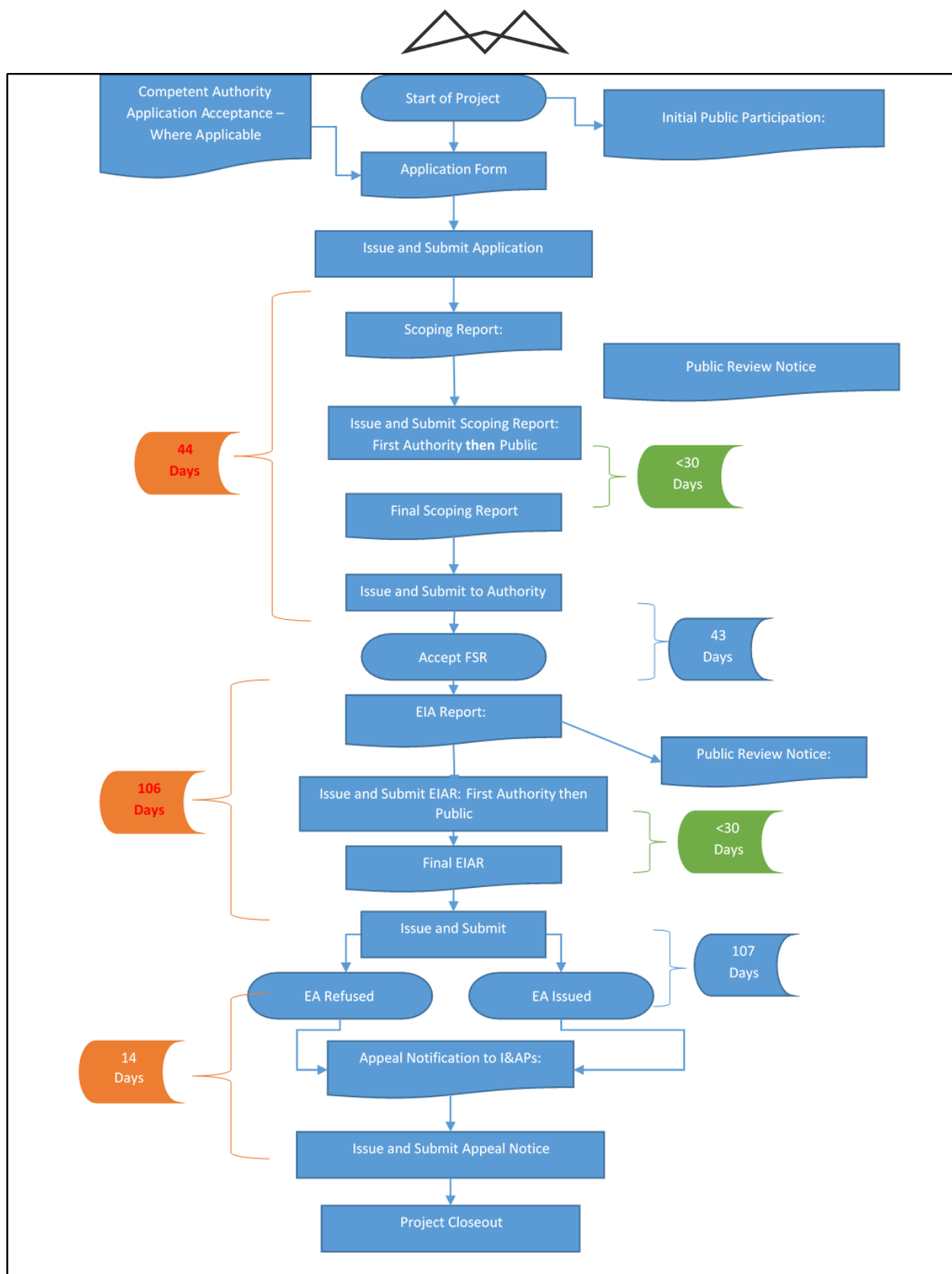


Figure 17: EIA process diagram

An environmental Scoping and Impact Assessment process is reserved for activities which have the potential to result in significant impacts which are complex to assess. Scoping and Impact Assessment studies accordingly provide a mechanism for the comprehensive assessment of activities that are likely to have more significant environmental impacts. **Figure 17** provides a graphic representation of all the components of a full EIA process.

Section 24P of the NEMA requires that an applicant for an environmental authorisation relating to prospecting, mining or production must, before the Minister responsible for mineral resources issues the EA, comply with the prescribed financial provision for the rehabilitation, closure and ongoing post decommissioning



management of negative environmental impacts. Therefore, the potential environmental liabilities associated with the proposed activity must be quantified and the method of financial provision indicated in line with the DMPP Financial Provision Regulations (2015) under the National Environmental Management Act (NEMA), which mandate mining and petroleum companies (holders of rights and permits) to set aside sufficient funds for environmental rehabilitation, remediation, and closure of operations. The financial provision costs will be presented in the EIA Report. The listed activities, the proposed project triggers and consequently requires authorisation prior to commencement are detailed in **Section 2.3**.

NEMA is the main Environmental Legislation in South Africa and other Specific Environmental Management Acts (SEMA's) support its objectives. Examples of SEMA's include the following:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); and
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

Some specific Environmental Management Legislation is discussed in **Sections 4.1.4 to 4.1.20**. The key principles of NEMA as outlined in Chapter 3 can be summarised as follows:

- sustainability must be pursued in all developments to ensure that biophysical and socio-economic aspects are protected; or
- there must be equal access to environmental resources, services and benefits for all citizens including the disadvantaged and the vulnerable. Adverse environmental impacts shall be distributed fairly among all citizens;
- environmental governance must include the participation of all interested and affected parties who must be catered for to allow their effective participation;
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably; and

The polluter pays principle must be applied in all cases where any person has caused pollution or undertaken any action that led to the degradation of the environment.

4.1.3 NEMA ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 AS AMENDED

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities that require authorisation as these activities may negatively affect the environment. The Act requires that in such cases the impacts must be considered, investigated and assessed before their implementation, and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The NEMA EIA Regulations guide the processes required for the assessment of impacts of Listed Activities.

The requirement for the undertaking of Environmental Impact Assessments and Basic Assessments began in 1997 with the promulgation of the EIA Regulations under the Environment Conservation Act, 1989 (ECA) (Act No. 73 of 1989). These were followed by the 2006, 2010 and 2014 regulations. **Table 10** is a summary of the progression of the EIA regulations to date.

Table 10: Summary of the South African EIA regulations from inception to date

EIA Regulations	Government Gazette
EIA Regulations promulgated in terms of the ECA, Act No 73 of 1989	GNR 1182 & 1183: Government Gazette No 18261, 5 September 1997



Amendment of the ECA EIA Regulations	GNR 670 and GNR 672 of 10 May 2002, Government Gazette No 23401
2006 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 385, 386 and 387 Government Gazette No 28753, Pretoria, 21 April 2006
2010 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 543, 544, 545 and 546 Government Gazette No 33306, Pretoria, 18 June 2010
2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 982, 983, 984 and 985 Government Gazette No 38282, Pretoria, 04 December 2014
Current Amendment of the 2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 982, 983, 984 and 985 Government Gazette No 44701, Pretoria, 2021 as amended

The scoping and EIA process for the proposed Mponeng Lower Compartment TSF is undertaken in terms of the NEMA EIA Regulations, 2014, as amended.

4.1.4 THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002

The MPRDA aims to “make provision for equitable access to, and sustainable development of, the nation’s mineral and petroleum resources”. The MPRDA outlines the procedural requirements that need to be met to acquire mineral and petroleum rights in South Africa. The MPRDA further governs the sustainable utilisation of South Africa’s mineral resources.

Several amendments have been made to the MPRDA. These include, but are not limited to, the amendment to Section 102 which concerns the amendment of rights, permits, programmes and plans, to requiring the written permission from the Minister for any amendment or alteration; and the Section 5A(c) requirement that landowners or land occupiers receive twenty-one (21) days’ written notice prior to any activities taking place on their properties. One of the most recent amendments requires all mining related activities to follow the full NEMA process as per the 2014 EIA Regulations, which came into effect on 4 December 2014 as was last amended in April 2017.

In support of the separate WML activities, the applicant is required to conduct an Integrated EIA process comprising of the preparation of environmental Scoping and EIA Reports, an EMPr, as well as Interested and Affected Party (I&AP) consultations, all of which must be submitted to the DMPr for adjudication. This report has been compiled in accordance with Regulation 49 of the MPRDA and Regulation 21 and Appendix 2 of the EIA Regulations (2014, as amended) in order to satisfy the criteria for a Scoping Report. This Scoping Report pertains to both the NEMA and WML application as part of the Integrated EA Application for the proposed Mponeng Lower Compartment TSF.

4.1.5 THE MINING AND BIODIVERSITY GUIDELINES, 2013

The Mining and Biodiversity Guidelines (2013) was developed by the Department of Mineral Resources, the Chamber of Mines, the SANBI and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to “foster a strong relationship between biodiversity and mining, which will eventually translate into best practice within the mining sector. It provides a tool to facilitate the sustainable development of South Africa’s mineral resources, in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country’s biodiversity and ecosystem services. It provides the mining sector with a practical, user- friendly manual for integrating biodiversity considerations into the planning processes and managing biodiversity during the operational phases of a mine, from exploration through to closure. The Guideline provides explicit direction in terms of where: mining-related impacts are legally prohibited; biodiversity priority areas may present high risks for mining projects; and biodiversity may limit the potential for mining.

In identifying biodiversity priority areas, which have different levels of risk against mining, the Guideline categorises biodiversity priority areas into four categories of biodiversity priority areas in relation to their



importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:

- A) Legally protected areas, where mining is prohibited;
- B) Areas of highest biodiversity importance, which are at the highest risk for mining;
- C) Areas of high biodiversity importance, which are at a high risk for mining; and
- D) Areas of moderate biodiversity importance, which are at a moderate risk for mining.

Based on the Baseline Terrestrial Report (The Biodiversity Company, 2025 - **Appendix F**), the study area is located within Categories B, C and D due to the existing mining activities in the area (**Figure 18**). Based on the Mining and Biodiversity Guidelines, specifically the restrictions, the proposed project is in an area that is **not** legally protected or where mining is prohibited (Category A).

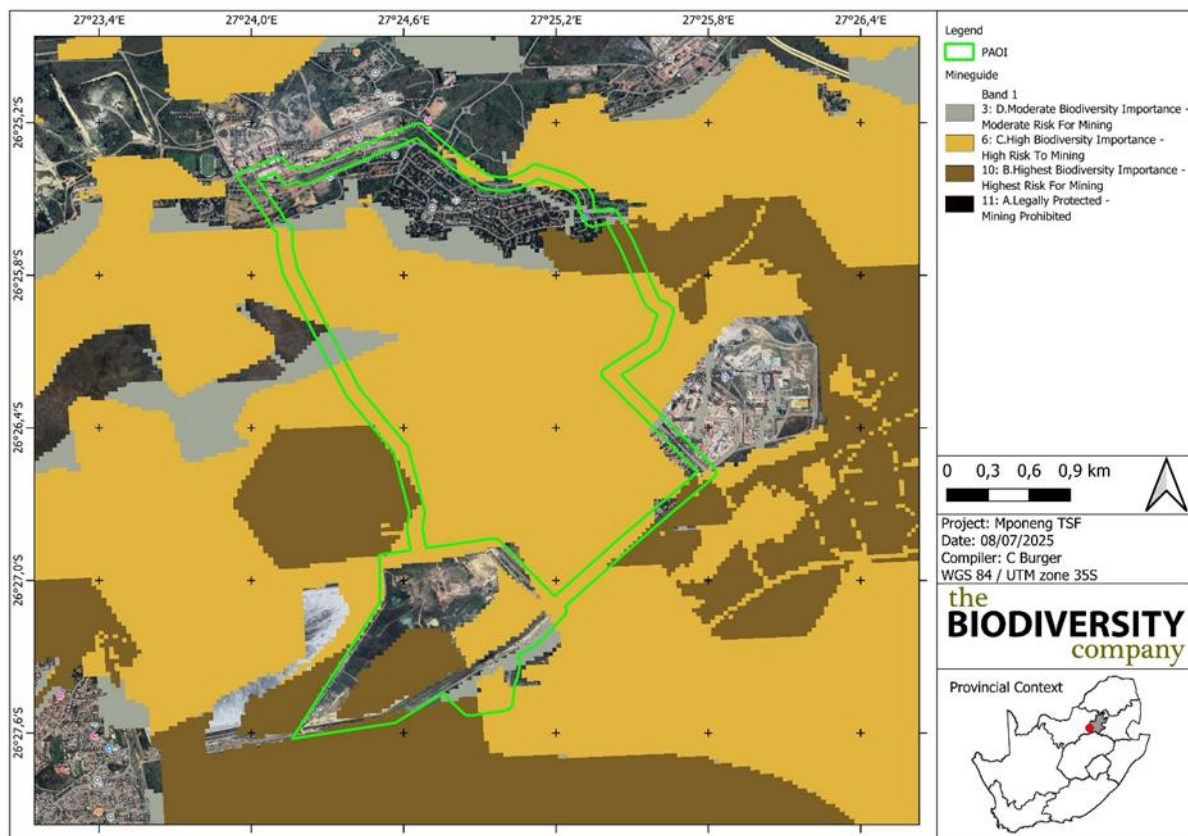


Figure 18: Map illustrating the Mining Biodiversity Importance/Risk (The Biodiversity Company, 2025)

4.1.6 NATIONAL RADIOACTIVE WASTE DISPOSAL INSTITUTE ACT 53 OF 2008

In terms of this Act the generators of radioactive waste are responsible for technical, financial and administrative management of such waste within the national regulatory framework at their premises and when such waste is transported to an authorised waste disposal facility. The generators of radioactive waste are responsible for technical, financial and administrative management of such waste within the national regulatory framework at their premises and when such waste is transported to an authorised waste disposal facility.

Generators of radioactive waste must:

- A) develop and implement site-specific waste management plans based on national policy;
- B) provide all relevant information on radioactive waste as required by the chief executive officer;
- C) demonstrate compliance with any conditions of a radioactive waste disposal certificate;



- D) provide site access to staff of the Institute for inspection against any conditions of the radioactive waste disposal certificate.

The TSF slurry is considered radioactive waste. Generators of radioactive waste remain responsible for all liabilities in connection with such radioactive waste under their control.

4.1.7 THE NATIONAL WATER ACT, 1998

4.1.7.1 DAM SAFETY RISK

In the context of the Department of Water and Sanitation (DWS), a dam refers to any physical structure, whether temporary or permanent, designed to contain, store, or impound water. Tailings Storage Facilities are a type of dam, specifically an embankment dam, designed to contain mining waste (tailings) instead of water. While both are essentially dams, a TSF's primary function is waste containment, unlike a conventional water dam, and it is a dynamic structure that often grows over the mine's lifespan to accommodate increasing waste volumes. The Department (DWS) is responsible for regulating dams and managing water resources under the National Water Act. DWS oversees dam safety, licensing, and registration, particularly for dams that pose a safety risk. DWS Dam safety risk refers to the Department of Water and Sanitation's (DWS) regulatory framework for managing dams in South Africa that pose a danger to life and property due to their potential to fail. A "dam with a safety risk" is defined by a wall height exceeding 5 meters and a storage capacity greater than 50 000 cubic meters (m³) or 17 657 tonnes, although the Minister can also designate other dams. The DWS's Dam Safety Office (DSO) manages this risk by registering these dams, enforcing safety regulations, and conducting technical assessments to prevent catastrophic dam failures. The registration is a requirement for all dams with a safety risk to be registered with the DSO, regardless of whether they are public or private. Every dam with a safety risk must be classified as a Category I, II or III dam (with I being the lowest risk and III being the highest risk). This is done on the basis of the dam's size and its hazard potential rating. Only 6% of South African dams have a Category III rating.

Based on preliminary information, the Mponeng Lower Compartment TSF will have a wall of 60m high and a capacity of 43 000 000 tonnes or 121 762 440m³ of tailings material thereby requiring technical assessment, enforcement of safety regulation by DWS and registration with the DSO. It must be noted that a tailings dam is not inherently a Category III rating; rather, its hazard potential determines its category, which can range from I to III, with Category III representing the highest risk based on factors like size and potential for loss of life or economic impact in the event of failure. Therefore, a specific tailings dam could be a Category I, II, or III, depending on its individual characteristics and the risk assessment conducted. A dam safety risk assessment will be required for the Mponeng Lower Compartment TSF prior the registration with DSO.

4.1.7.2 WATER USES

The National Water Act, 1998 (Act 36 of 1998 – NWA) makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The NWA also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the NEMA EIA Regulations. These water use processes are described in **Figure 19**. A person may use water if the use is –

- Permissible as a continuation of an existing lawful water use (ELWU);
- Permissible in terms of a general authorisation (GA);
- Permissible under Schedule 1; or
- Authorised by a licence.

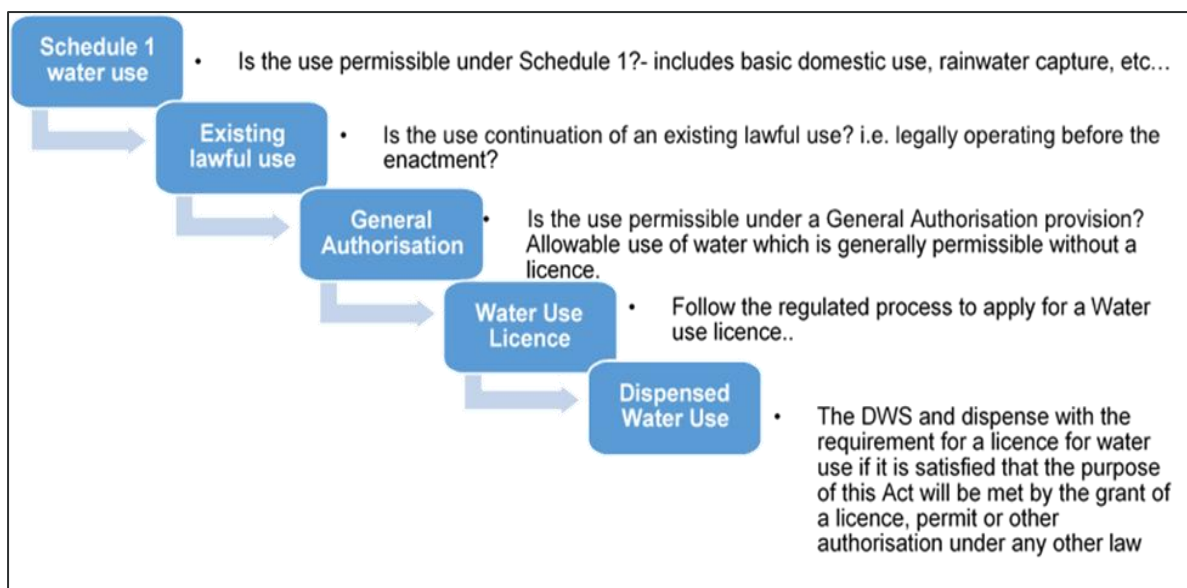


Figure 19: Authorisation processes for new water uses

The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved and managed in ways that take into account:

- Meeting basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest; facilitation social and economic development;
- Providing for the growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and drought.

The NWA defines 11 water uses in Section 21 of the Act. A water use may only be undertaken if authorised by the Department of Water and Sanitation (DWS). The water uses for which an authorisation or licence can be issued include:

- a) Taking water from a water resource;
- b) Storing water;
- c) Impeding or diverting the flow of water in a watercourse;
- d) Engaging in a stream flow reduction activity contemplated in section 36;
- e) Engaging in a controlled activity identified as such in section 37(1) or declared under section 38(1);
- f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduits;



- g) Disposing of waste in a manner which may detrimentally impact on a water resource;
- h) Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- i) Altering the bed, banks, course or characteristics of a watercourse;
- j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- k) Using water for recreational purposes.

The regulated area of a watercourse for section 21 activities of the Act water uses is similarly defined in terms of the Act as follows:

- a) The outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- b) In the absence of a determined 1 in 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); or
- c) A 500 m radius from the delineated boundary (extent) of any wetland or pan.

A review of the NWA Section 21 activities was undertaken to assess if the proposed development triggers any activity. Based on the information provided by the developer, the proposed development triggers Section 21a, 21c, Section 21i and Section 21g of the NWA. Subsequently, a Water Use License Application must be undertaken for the project with the Department of Water and Sanitation, Gauteng Region. During the compilation of this report, a pre-application meeting with DWS officials was submitted but had not taken place, the triggered activities, process to be followed and lining requirements will only be confirmed once the pre-application meeting has been undertaken. The outcome will be incorporated in the Final Scoping Report and EIA Reports.

4.1.7.3 THE NATIONAL WATER ACT, GOVERNMENT NOTICE 704, 1999

GN 704 (Government Gazette 20118 of June 1999) was established to provide regulations on the use of water for mining and related activities aimed at the protection of water resources. The five main principal conditions of GN 704 applicable to this project are:

- Condition 4 – which defines the area in which, mine workings or associated structures may be located, with reference to a watercourse and associated flooding. Any residue deposit, dam, reservoir together with any associated structure or any other facility should be situated outside the 1:100-year flood-line. Any underground or opencast mining, prospecting or any other operation or activity should be situated or undertaken outside of the 1:50 year flood-line. Where the flood-line is less than 100 metres away from the watercourse, then a minimum watercourse buffer distance of 100 metres is required for infrastructure and activities;
- Condition 5 – which indicates that no residue or substance which causes or is likely to cause pollution of a water resource may be used in the construction of any dams, impoundments or embankments or any other infrastructure which may cause pollution of a water resource;
- Condition 6 – which describes the capacity requirements of clean and dirty water systems. Clean and dirty water systems must be kept separate and must be designed, constructed, maintained and operated to ensure conveyance the 1:50 year peak flow. Clean and dirty water systems should not spill into each other more frequently than once in 50 years. Any dirty water dams should have a minimum freeboard of 0.8m above full supply level;



- **Condition 7** – which describes the measures which must be taken to protect water resources. All dirty water or substances which may cause pollution should be prevented from entering a water resource (by spillage, seepage, erosion, etc.) and ensure that water used in any process is recycled as far as practicable; and
- **Condition 10** – which describes the requirements for operations involving extraction of material from the channel of a watercourse. Measures should be taken to prevent impacts on the stability of the watercourse, prevent scour and erosion resulting from operations, prevent damage to in-stream habitat through erosion, sedimentation, alteration of vegetation and flow characteristics, construct treatment facilities to treat water before returning it to the watercourse, and implement control measures to prevent pollution by oil, grease, fuel and chemicals.

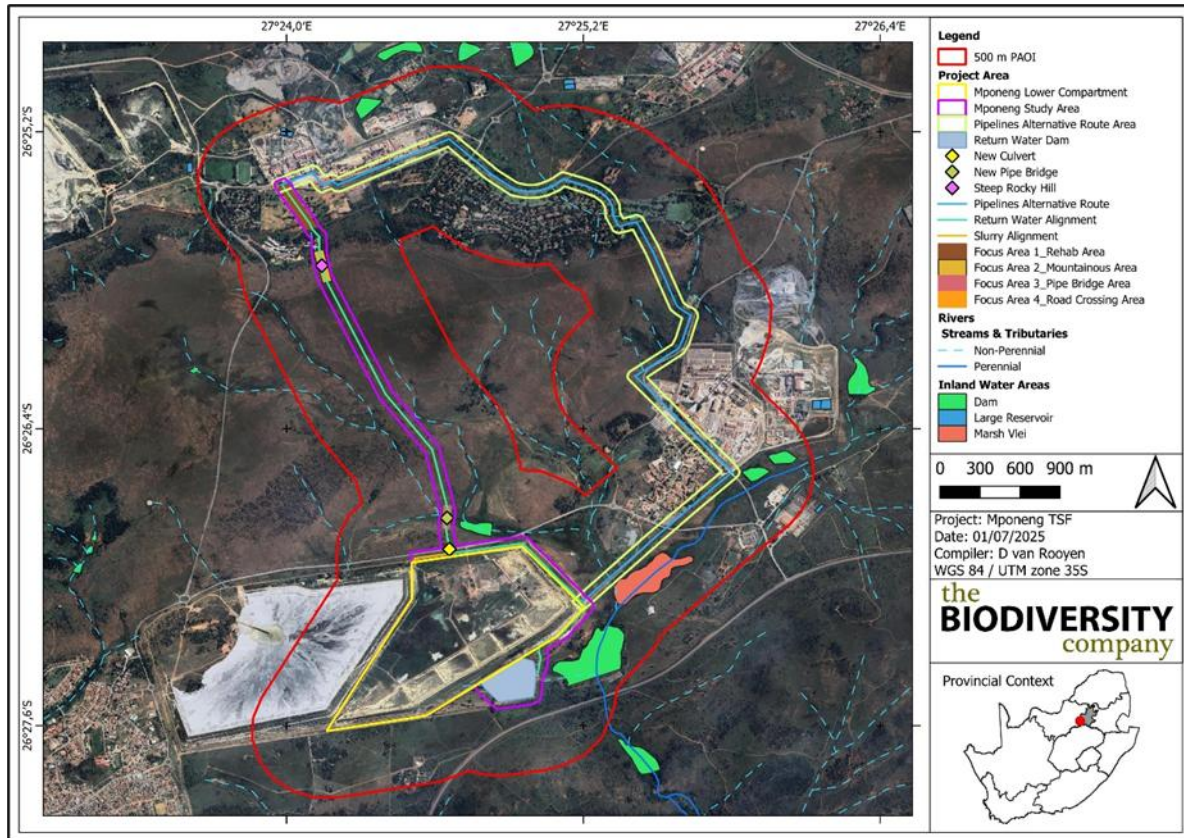


Figure 20: Topographical inland water areas and river lines that intersect the Project Area of Influence (The Biodiversity Company, 2025)

Based on preliminary assessment, it is unlikely that the Mponeng Lower Compartment TSF will be located within the 1:100-year floodline of a watercourse. However, based on the Baseline Aquatic and Wetlands Study (The Biodiversity Company, 2025 - **Appendix F**), the topographical inland and river line data for the “2627” dataset indicated several inland water areas, which were classified as numerous dams, one marsh vlei and three large reservoirs. Furthermore, several topographic non-perennial drainage features were identified within the study area, along with one perennial river, the Elandsfontainspruit (**Figure 20**). It must be noted this does not exempt the applicant from the requirements of GN 704 as discussed in **Section 4.1.7.4** below.

4.1.7.4 DWS GN704 - REGULATIONS ON USE OF WATER FOR MINING AND RELATED ACTIVITIES

Regulations on Use of Water for Mining and Related Activities Aimed at the Protection of Water Resources Government Notice 704 (GNR 704) is a regulation under the National Water Act (Act No. 36 of 1998) in South Africa that places restrictions on mining operations for the purpose of protecting water resources. It prescribes measures and precautions that must be taken to prevent pollution of water resources and minimize the impact of mining activities on the environment. Compliance with this regulation is crucial for companies that engage in any mining related process on the mine including the operation of washing plants, mineral processing facilities,



mineral refineries and extraction plants, and the operation and the use of mineral loading and off-loading zones, transport facilities and mineral storage yards. Non-compliance to GNR 704 can result in severe consequences for such companies, such as fines, penalties, and damage to their reputation.

The principle conditions of GN 704 applicable to the site and/or activity are:

i. Condition 4 – Restrictions on locality – No person in control of a mine or activity may:

- (a) locate or place any residue deposit, dam, reservoir, together with any associated structure or any other facility within the 1:100 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, borehole or well, excluding boreholes or wells drilled specifically to monitor the pollution of groundwater, or on water-logged ground, or on ground likely to become water-logged, undermined, unstable or cracked;
- (b) except in relation to a matter contemplated in regulation 10 (i.e. Additional regulations relating to winning sand and alluvial minerals from watercourse or estuary), carry on any underground or opencast mining, prospecting or any other operation or activity under or within the 1:50 year flood-line or within a horizontal distance of 100 metres from any watercourse or estuary, whichever is the greatest;
- (c) place or dispose of any residue or substance which causes or is likely to cause pollution of a water resource, in the workings of any underground or opencast mine excavation, prospecting diggings, pit or any other excavation; or
- (d) use any area or locate any sanitary convenience, fuel depots, reservoir or depots for any substance which causes or is likely to cause pollution of a water resource within the 1:50 year flood-line of any watercourse or estuary.

ii. Condition 5 – Restrictions on use of material:

- (a) No person in control of a mine or activity may use any residue or substance which causes or is likely to cause pollution of a water resource for the construction of any dam or other impoundment or any embankment, road or railway, or for any other purpose which is likely to cause pollution of a water resource.

iii. Condition 6 - Capacity requirements of clean and dirty water systems

Every person in control of a mine or activity must:

- (a) confine any unpolluted water to a clean water system, away from any dirty area;
- (b) design, construct, maintain and operate any clean water system at the mine or activity so that it is not likely to spill into any dirty water system more than once in 50 years;
- (c) collect the water arising within any dirty area, including water seeping from mining operations, outcrops or any other activity, into a dirty water system;
- (d) design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50 years; and
- (e) design, construct, maintain and operate any dam or tailings dam that forms part of a dirty water system to have a minimum freeboard of 0.8 metres above full supply level, unless otherwise specified in terms of Chapter 12 of the Act.
- (f) design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years

iv. Condition 7 – Protection of water resources

Every person in control of a mine or activity must take reasonable measures to:

- (a) prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource, either by natural flow or by seepage, and must retain or



collect such substance or water containing waste for use, re-use, evaporation or for purification and disposal in terms of the Act;

- (b) design, modify, locate, construct and maintain all water systems, including residue deposits, in any area so as to prevent the pollution of any water resource through the operation or use thereof and to restrict the possibility of damage to the riparian or in-stream habitat through erosion or sedimentation, or the disturbance of vegetation, or the alteration of flow characteristics;
- (c) cause effective measures to be taken to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings;
- (d) design, modify, construct, maintain and use any dam or any residue deposit or stockpile used for the disposal or storage of mineral tailings, slimes, ash or other hydraulic transported substances, so that the water or waste therein, or falling therein, will not result in the failure thereof or impair the stability thereof;
- (e) prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain material or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources;
- (f) ensure that water used in any process at a mine or activity is recycled as far as practicable, and any facility, sump, pumping installation, catchment dam or other impoundment used for recycling water, is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time;
- (g) at all times keep any water system free from any matter or obstruction which may affect the efficiency thereof; and
- (h) cause all domestic waste, including wash-water, which cannot be disposed of in a municipal sewage system, to be disposed of in terms of an authorisation under the Act.

The Minister of the DWS may in writing, authorise an exemption to instances of GN 704 non-compliance. DWS will be engaged regarding the applicability or exemption for the project in relation to GN 704 during the WULA Application.

4.1.7.5 CATCHMENT MANAGEMENT STRATEGIES

In the development of the National Water Resources Strategy (2004) (a process that included extensive public participation) 19 water management areas were defined for the country, in each of which, it was envisaged, a Catchment Management Agency (CMA) would be established. This was a significant departure in approach to the management of water resources. However, there were concerns raised during the gazetting of the original Water Management Areas (WMA) as to the capacity of the country to support 19 CMAs. Taking these matters into consideration, a decision was made to reduce the number of water management areas to nine, concomitantly requiring the establishment of nine CMAs. To support this, the department has recognised the establishment and ring-fencing of Proto-CMAs, headed by an Acting Chief Executive Officer. Drawing on international experience one can identify several key drivers for catchment-based management of water resources, this includes amongst others:

- Achieving integrated management of the catchment;
- Facilitating the participation of stakeholders in decision making and management of water resources;
- Separation between the policy and national strategy functions of the Ministry/department and the operational functions of the CMA

Each CMA progressively develops a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable



and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a WMA is the Catchment Management Strategy (CMS) which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources.

According to the Baseline Hydrological Study (Hydrologic Consulting, 2025, **Appendix F**), the proposed development site is situated within the Upper Vaal Water Management Area (WMA 8). The Mponeng Lower Compartment TSF and RWD are positioned within quaternary catchment C23J with the proposed pipelines extending to quaternary catchment C23E. The Upper Vaal WMA is responsible for assessing the availability of local surface water and groundwater resources. It is responsible for managing water quality, including long-term trends and short-term impacts. It is responsible for managing water supply to local authorities and district councils. The Upper Vaal WMA is used for industrial, mining, power generation, commercial agriculture, nature conservation, and urban and rural human settlements. The main watercourses in these quaternary catchments include the Mooirivierloop (C23E) and the Loopspruit (C23E), with several non-perennial drainages in both quaternaries. Water quality at sampling point SW06, which is a downstream point on the Loopspruit (C23J) indicate elevated concentrations of Nitrate, Chloride, Electrical Conductivity, Fluoride and Sulfate that exceeds the In-Stream Water Quality Guidelines for the Vaal Barrage subcatchment. Elevated concentration of Nitrate, Chloride, Electrical Conductivity and Sulfate that exceeds the In-Stream Water Quality Guidelines for the Vaal Barrage sub-catchment was observed in the unnamed river which is a tributary of the Mooirivierloop.

The nearest River to the study area is the Elandsfonteinspruit River to the south-east of the site, however, this river is only labelled in the 1:500,000 river dataset for South Africa. The NGI's 1:50,000 topographical map data illustrates numerous non-perennial river systems to the north and south, both of which converge to the south east of the site. The northern system feeds the Elandsfonteinspruit, enabling perennial flows (per the NGI's classification). The northern and southern system are associated with a vlei to the east and dams both north and south to the site. There are upstream furrows directing runoff from part of the greater Mponeng Operation (south of the Old North Complex TSF) and along the Mponeng TSF trenches draining to the non-perennial rivers to the west. The southern system is characterised by two larger dams, one of which is listed as the proposed return water dam for the Mponeng TSF (Hydrologic Consulting, 2025, **Appendix F**). Subsequently, the applicant is required to apply for a Water Use License to ensure that any water resources (surface and groundwater as well as wetlands) affected by the proposed project activities are licensed and managed in accordance with the relevant water and environmental legislation.

4.1.8 THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT (NEMWA)

The National Environmental Management: Waste Act, no 59 of 2008 (NEMWA) came into effect on the 1st of July 2009. The Waste Act places a general duty on a holder of waste to avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated; reduce, re-use, recycle and recover waste; where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner; manage the waste in such a manner that it does not endanger the health or the environment or cause a nuisance through noise, odour or visual impacts; prevent any employee or any person under his or her supervision from contravening the Act; and prevent the waste from being used for an unauthorised purpose. Section 16 of the NEMWA must also be considered which states the following:

1. A holder of waste must, within the holder's power, take all reasonable measures to-
 - a) *"Avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated;*
 - b) *Reduce, re-use, recycle and recover waste;*
 - c) *Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;*
 - d) *Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour, or visual impacts;*
 - e) *Prevent any employee or any person under his or her supervision from contravening the Act; and*



f) *Prevent the waste from being used for unauthorised purposes."*

These general principles of responsible waste management will be incorporated into the requirements in the EMPr to be implemented for this project.

Waste can be defined as either hazardous or general in accordance with Schedule 3 of the NEMWA (2014) as amended. "Schedule 3: Defined Wastes" has been broken down into two categories – Category A being hazardous waste; and Category B being general waste. In order to attempt to understand the implications of these waste groups, it is important to ensure that the definitions of all the relevant terminologies are defined:

- Hazardous waste: means *"any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristic of that waste, have a detrimental impact on health and the environment and includes hazardous substances, materials or objects within business waste, residue deposits and residue stockpiles."*
- Residue deposits: means *"any residue stockpile remaining at the termination, cancellation or expiry of a prospecting right, mining right, mining permit, exploration right or production right."*
- Residue stockpile: means *"any debris, discard, tailings, slimes, screening, slurry, waste rock, foundry sand, mineral processing plant waste, ash or any other product derived from or incidental to a mining operation and which is stockpiled, stored or accumulated within the mining area for potential re-use, or which is disposed of, by the holder of a mining right, mining permit or, production right or an old order right, including historic mines and dumps created before the implementation of this Act."*
- General waste: means *"waste that does not pose an immediate hazard or threat to health or to the environment and includes – domestic waste; building and demolition waste; business waste; inert waste; or any waste classified as non-hazardous waste in terms of the regulations made under Section 69."*

Furthermore, the NEMWA provides for specific waste management measures to be implemented, as well as providing for the licensing and control of waste management activities. The proposed Mponeng Lower Compartment TSF waste management activities in terms of Category B of GN R. 921 which states that *"a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct an environmental impact assessment process, as stipulated in the environmental impact assessment regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as part of a waste management licence application."*

The listed waste activities that are triggered by the Mponeng Lower Compartment TSF, and which form the basis of this waste management licence application, are A14, B7, B10 and B11 presented in **Section 2.3 (Table 8)**.

4.1.8.1 NEMWA WASTE CLASSIFICATION AND MANAGEMENT REGULATIONS, 2013

These regulations pertain to waste classification and management, including the management and control of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation which is relevant to the proposed project. The purpose of these Regulations is to –

Regulate the classification and management of waste in a manner which supports and implements the provisions of the Act;

Establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence;

- Prescribe requirements for the disposal of waste to landfill;
- Prescribe requirements and timeframes for the management of certain wastes; and
- Prescribe general duties of waste generators, transporters and managers.

Waste classification, as presented in Chapter 4 of these regulations, entails the following:

- Wastes listed in Annexure 1 of these Regulations do not require classification in terms of SANS 10234;



- Subject to sub regulation (1), all waste generators must ensure that the waste they generate is classified in accordance with SANS 10234 within one hundred and eighty (180) days of generation;
- Waste must be kept separate for the purposes of classification in terms of sub regulation (2), and must not be mixed prior to classification;
- Waste-must be re-classified in terms of sub regulation (2) every five (5) years, or within 30 days of modification to the process or activity that generated the waste, changes in raw materials or other inputs, or any other variation of relevant factors;
- Waste that has been subjected to any form of treatment must be re-classified in terms of sub regulation (2), including any waste from the treatment process.; and
- If the Minister reasonably believes that a waste has not been classified correctly in terms of sub regulation (2), he or she may require the waste generator to have the classification peer reviewed to confirm the classification.

Furthermore, Chapter 8 of the Regulations stipulates that unless otherwise directed by the Minister to ensure a better environmental outcome, or in response to an emergency so as to protect human health, property or the environment –

- Waste generators must ensure that their waste is assessed in accordance with the Norms and Standards for Assessment of Waste for Landfill Disposal set in terms of section 7(1) of the Act prior to the disposal of the waste to landfill;
- Waste generators must ensure that the disposal of their waste to landfill is done in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7(1) of the Act; and
- Waste managers disposing of waste to landfill must only do so in accordance with the Norms and Standards for Disposal of Waste to Landfill set in terms of section 7 (1) of the Act.

Although Golden Core Trade and Invest prefers an unlined facility, the Mponeng barrier system will be determined in consultation with the authorities and will be in compliance with these norms and standards. As indicated in **Section 2.2.1**, the previous hydrogeological studies have indicated very low seepage rates beneath and around the facility, primarily due to the low permeability of the bedrock and the presence of artesian conditions.

4.1.8.2 NEMWA REGULATIONS REGARDING THE PLANNING AND MANAGEMENT OF RESIDUE STOCKPILES AND RESIDUE DEPOSITS AND ASSOCIATED AMENDMENT

These Regulations, which pertain to the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration or production operation, were published in 2015 and were amended in 2018. The Regulations and associated amendment relate to the assessment of impacts and the analyses of risks relating to the management of residue stockpiles and residue deposits, and involve the following:

- The identification and assessment of environmental impacts arising from the establishment of residue stockpiles and residue deposits must be done as part of the environmental impact assessment conducted in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- A risk analysis based on the characteristics and the classification set out in regulation 4 (characterisation of residue stockpiles and residue deposits) and 5 (classification of residue stockpiles and residue deposits) of these regulations must be used to determine the appropriate mitigation and management measures; and
- A competent person must recommend the pollution control measures suitable for a specific residue stockpile or residue deposit on the basis of a risk analysis as contemplated in regulations 4 and 5 of these Regulations.

As stated in **Section 4.1.8.1**, the proposed recommencement of deposition onto Mponeng Lower Compartment TSF will be subject to these regulations. In this regard, the containment barrier design (including requirements



for a liner and nature of the liner), will be addressed in accordance with chapter 3 of these Regulations and their associated amendments.

4.1.9 NATIONAL RADIOACTIVE WASTE DISPOSAL INSTITUTE ACT 53 OF 2008

In terms of this Act the generators of radioactive waste are responsible for technical, financial and administrative management of such waste within the national regulatory framework at their premises and when such waste is transported to an authorised waste disposal facility. The generators of radioactive waste are responsible for technical, financial and administrative management of such waste within the national regulatory framework at their premises and when such waste is transported to an authorised waste disposal facility.

Generators of radioactive waste must:

- A) develop and implement site-specific waste management plans based on national policy;
- B) provide all relevant information on radioactive waste as required by the chief executive officer;
- C) demonstrate compliance with any conditions of a radioactive waste disposal certificate;
- D) provide site access to staff of the Institute for inspection against any conditions of the radioactive waste disposal certificate.

The TSF slurry is considered radioactive waste. Generators of radioactive waste remain responsible for all liabilities in connection with such radioactive waste under their control.

4.1.10 THE HAZARDOUS SUBSTANCES ACT, 1973 (ACT NO. 15 OF 1973)

The Hazardous Substances Act, 1973 (Act No. 15 of 1973) in South Africa regulates substances that can cause harm to human health. It categorizes these substances based on their risk level and controls their manufacture, sale, use, and disposal. The Act also provides for inspections, enforcement measures, and penalties for violations. The Act defines hazardous substances as materials or mixtures that can cause harm to human health, ranging from mild irritation to severe illness or death.

The Act addresses the control of substances that can cause injury, ill-health, or death due to their hazardous properties. This includes substances found in mine tailings, which often contain heavy metals like arsenic, lead, and mercury. The Act aims to regulate the handling, use, and disposal of these substances to protect human health and the environment.

4.1.11 THE NATIONAL ENVIRONMENTAL MANAGEMENT BIODIVERSITY ACT, 2004

The National Environmental Management Biodiversity Act (Act No. 10 of 2004 – NEMBA) provides for the management and conservation of South Africa's biodiversity within the framework of the NEMA as well as the protection of species and ecosystems that warrant national protection. Within the framework of this act, various regulations are promulgated which provide specific requirements and management measures relating to protecting threatened ecosystems, threatened or protected species as well as the control of alien and invasive species. A summary of these regulations is presented below.

4.1.11.1 THE LIST OF ECOSYSTEMS THAT ARE THREATENED AND NEED OF PROTECTION, 2011

The NEMBA provides for listing of threatened or protected ecosystems in one of the following categories:

- Critically Endangered (CR) ecosystems, being ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation;
- Endangered (EN) ecosystems, being ecosystems that have undergone degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems;
- Vulnerable (VU) ecosystems, being ecosystems that have a high risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention, although they are not critically endangered ecosystems or endangered ecosystems; and



- Protected ecosystems, being ecosystems that are of high conservation value or of high national or provincial importance, although they are not listed as critically endangered, endangered or vulnerable.

Based on the Baseline Terrestrial Biodiversity Study (The Biodiversity Company, 2025), according to the Red List of Ecosystems dataset (Skowno & Monyeke, 2021) the study area overlaps with a Least Concerned ecosystem, which is an ecosystem that has been evaluated by the International Union for Conservation of Nature (IUCN) Red List of Ecosystems and is not currently considered threatened with collapse, degradation, or biodiversity loss. These are widespread, relatively undegraded, and stable ecosystems that face a low risk of future decline.

4.1.11.2 THE THREATENED OR PROTECTED SPECIES REGULATIONS, 2007

The purpose of these regulations is to -

- (a) further regulate the permit system set out in Chapter 7 of the Biodiversity Act insofar as that system applies to restricted activities involving specimens of listed threatened or protected species;
- (b) provide for the registration of captive breeding operations, commercial exhibition facilities, game farms, nurseries, scientific institutions, sanctuaries and rehabilitation facilities and wildlife traders;
- (c) provide for the regulation of the carrying out of a specific restricted activity, namely hunting;
- (d) provide for the prohibition of specific restricted activities involving specific listed threatened or protected species;
- (e) provide for the protection of wild populations of listed threatened species; and
- (f) provide for the composition and operating procedure of the Scientific Authority.

Based on the Baseline Terrestrial Biodiversity Study (The Biodiversity Company, 2025), Four (4) floral species namely, *Adromischus umbraticola* (cliff adromischus), *Khadia beswickii* (khadiwortel), *Lithops leslie subsp. Lesliei* (Living Stone) and Sensitive Species 1248 expected within the project area are considered as Species of Conservation Concern (SCC). Two (2) species were listed as per the DFFE Screening Tool Report (**Appendix D**). One (1) amphibian SCC (*Pyxicephalus adspersus* (Giant Bull Frog)) is expected to occur within the project area, three (3) reptile species namely, *Chamaesaura aenea* (Coppery Grass Lizard), *Crocodylus niloticus* (Nile Crocodile) and *Homoroselaps dorsalis* (Striped Harlequin Snake) regarded as SCCs are also expected within the study area however, no reptile species were listed by the DFFE Screening Tool Report. Fifteen (15) mammal SCC are expected within the study area. Of these 15 SCCs, 11 have been assigned a low likelihood of occurrence based on the lack of suitable habitat in the project area. Four (4) species have been assigned a moderate likelihood of occurrence and only two (2) species namely the *Crocidura maquassiensis* (Makwassie Musk Shrew) and *Hydrichtis maculicollis* (Spotted-necked Otter) were listed by the DFFE Screening Tool Report. Twenty-seven (27) bird species regarded SCC are expected within the study area. The DFFE Screening Tool Report lists three (3) avifauna SCC that could be expected to occur namely, *Tyto capensis* (African Grass Owl), *Hydroprogne caspia* (Caspian Tern) and *Eupodotis senegalensis* (White-bellied Korhaan). Site specific assessment of the species occurrence on site and additional requirements (impact mitigation measures, licensing / permitting) will be outlined in the Terrestrial Biodiversity Impact Assessment to be undertaken during the EIA Phase.

4.1.11.3 THE ALIEN AND INVASIVE SPECIES LIST, 2020

This Act is applicable since it protects the quality and quantity of arable land in South Africa. Loss of arable land should be avoided and declared Weeds and Invaders in South Africa are categorised according to one of the following categories, and require control or removal:

- *Category 1a Listed Invasive Species*: Category 1a Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combated or eradicated;
- *Category 1b Listed Invasive Species*: Category 1b Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled;
- *Category 2 Listed Invasive Species*: Category 2 Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be; and



- *Category 3 Listed Invasive Species*: Category 3 Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.

Baseline Terrestrial Biodiversity Study (The Biodiversity Company, 2025), the study area is located within the Savanna biome. The Savanna biome of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Most savanna vegetation communities are characterised by a herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006). On a fine-scale vegetation type, the study area is located within the Gauteng Shale Mountain Bushveld vegetation type. This vegetation unit occurs mainly on the ridge of the Gatsrand south of Carletonville-Westonaria-Lenasia. Alien species such as *Mahonia lomariifolia* (*Mahonia oiwakensis*), *Argemone ochroleuca* (Mexican poppy), *Verbena bonariensis* (Purpletop vervain), *Taraxacum officinale* (Common Dandelion), and *Eucalyptus camaldulensis* (River red gum) are known to occur in or around the Gauteng Shale Mountain Bushveld, often as a result of garden escapees and habitat disturbance from urbanisation, waste dumping, and other anthropogenic activities. The presence and type of alien species will be presented in the EIA Phase report.

4.1.12 THE NATIONAL ENVIRONMENTAL MANAGEMENT AIR QUALITY ACT, 2004

The National Environmental Management: Air Quality Act (Act No. 39 of 2004 as amended – NEMAQA) is the main legislative tool for the management of air pollution and related activities. The Object of the Act is:

To protect the environment by providing reasonable measures for –

- i. the protection and enhancement of the quality of air in the republic;
- ii. the prevention of air pollution and ecological degradation; and
- iii. securing ecologically sustainable development while promoting justifiable economic and social development; and
- iv. Generally, to give effect to Section 24(b) of the constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

The NEMAQA mandates the Minister of Environment to publish a list of activities which result in atmospheric emissions and consequently cause significant detrimental effects on the environment, human health and social welfare. All scheduled processes as previously stipulated under the Air Pollution Prevention Act (APPA) are included as listed activities with additional activities being added to the list. The updated Listed Activities and Minimum National Emission Standards were published on the 22nd November 2013 (Government Gazette No. 37054).

According to the NEMAQA, air quality management control and enforcement is in the hands of local government with District and Metropolitan Municipalities as the licensing authorities. Provincial government is primarily responsible for ambient monitoring and ensuring municipalities fulfil their legal obligations, with national government primarily as policy maker and co-ordinator. Each sphere of government must appoint an Air Quality Officer responsible for co-ordinating matters pertaining to air quality management. Given that air quality management under the old Act was the sole responsibility of national government, local authorities have in the past only been responsible for smoke and vehicle tailpipe emission control.

Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the NEMAQA Published under GN 893 in GG 37054 of 22 November 2013 were assessed to determine if the proposed development triggers any of the identified activities. Based on the assessment, the proposed Mponeng Lower Compartment TSF does not trigger any Listed Activities and Associated Minimum Emission Standards Identified in terms of Section 21 of the NEMAQA. However, any changes to the project description which may trigger such listed activities must be assessed thoroughly for the applicant to check applicability for an Atmospheric Emission Licence (AEL).



4.1.12.1 THE NATIONAL DUST CONTROL REGULATIONS, 2013

Dustfall is assessed for nuisance impact and not for inhalation health impact. The National Dust Control Regulations (Department of Environmental Affairs, 2013) prescribes measures for the control of dust in residential and non-residential areas. Acceptable dustfall rates are measured (using American Standard Testing Methodology (ASTM) D1739:1970 or equivalent) at and beyond the boundary of the premises where dust originates. In addition to the dustfall limits, the National Dust Control Regulations prescribe monitoring procedures and reporting requirements. Dust that may be created from the proposed TSF will be managed in accordance with these Regulations.

4.1.12.2 THE NATIONAL GREEN HOUSE GASES EMISSION REPORTING REGULATIONS, 2017

On 14 March 2014, the following six Green House Gases (GHGs) were declared as priority air pollutants in South Africa:

- Carbon dioxide (CO₂);
- Methane (CH₄);
- Nitrous Oxide (N₂O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulphur hexafluoride (SF₆).

National GHG Emission Reporting Regulations (Government Gazette No. 40762 of 3 April 2017), as amended (General Notice 994 in Government Notice 43712 of 11 September 2020), were published by the DFFE. A person identified as a Category A data provider in terms Annexure 1 of these regulations, must register their facilities using the online South African Greenhouse Gas Reporting System (SAGERS) (<https://ghgreporting-public.environment.gov.za/GHGlanding/>). Once registered the data provider must submit a GHG emissions inventory, activity data and report in the required format given under Annexure 3 of these regulations on an annual basis. All data must be provided annually, by the 31 March of the following year. Based on the EAPs preliminary assessment, the proposed Mponeng Lower Compartment TSF will not trigger GHG listed activities. However, any changes to the project description which may trigger such listed activities, the applicant would need to quantify and report on the proposed plant's GHG emissions by the 31 March of each year.

4.1.13 THE NATIONAL HERITAGE RESOURCES ACT (NHRA)

The National Heritage Resources Act (Act 25 of 1999 – NHRA) stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA states that, *“no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...”* The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through the NEMA, MPRDA and the Development Facilitation Act (FDA) legislation. In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorisations are granted for a development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impact Processes required by the NEMA and MPRDA. This change requires us to evaluate the Section of these Acts relevant to heritage (Fourie, 2008).

The NEMA 23(2)(b) states that an integrated environmental management plan should, *“...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”*. A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be



taken into account of in the EIA Regulations under the NEMA relates to the Specialist Report requirements (Appendix 6 of EIA Regulations 2014, as amended).

The MPRDA defines 'environment' as it is in the NEMA and, therefore, acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the NHRA that are to be impacted on by activities governed by the MPRDA. Section 40 of the same Act requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities (Fourie, 2008).

Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

- (a) **the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;**
- (b) *the construction of a bridge or similar structure exceeding 50 m in length;*
- (c) *any development or other activity which will change the character of a site—*
 - (i) *exceeding 5 000 m² in extent; or*
 - (ii) *involving three or more existing erven or subdivisions thereof; or*
 - (iii) *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - (iv) *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (d) *the re-zoning of a site exceeding 10 000 m² in extent; or*
- (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*

According to the DFFE Screening Tool Report (**Appendix D**), the proposed development is located within an area of *low* relative archaeological and cultural heritage theme sensitivity. However, an assessment of the NHRA and preliminary project information revealed that the proposed development triggers Section 38(1) of the NHRA. Therefore, a Heritage Impact Assessment was required and has been undertaken by PGS Heritage and attached in **Appendix F**. Based on the Heritage Assessment Report (PGS Heritage, 2025), two archaeological sites were located, which consist of stonewalling (MPnr1) and stonewalling with possible kraals (MPnr2). Both of these sites are rated as having high significance and graded as Grade IIIA. Through further research and investigation of satellite imagery, it was identified that these sites are part of a larger group of stonewalling within the area, on which there has been very little research conducted within the archaeological fraternity to date. Through archival research and further comparisons, it is hypothesised that the baMare-a-Phogole were the most-likely inhabitants of the area from the 1500s to the 1820s. Furthermore, there are various stonewalling circles located adjacent to the study area which need to be taken into consideration. Refer to **Section 0** for the detailed archaeological and cultural heritage findings and recommendations.

The South African Heritage Resources Agency (SAHRA), the Provincial Heritage Resources Authority Gauteng (PHRAG) and Association of Southern African Professional Archaeologists (ASAPA) are I&APs in the project and will be provided with a copy of this Scoping Report and specialist report for review and comment.

4.1.14 THE NATIONAL NOISE CONTROL REGULATIONS, 1992

In terms of section 25 of the ECA, the National Noise Control Regulations (GN R. 154 – NCRs) published in Government Gazette No. 13717 dated 10 January 1992, were promulgated. The NCRs were revised under GN R.



55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Provincial noise control regulations have been promulgated in Gauteng, Free State and Western Cape Provinces.

The NCRs will need to be considered in relation to the potential noise that may be generated mainly during the construction phase of the proposed project. The two key aspects of the NCRs relate to disturbing noise and noise nuisance.

Section 4 of the Regulations prohibits a person from making, producing or causing a disturbing noise, or allowing it to be made produced or caused by any person, machine, device or apparatus or any combination thereof. A disturbing noise is defined in the Regulations as *“a noise level which exceeds the zone sound level or if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more.”*

Section 5 of the NCRs in essence prohibits the creation of a noise nuisance. A noise nuisance is defined as *“any sound which disturbs or impairs or may disturb or impair the convenience or peace of any person”*. The South African National Standard 10103 also applies to the measurement and consideration of environmental noise and should be considered in conjunction with these Regulations.

4.1.14.1 THE NOISE STANDARDS

There are a few South African scientific standards (SABS) relevant to noise from mines, industry and roads. They are:

South African National Standard (SANS) 10103:2008 – ‘The measurement and rating of environmental noise with respect to annoyance and to speech communication’;

- SANS 10210:2004 – ‘Calculating and predicting road traffic noise’;
- SANS 10328:2008 – ‘Methods for environmental noise impact assessments’;
- SANS 10357:2004 – ‘The calculation of sound propagation by the Concave method’;
- SANS 10181:2003 – ‘The Measurement of Noise Emitted by Road Vehicles when Stationary’; and
- SANS 10205:2003 – ‘The Measurement of Noise Emitted by Motor Vehicles in Motion’.

The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. With regards to SANS 10103:2008, the recommendations are likely to inform decisions by authorities, but non-compliance with the standard will not necessarily render an activity unlawful per se.

4.1.15 THE NATIONAL WEB-BASED ENVIRONMENT SCREENING TOOL, 2019

On the 5th of July 2019, the Department of Forestry, Fisheries and the Environment (DFFE) issued a 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 applying for environmental authorisation in terms of Regulation 19 and Regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from the 4th of October 2019. The DFFE Screening Tool Report was generated on the 22nd of July 2024. The Screening report is provided in **Appendix D** of this report. The main findings to be discussed from the screening report are listed below.

The following summary of the study area’s environmental sensitivities were identified in the Environmental Screening Report. The environmental sensitivities for the proposed development footprint are indicated on **Table 11**.



Table 11: Environmental Sensitivity of Project Area

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme			X	
Aquatic Biodiversity Theme	X			
Archaeological and Cultural Heritage Theme				X
Civil Aviation (Solar PV) Theme			X	
Defence Theme				X
Palaeontology Theme		X		
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

The information collected by the specialists and EAP's assessment may be used to confirm or dispute (as may be applicable) the environmental sensitivity ratings identified by the National Screening Tool. Although the specialist studies will be undertaken during the EIA phase, the EAP has already undertaken a site sensitivity verification (**Appendix E**) and EAPs assessments/theme and sensitivity ratings identified by the Screening Tool are summarized in **Table 12** below.

Page 7 of 17 on the DFFE Screening Report indicates that certain Specialist Assessments must be undertaken for the proposed development. There is however an allowance of the EAP to motivate for the reasons for not including certain assessments in the assessment report. **Table 13** presents these Specialist Assessments/Studies as well as the motivations behind the EAP's decision of recommending or not recommending the undertaking of certain Specialist Assessments.



Table 12: Specialist Assessments/themes and Sensitivity Ratings identified by DFFE's Web-based Screening Tool

Assessment Theme	Sensitivity Rating (Screening Report)	Sensitivity Rating (Site Verification)	Response
Agriculture Theme	High	Medium	Relative Agricultural Sensitivity was assessed to be <i>Medium-Sensitive</i> by the Site Sensitivity Verification (SSV) attached as Appendix E . The only agricultural activity noted within the area was the small-scale grazing. Considering the nature of the proposed activity (redeposition and pipelines), and the limited agricultural activities in the project area, there will be minimal impact expected on agricultural activities. Based on the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources (GN 320, 2020, as amended), an Agricultural Compliance Statement must be undertaken for the application. Baseline Soils and Agricultural Assessment was undertaken by The Biodiversity Company (2025) discussed in Section 7.6 and attached in Appendix F. The Soils and Agricultural Compliance Assessment will be undertaken and made available to I&APs during the EIA Phase.
Animal Species Theme	Medium	Very High	Relative Animal Species Sensitivity was assessed to be <i>Low-Sensitive</i> by the SSV. Based on the DFFE Screening Tool Report, several medium sensitive animal species are likely to occur with the study area including species listed on the Red List of South African Species and/or IUCN Red List of Threatened Species such as <i>Aves-Tyto capensis</i> (African grass owl), <i>Aves-Hydroprogne caspia</i> (Caspian tern), <i>Aves-Eupodotis senegalensis</i> (White-bellied bustard), <i>Insecta-Lepidochrysops praeterita</i> (Highveld blue butterfly (endangered)), <i>Insecta-Lepidochrysops procera</i> (Potchefstroom blue), <i>Mammalia-Crocidura maquassiensis</i> (Makwassie musk shrew), <i>Mammalia-Hydrictis maculicollis</i> (Spotted-necked otter (near threatened)), and <i>Invertebrate-Clonia uvarovi</i> (Clonia uvarovi (endangered)). Considering that the rocky ridge where the pipelines and associated infrastructure (pipeline bridge) are proposed, is an area of largely intact pristine vegetation, there is a likelihood of these species and other sensitive plants being present as there is a habitat likely suitable to support these animal species. Based on the aspects of the proposed development and current environmental conditions on site, it is anticipated that there will be medium-low impacts on the animal species provided that the mitigation measures highlighted in brief in Section 8.3 which will be revised and detailed in the EMP during the EIA Phase are adhere to.
Aquatic Biodiversity Theme	Very High	Very High	Relative Aquatic Biodiversity Theme Sensitivity was confirmed to be <i>Very-High Sensitive</i> . Based on the DFFE Screening Tool Report, there are very-high sensitive Channelled valley-bottom wetlands within the study area. Based on the site sensitivity verification, there are several natural and artificial watercourses, wetlands and drainage lines within close proximity of the TSF and pipelines including Elandsfonteinspruit to the east which feeds into the natural dam approximately 150m southeast of the Mponeng Lower TSF. In addition, the study area is located within an Ecological Support Area 2. Based on the aspects of the proposed development and current environmental conditions on site, it is anticipated that there will be medium impacts on the aquatic biodiversity and wetlands provided that the mitigation measures highlighted in in brief in Section 8.3 which will be revised and detailed in the EMP during the EIA Phase area adhered to.



Assessment Theme	Sensitivity Rating (Screening Report)	Sensitivity Rating (Site Verification)	Response
Archaeological and Cultural Heritage Theme	Low	Very High	Relative Archaeological and Cultural Heritage Theme Sensitivity was assessed to be <i>Medium- Sensitive</i> by the SSV. Based on the DFFE Screening Tool, there are no known heritage features within the assessment area. No heritage features were noted during the site verification assessment on areas traversed by the EAP. However, a section of the ridge where the pipelines traverses appeared to be stone walling. Provided the rich heritage background of the area (baMare-a-Phogole), it was likely that these could be heritage features. In addition, the proposed activity triggers Section 38 of the National Heritage Resources Act, therefore, a Heritage Impact Assessment is required in terms of the Minimum Standards for Heritage Specialist Studies in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999). Based on the aspects of the proposed alignment of the proposed route for the pipelines, it is anticipated that there will be direct impacts on stonewalling (MPnr1) and stonewalling with possible kraals (MPnr2) as indicated in the Heritage Study (PGS Heritage, 2025). Both of these sites are rated as having high significance and graded as Grade IIIA. Findings, impacts assessment and mitigation measures are highlighted in in brief in Section 8.3 which will be detailed during the EIA Phase.
Palaeontology Theme	High	Medium	Based on the PalaeoMap from SAHRIS, the Palaeontological Sensitivity of the proposed area of the project footprint occurs in an area with <i>High, Moderate and Zero Palaeontological Sensitivity</i> . Considering that the study area is located on areas which have largely been significantly transformed with the exception of the sensitive ridge area and the proposed development only entailing shallow excavations of the topsoil and subsoils (where necessary) with the exception of the spring diversion system and the upgrades to the RWD, the relative Palaeontology Theme Sensitivity was assessed to be <i>Medium-Sensitive</i> . Therefore, based on the aspects of the proposed development and current environmental conditions on site, it is anticipated that there will be low impacts on palaeontology provided that the mitigation measures highlighted in in brief in Section 8.3 which will be detailed in the EMPr during the EIA Phase are adhered to.
Civil Aviation Theme	Medium	Low	Relative Civil Aviation Theme Sensitivity was assessed to be <i>Low-Sensitive</i> . Based on the DFFE Screening Tool Report, the study area is located between 8 and 15 km of other civil aviation aerodrome, a medium sensitive area for Civil Aviation Theme. Based on the site sensitivity verification, there were no civil aviation infrastructure or facilities within or near the study area. Based on the project description of redeposition and pipelines, the project will not transect nor reflect light which may have an impact on civil aviation. The proposed activities do not interfere with surface and air transmission and therefore, no anticipated impacts on civil aviation emanating from the project. The proposed development is a TSF in an existing mining area with existing TSFs does not entail the establishment of new high-rise structures in a flat area, use of aboveground high frequency electromagnetic radiation nor reflecting infrastructure. In addition, the area has low air traffic. Therefore, the proposed activities are assessed to have a low impact on Civil Aviation provided that the mitigation measures highlighted in in brief in Section 8.3 which will be detailed in the EMPr during the EIA Phase are adhered to.



Assessment Theme	Sensitivity Rating (Screening Report)	Sensitivity Rating (Site Verification)	Response
Defence Theme	Low	Low	Relative Defence Theme Sensitivity was assessed to be <i>Low-Sensitive</i> as there are no military bases / facilities present within the vicinity of the project site. The nearest military facilities to the site are located in Thaba Tshwane (formerly Voortrekkerhoogte) and Doornkop. Thaba Tshwane, now a military city, houses various units and is known for its historical significance. Doornkop has a military base located 62km east of the study area. There are no anticipated impacts on defence theme emanating from the proposed activities, subsequently, there is no requirement or justification to undertake a Defence Assessment for the project. Therefore, based on the aspects of the proposed development and current environmental conditions on site, it is anticipated that there will be low impacts on defence facilities and/or activities provided that the mitigation measures highlighted in in brief in Section 8.3 which will be detailed in the EMPr during the EIA Phase are adhered to.
Plant Species Theme	Medium	Very High	Relative Plant Species Sensitivity was assessed to be <i>High-Sensitive</i> as based on the DFFE Screening Tool Report, there are sensitive plant species in the area including <i>Khadia beswickii</i> (L.Bolus) N.E.Br. listed on the Red List of South African Plants and Sensitive species 1248 (name withheld to protect the species from illegal harvesting and must be protected). Sensitive species, in an ecological context, refers to species that are vulnerable to environmental changes or human impacts and are therefore given special protection or management considerations. Considering that the rocky ridge where the pipelines and associated infrastructure (pipeline bridge) are proposed, is an area of largely intact pristine vegetation, there is a likelihood of these species and other sensitive plants being present. Based on the aspects of the proposed development and current environmental conditions on site, it is anticipated that there will be medium-low impacts on the plant species provided that the mitigation measures highlighted in in brief in Section 8.3 which will be detailed in the EMPr during the EIA Phase are adhered to.
Terrestrial Biodiversity Theme	Very High	Very High	Relative Terrestrial Biodiversity Sensitivity was confirmed to be <i>Very High Sensitive</i> by the SSV. The National Web-Based Screening Tool Report found that the Relative Terrestrial Biodiversity Impact Assessment Theme Sensitivity is Very High-Sensitive. Based on desktop datasets and site sensitivity verification, the pipeline section consists of largely intact pristine vegetation. The area is considered to fall within Critical Biodiversity Areas (CBA), Ecological Support Area (ESA) and National Protected Area Expansion Strategy (NPAES). Based on the aspects of the proposed development and current environmental conditions on site, it is anticipated that there will be limited medium-low impacts on terrestrial biodiversity provided that the mitigation measures highlighted in in brief in Section 8.3 which will be detailed in the EMPr during the EIA Phase are adhered to.



Table 13: Summary of discussions regarding the undertaking of specialist Assessments

SPECIALIST ASSESSMENT		DICUSSION AND MOTIVATION
Agricultural Assessment	Impact	The only agricultural activity noted within the area was the small-scale grazing. Considering the nature of the proposed activity (redeposition and pipelines), there will be minimal impact on agricultural activities. Based on the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Agricultural Resources (GN 320, 2020, as amended), an Agricultural Compliance Statement as a minimum must be undertaken for the application. The EAP recommends a Soils and Agricultural Impact Assessment for the project.
Archaeological and Cultural Heritage Assessment	Impact	Based on the DFFE Screening Tool, there are no known heritage features within the assessment area. No heritage features were noted during the site verification assessment on areas traversed by the EAP. However, a section of the ridge where the pipelines traverses appeared to be stone walling. Provided the rich heritage background of the area (baMare-a-Phogole), it is likely that these could be heritage features. In addition, the proposed activity triggers Section 38 of the National Heritage Resources Act, therefore, a Heritage Impact Assessment is required and recommended by the EAP in terms of the Minimum Standards for Heritage Specialist Studies in terms of Section 38 of the National Heritage Resources Act (No. 25 of 1999).
Palaeontology Assessment	Impact	Although no fossiliferous outcrops were noted within the assessment area, due to the extent of the development footprint and the high palaeo-sensitivity rating by the DFFE Screening Tool Report, it is consequently the EAPs recommendation that a Palaeontological Assessment be undertaken for the project. In addition, according to the DFFE Guidance on the Preparation of a Palaeontological Impact Assessment, Palaeontology resources are widely dispersed and can occur on any development site in South Africa. Therefore, Palaeontological Impact Assessments (PIAs) must be undertaken for all developments as per the PalaeoSensitivity Map provided on SAHRIS1, irrespective of the sensitivity shown on the palaeontology theme layer. Based on the SAHRA PalaeoSensitivity Map, the study area is located within insignificant/zero sensitivity (no palaeontological studies are required), moderate sensitivity (desktop study is required) and high sensitivity (desktop study is required and based on the outcome of the desktop study, a field assessment is likely). Therefore, the EAP recommends a full PIA for the project.
Terrestrial Biodiversity Impact Assessment		The National Web-Based Screening Tool Report found that the Relative Terrestrial Biodiversity Impact Assessment Theme Sensitivity is Very High-Sensitive. Based on desktop datasets and site sensitivity verification, the pipeline section consists of largely intact pristine vegetation. The area is considered to fall within Critical Biodiversity Areas (CBA), Ecological Support Area (ESA) and National Protected Area Expansion Strategy (NPAES). Therefore, a Terrestrial Biodiversity Impact Assessment is recommended by the EAP and must be undertaken in line with the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity (GN 320, 2020 as amended) to confirm presence of Flora or Fauna, Avifauna, SCC, or protected species within the development site, verify site terrestrial biodiversity sensitivity and provide necessary mitigation measures.
Plant Species Assessment		Similarly, to the rationale above, the EAP recommends that a Terrestrial Biodiversity Assessment be undertaken to confirm if there are no Flora or Fauna SCC, or protected species within the development site. The Plant Species Assessment will be covered by the Terrestrial Biodiversity Impact Assessment.
Animal Species Assessment	Species	Similarly, to the rationale above for Terrestrial Biodiversity Impact Assessment, the EAP recommends that a Terrestrial Biodiversity Assessment be undertaken to confirm if there are no Flora or Fauna SCC, or protected species within the development site. The Animal Species Assessment will be covered by the Terrestrial Biodiversity Impact Assessment.



Aquatic Biodiversity Impact Assessment	Based on the DFFE Screening Tool Report, there are very-high sensitive Channelled valley-bottom wetlands within the study area. Based on the site sensitivity verification, there are several natural and artificial watercourses, wetlands and drainage lines within close proximity of the TSF and pipelines including Elandsfontein spruit to the east which feeds into the natural dam approximately 150m southeast of the Mponeng Lower TSF. Subsequently, an Aquatic Biodiversity Assessment is recommended by the EAP and must be undertaken in line with the Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Aquatic Biodiversity (GN 320, 2020 as amended) to amongst others, provide a description of the aquatic biodiversity and ecosystems on the site, the threat status of the ecosystem and species as identified by the screening tool, an indication of the national and provincial priority status of the aquatic ecosystem, a description of the ecological importance and sensitivity of the aquatic ecosystem and a detailed assessment of the potential impacts of the proposed development and buffer requirements.
Hydrology Assessment	The proposed development entails the establishment of a medium-high hazardous waste facility which its integrity can be influenced by hydrological conditions and inversely, it can impact the hydrological conditions. Provided that hydrological analysis can assist in analysing the scope of the flood, position the runoff pollution sources, and predict geomorphological change on runoff, the EAP recommends a Hydrology Assessment be undertaken for the project.
Noise Impact Assessment	A noise impact assessment (NIA) predicts the impact that noise, from a proposed development, is likely to have on the surrounding area. An NIA is usually associated with large industries or developments with excessive noise generation such engineering companies, printing presses, textile mills, and metal works which immensely generate noise pollution. The noise from the machine's mechanical pneumatic drills, saws, and rotating belts usually produces intolerable sounds and are a nuisance to the public. Considering that the proposed development is for a TSF within an area used for similar activities and no excessive noise impacts are anticipated, the EAP does not recommend a Noise Impact Assessment be undertaken for the project.
Traffic Impact Assessment	A traffic impact study or traffic impact assessment is a study which assesses the effect that a particular development has on the transportation network. New developments are one of the major causes of traffic congestion in many of the major cities of developing countries, due to the absence of adequate mitigation measures. Developments usually increases and/or contributes to the traffic in the area during the construction phase as a result of construction vehicles going to and from the development site and traffic control measure such as 'Stop and Go'. It is anticipated that the proposed development of the TSF will not largely increase the traffic congestion as minimal construction vehicles will be used during the construction and operation phases. Based on the EAPs assessment during the site sensitivity verification, the existing road network was noted to be currently sufficient for the anticipated minimal additional traffic load mainly during construction and no major congestions were noted. Therefore, the EAP does not recommend a Traffic Impact Assessment be undertaken for the project.
Health Impact Assessment	Health impact assessment (HIA) is a tool that can help communities, decision makers, and practitioners make choices that improve public health. HIA can be used to evaluate objectively the potential health effects of a project or policy before it is built or implemented. HIA is usually undertaken for projects which can have health impacts on the surrounding communities. Based on the proposed project description, the establishment of the TSF can be associated with health impacts especially cumulative health impacts considering the existing TSF's in the area. Therefore, the EAP recommends a Health Impact Assessment be undertaken for the project. This will be covered by the Health Risk and Radiological Assessment.
Socio-Economic Assessment	The overarching aim of undertaking a Socio-Economic Assessment of a projects is to develop an understanding of the current social and economic environment and aims to assess or assesses the potential impact of the project on the socio-economic environment. Socio-Economic Assessment are usually undertaken for



	projects which have an impact and/or affect the social and/or economic structures such as low-cost housing projects, mixed-use developments, upgrading of informal settlements, linear projects transecting different communities, etc. Based on the project information and the purpose of the development largely relating to the nature of the project being the same activity already undertaken on the site, minimal socio-economic influence / change is anticipated. Therefore, the EAP does not recommend a Socio-Economic Assessment for the project due to the minimal anticipated changes / impacts on the surrounding social structures and potential cumulative socio-economic impacts which may emerge from the project.
Ambient Air Quality Impact Assessment	Air Quality Impact Assessment (AQIA) is an evaluation, using approved computer models, of the ambient air quality impacts that the public may be expected to be exposed to due to air pollution emissions from one or more facilities. AQIA is an important technique for determining the relative contribution to ground level pollutant concentrations of specific current or future source emissions at receptor sites. AQIA is usually undertaken for projects which will potentially emit and/or increase pollutant concentrations during construction and/or operational phases. Based on the project information, the EAP recommends an Air Quality Impact Assessment for the project as it will potentially emit and/or increase pollutant concentrations in the area.
Additional Specialist Assessments Identified by the EAP	
Geohydrology Assessment	Hydrogeological assessments consider how proposed developments may be affected by groundwater and nearby surface water, in terms of potential flood risk and impact on structural foundations. Provided that the nature of the proposed development is a hazardous waste facility and it may be affected and/or be affected by groundwater and the pre-identified nearby wetlands, the EAP recommends a Geohydrology Assessment be undertaken for the project.
Landscape/Visual Impact Assessment	Although the development is a TSF proposed within an area used for similar land uses, the specific area was abandoned in the very early stages (approximately 25m) and the redeposition of tailings up to 60m high will therefore re-affect the visual impression. Therefore, a Landscape / Visual Impact Compliance Statement is recommended by the EAP.
Financial Provisions Closure and Rehabilitation Plan	Financial provision plan is a form of security assessment. Before mining companies undertake mining activities, mining companies must assess what it will cost to rehabilitate the impact of their operations on the environment, and then they must set aside and secure the amount of money needed to cover that cost until the money is needed for rehabilitation. Therefore, a Financial Provisions Closure and Rehabilitation Plan is recommended by the EAP.
Health Risk and Radiological Assessment	A Health Risk Assessment is the process to estimate the nature and probability of adverse health effects in humans who may be exposed to harmful environmental conditions emanating from a specific source. A Radiological assessment is defined as the process of estimating dose and risk to humans from radioactive materials in the environment. Considering that the proposed development entails the storage of tailings which likely contain gold and uranium isotopes which are radioactive, the project poses a health risk to the staff and surrounding communities. Therefore, a Health Risk and Radiological Assessment is recommended by the EAP.
Climate Change Impact Assessment	Climate change impact assessments seek to characterize, diagnose, and project risks or impacts of environmental change on people, communities, economic activities, infrastructure, ecosystems, or valued natural resource. The need to undertake Climate Change Impact Assessments as part of a EIA Projects which may influence climate change has been on the rise as competent authorities seek to assess how the project has considered climate change. The EAP recommends that a Climate Change Impact Assessment be undertaken to evaluate how the TSF will impact on climate change.



4.1.16 THE NATIONAL VELD AND FOREST FIRE ACT, 1998

While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the Mponeng Lower Compartment TSF, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and trained personnel for firefighting purposes.

4.1.17 THE NATIONAL FORESTS ACT, 1998

A licence is required for the removal of protected trees in terms of the NFA, (Act 84 of 1998). It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present in the development footprint for the submission of relevant permits to authorities prior to the disturbance of these individuals. This will be covered by the Terrestrial Biodiversity Impact Assessment during the EIA Phase and the findings, implications and recommendations will be discussed in the EIA Report.

4.1.18 THE SUB-DIVISION OF AGRICULTURAL LAND ACT, 1970

In terms of the Subdivision of Agricultural Land Act (Act 70 of 1970), any application for change of land use must be approved by the Minister of Agriculture, and while under the Conservation of Agricultural Resources Act (Act 43 of 1983) no degradation of natural land is permitted.

4.1.19 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The law on Conservation of Agricultural Resources (Act 43 of 1983) aims to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants. In order to achieve the objectives of this Act, control measures related to the following may be prescribed to land users to whom they apply:

- The cultivation of virgin soil;
- The utilisation and protection of land which is cultivated;
- The irrigation of land;
- The prevention or control of waterlogging or salination of land;
- The utilisation and protection of vleis, marshes, water sponges, water courses and water sources;
- The regulating of the flow pattern of run-off water;
- The utilisation and protection of the vegetation;
- The grazing capacity of veld, expressed as an area of veld per large stock unit;
- The maximum number and the kind of animals which may be kept on veld; The prevention and control of veld fires;
- The utilisation and protection of veld which has burned;
- The control of weeds and invader plants;
- The restoration or reclamation of eroded land or land which is otherwise disturbed or denuded;
- The protection of water sources against pollution on account of farming practices;
- The construction, maintenance, alteration or removal of soil conservation works or other structures on land; and
- Any other matter which the Minister may deem necessary or expedient in order that the objects of this Act may be achieved.

Further, different control measures may be prescribed in respect of different classes of land users or different areas or in such other respects as the Minister may determine. Preliminary impacts on the soil, biodiversity and



water resources have been identified with regards to the proposed Mponeng Lower Compartment TSF, and mitigation and management measures recommended. These will be updated during the EIA phase of this project as and where necessary.

4.1.20 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (SPLUMA)

The Spatial Planning and Land Use Management (Act 16 of 2013 – SPLUMA) is set to aid effective and efficient planning and land use management, as well as to promote optimal exploitation of minerals and mineral resources. The SPLUMA was developed to legislate for a single, integrated planning system for the entire country. Therefore, the Act provides a framework for a planning system for the country and introduces provisions to cater for development principles; norms and standards; inter-governmental support; Spatial Development Frameworks (SDFs) across national, provincial, regional and municipal areas; Land Use Schemes (LUS); and municipal planning tribunals. Furthermore, the SPLUMA strengthens the position of mining right holders when land needs to be re-zoned for mining purposes. Although the Mponeng Lower Compartment TSF is no longer in operation and is currently utilised as a Holding Dam and a portion used as a Landfill Facility (authorised) with the approved 2012 EMPr stating that the Lower Compartment TSF will no longer be used for tailings storage but rather be used as a Holding Dam, rezoning of properties is not anticipated for this project as it is still a mining activity and the area was not reassigned any other zoning.

4.2 OTHER APPLICABLE ACTS AND GUIDELINES

Other applicable acts and guidelines include the Interim Guidance on The Management of Naturally Occurring Radioactive Material (NORM) Tailings and Waste Rock from the National Nuclear Regulator (NNR), Global Industry Standard on Tailings Management, Gauteng Conservation Plan (C-Plan v4), Gauteng Province Environmental Management Framework and Guideline (GPEMF), Gauteng Ridges Guideline. In addition, the municipal planning documents such as West Rand District Municipality Regional Growth and Development Strategy, The Merafong City Local Municipality Spatial Development Framework, and The Merafong City Local Municipality Solid Waste Management Plan are also applicable to the project and are discussed briefly in this report.

4.2.1 INTERIM GUIDANCE ON THE MANAGEMENT OF NORM TAILINGS AND WASTE ROCK FROM THE NATIONAL NUCLEAR REGULATOR

The National Nuclear Regulator (NNR) exercises regulatory control related to nuclear safety and security for all the activities and facilities as defined in the NNR Act. The process waste generated at a mining and minerals processing facility, also known as slurry, is naturally radioactive because of the associated radionuclides in the uranium and thorium decay series that accompany the metals that are mined. The slurry, also referred to as Naturally Occurring Radioactive Material (NORM) residue, is pumped to containment areas for permanent or temporary storage and thus qualifies as radioactive waste facilities named NORM tailings dams, also interchangeably referred to as Tailings Storage Facilities (TSF).

This document provides guidance for the implementation of the requirements as set out in the draft General Nuclear Safety Regulations on the management of NORM tailings and waste rock. Due to the lengthy promulgation process for regulations, and the fact that the guidance provided is based on draft regulations, the Executive has resolved to issue this document as interim guidance. This document will be revised once the regulations in question have been promulgated.

The guidance is applicable to all NORM facilities which carry out activities and operations involving NORM tailings and waste rock containing uranium, thorium and their progeny. This guide extends to both authorised facilities regulated by the NNR and prospective applicants who wish to handle, process and dispose of NORM tailings and waste rock in terms of the provisions of the NNR Act and associated regulations.

This guideline contains information that provide guidance in terms of best practice in terms of EIA aspects that is related to mining and specifically mineral processing. While the best practice guidance must to be taken into account, this document does not take the place of legal advice in a specific situation governed by legislation.

Key aspects of an NNR-approved Closure Plan include:



- **Decommissioning Strategy:** The plan specifies the methods for dismantling the facility, removing or treating radioactive materials, and decontaminating equipment and site surfaces.
- **Environmental Protection:** It includes measures to prevent or mitigate environmental damage from decommissioning activities, such as controlling dust, managing waste, and protecting water resources.
- **Public and Worker Safety:** The plan outlines procedures for protecting the health and safety of workers involved in decommissioning and the public who may be affected by the process.
- **Long-Term Stewardship:** The plan addresses the long-term management of any residual risks or contamination, ensuring that the site remains safe for the future.
- **Financial Assurance:** It demonstrates that sufficient financial resources are available to implement the closure plan and manage any long-term liabilities.
- **Regulatory Compliance:** The plan must be developed in accordance with the NNR's regulations and guidance documents.

4.2.2 THE GLOBAL INDUSTRY STANDARD ON TAILINGS MANAGEMENT (GISTM) AND SOCIAL PERFORMANCE

The Global Industry Standard on Tailings Management (GISTM) is organised around six Topic areas, 15 Principles and 77 auditable Requirements. The aim of the standard is to adopt an integrated approach to tailings management. Social performance spans all six Topic Areas of the Standard, with specialist components defined in 14 (18 %) of the Standard's 77 Requirements, with a further 18 Requirements (23 % of the Standard) requiring operators to integrate social performance inputs into processes, systems, and decisions about tailings facility management (Joyce & Kemp, 2020).

Under Topic I (**Figure 21**), Affected Communities there are four explicit social performance requirements namely consideration of human rights throughout the lifecycle of the TSF, Free, Prior, Informed Consent of indigenous and tribal people, meaningful engagement, and a grievance mechanism. Topic II, Integrated Knowledge Base package social, environmental, and local economic conditions together. Understanding of local context, human exposure and vulnerability is important in this topic. Impact assessment and mitigation plans fall under this topic. Although Topic III, Design, Construction, Operation and Monitoring deals mainly with technical aspects, social requirements are included when additional steps to minimise consequences are considered, and in the mention that international standards should be followed if involuntary resettlement is required.

Topic IV, Management and Governance requires the establishment of a tailings governance framework and confirms the Environmental and Social Management System (ESMS) as an integral component as indicated in **Figure 21**. This topic nominates one or more Accountable Executive(s) as responsible for, amongst other matters, avoiding or minimising the consequences of a tailings facility failure for local people. Other requirements include multi-disciplinary risk assessments, and the review and audit of the ESMS as it relates to the tailings facility.

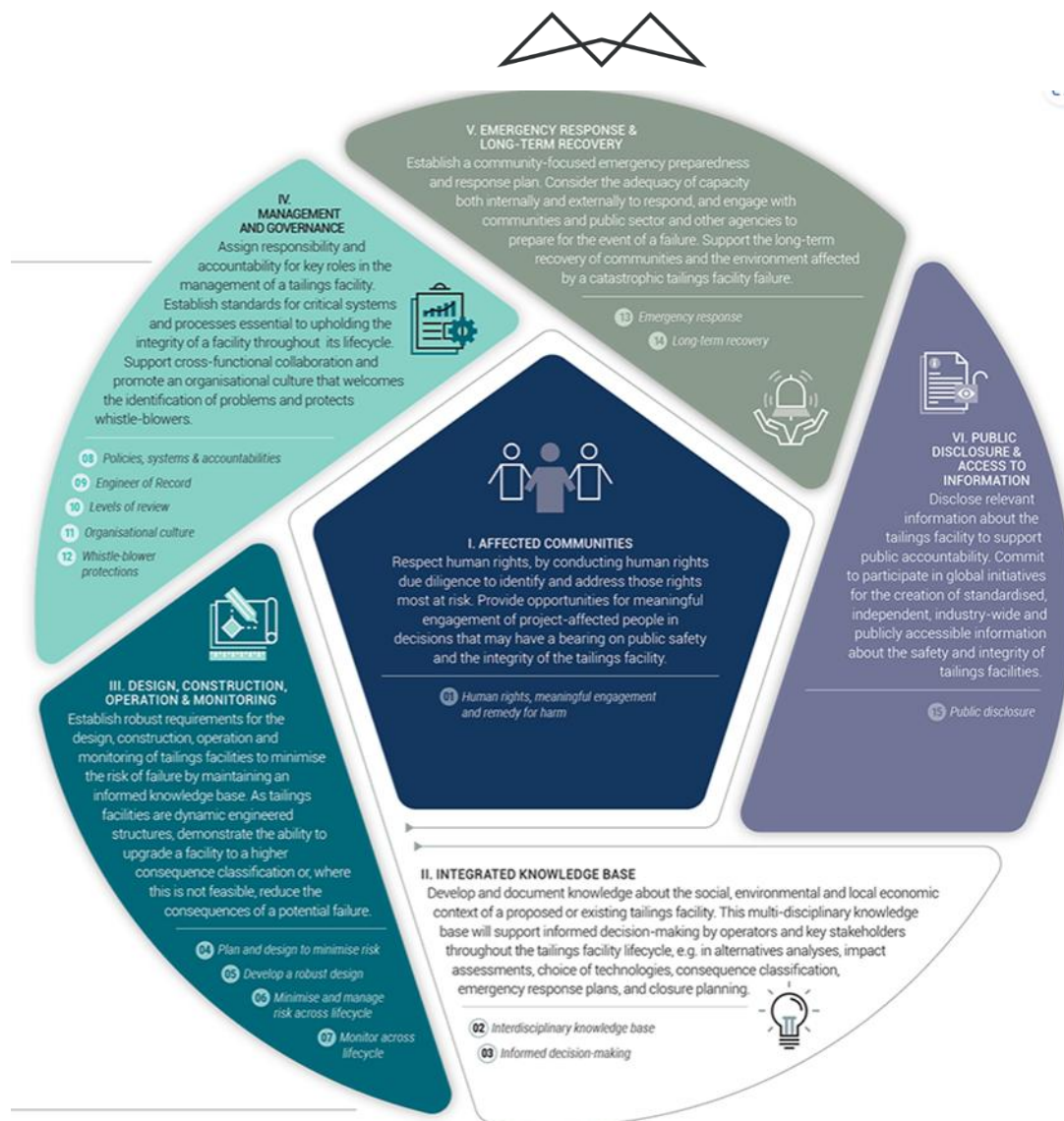


Figure 21: Summary of Global Industry Standard on Tailings Management (Joyce & Kemp, 2020)

Topic V, Emergency Preparedness and Recovery is critically important from a social performance perspective. It requires meaningful engagement with employees and contractors in the development of Emergency Preparedness and Response Plans, and 'locks in' the role of project-affected people in the co-development of community-focused emergency preparedness measures. Topic V also cover the long-term recovery of people and the environment in the event of a catastrophic failure event – a topic that is not covered in any other tailings or social performance standard. Requirement 14.1 asks operators to take reasonable steps, before a failure event, to meaningfully engage with public sector agencies and other organisations that would participate in medium- and long-term social and environmental post-failure response strategies. These agencies are likely to be quite different to the first responder groups engaged. Topic V would involve post hoc impact assessments, and stakeholder engagement to develop and implement plans that enable the participation of affected people in restoration and recovery works and ongoing monitoring activities.

The documents listed under Topic VI, Public Disclosure and Access to Information will likely be in the hands of other functions, such as external affairs and legal, many of these concerns fall within the purview of social performance. Regularly publishing and updating information and responding to reasonable requests for additional information is fundamental to meaningful engagement at the local-level, and for generating trust across the stakeholder spectrum (Joyce & Kemp, 2020). Golden Core Trade and Invest aims to align their operations with the requirements of the GISTM.



4.2.3 PROVINCIAL CONSERVATION PLAN – THE GAUTENG CONSERVATION PLAN

Bioregional plans are one of a range of decision support tools provided for in the Biodiversity Act that can be used to enable biodiversity conservation in priority areas. The purpose of a bioregional plan is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity (Desmet et al., 2013). The purpose of the conservation plans is to inform land-use planning and development on a provincial scale and to aid in natural resource management, with one of the outputs being a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely Protected Areas, CBA1 areas, CBA2 areas, ESA1 areas, ESA2 areas, Other Natural Areas (ONAs) and areas with No Natural Habitat Remaining (NNR) based on biodiversity characteristics, spatial configuration and requirements for meeting targets for both biodiversity patterns and ecological processes.

Critical Biodiversity Areas (CBAs) – Areas considered critical for meeting biodiversity targets and thresholds, and which are required to ensure the persistence of viable populations of species and the functionality of ecosystems. Ecological Support Areas (ESAs) - Areas are required to support and sustain the ecological functioning of Critical Biodiversity Areas (CBAs). For terrestrial and aquatic environments, these areas are functional but are not necessarily pristine natural areas. They are however required to ensure the persistence and maintenance of biodiversity patterns and ecological processes within the CBAs, and which also contributes significantly to the maintenance of Ecological Infrastructure

The Gauteng C-Plan focuses on the mapping of biodiversity priority areas within the Gauteng Province, as compiled by the Gauteng Department of Agriculture and Rural Development (GDARD). The C-Plan was consulted in order to determine the location of areas of increased ecological or conservation importance and sensitivity within the vicinity of the study area. This is done by providing a map of biodiversity priority areas, referred to as CBAs and ESAs. According to information obtained from SANBI, CBAs are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services. The primary purpose of a map of CBAs and ESAs is to guide decision-making about where best to locate development. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes.

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The Conservation plan delineates CBAs, Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state. The conservation of CBAs is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017). According to the latest Gauteng Conservation Plan (C-Plan v4), the Mponeng Lower Compartment TSF site falls within areas of CBA 2 and ESA 1 (**Figure 22**).

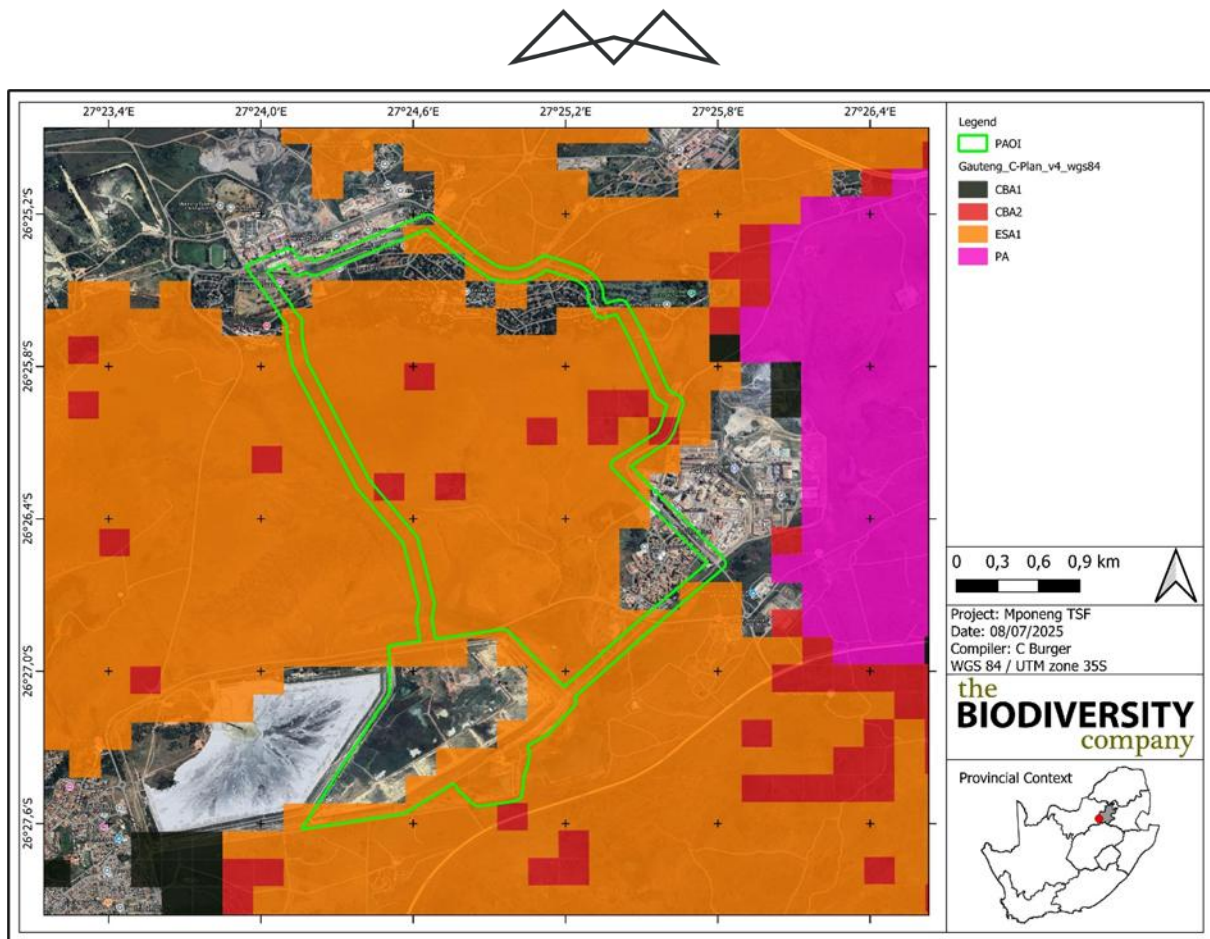


Figure 22: Map illustrating the study area in relation to the Gauteng Conservation Plan (The Biodiversity Company, 2025)

A site visit undertaken by the EAP indicated that the TSF site and sections of the pipeline and access road have been largely modified, few sections along the pipeline routes were observed to be intact and/or less modified and potentially sensitive. Terrestrial Biodiversity Impact Assessment will be undertaken to identify and assess potential sensitive flora and fauna in the area, impacts and mitigation measures.

4.2.4 THE GAUTENG ENVIRONMENTAL MANAGEMENT FRAMEWORK TOOL

The Gauteng Department of Agriculture and Rural Development have developed an *Environmental Management Framework Tool* to streamline the requirements for an environmental impact assessment (EIA) (reduce EIA requirements), reduce timeframes for approvals and to contribute towards reducing the cost of doing business in Gauteng. In this tool, a number of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) listed activities are excluded from the requirement to obtain an environmental authorisation (EA). This exclusion is currently only applicable to activities that fall within Environmental Management Zones 1 and 5 of the Gauteng Provincial Environmental Management Framework Zones (GPEMF). **Table 14** indicates the various zones of the GPEMF including Zones 1 and 5.

Table 14: Gauteng Provincial Environmental Management Framework Zones

ZONE	INTENTION
Zone 1: Urban development zone	The intention with this zone is to streamline urban development activities in it and to promote development infill, densification and concentration of urban development, in order to establish a more effective and efficient city region that will minimise urban sprawl into rural areas.



Zone 2: High control zone (within the urban development zone)	This zone is sensitive to development activities. Only conservation should be allowed in this zone. Related tourism and recreation activities must be accommodated in areas surrounding this zone.
Zone 3: High control zone (outside the urban development zone)	This zone is sensitive to development activities and in several cases also have specific values that need to be protected. Conservation and related tourism and recreation activities should dominate development in this zone.
Zone 4: Normal control zone	This zone is dominated by agricultural uses outside the urban development zone. Agricultural and rural development that support agriculture should be promoted.
Zone 5: Industrial and large commercial focus zone Intention	The intention with Zone 5 is to streamline non-polluting industrial and large-scale commercial (warehouses etc.) activities in areas that are already used for such purposes and areas that are severely degraded but in proximity to required infrastructure.

Review of the latest GPEMF v12 (GDARD, 2022), the study area falls within Zones 1, 2, 3 and 4 of the GPEMF. Considering that Site falls within Zones 2, 3 and 4, the site is not exempted from the process of an EA through the GPEMF. In addition, as indicated in Section 4.2.3, the study area is located within CBA 2 and ESA1 which triggers Listing Notices 3 which are activities not exempted from an EA process through the GPEMF. Therefore, an EA application will be required.

4.2.5 THE GAUTENG RIDGES GUIDELINE

The quartzite ridges of Gauteng are one of the most important natural assets in the northern provinces of South Africa. This is because these ridges, and the area immediately surrounding the ridges, provide habitat for a wide variety of fauna and flora, some of which are Red List, rare or endemic species or, in the case of certain of the plant species, are found nowhere else in South Africa or the world. The ridges also fulfil functions that are necessary for the sustainability of ecosystems such as the recharging of groundwater, wetlands and rivers, wildlife dispersal and providing essential habitat for pollinators. Ridges also have a socio-cultural role in that they provide aesthetically pleasing environments that are valued by residents, tourists and recreational users. Human activities such as urbanization, mining and the planting of alien vegetation may undermine the contribution that ridges make to the environment.

The environmental right, which is set out in section 24 of the Constitution, requires government to take - “....reasonable legislative and other measures that –

- (i) prevent pollution and ecological degradation;
- (ii) promote conservation; and
- (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

The conservation of ridges therefore falls within the ambit an environmental right. The guidelines were first promulgated in 2001, updated in 2019 and recently in June 2025. The guideline applies to all ridges in Gauteng. For the purposes of the report, a ridge includes hills, koppies, mountains, kloofs and gorges and/or a landscape type or topographic feature that is characterized by two or more of the following features - a crest, plateau, cliff or footslope. In addition, ridges are characterized by slopes of 5° or more (that is equivalent to slopes of > 8.8% or > 1: 11 gradient) when modelled in a Geographic Information System digital elevation model that is based on 20m contour intervals at a scale of 1:50 000.

The general objective of GDARD is that the ecological and socio-cultural value of ridges must be conserved. The ridges have, however, undergone different degrees of habitat loss due to human activities such as urban development and quarrying. The approach which the Department has adopted to realizing its general objective is to provide for the maximum feasible conservation of a ridge within the existing constraints of the habitat loss



that has already taken place. In order to give practical effect to this policy, the Department has classified all ridges in Gauteng into one of four classes, based on the existing extent and percentage of area converted to urban development or other human activities. The classes are as follows -

- a) Class 1 ridges include ridges of which 5% or less of their surface area has been converted to urban development, quarries and/or alien vegetation. (Approximately 58% of ridges currently fall within Class 1, including the Suikerbosrand and parts of the Magaliesberg.)
- b) Class 2 ridges are those in respect of which 5-34% of the ridge area has been irreversibly transformed by human activity. (Approximately 23% of ridges currently fall within Class 2, including parts of the Magaliesberg, ridges falling within the Cradle of Humankind World Heritage Site, the Klipriviersberg, the Bronberg and the Skurweberg).
- c) Class 3 ridges are those that have been transformed by 35-65%, as a result of human activity (Approximately 8% of ridges currently fall within Class 3, including the Northcliff, Roodepoort and Krugersdorp ridges).
- d) Class 4 are those that have been transformed as a result of human activity by 65% or more. (Approximately 11% of ridges currently fall within Class 4, including the Melville Koppies and the Linksfield Ridge).

A review of the latest Gauteng Ridges dataset from GDARD indicated that the study area is located within a Class 1 Ridge Buffer Zone and a Class 2 Ridge (**Figure 23**). **It should be noted that portions on the northern section of the pipelines are located within a transformed area of the Class 2 Ridge as per the dataset (Figure 24). The development / transformation noted include Savuka Plant mining activities, Western Deep Levels Hospital, Western Deep Levels Residential Area, reservoirs, pipelines, etc. Therefore, the proposed activities will be within a transformed Class 2 Ridge and will be linear infrastructure i.e., pipelines and pipeline bridge.** Based on the Sensitive Ridge datasets from GDARD, there are Class 1 and Class 2 sensitive ridges and associated buffer areas within the study area. The guidelines which are applicable to the use and development of the Class 1 and Class 2 ridges are set out below:

- a) Class 1 ridges:

No development within the 200m buffer zone is preferred by the Department, although, low impact activities with an ecological footprint of 5% or less in the 200m buffer zone of the ridge may be considered to deter edge-effect. No development will be permitted on the ridge itself.
- b) Class 2 ridges:

Development activities and uses that have significant environmental impact on a Class 2 ridge will not be permitted. Only low impact activities might be permitted. Low impact development activities, such as tourism facilities, which comprise of an ecological footprint of 5% or less of the property may be supported. (The ecological footprint includes all areas directly impacted on by a development activity, including all paved surfaces, landscaping, property access and service provision). Low impact development activities on a ridge will not be supported where it is feasible to undertake the development on a portion of the property abutting the ridge.

Considering that the proposed development within these sensitive ridges are pipelines and access road along already disturbed area with existing pipelines and access roads, the potential impact is anticipated to be low and as such, the activities are likely to be supported by the relevant department (GDARD). The following requirements for applications that must follow an environmental impact assessment process will apply:

- a) Applications involving activities on a ridge that must be subjected to an environmental impact assessment in any form must, in addition to any other requirements of law, be supported by a study or studies which, as a minimum, describe –
 - i. the ecological conditions – including the functional, hydrological and compositional aspects – of the ridge,



- ii. flora and fauna – including any mammals, birds, reptiles, amphibians and invertebrates - that are present on the ridge,
 - iii. the impacts of the proposed activity on ecology conditions, flora and fauna,
 - iv. the stability of the slope and any implications thereof for the application, and
 - v. the cultural, historical, open space and visual value aspects as well as the current use and value of the ridge for social purposes and the extent to which the proposed activity will impact on these uses or values
- b) **Applications involving developments on a ridge falling within Class 1, 2 or 3 must also be supported by a study on service provision and access. The study on service provision and access must, as a minimum, describe the location of access roads to the site; what services are available; and - if no services are available - how the site will be serviced and the impact that any new infrastructure contemplated may have on the ridge.**

An ecological management plan must accompany an application which sets out the measures and responsibilities in respect of the management the ecological integrity of the property, other than the specific area where the development activity is proposed. GDARD must and will be consulted in the initial stages of this application.

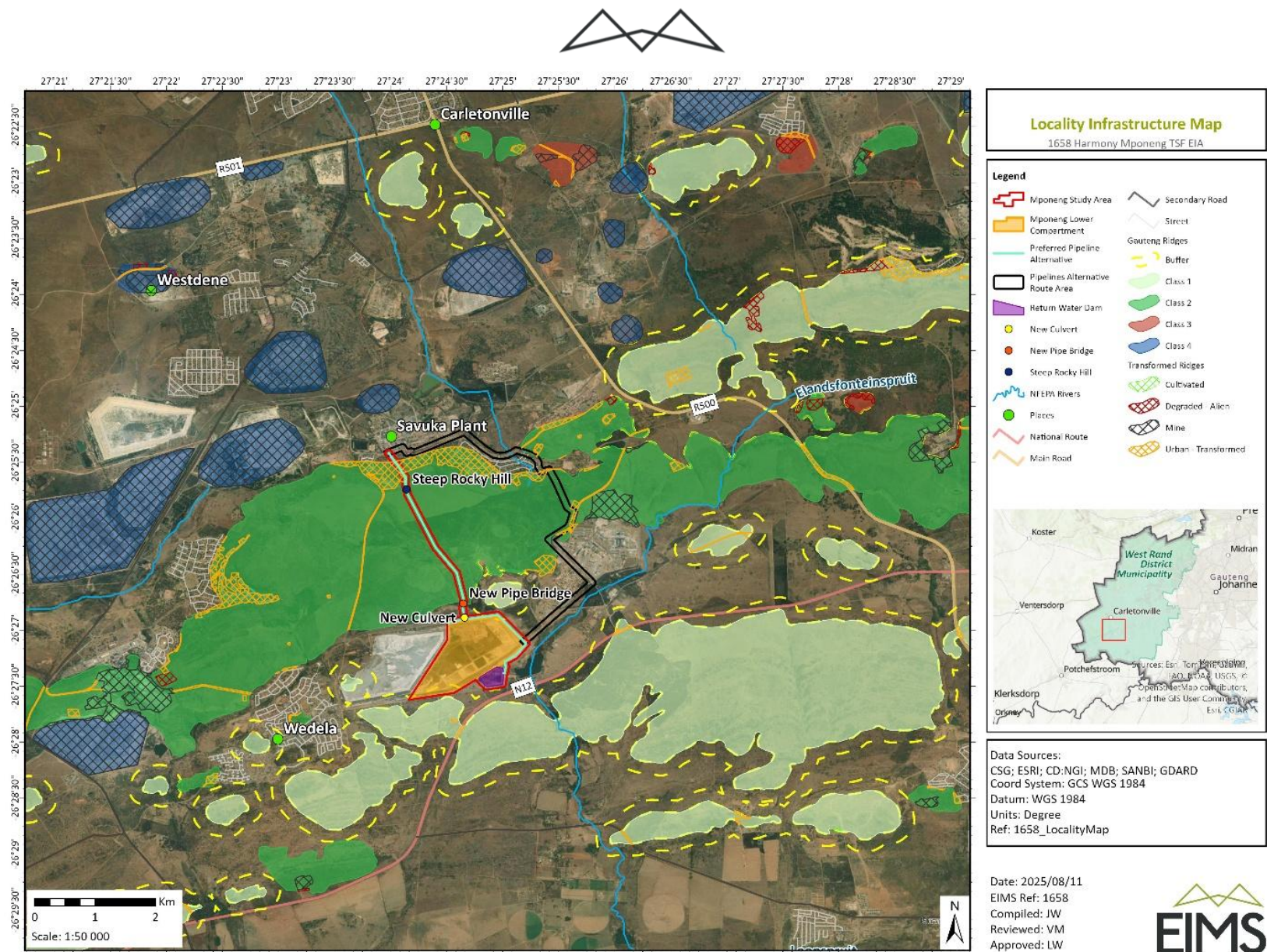


Figure 23: Map illustrating the study area in relation to the Gauteng Ridges

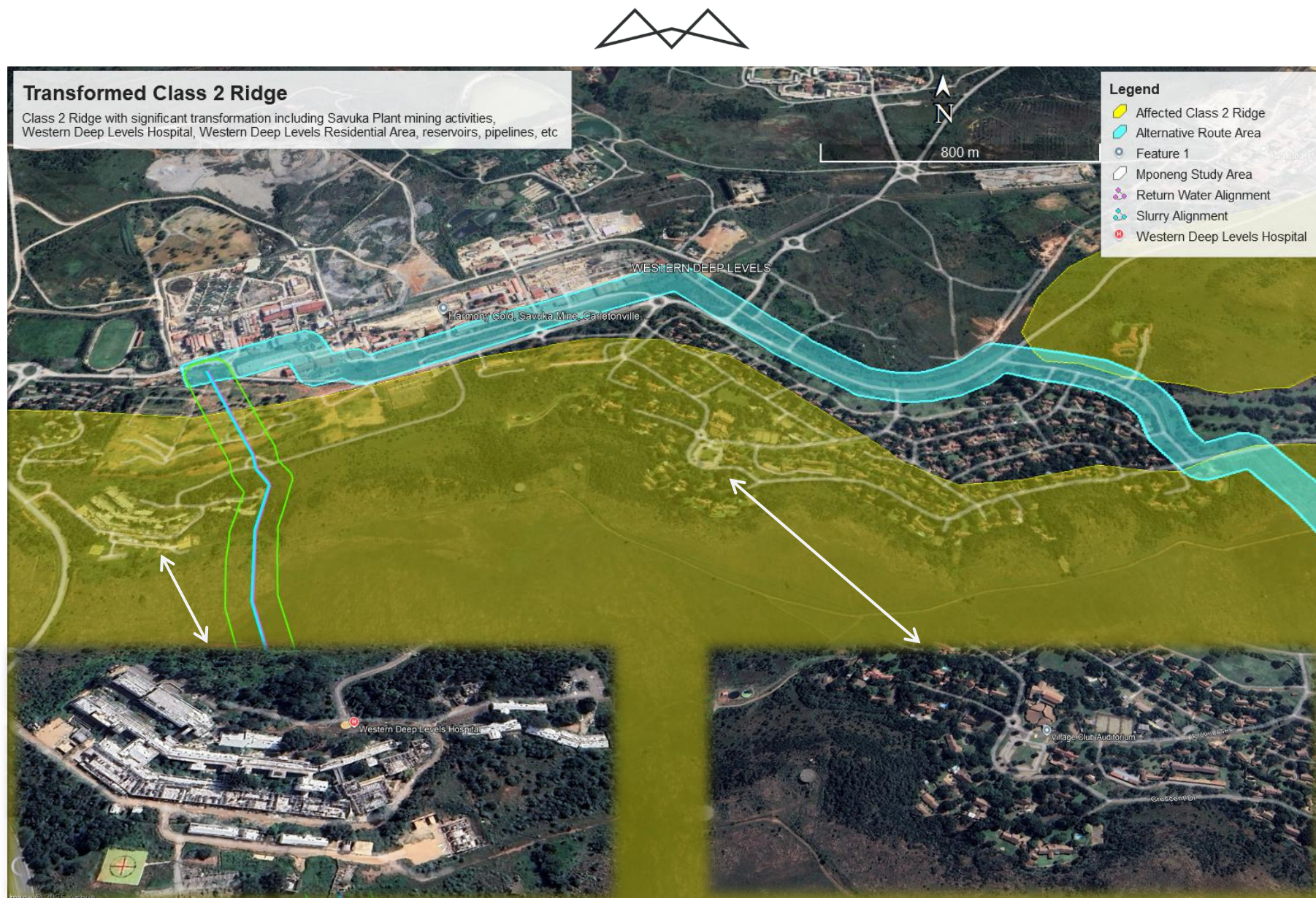


Figure 24: Aerial view map illustrating transformed state of the affected Class 2 Ridge.



4.2.6 WEST RAND DISTRICT MUNICIPALITY REGIONAL GROWTH AND DEVELOPMENT STRATEGY

The vision of the West Rand District Municipality Regional Growth and Development Strategy is to “develop and sustain an integrated, socio-economically and economically thriving and green environment with a unified society.” In order to achieve the above Vision, the Regional Growth and Development Strategy identified the following critical requirements:

- Ensure the WRDM is connected – with more people enjoying the benefits of flourishing activity centres where shops, jobs, services and recreation are within walking and travelling distance of their homes, with fast and reliable travel to and from local centres and regional opportunities, with a comprehensive, efficient and networked public transport system and pedestrian routes and access to rural and tourism areas.
- Ensure the WRDM is attractive – with quality urban and rural areas that are well-maintained, new developments which comply with high design standards, clean and safe environments and well-preserved heritage and natural areas.
- Ensure the WRDM is sustainable – with resources well managed and planned for, viable and cost-effective service provision; and where the environment is valued as a vital resource and meaningful open space is provided for all.
- Ensure the WRDM is well managed – where development decisions are predictable, fair and cost-effective, partnerships are developed, planning takes place on a continuous basis, formal systems for data collections are in place, and data is used to support and improve planning.

The WRDM Green IQ was compiled in (2012) and is a commitment to make the West Rand District the greenest district in South Africa and an African example of how sustainable development should be conducted. The Green IQ is a comprehensive strategy, built on 5 pillars, namely:

- PEOPLE: To create a place where people come first, a place characterized by equity, dignity and possibility; where everyone has the opportunity to build a better life for themselves, their children.
- ECONOMY: To restructure the economy to seize future development opportunities; to foster local resilience; to serve the people of the West Rand and to be an example of participatory prosperity.
- ENVIRONMENT: To make the precious natural resources available for future generations; create a low-carbon built environment dedicated to quality of life; and regenerate rural areas with a new sense of purpose.
- ENERGY: To facilitate the creation of new independent power producers to generate renewable, affordable and reliable energy to power new industries and create competitive advantages.
- INNOVATION: To establish itself as a centre of excellence in green technology and green living; attract the best minds; and encourage and support the industries of the future.

The redeposition activity on an already disturbed footprint to allow the continuation of mining activities is in line with the WRDM Green IQ.

4.2.7 MERAFONG MUNICIPAL SPATIAL DEVELOPMENT FRAMEWORK

In terms of chapter 5 of the Municipal Systems Act, 2000 (Act 32 of 2000), the municipality’s Integrated Development Plan “...must reflect a Spatial Development Framework which must include the provision for basic guidelines for a Land Use Management System for the municipality”. The Merafong Municipal Spatial Development Framework (MSDF), forms part of a hierarchy of plans feeding into the Integrated Development Plan (IDP). The Spatial Development Framework serves as an input into the IDP and concentrates on the spatial aspects of development planning, whereas the IDP focuses on broader developmental issues. Following the SDF in the hierarchy are Sector Plans.



The MSDF aims to guide the future spatial development of the Merafong City municipality by focusing on integrating segregated urban areas, restructuring the urban form for efficiency, and prioritizing the development of a connected network of towns while considering factors like infrastructure provision, mobility, and settlement viability, particularly within mining communities, to create a more accessible and business-friendly environment for residents and businesses alike; essentially aiming to achieve a balanced and sustainable urban landscape through strategic land use planning. Overall, the Merafong MSDF serves as a roadmap for the municipality's future development, aiming to create a more inclusive, efficient, and sustainable urban environment by strategically managing land use and infrastructure investments. The study area is located in area identified / earmarked for mining in the MSDF. It can be considered that the proposed Mponeng Lower Compartment TSF project aligns with the MSDF as a better and more sustainable development to redeposit mining waste on an existing mining waste facility than to deposit waste on an undisturbed area.

4.2.8 INTEGRATED WASTE MINIMISATION PLANS

The West Rand District Municipality's Integrated Waste Minimisation Plan is a strategy designed to reduce the amount of waste generated within the district by promoting waste reduction, reuse, and recycling initiatives, aiming to achieve sustainable solid waste management practices across the municipalities of Randfontein, Mogale City, Westonaria, and Merafong City, all while adhering to national environmental legislation and minimizing environmental impact; key aspects include community awareness campaigns, improved waste collection systems, and collaborating with businesses and industries to minimize waste at its source.

The Merafong City Local Municipality Solid Waste Management Plan aims to address the issue of waste disposal in the area by implementing a comprehensive strategy that includes waste reduction, recycling initiatives, proper collection systems, and a designated landfill site, with a strong focus on community engagement to promote sustainable waste management practices, while also considering the unique challenges posed by the region's mining history and potential environmental impacts. Waste management for Mponeng Lower Compartment TSF shall align with these Integrated Waste Minimisation Plans.



5 PROJECT ALTERNATIVES

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended, feasible and reasonable alternatives must be identified and considered within the environmental assessment process. An alternative is defined as “...in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:

- (a) property on which or location where it is proposed to undertake the activity;*
- (b) type of activity to be undertaken;*
- (c) design or layout of the activity;*
- (d) technology to be used in the activity;*
- (e) operational aspects of the activity; and*
- (f) Includes the option of not implementing the activity.”*

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection. In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the EIA Process and each role is detailed as follows:

The role of the environmental assessment practitioner is to:

- encourage the proponent to consider all feasible alternatives;
- Identify reasonable alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;
- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the proponent is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social and economic aspects.



Table 15 outlines the various alternative types that must be considered for each development. The extent of the applicability of each of these is further presented. It must be highlighted that the alternatives presented in the table are derived from both the the EIA Regulations (2014) as amended as well as the the Department of Environmental Affairs and Tourism's (now Department of Environmental, Fisheries and Forestry) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it will be further discussed in this Scoping Report. The alternatives discussed further in this SR are as follows:

- The No-Go Option;
- Process alternatives;
- Design alternatives; and
- Routing alternatives.

Table 15: Project alternatives as per NEMA EIA Regulations, 2014 as amended

ALTERNATIVE	COMMENT
No-go Option	The 'no-go' alternative is sometimes referred to as the 'no-action' alternative (Glasson <i>et al.</i> , 1999) and at other times the 'zero-alternative'. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. This alternative must be discussed on all projects as it allows for an assessment of impacts should the activity not be undertaken. This alternative is discussed in this report.
Activity alternatives	These are sometimes referred to as project alternatives, although the term activity can be used in a broad sense to embrace policies, plans and programmes as well as projects. Consideration of such alternatives requires a change in the nature of the proposed activity. This would entail a process where a different project is proposed instead of the Mponeng Lower Compartment TSF. Based on project information, there is one proposed activity and no other activity alternative. Therefore, this alternative is considered <u>not</u> feasible and will not be discussed in this report.
Location / property alternatives	Location alternatives could be considered for the entire proposal or for a component of a proposal, for example the location of a processing plant within the property boundary. The latter is sometimes considered under site layout alternatives. A distinction should also be drawn between alternative locations that are geographically quite separate, and alternative locations that are in proximity. In the case of the latter, alternative locations in the same geographic area are often referred to as alternative sites. Based on the project description, there were other alternative TSF locations considered by the applicant. The high-level assessment identified the height extension of Savuka 7a and 7b and the recommencement of deposition on Mponeng Lower Compartment TSF as the viable options. However, due to the high-level nature of the alternative site screenings, minimal information is available for a detailed site alternative assessment. In addition, it must be noted that the Savuka 7a & 7b TSF height extension and Mponeng Lower Compartment TSF projects actually form part of the alternative deposition sites currently being assessed by the applicant. The EA for the height extension of Savuka 7a and 7b was undertaken in a parallel process to this Mponeng Lower Compartment TSF. The location/property alternatives are being considered and are currently being assessed in separate processes for the West Wits Reclamation Project. Additional



ALTERNATIVE	COMMENT
	information on location alternatives will be discussed in the EIA Phase should the information be available.
Process alternatives	Various terms are used for this category, including technological alternative and equipment alternative. The purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process. An industrial process could be changed, or an alternative technology could be used. These are also known as technological and equipment alternative and are considered feasible and will be discussed in this report and in detail in the EIA Phase as they are applicable to the Mponeng Lower Compartment TSF.
Demand alternatives	Demand alternatives arise when a demand for a certain product or service can be met by some alternative means. This is applicable to the demand for a product or service. An example of this would be where there is a need to provide housing units. Examples of alternatives can be through managing demand through various methods or providing additional housing through either single dwelling residential units or mixed-use developments. Specific to the proposed project, alternatives regarding the demand are considered <u>not</u> feasible and will not be discussed in this report.
Scheduling alternatives	These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise several components, which can be scheduled in a different order or at different times and as such produce different impacts. These alternatives are considered <u>not</u> feasible to the project as there will be no significant impact variation due to scheduling.
Input alternatives	By their nature, input alternatives are most applicable to industrial applications that may use different raw materials or energy sources in their processes. Considering that the proposed development is a TSF which does not involve the conversion of raw materials into finished products, these alternatives are considered <u>not</u> feasible to the project and will not be discussed further.
Routing alternatives	Consideration of alternative routes generally applies to linear developments such as power lines, transport, and pipeline routes. There are two pipeline route alternatives assessed as part of this study. Therefore, routing alternatives are feasible and applicable to this development and will be discussed further.
Site layout alternatives	Site layout alternatives permit consideration of different spatial configurations of an activity on a particular site. This may include particular components of a proposed development or may include the entire activity. One layout with two pipeline routes has been proposed for the Mponeng Lower Compartment TSF. Based on this, site layout alternatives are considered currently <u>not</u> feasible for scoping phase but may be applicable for EIA phase.
Scale alternatives	In some cases, activities that can be broken down into smaller units can be undertaken on different scales. For example, a housing development within an overall mixed-used development could have the option of 1 000, 2 000 or 4 000 housing units. Each of these scale alternatives may have different impacts. However, the proposed TSF cannot be broken down into smaller units. For this reason, scale alternatives are considered <u>not</u> feasible and will not be discussed further.
Design alternatives	This entails the consideration of different designs for aesthetic purposes or different construction materials to optimise local benefits, and sustainability would constitute



ALTERNATIVE	COMMENT
	design alternatives. Different designs are assumed to have different impacts. Generally, the design alternatives could be incorporated into the project proposal and so be part of the project description and need not be evaluated as separate alternatives. Based on project description and background information, engineering designs are still under assessment and will be available during the EIA Phase. Therefore, design alternatives are considered feasible and will be slightly discussed in this SR and detailed in the EIA Phase.
Operational alternatives	The Operational Alternative is where you can specify controls on the operational aspects of the project such as pressure pipes, pumps, as well as valves. In the case of the proposed TSF, feasible operational alternatives were not identified and are not discussed further.

As this application relates only to a TSF which is being developed on the disturbed footprint of a an existing TSF currently used as a holding dam and landfill, there are limited feasible and/or reasonable alternatives that can be considered, and which are described and motivated below.

5.1 DESIGN ALTERNATIVES

Design alternatives are the consideration of different designs for technical efficiency, aesthetic purposes or different construction materials in an attempt to optimise local benefits and sustainability. The following design alternatives were considered for the project.

Tailings can be stored in a variety of ways: which way depends on numerous factors, for instance the local topography, how much rainfall an area gets, whether there is regular or irregular seismic activity recorded, the type of metal or mineral being mined and how close the mine is to populated areas. There is no one-size-fits-all solution, each tailings storage facility is unique. Considering that the engineering designs are still in progress, the assessment made in this report is based on the following TSF designs aspects which are discussed below:

(a) **Wall construction designs:**

- i) Downstream;
- ii) Upstream; and
- iii) Centreline.

(b) **Lining Desings:**

- i) Lined TSF; and
- ii) Unlined TSF.

5.1.1 WALL CONSTRUCTION DESIGNS

5.1.1.1 DOWNSTREAM

Downstream designs start with an impervious starter dam. Tailings are then discharged into the dam and as the embankment is raised, each new wall is constructed and supported on top of the downstream slope of the previous section, so the dam crest moves downstream with each raise (refer to **Figure 25**). The downstream design was developed for areas with seismic activity and high rainfall or water collection.

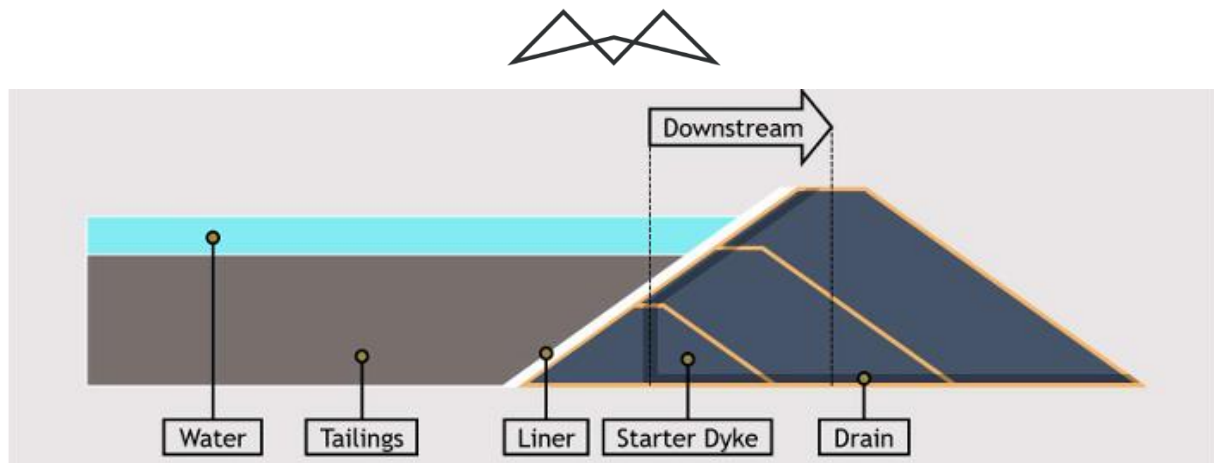


Figure 25: Downstream Tailing Storage Facility design (Yanama Gold, 2023)

Downstream tailings dams resemble typical water retaining structures but are raised in stages during operations. Downstream tailings dams are raised following a downstream direction, starting at the starter dyke, and growing away from the initial impoundment area. Tailings slurry discharged behind each new section of the dam is not used to support successive raises of the dam.

5.1.1.2 UPSTREAM

Upstream construction begins with a starter dam. The tailings are then discharged into the facility where they form a tailings beach. The deposited tailings adjacent to the dam wall is allowed to drain and then can be compacted to be used to form the foundation for subsequent levels of the wall as the dam is raised. As such, the crest of the dam moves upstream with each raise. Upstream tailings dams need to be raised slowly, to allow the solid tailings time to dry and consolidate enough to support a new level of the dam (refer to **Figure 26**). These are suitable for facilities in areas of low rainfall and low seismic activity.

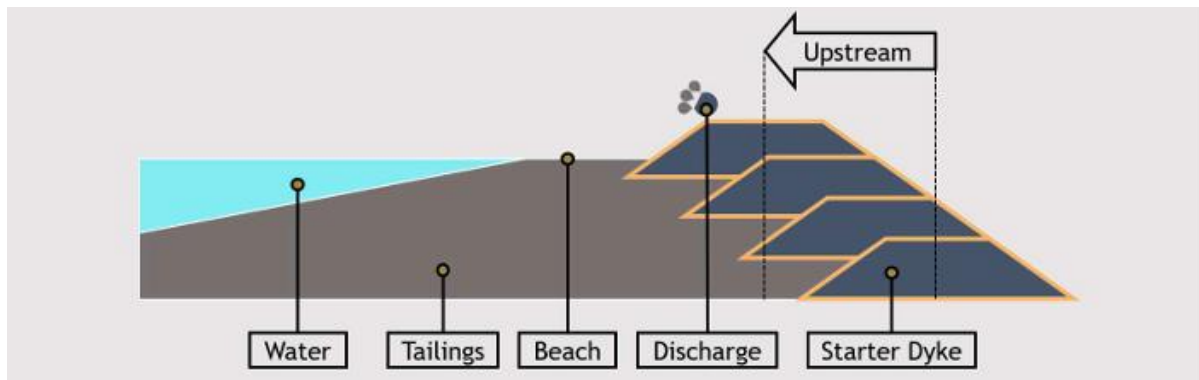


Figure 26: Upstream Tailing Storage Facility design (Yanama Gold, 2023)

An upstream tailings dam is raised in the upstream direction of the starter dyke. Tailings discharged from the starter dike are deposited at an angle away from the dam crest and allowed to drain, forming a dry beach that is used as a partial foundation for the construction of a successive embankment raise. This process is continued in stages until the dam is raised to its ultimate elevation. Adequate water management is important in this design to create a beach area close to the embankment and keep water as far as possible from the embankment. The use of thickeners and other dewatering technologies is common.

5.1.1.3 CENTRELINE

The centreline method is a hybrid of upstream and downstream designs. In centreline construction, the dam is raised vertically from the starter dam. The dam crest therefore remains fixed relative to upstream and downstream directions as the dam is sequentially raised (refer to **Figure 27**). Internal drainage can be incorporated to improve stability.

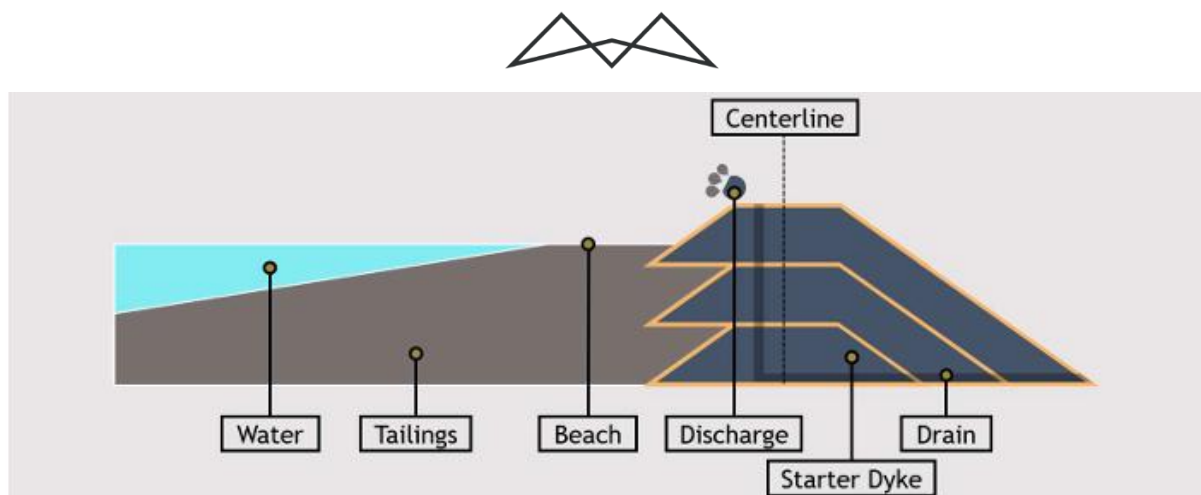


Figure 27: Centreline Tailing Storage Facility design (Yanama Gold, 2023)

A centerline tailings dam is raised vertically and its construction combines the principles of both downstream and upstream design concepts. Similar to the upstream construction method, tailings are discharged behind each dam section and allowed to dry to form a beach. This tailings beach later supports the upstream slope of the successive embankment raise. Dewatering technologies such as thickening are commonly used to improve the construction of these structures.

5.1.1.4 FILTERED TAILINGS OR DRY STACKING

Following crushing, grinding and chemical leaching to separate the target mineral from the ore, tailings are dewatered in a plant, using a thickening tank followed by filters. Most of the process water in the tailings is recovered and returned to the plant for reuse in the processing of new ore material. The unsaturated filtered tailings, also known as filter cake, are deposited and compacted to form a stable dry stack (refer to **Figure 28**). Dry stack tailings do not require the construction of a tailings dam, as these structures do not retain any slurry or water.

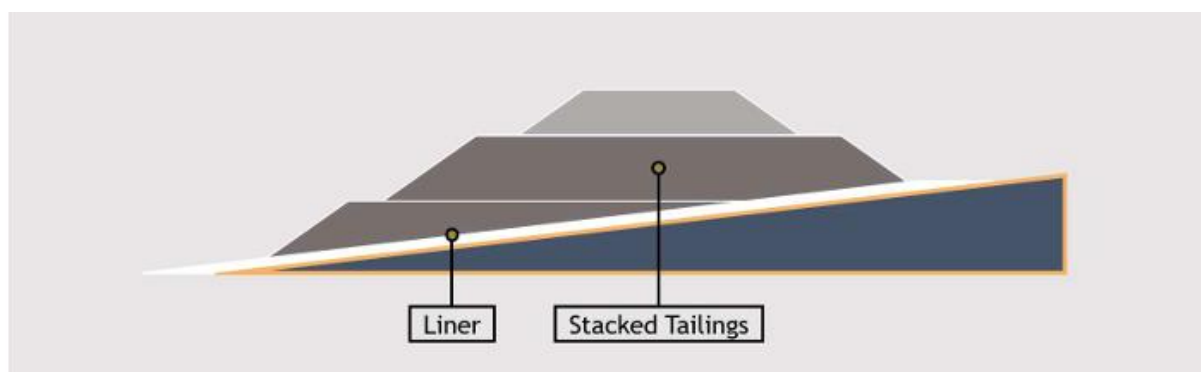


Figure 28: Filtered / Dry Stacking Tailing Storage Facility design (Yanama Gold, 2023)

The advantages and disadvantages of each of the TSF designs are indicated in **Table 16**.

Table 16: Advantages and disadvantages different TSF Designs (ICCM, 2022 & Yanama Gold, 2023)

ADVANTAGE	DISADVANTAGE
Downstream	
Downstream design can have unrestricted heights due to each raise being structurally independent of the tailings.	This construction method requires larger areas and greater volumes of construction materials
Downstream tailings dams are considered the most stable.	Method requires larger areas and greater volumes of construction materials



Upstream	
Upstream tailings dams generally require less construction materials.	Upstream method is the most common design to fail causing huge environmental consequences.
Upstream method is the lowest initial cost and most popular design for a raised tailings embankment in low-risk seismic areas.	Upstream embankments are not suited to areas of seismic activity as the risk of liquefaction increases.
Centreline	
More stable than upstream tailings dams and require less construction material than downstream tailings dams	A centreline dam cannot be used as a large water retention facility solely due to the subsequent raises being partially built on consolidated tailings
Free water can encroach closer to the dam crest than the upstream method without the worry of increasing the phreatic surface and causing a potential failure risk.	A suitable decant system needs to be installed to prevent the free water submerging the beach around the dam crest.
Filtered Tailings/Dry-Stack Tailings	
Dry stack tailings do not require the construction of a tailings dam.	Filtration technology generally makes this method more complex to operate.
Most of the process water in the tailings is recovered and returned to the plant for reuse in the processing of new ore material.	Requires close monitoring for dust management and clay content in the tailings materials.
Generally, occupies a smaller footprint and allows for improved water management.	Nil.
Filtered tailings can also support concurrent reclamation.	Nil.

Based on the advantages and disadvantages indicated in **Table 16** above, **Filtered Tailings / Dry-Stack Tailings appear to be the more favourable designs**. The wall construction option will be identified in the design report once completed and this information will form part of the EIA report.

5.1.2 DESIGN LINING OPTIONS

5.1.2.1 UNLINED TAILINGS STORAGE FACILITY / RETURN WATER DAM

As indicated in **Section 2.2.1.1**, GCS Water & Environmental Consultants conducted hydrogeological investigations for the Mponeng TSF in January 2019 and April 2025 to support designs for water management. The January 2019 report concluded that seepage rates are currently low—ranging from 12 to 20 mm/year—but are expected to increase moderately with the proposed elevation of the TSF. Seepage rates will remain fairly low for gold tailings, due the foundation geology (shales and andesites) and characteristics of the tailings material. Furthermore, most monitoring points show sulphate levels below 100 mg/L, with only two boreholes exceeding 500 mg/L. A calibrated groundwater model predicted a sulphate plume of 200-600mg/L remaining largely confined to the TSF and return water dam areas by the year 2060. However, the Aquatic Dam is already showing elevated sulphate levels, which could rise further if seepage is not effectively managed.

The Baseline Hydrogeological Assessment for The Proposed Tailings Redeposition on The Harmony Mponeng Lower Compartment Tailings Storage Facility undertaken by MvB Consulting (2025) found that groundwater occurrences in the study area are predominantly restricted to the weathered and fractured rock aquifer in the Transvaal Formations and Dolomitic and Karst Aquifers. Although the dolomite aquifer is the most prominent aquifer in the region, it does not play any role in the activities at the Mponeng Lower Compartment TSF. The dolomite is ±400m below surface at the Mponeng Lower Compartment TSF site. Evidence has shown that there



is no connectivity between the weathered / fractured aquifer and the underlying dolomite aquifer. Even in compartments where the dolomite aquifer is dewatered the groundwater levels in the weathered / fractured aquifer remains unaffected. Groundwater recharge in the fractured aquifer is estimated at 31mm / annum with water occurring in the shallow weathered zone and water bearing fractures only. This is equal to approximately 4% of mean annual precipitation. The baseline study found that the TSF is possibly impacting on the baseflow of the Elandsfontein spruit. This stream is the only down-gradient receptor that may be directly impacted on by the current and proposed tailings deposition.

Both reports confirmed that the spring is a natural groundwater discharge point, distinguished by its ambient water quality and surface flow. However, the spring water currently mixes with contaminated TSF seepage in a downstream control dam, raising environmental concerns. The GCS Water and Environmental Consultants April 2025 report recommended three key mitigation strategies:

- Implementing a spring capture system to divert clean groundwater away from the TSF;
- Diverting clean stormwater runoff from the northern area to prevent it from entering the seepage control infrastructure;
- And installing a series of scavenger boreholes along the TSF's southern toe to intercept contaminated seepage caused by groundwater mounding.

These interventions aim to significantly reduce the environmental impact of the TSF during both operational and post-closure phases. The reports concludes that most test pits on the original ground level showed no seepage during the geotechnical investigation, except TP32, which may be influenced by the upper compartment's embankment. Moderate to strong seepage was observed at the base of the landfill site due to its permeable waste material, though downstream test pits showed no seepage, suggesting localized infiltration. Additionally, significant seepage was found at the southeast corner of the starter wall, potentially sourced from the lower compartment's catchment area or along bedrock lineations. In conclusion, the previous hydrogeological studies have indicated very low seepage rates beneath and around the facility, primarily due to the low permeability of the bedrock and the presence of artesian conditions. Additionally, tailings have already been deposited on the proposed footprint below the level that a liner can be safely installed. For these reasons, Golden Core Trade and Invest prefers an unlined facility. Only if the licence application for an unlined facility is unsuccessful will the lined option be pursued.

The MvB Baseline Hydrogeological Report indicated that the following phase of the investigation will be the development of a numerical groundwater flow and mass transport model. The groundwater model, once calibrated, will be used to simulate contaminant migration and the effectiveness of recommended management options. The latter includes, but not restricted to, the following:

- Lining of the proposed tailings facility.
- Cut-off trench on the down-gradient side of the TSF.
- Scavenger boreholes to intercept and contain the contaminant plume.
- Phyto-remediation.

The most suitable remedial option may be one, or a combination of the above options. It is expected that a liner such as the inverted barrier system will be suitable to prevent any potential contaminant impact on the groundwater in the immediate area. There is, however, a cumulative impact from the existing TSF. The aim of the numerical modelling is to quantify the benefit of installing a liner for the Mponeng Lower Compartment TSF.

5.1.2.2 LINED TAILINGS STORAGE FACILITY OPTION / RETURN WATER DAM

Under current environmental legislation in South Africa, tailings are viewed as potentially hazardous waste that needs to be disposed of in compliance with the appropriate minimum requirements. Traditionally, tailings in South Africa have been built on top of the *in-situ* soils. The use of composite liners is relatively new in tailings dam construction in South Africa and brings with it its own set of challenges. The requirement for a barrier system in South Africa regulations were promulgated under the National Environmental Management Act -



Regulations 632, 634, 635 and 636. These are currently administered by the Department of Water and Sanitation (DWS). Under these regulations waste, including tailings, is assessed under Waste Acceptance Criteria for Disposal to Landfill, which determines the requirements for disposal of different types of waste. Under these regulations, many mineral residue deposits are found to require a barrier system, which typically includes a geomembrane. It is usually not practical, and currently not mandatory, to retrofit a barrier system to existing tailings dams. However, there is an increase in the number of new tailings dams being constructed to include a barrier system.

The Department (DWS) no longer condones South Africa's philosophy of the past 20 years, in terms of which dilution of water contamination and dispersion relying on attenuation was regarded as acceptable (Legge, 2019). Protection of water resources, and prevention of contamination in the first place (source) is now being sought in preference to mitigating contamination spread (pathway) and pollution cleanup (receptor). Apart from preventing polluted leachate from seeping into the groundwater, an additional benefit of lining a tailings dam is that more water in the tailings system can be captured and returned to the plant. This is useful in a water-scarce country such as South Africa. Since the tailings industry has not always included barrier systems in design or construction, there are learnings to be acquired, even by seasoned tailings consultants and contractors, on how to work with these systems. A proposed amendment to Regulation 632 (2016) has been drafted whereby there could in future be a relaxation of the regulations on a case-by-case basis, following a risk-based approach. However, such regulations have yet to be promulgated into law. In the meantime, the current regulations apply to the disposal of tailings in the same way they apply to the disposal of any other waste to landfill.

The alternatives relate to the liner design for the TSF and the RWD. However, the liner requirements are based on the waste classification of the material, geohydrological modelling and risk assessment. Tailings use liners to prevent the release of concentrated mine chemicals into the environment. Many regulatory agencies request lined Tailings Storage Facilities in hopes of better protecting groundwater resources. Liners are not always necessary; however, tailings solution containment is critical to meeting environmental requirements and the necessary assessments and measures must be undertaken to ensure best environmental practices. The necessity of liners for TSF and/or RWD are subject to the type, nature and surrounding geohydrological conditions in consultation with the 2013 regulations published in terms of the National Environmental Management: Waste Act, notably GN R. 634 to GN R. 636 relevant to Waste Classification and Management, National Norms and Standards for the Assessment of Waste for Landfill Disposal and National Norms and Standards for Disposal of Waste to Landfill.

For important reasons, hazardous waste landfills are the most closely regulated and structured landfills. They are specifically designed to hold hazardous wastes in a way that virtually eliminates the chance of it being released into the environment. In addition to these design requirements, hazardous waste landfills are often inspected multiple times a year to make sure that the facility is up to code and the standards are top-notch. Some of the design requirements for hazardous waste landfills include:

- Double liners;
- Double leachate collection and removal systems;
- Leak detection systems;
- Run on, runoff and wind dispersal controls; and
- Construction quality assurance programs.

As indicated in **Section 2.2.1.2**, an inverted barrier system with equivalent performance to a Class C barrier can be motivated for implementation if the TSF needs to be lined. It is important to note that this barrier system will reduce contamination from newly deposited tailings on the Lower Compartment but will not reduce contamination from the tailings already placed on the facility nor from the existing Upper Compartment. The inverted barrier system substantially reduces the seepage areas as well as the seepage rate by changing the seepage flow from orifice flow to Darcian flow. This is achieved by placing the geomembrane on top of a SANS 10409 (2020) compliant receiving face of reworked foundation soil (consisting of existing tailings) instead of a



clay layer and sliming fine tailings over the geomembrane. A Class C performance barrier system has been opted for the RWD. The geomembrane was changed from a general Class C 1.5 mm HDPE to a 2 mm HDPE to improve the liner performance as well as to negate the use of a clay layer below. Seepage losses through a traditional Class C barrier is primarily determined based on the number of holes intersecting wrinkles as reflected in the Casagrande lecture 2012 by RK Rowe. For the inverted barrier, seepage losses change from orifice flow controlled by the Bernoulli equation at wrinkles (with Darcian flow through the area beneath the wrinkle) to Darcian flow through the tailings at the discontinuity in the geomembrane. Furthermore, this barrier system substantially reduces the risk of damage to the liner when placing above liner ballast and gravel by mechanical means and increases stability by eliminating the low strength expansive clay and its interface with the geomembrane in the outer wall zone between the toe wall and starter wall (Eco Elementum, 2025).

5.1.2.3 UNLINED TAILINGS STORAGE FACILITY WITH PHYTOREMEDIATION

Phytoremediation is a green, cost-effective technology that uses plants to remove, degrade, or stabilize contaminants from soil, water, or air. It works by plants absorbing pollutants through their roots, storing them in their tissues, converting them to less harmful substances, or releasing them as vapors. This process includes methods like phytoextraction (storing metals in plants) and rhizofiltration (using roots to filter pollutants from water). Phytoremediation is proposed as a cost-effective plant-based approach of environmental remediation that takes advantage of the ability of plants to concentrate elements and compounds from the environment and to detoxify various compounds without causing additional pollution. The concentrating effect results from the ability of certain plants called hyperaccumulators to bioaccumulate chemicals. The remediation effect is quite different. Toxic heavy metals cannot be degraded, but organic pollutants can be and are generally the major targets for phytoremediation. Phytoremediation is effective for a wide range of contaminants, including:

- Heavy Metals: such as arsenic, cadmium, and lead.
- Organic Compounds: including petroleum hydrocarbons, pesticides, and solvents.
- Radionuclides: radioactive elements found in contaminated soil and water.
- Landfill Leachates: liquids that seep from landfills.

Although attractive for its cost, phytoremediation has not been demonstrated to redress any significant environmental challenge to the extent that contaminated space has been reclaimed. The advantages and disadvantages of lined, unlined TSFs and unlined TSF with Phytoremediation are indicated in **Table 17**.

Table 17: Advantages and disadvantages Lined, Unlined TSF and Unlined TSF with Phytoremediation

ADVANTAGE	DISADVANTAGE
Lined TSF	
A lining under a tailings also allows more water in the tailings system to be captured and returned to the plant for reuse.	The lining of the Mponeng Lower Compartment TSF could affect the stability of the TSF as it is an existing facility which has been inactive for years. The installation of the liner could therefore affect the stability as it will be a liner on top of old tailings. Liners can be difficult to install especially on top of an existing TSF Facility which has been inactive for years.
A geomembrane liner, such as high-density polyethylene (HDPE), prevents leachate (polluted liquid) from seeping into the groundwater and surrounding soils	Liners need to be properly installed for maximum pollution prevention.



ADVANTAGE	DISADVANTAGE
By containing contaminated liquids, liners protect both the environment and local water resources from pollution	Requires artificial drainage systems and rigorous monitoring for stability and performance.
Aligned with the current DWS requirement for the use of liners for the safe disposal of tailings	Prone to damage and localized leakage, necessitating strict quality control during installation.
	The introduction of a liner can alter the interface between the tailings and the underlying materials, requiring new methods to assess and ensure the stability of the facility.
Unlined TSF	
Unlined facilities require less initial investment as they don't involve the cost of lining materials or the increased complexity of a lined system, which can also make them easier to operate and maintain	No pollution prevention. May pose significant environmental risks due to potential seepage of toxic contaminants into groundwater and soil.
The absence of liners and associated complex systems simplifies the design and construction process, making them quicker to build and deploy.	Water use inefficiency - No recycling of water. More water in the tailings system escapes and not returned to the plant for reuse.
The lining of the Mponeng Lower Compartment TSF could affect the stability of the TSF as it is an existing facility which has been inactive for years. The installation of the liner could therefore affect the stability as it will be a liner on top of old tailings. Therefore, an unlined facility will affect the stability of the TSF less as it will not separate the two layers (old and new) of tailings	Seepage through unlined facilities can lead to the contamination of aquifers and soil, affecting water sources for communities and ecosystems downstream of the mine site
Based on the pre-feasibility report, the Mponeng Lower Compartment TSF have already been deposited on the proposed footprint below the level that a liner can be safely installed. Therefore, an unlined TSF would be safer.	Without a liner, there is a greater risk of uncontrolled leakage or, in the worst case, a complete failure of the facility, which could release vast quantities of toxic slurry and debris into the surrounding environment
	Closing and rehabilitating an unlined facility presents significant challenges, as long-term containment of potential contaminants in the natural environment is more difficult to achieve and can be very expensive.
Unlined TSF with Phytoremediation	
Phytoremediation can be as effective / equivalent to lined TSF.	Phytoremediation is limited to the surface area and depth occupied by the roots
It preserves the topsoil, maintaining the fertility of the soil. Increase soil health, yield, and plant phytochemicals.	With plant-based systems of remediation, it is not possible to completely prevent the leaching of contaminants into the groundwater (without the complete removal of the contaminated ground, which in itself does not resolve the problem of contamination).



ADVANTAGE	DISADVANTAGE
The use of plants also reduces erosion and metal leaching in the soil.	The survival of the plants is affected by the toxicity of the contaminated land and the general condition of the soil.
Dust and visual disruption are usually less than with alternative methods.	Some plants are too hard to cultivate or too slow growing to make them viable for phytoremediation despite their status as hyperaccumulators.
The cost of the phytoremediation is lower than that of traditional processes both <i>in situ</i> and <i>ex situ</i> .	

Based on the advantages and disadvantages indicated in **Table 17** above, **Lined TSF's can be considered as favourable designs**. However, unlined TSF's are at certain circumstances the more viable option when considering the underlying geological and geohydrological conditions and the installation of a fully functional phytoremediation process. Based on the preliminary geohydrological information, for the proposed Mponeng Lower Compartment TSF, a lined facility will have environmental benefits over an unlined facility. However, the **study also found that the phytoremediation is a more effective option, and it is recommended that this option be considered**. The installation of a liner and / or scavenger boreholes may improve the rehabilitation of the groundwater, but it is considered unnecessary as the phytoremediation is effective on its own. Detailed conditions, advantages and disadvantages will be obtained from the geohydrological study and presented in the EIA Report. DWS will be engaged to determine lining requirements for the application.

5.1.3 PIPELINE DESIGNS

In order to allow for slurry deposition on Mponeng Lower Compartment TSF from either of the operational plants, new residue deposition pipelines will be required (**Figure 7**). The residue deposition pipelines will have a NB diameter of more than 360mm with a peak throughput of more than 120 ℓ/s. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths. Slurry pipelines can be made of many different materials such as carbon steel, alloy steel, hardened steel, stainless steel, abrasion resistant lined pipes, and non-ferrous pipes, HDPE etc. The material of the pipeline is generally selected based on the application, material being pumped, and cost. The assessment of slurry pipelines design alternative on this report is based on relative location to the ground; aboveground and underground. Based on the analysis of the same type of pipelines proposed for the project, the advantages and disadvantages of the pipeline in relation to the ground is provided in **Table 18**.

Table 18: Advantages and disadvantages Pipelines Design

ADVANTAGE	DISADVANTAGE
Above-Ground Pipelines	
Above-ground pipelines are much easier and cheaper to build and install.	Can be easily damaged, requires constant monitoring and maintenance.
Above-ground pipelines are much easier and cheaper to monitor and maintain.	Generally, have a shorter lifespan.
Above-ground pipelines allows for quicker and effective repairs, reducing the amount of pollution	Easily accessible, there is also the concern of vandalism and the chance that damage may lead to leaks and impacts on the environment.
Above-ground pipelines have lesser environmental impacts as there are shallow distal excavations and no deep excavations or blasting requirements.	
Below-Ground Pipelines	



ADVANTAGE	DISADVANTAGE
Security: Below-ground pipelines are less likely to be affected by weather phenomenon and/or vandalism.	Pipelines are more difficult and expensive to build and install.
Below-ground pipelines generally require less frequent monitoring and maintenance.	Pipelines are more difficult and expensive to maintain.
The land above the pipeline can be rehabilitated to blend in with the surrounding landscape / land use.	Pipelines have more environmental impacts as there is a need for excavations and/or blasting requirements. Any leak directly contaminates the environment and may be only recognized after a period of time.

Based on the advantages and disadvantages indicated in **Table 18** above, it is the **EAPs opinion that above-ground pipelines are the more favourable designs**. Based on the project description, the proposed Mponeng Lower Compartment TSF will follow the above-ground pipelines design.

5.2 PROCESS ALTERNATIVES

5.2.1 CONVENTIONAL DISPOSAL METHODS

There are various deposition techniques which are applicable to tailings storage facilities. Once the tailings slurry (dilute or paste consistency) has arrived at the tailings storage area, there are several possible ways it can be deposited. These include the spigotting method, cyclone deposition and the paddocking method.

5.2.1.1 SPIGOTTING METHOD

Spigots are multiple outlets along a delivery pipeline. They are used when it is easily possible to cause a gravitational grading split between the coarse and the tailings' fine fractions. Reticulation along the TSF embankment is achieved through spigot pipes extending from delivery stations located on the pre-constructed embankment crest (**Figure 29 left**). The spigot pipes are laid along the main wall, allowing deposition to occur from any point on the crest. In the course of a deposition cycle, a batch of adjacent spigots is opened, sufficient to cater for the slurry flow rate (**Figure 29 right**). Spigots break up the tailings delivery stream into smaller streams, thus causing a drop in stream velocity. This velocity drop lets the coarser fractions settle close to the deposition point. As the beach fills, spigots at one end of the batch are opened while the equivalent number at the other end is closed so that the deposition gradually moves along the spigot pipe and around the tailings dam.





Figure 29: Example of spigot deposition. Spigot at a pre-constructed embankment crest (left) and spigot pipes laid along the main wall (right) (Goldfields, 2023)

A variation to this method is where the spigot pipeline is located on the embankment crest, and the perimeter bund is raised to coincide with the tailings deposition cycle. The spigot lines usually have a series of nozzles located along the delivery pipeline at intervals of 2 m to 3 m. During each deposition cycle, a section of the spigot pipe is dismantled and moved to one side to allow the perimeter bund's raising, which is usually constructed of the beach tailings.

5.2.1.2 PADDOCK OR DAYWALL DEPOSITION

The daywall is so-called as it is that portion of the dam used during the day when there is supervision available and daylight to see what is going on. The conventional daywall is used to deposit uniformly graded tailings through an open-ended discharge located at one end of the paddock daywall (**Figure 30 left**). The principle of a paddock or daywall is to create or form small impoundments or containment berms with dried-out tailings borrowed from the previous layer deposited around the perimeter or edge of the paddock (**Figure 30 right**). These shallow paddocks are then filled preferentially with dilute ($\pm 30\text{-}50\%$ solids) slurry. The tailings solids settle out of suspension, releasing clear water, the bulk of which can be decanted from the surface of the paddock into the basin via a drain or "vent" pipe. The resulting layer of slimes continues to dry out through some seepage, but mainly through evaporation resulting in shrinkage cracking of the surface.

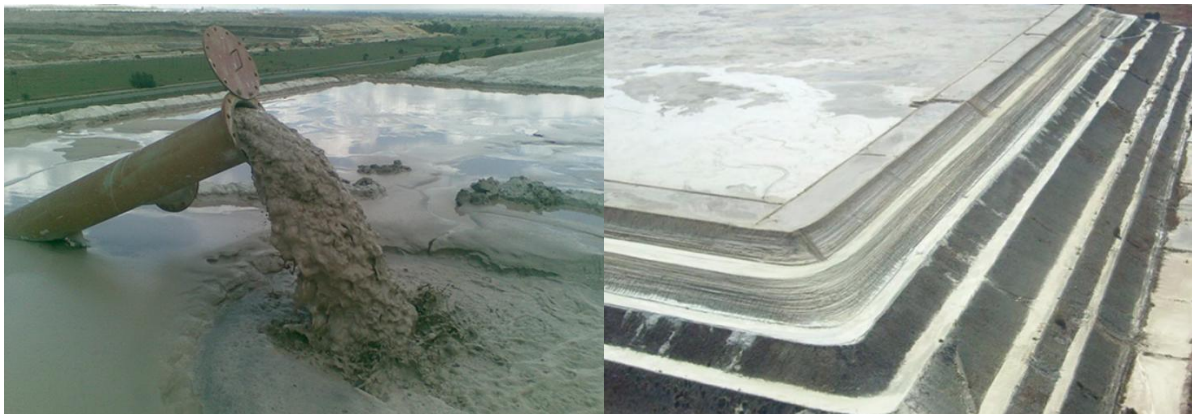


Figure 30: Example of daywall deposition. An open-ended discharge at one end of the paddock daywall (left) and small impoundments with dried-out tailings (right) (Goldfields, 2023)

Since each subsequent layer deposited is formed on top of the previous layer, a paddock or daywall can essentially only be developed in an upstream manner. By definition, the upstream wall development stability depends on the strength of the earlier deposited underlying layers. Thus, it is essential to develop a daywall facility in thin layers (maximum 200 mm) to allow consolidation.

5.2.1.3 CYCLONE DEPOSITION

In **cyclone deposition** is a cyclone deposition device consisting of conical housing equipped with a feed pipe that enters the cone at its larger diameter closed end. A second pipe enters the cone and intrudes into the body of the cone. The slurry feed enters under pressure and is forced to swirl with a spiral motion towards the smaller end. In the process, centrifugal forces cause the larger particles in the slurry to move down and away from the axis, towards the narrow exit of the cone. The net effect is that the finer particles and most of the water leave the cyclone through the vortex finder and form the "overflow," while the partially dewatered larger particles leave at the opposite end as the coarser "underflow (**Figure 31**). The purpose of using a cyclone is to create underflow material that has good geotechnical characteristics, i.e., high permeability, fast consolidation and strength gain rate than the original tailings so that the underflow can be used to form an impoundment wall to the tailings storage facility. Effective operations of a cyclone TSF can also result in high water recoveries.



Figure 31: Example of cyclone deposition (Goldfields, 2023)

Currently cyclone deposition is the vastly preferred method of deposition for the majority of Harmony's current TSF operations due to the reasons described above. The environmental impacts associated with each deposition method are similar, however **cyclone deposition has higher water recovery rates and is also preferred from a geotechnical perspective.**

5.2.1.3.1 HYDROCYCLONE

Golden Core Trade and Invest proposes to implement the hydrocyclone deposition method. The hydrocyclone is a widely used classifier in the mineral-processing industry. It is installed in close circuit between the grinding and conditioning paths for flotation of complex base metal ore. It consists of a cylindrical section at the top connected to a feed chamber for continuous inflow of pulp, which is then expelled through an overflow pipe. The unit continues downward as a conical vessel and opens at its apex to the underflow of coarse material (**Figure 32**). The feed is pumped under pressure through the tangential entry that imparts a spinning motion to the pulp. The separation mechanism works on this centrifugal force to accelerate the settling of particles. The velocity of slurry increases as it follows in a downward centrifugal path from the inlet area to the narrow apex end. The larger and denser particles migrate nearest to the wall of the cone. The finer/lighter particles migrate toward the center axis of the cone, reverse their axial direction, and follow a smaller diameter rotating path back toward the top. The oversized discharge fractions return to the mill for regrinding, while the undersized fractions move to the conditioning tank for flotation. Hydrocyclones perform at higher capacities relative to their size and can separate at finer sizes than other screening and classification equipment.

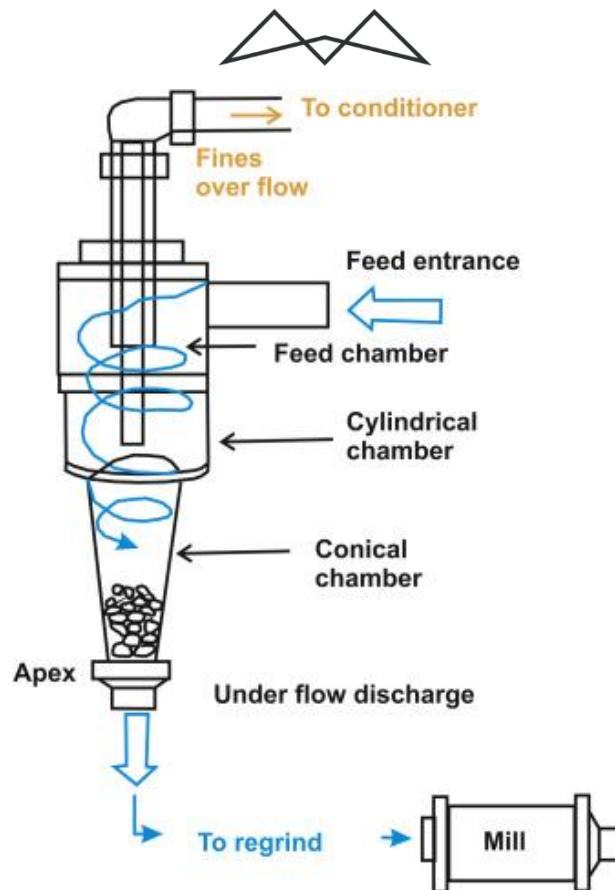


Figure 32: Sketch diagram showing the working principle of a hydrocyclone in close circuit classification (Halдар, 2018)

With no moving parts, hydrocyclones are inherently simple and robust, leading to lower initial investment and reduced maintenance needs. They can be compact and occupy less space, and multiple units can be arranged in parallel or series to handle large volumes. Hydrocyclones can process large volumes of material, making them efficient for high-capacity applications. They can operate at high temperatures and can handle both liquid mists and dry materials, depending on the application. However, a significant drawback is their high energy requirement due to the pressure drop across the unit, leading to high operating costs. Their efficiency drops significantly for very fine particles (under 5-10 micrometers) and can be poor at less-than-capacity flow. While simple, the abrasive nature of the slurry can cause wear and tear on the cyclone's materials over time. They are also unsuitable for processing sticky or adhering materials, which can clog the cyclone.

5.2.2 ALTERNATIVE TAILINGS DISPOSAL DETHODS

Despite technological advances in mineral processing, mining companies still face challenges in how to best manage tailings materials. In addition, mining of lower grades of ore has resulted in increased water use per unit of production; at certain sites, water availability is the single greatest constraint on mine development. In some cases, alternative tailings disposal (ATD) has been viewed as a 'silver bullet' that will address all tailings management issues, especially water concerns. In addition, in some cases ATD technologies also promise a smaller footprint and reduced environmental impact and risks. Despite the perceived advantages, there are a number of factors that determine whether an ATD technology including:

- Energy supply: removing water from a slurry requires significant energy, with increased energy, expenditure comes with additional costs;
- Production rates: conventional tailings deposition remains the only proven technology at mines with high production rates;
- Project economics: a reduced footprint and less water used come at the expense of higher initial capital;



- Operational predictability: mines operating under narrow production constraints may be prohibited from employing ATD technologies because of the possibility of operational instability;
- Topography: some ATD technologies lend themselves to flat topographies and are usually not feasible (without embankment support) at sites with even moderately steep terrain; and
- Water: in many cases, the water saved by the ATD technology is only marginally better than conventional disposal methods.

Based on the above listed challenges, Conventional Disposal Methods are preferable over the Alternative Tailings Disposal methods.

5.3 PIPELINE ROUTING ALTERNATIVES

Consideration of alternative routes generally applies to linear developments such as power lines, transport and pipeline routes. In route investigations, various corridors are investigated and compared in terms of their impacts. Although the project is largely a footprint development and route alternatives are usually not applicable to such developments, route alternatives are applicable to this project due to the proposed residue pipeline from Savuka Plant to Mponeng Lower Compartment TSF which has two optional routes (refer to **Figure 33**).

- Savuka Plant to Mponeng Lower Compartment TSF pipeline route (proposed):
 - The proposed slurry and return water pipes extend from the south of Savuka Plant at starting point 26°25'24.95"S; 27°23'58.94"E, extending southwards, parallel to each other until reaching the northern extent of Mponeng TSF where they split. Thereafter, the slurry pipeline extends to west before connecting to Mponeng TSF while the return water pipeline extends east then south around the TSF to the return water dam.
 - The slurry pipeline is approximately 3.36km long extending from the Savuka Plant at 26°25'24.77"S; 27°23'58.84"E and ending at the Mponeng Lower Compartment TSF northern edge at 26°26'57.60"S; 27°24'31.59"E.
 - The return water pipeline is approximately 4.85km long extending from the Savuka Plant at 26°25'24.77"S; 27°23'58.84"E and ending at the Mponeng Lower Compartment TSF return water at 26°27'23.09"S; 27°25'0.37"E.
- Savuka Plant to Mponeng Lower Compartment TSF pipeline route alternative 1:
 - There alternative slurry and return water pipeline route extends to the east through Western Deep Levels then south along Mponeng Gold Mine before heading to the west where it connects to Mponeng.
 - The alternative slurry and return water pipelines route follow the same path. Both commence at the Savuka Plant at 26°25'24.77"S; 27°23'58.84"E and connect to the Mponeng Lower Compartment TSF on the southeastern section at 26°27'6.62"S; 27°25'10.61"E where the slurry pipeline ends while the return water pipeline extends slightly further to connect to the return water dam at 26°27'23.09"S; 27°25'0.37"E.. Subsequently, the alternative slurry pipeline is 6.73km long while the alternative return water pipeline is 7.4km long.

The pipelines will have a NB diameter of more than 360mm with a peak throughput of more than 120 ℓ/s. The pipelines will be flanged steel pipelines and installed above-ground on pre-cast concrete plinths. The advantages and disadvantages of each route are presented on **Table 19**.

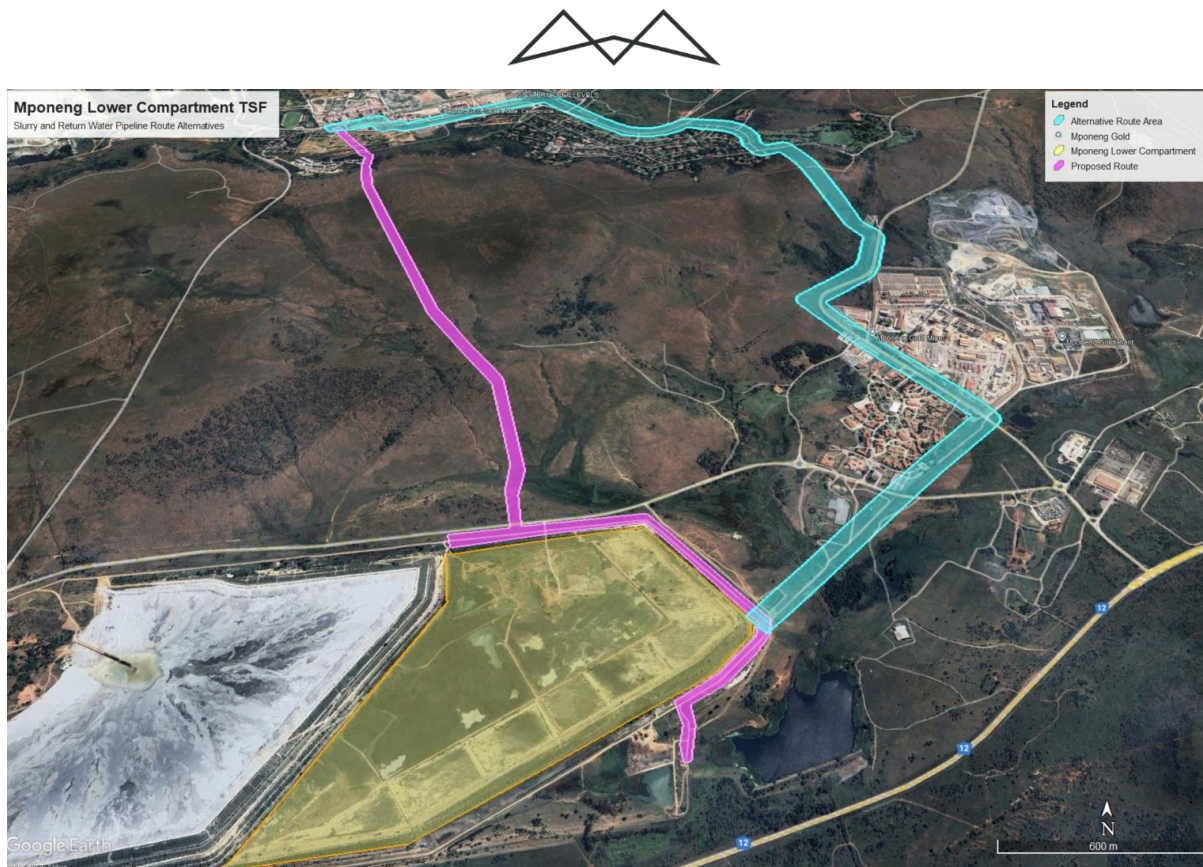


Figure 33: Aerial view of the pipeline route alternatives

Table 19: Advantages and disadvantages of pipeline routes

ADVANTAGE	DISADVANTAGE
Savuka Plant to Mponeng Lower Compartment TSF pipeline route (proposed)	
Shorter: slurry pipeline is approximately 3.36km and return water pipeline is approximately 4.85km long. Making it cheaper to install the pipes. However, it should be noted that the construction of the bridge and culvert may result in this option becoming more expensive	Intersects two archaeological sites: stonewalling (MPnr1) and stonewalling with possible kraals (MPnr2). Both of these sites are rated as having high significance and graded as Grade IIIA. Requires deviation along these heritage features.
	Requires new culvert for the road section and requires new pipe bridge for the channelled valley bottom wetland section
	Anticipated to have more construction related impacts on the watercourse (i.e., construction of the bridge and the culvert within the channelled valley bottom wetlands
Savuka Plant to Mponeng Lower Compartment TSF pipeline route alternative 1	
Along largely disturbed footprint, lesser environmental impacts. No deviations required.	Longer: the alternative slurry pipeline is 6.73km long while the alternative return water pipeline is 7.4km long. Making it more expensive to install the pipelines. However, it should be noted that this option does not include any construction of a bridge
Largely follows existing pipelines with existing access and maintenance routes	



Appears not to require any additional crossing structures such as a bridge and/or a culvert	and culvert which may ultimately result in this option becoming less expensive
---	--

Based on preliminary assessment **route alternative 1 is preferable at this stage**. Specialist studies will be undertaken in the EIA phase to confirm the preferred route.

5.4 NO GO ALTERNATIVE

The no go alternative would imply one of two scenarios; either continue deposition on the other nearby TSF which are already nearing their capacity or stop the operations. The first option would result in overburdening the Mponeng Upper Compartment TSF and/or Savuka TSFs. The aforementioned TSFs are already nearing their carrying capacity and would therefore make the TSFs unstable and unsafe and possibly breaking their walls. As indicated above, these facilities are approaching their final and approved height, and the current planned Life of Mine (LOM) for the West Wits Region exceed the available deposition capacity of these TSFs. The Savuka tailings facility has reached the end of its lifecycle and is undergoing a short-term extension of two years. Following this period, tailings from Savuka will need to be diverted to an alternative facility. The second option would mean once the Mponeng Upper Compartment and Savuka TSFs reach their carrying capacity and approved height, deposition would stop which would mean the mining activities would come to a halt. That would negatively affect the future viability of Harmony's West Wits mining operations and massive socio-economic impacts would emanate due to lack of deposition space. This would also negatively affect the company's financial closure and rehabilitation plans. Subsequently, the No-Go Alternative, would have a significant financial impact on not only Harmony, but also have a direct negative impact on the workforce on the mine and surrounding businesses and communities that are directly or indirectly linked to the operations. As such, **the no go alternative is considered not feasible or reasonable** for this project.



6 STAKEHOLDER ENGAGEMENT

The Public Participation Process (PPP) is a requirement of several pieces of South African legislation and aims to ensure that all relevant Interested and Affected Parties (I&APs) are consulted, involved and their comments are considered, and a record included in the reports submitted to the Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study. The PPP for the proposed project needs to be managed sensitively and according to best practises to ensure and promote:

- Compliance with international best practice options;
- Compliance with national legislation;
- Establishment and management of relationships with key stakeholder groups; and
- Involvement and participation in the environmental study and authorisation/approval process.

As such, the purpose of the PPP and stakeholder engagement process is to:

- Introduce the proposed project;
- Explain the authorisations required;
- Explain the environmental studies already completed and yet to be undertaken (where applicable);
- Solicit and record any issues, concerns, suggestions, and objections to the project;
- Provide opportunity for input and gathering of local knowledge;
- Establish and formalise lines of communication between the I&APs and the project team;
- Identify all significant issues for the project; and
- Identify possible mitigation measures or environmental management plans to minimise and/or prevent negative environmental impacts and maximize and/or promote positive environmental impacts associated with the project.

6.1 PRE-CONSULTATION WITH THE COMPETENT AUTHORITY

A pre-application meeting with the Competent Authority (CA) for the Integrated Environmental Authorisation Application, the Department of Mineral and Petroleum Resources Gauteng Region was requested by the EAP on the 15th of August 2025. The pre-application meeting was held on the 29th of August 2025. The purpose of the pre-consultation was to provide the authorities with background information of the proposed project, confirm NEMA EIA and NEMWA triggered listed activities, the process to be followed and plan of study for the EIA such as specialist studies and public participation. It should also be noted that that a pre-application meeting with the other CA for the Water Use Authorisation Application, the Department of Water and Sanitation was requested on the 14th of August 2025. At the time of compilation of this report, the pre-application meeting with DWS had not yet been undertaken, as such identified Section 21 triggered activities, the process to be followed and the lining requirements were not confirmed by the CA.

6.2 GENERAL APPROACH TO SCOPING AND PUBLIC PARTICIPATION

The PPP for the proposed project is undertaken in accordance with the requirements of the MPRDA and NEMA EIA Regulations (2014), and in line with the principles of Integrated Environmental Management (IEM). IEM implies an open and transparent participatory process, whereby stakeholders and other I&APs are afforded an opportunity to comment on the project and have their views considered and included as part of project planning.

An initial I&AP database has been compiled based on known key I&AP's, Windeed searches, and stakeholder databases provided by the applicant consisting of key stakeholders within the Harmony West Wits Mining



operations area. The I&AP database includes amongst others, landowners, ward councillors, communities, regulatory authorities and other special interest groups.

6.2.1 LIST OF PRE-IDENTIFIED KEY STAKEHOLDERS / I&APS

6.2.1.1 ORGANS OF STATE IDENTIFIED AND NOTIFIED

The following authorities have been identified and notified, but not limited to:

- Merafong City Local Municipality;
- West Rand District Municipality;
- The Department of Mineral and Petroleum Resources;
- National Department of Forestry, Fisheries and Environment;
- National Department of Water and Sanitation;
- National Department of Rural Development and Land Reform;
- National Nuclear Regulator;
- Gauteng Department of Agriculture and Rural Development;
- Gauteng Department of Roads and Transport;
- Gauteng Department of Health;
- Gauteng Department of Community Safety;
- South African Resource Heritage Agency (SARHA);
- Agricultural Research Council; and
- South Africa Civil Aviation Authority.

6.2.1.2 LIST OF PRE-IDENTIFIED KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

The following key stakeholders have been identified and notified of the proposed activity:

- Birdlife South Africa;
- Endangered Wildlife Trust;
- Eskom Holdings SOC Limited;
- Federation for a Sustainable Environment;
- Local Ward Councillors.
- Mining Affected Communities United in Action;
- Mining and Environmental Justice Community Network of South Africa
- South African National Roads Agency Ltd; and
- Wildlife and Environment Society of South Africa.

6.2.1.3 LIST OF SURROUNDING SURFACE RIGHTS HOLDERS/LANDOWNERS IDENTIFIED

The following surrounding surface rights holders/landowners of the area under application have been identified as part of this application:

- Blyvooruitzicht Gold Mining Co Ltd;
- AngloGold Ashanti Ltd;
- Blywonder Trust (Pty) Ltd;



- Deelkraal Behuising Trust;
- Eskom Holdings SOC Ltd;
- Gauteng Provincial Government;
- Gold Fields Limited;
- Howden Group South Africa Limited;
- Jicapari Trust;
- Carleton Midas;
- Morgan Creek Sewerage Plants;
- Rand Water;
- Randfontein Estates Ltd (Care of Harmony Gold);
- Republic of South Africa;
- Welverdiend Township Development Company Ltd; and
- Other private individuals

Refer to **Appendix C** for the full list of I&APs.

6.2.2 INITIAL NOTIFICATION

The PPP commenced on the 15th of August 2025 with an initial notification and call to register on the project. The notification was given in the following manner:

6.2.2.1 REGISTERED LETTERS, FAXES AND EMAILS

Notification letters (English, Afrikaans and Setswana), faxes, and emails were distributed to all pre-identified key I&APs including government organisations, NGOs, relevant municipalities, ward councillors, landowners and other organisations that might be affected.

The notification letters included the following information to I&APs:

- List of anticipated activities to be authorised;
- Scale and extent of activities to be authorised;
- Information on the intended mining operation to enable I&APs to assess/surmise what impact the activities will have on them or on the use of their land;
- The purpose of the proposed project;
- Details of the affected properties (including details of where a locality map could be obtained);
- Details of the relevant NEMA Regulations;
- Initial registration period timeframes;
- Scoping Report commenting and Review period; and
- Contact details of the EAP.

6.2.2.2 NEWSPAPER ADVERTISEMENTS / GOVERNMENT GAZETTE

Advertisements describing the proposed project and EIA process were placed in the local newspaper with circulation in the vicinity of the study area. The initial advertisement was placed in the Carletonville Herald (in English, Afrikaans and Setswana) on the 21st of August 2025. The provincial Gazette was advertised on the 3rd of September 2025. The advertisements included the following information:

- Project name;



- Applicant name;
- Project location;
- Nature of the activity and application
- Availability of Scoping Report; and
- Relevant EIMS contact person for the project.

6.2.2.3 SITE NOTICE PLACEMENT

A1 Correx site notices in English, Afrikaans and Setswana were placed at 23 locations within the local project area on the 21st of August 2025. The on-site notices included the following information:

- Project name;
- Applicant name;
- Project location;
- Map of proposed project area;
- Project description;
- Legislative requirements; and
- Relevant EIMS contact person for the project.

6.3 AVAILABILITY OF SCOPING REPORT

Notification regarding the availability of this Scoping Report for public review was given in the following manner to all registered I&APs (which includes key stakeholders and landowners):

- Registered letters (only where no other communication method could be established with the I&AP) with details on where the scoping report can be obtained and/or reviewed, public meeting date and time, EIMS contact details as well as the public review comment period;
- Facsimile notifications with information described above;
- Email notifications with a letter attachment containing the information described above;
- Site notices and posters placed at and around the vicinity of the site and surrounding communities;
- Newspaper advertisement in the Carletonville Herald.

The scoping report will be available for public review from the 30th of September 2025 to the 31st of October 2025 for a period of 31 days. Proof of notification of the availability of the scoping report will be made available in the Final Scoping Report to be submitted to the CA as well as in the EIA Phase which will be available to I&APs.

6.4 PUBLIC MEETING / FOCUS GROUP MEETING

Notification regarding the scoping phase public meeting during the public review and comment period of the scoping report was given in the following manner to all registered I&APs (which includes key stakeholders and landowners):

- Registered letters with details on the date, time and venue of the scoping phase public meeting as well as EIMS contact details for any inquiries;
- Facsimile notifications with public meeting information above;
- Email notifications with a letter attachment containing the information described above;
- Site notices and posters placed at and around the vicinity of the site and surrounding communities;
- Newspaper advertisement in the Carletonville Herald.



Proof of notification of the scoping phase public meeting as the meeting minutes will be made available in the Final Scoping Report to be submitted to the CA as well as in the EIA Phase which will be available to I&APs.

6.5 PUBLIC PARTICIPATION PROGRESS

Comments raised to date have been addressed in a transparent manner and included in the Public Participation Report (**Appendix C**). To date, summary of comments received are as follows:

- Requests to register as I&AP;
- Requests for locality map and site kml files;
- Request for project reports; and
- Confirmation from stakeholders that they are not affected by the proposed project.

All comments that will be received during the review of the Scoping Report will be captured and responded to through a Comments and Response Report that will be included in the report. Comments received to date have been included in this report. All I&APs registered on the Project database will be informed of the availability of the Scoping Report for public review as well as the public meeting details. I&APs will be provided with another opportunity to submit their comments during the Environmental Impact Assessment (EIA) Phase of the project. Refer to see **Appendix C** for all Public Participation related documents.

6.6 REVIEW OF THE SCOPING REPORT BY COMPETENT AUTHORITIES

DMPR as the competent Authority for the listed activity must, within 43 days of receipt of the Final Scoping Report that has been subjected to 30 days of public review as a Draft Report, accept the Final Scoping Report and Plan of Study for EIA in writing should no amendments be required, or shortcomings be identified therein. Upon acceptance of the Scoping Report, the Environmental Assessment Practitioner (EAP) may then proceed with the tasks contemplated in the Plan of Study for EIA.

The authority can also reject the Scoping Report for not following legislative procedure if any of the required steps were not undertaken. In terms of Regulation 22 (b) of Government Notice R. 982, the Scoping Report may be amended and resubmitted by the EAP should it be rejected. On receipt of the amended Scoping Report and Plan of Study for EIA, the competent authority will then reconsider the application. Should the Scoping Report be approved, the amended Scoping Report will then be made available for public review and comment prior to submission to the Competent Authority. The authority may also advise the EAP of matters that may hinder the success of the EIA application or matters that may prejudice the success of the application.

6.7 PUBLIC PARTICIPATION PROCESS FOR EIA PHASE

The Public Participation Process (PPP) will be documented and included in the Environmental Impact Report (EIR). The PPP will be undertaken in accordance with the Plan of Study for EIA (refer to **Section 10.7**). The project I&APs will be updated on all project developments throughout the EIA Phase. A summary of comments received from the registered I&APs, the date of their receipt and responses of the EAP to those comments will be provided in the Comments and Response Report that will be updated during all project phases. All copies of any representations, objections and comments received will also be submitted to the competent authority together with the EIR.

6.8 APPEAL PERIOD

After a decision has been reached by DMRE, Chapter 2 of the National Appeal Regulations 2014 makes provision for any affected person to appeal against the decision. Within 20 days of being notified of the decision by the competent authority, the appellant must submit the appeal to the appeal administrator. An appeal panel may be appointed at the discretion of the delegated or organ of state to handle the case and it would then submit its recommendations to that organ of state for a final decision on the appeal to be reached. EIMS will



communicate the decision of the Provincial Authority and the way appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the final decision has been received.



7 ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section of the Scoping Report provides a description of the environment that may be affected by the proposed project. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from existing information available for the area as well as baseline information received from certain specialist's assessments. Please note that detailed specialist assessments are being completed to inform the EIA-phase report. The DFFE screening tool was also used to inform this section, and a copy of the screening report is included in **Appendix D**.

7.1 LOCATION

The project area falls within the West Rand District Municipality in Gauteng Province. Development area falls within Wards 11, 14 and 27 of Merafong City Local Municipality administrative area. The Mponeng Lower Compartment TSF is located at 26°27'10.53"S; 27°24'39.93"E in Wadela, immediately north of the N12. The site is approximately 7km northwest of Fochville, 10km south of Carletonville central and 20km west of Westonaria.

7.2 TOPOGRAPHY AND LANDSCAPE

The area north of the Mponeng TSF is characterized by a series of parallel hills that form the Gatsrand and have an elevation of approximately 1 770 metres above mean sea level (mamsl) (**Figure 34**). The Mponeng Lower Compartment TSF is located at approximately 1 538 mamsl. The difference in elevation of approximately 230mamsl symbolizes the ridge between the TSF and the Savuka Plant.

The study area features a varied aesthetic and visual landscape, with mining activities predominating the western and northern sections of the study area and savannah-covered grassland and agriculture in the southern regions. The northwestern and western sections consist of gently undulating land that slopes westward and southward towards drainage lines that generally flow west and northwest. The topography rises in the central parts of the study area immediately north of the Project site, which is mostly undeveloped and composed of gentle rolling grassland. Residential areas, linked to the mines, are situated immediately west (Wedela), northwest (Harmony housing), and north of the Project site (Western Deep Levels housing). South of Wedela and the Project site is a grassland area with savannah-covered slopes. These areas are primarily used for grazing. The far southern sections of the study area comprise agricultural lands



Figure 34: General topography of the study area



7.3 GENERAL SITE CONDITIONS / LAND-USES

The proposed Mponeng Lower Compartment TSF development is situated within an area consisting mainly of mining activities, grazing and naturally occurring dams. Residential areas, waterbodies, wetlands, mines and ridges are also located within and surrounding the study area. The larger area surrounding the proposed plant is classified as industrial in nature.

The study area can be distinguished into two sections: the southern (TSF) section and the northern (pipelines) section. The TSF section is a disturbed area consisting of mining residue, holding dam, landfill, two return water dams (north dam and south dam) and gravel access and maintenance roads. This area consists of an area previously disturbed and vegetation re-establishing itself with significant alien infestation present. The pipeline section is largely an undisturbed area consisting of a rocky ridge, uniform vegetation, tributaries and Eskom powerlines. The vegetation in this section is largely intact and uniform with the exception of the first part of the pipeline routes where the pipes extend from the Savuka Plant on an area where there were demolitions of buildings / infrastructure including the Western Deep Levels Hospital resulting in disturbance of the vegetation. There was evidence of some alien species along the section. Refer to **Figure 35** to **Figure 45** for the site conditions.



Figure 35: Mponeng Upper Compartment TSF immediately west of Mponeng Lower Compartment TSF



Figure 36: View of the Mponeng Lower TSF from the Mponeng Upper Compartment TSF.



Figure 37: View of the current holding dam on the Mponeng Lower TSF.



Figure 38: View of the existing landfill site on the Mponeng Lower TSF.



Figure 39: Steep embankment of the Mponeng Lower TSF with alien vegetation and maintained gravel access road.



Figure 40: Current conditions of Mponeng Lower TSF Return Water Dam.

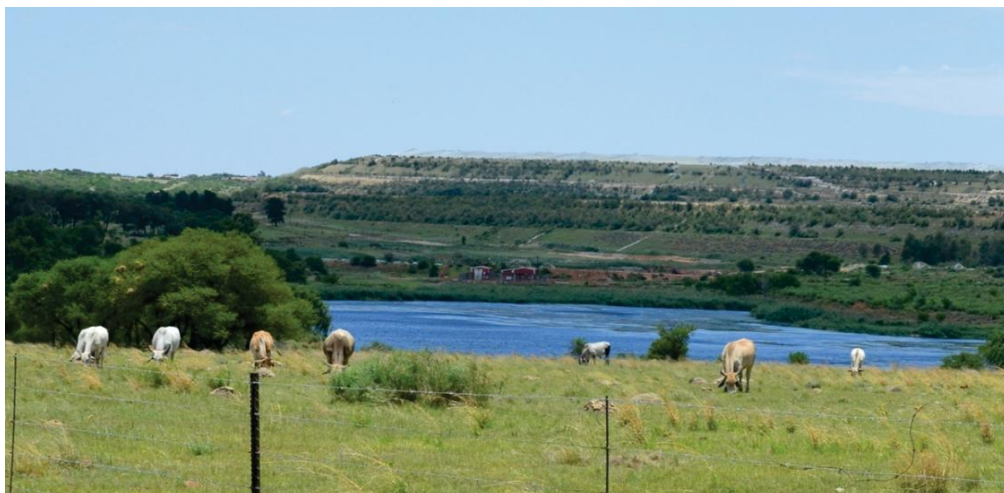


Figure 41: Natural (aquatic) dam approximately 150m southeast of the Mponeng Lower TSF (Young, 2025). The image also shows some of the grazing activities in the area.



Figure 42: Google Earth view showing the close proximity of the (aquatic) dam southeast of the Mponeng Lower TSF. The dam is fed by the Elandsfonteinspruit.



Figure 43: Northern boundary of the Mponeng Lower TSF showing the steep embankment and vegetation including alien invasive trees and a potential wetland.



Figure 44: Northern view of the pipeline section showing a channelled valley bottom wetland, uniform vegetation of low-lying grass and sections of trees and shrubs within the rocky ridge.



Figure 45: Current conditions of the rocky ridge.

The proposed pipelines traverse through a Class 2 Ridge (Gauteng sensitive quartzite rocky ridge) from the main road along the alternative pipeline section (**Figure 45** left). The area consists of medium high grass and thick vegetation comprising of trees and shrubs. One of the Eskom Powerlines within this section can be seen on the image. There are also several Harmony Gold pipelines running along the road and across this section. View of the transformed area currently under rehabilitation on the northern section of the ridge (**Figure 45** right image). The area consisted of a Western Deep Levels Hospital which has since been demolished



7.4 CLIMATE

7.4.1 CURRENT CLIMATIC CONDITIONS

According to Köppen-Geiger Climate classification, Carletonville has a Subtropical steppe climate (Classification: BSh). The summers are long, warm, and mostly clear and the winters are short, cold, dry, and clear. Over the course of the year, the temperature typically varies from 2°C to 27°C and is rarely below -2°C or above 31°C. (Figure 46). Carletonville experiences significant seasonal variations in monthly rainfall, average monthly rainfall reaching 96 mm in January and being as low as 2mm in July. Evaporation data was sourced from the South African Atlas of Climatology and Agrohydrology (Schulze and Lynch, 2006) in the form of A-Pan equivalent potential evaporation. The average monthly evaporation distribution is presented in Figure 46 and shows the site has an annual potential evaporation of 2,240mm.

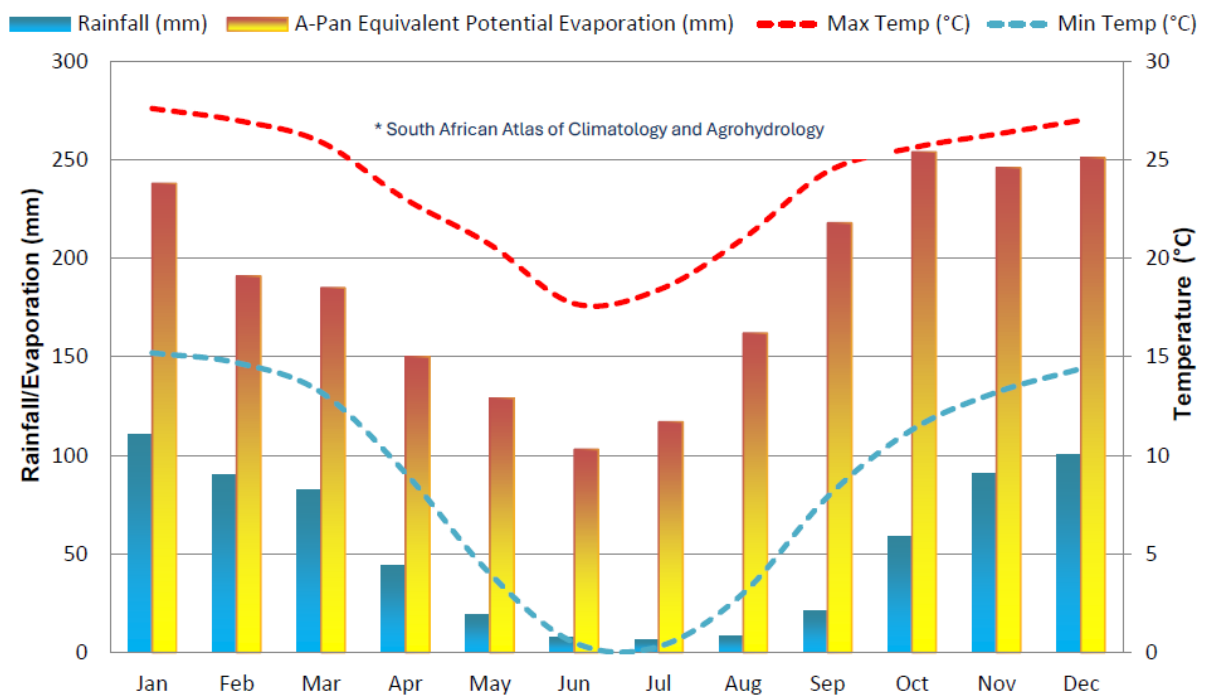


Figure 46: Average climatic conditions (Hydrological Consulting, 2025)

The climate is a typical Southern African Highveld climate with warm to hot summers and warm sunny winter days with frosty nights. Rainfall occurs predominantly during the summer months because of thunderstorm activity. The mean annual precipitation ranges from 565 mm to 697 mm per annum depending on the location of the weather station. Rainfall data was obtained from several sources, including mine data and data from the South African Weather Service. The rainfall for the region is summarised in Table 20.

Table 20: Rainfall Summary (MvB Consulting, 2025)

Period	1927-2000	1962-2008	1983-2004	1966-2012	1900-2000	1958-2011	Regional Average
Station Name	Fochville	Carltonville	Wes Driefontein	Westonaria	Zuurbekom (RWB)	Randfontein	
Station Number	474899	4746809	04747421	04751744	475528	04753389	
Month	Average Monthly Rainfall (mm)						



Period	1927-2000	1962-2008	1983-2004	1966-2012	1900-2000	1958-2011	Regional Average
Station Name	Fochville	Carltonville	Wes Driefontein	Westonaria	Zuurbekom (RWB)	Randfontein	
Station Number	474899	4746809	04747421	04751744	475528	04753389	
January	104	118	98	130	113	126	115
February	81	86	74	85	98	92	86
March	80	77	70	81	78	83	78
April	45	52	33	48	46	52	46
May	18	14	14	13	17	12	15
June	9	7	8	6	6	7	7
July	5	3	2	3	5	2	3
August	7	7	8	10	7	6	7
September	23	19	18	21	19	20	20
October	56	70	69	72	68	69	67
November	95	87	80	100	100	99	94
December	97	111	92	129	111	104	107
Total	620	651	565	697	668	672	646

7.4.2 CLIMATE CHANGE / RISK PROFILE

According to DEA (2018), a key feature of the projected climate change futures of South Africa is that temperatures are to increase drastically under low mitigation scenarios. For the far-future period of 2080-2099, temperature increases of more than 4 °C are likely over the entire South African interior, with increases of more than 6 °C plausible over large parts of the western, central and northern parts. Such increases will also be associated with drastic increases in the numbers of heat-wave days and very hot days, with potentially devastating impacts on agriculture, water security, biodiversity and human health. The model projections are indicative that a modest-high mitigation pathway can still significantly decrease the amplitude of this warming – most projections suggest that under Representative Concentration Pathway 4.5(RCP4.5), for example, temperature increases over the interior can be constrained to 2.5 to 4 °C. Nevertheless, it should be realised that South Africa is plausibly committed to relatively large (compared to the global average) increases in near-surface temperatures, even under high-mitigation futures.

South Africa is expected to experience:

- Increase in mean, maximum and minimum temperatures.
- Increase in very hot days – above 35 °C and the frequency of heat wave events.



- Drier conditions in the future, with regional variation.
- Slight increases in rainfall towards the north-eastern region.
- A strong drying signal over the southwestern region, which could result in reductions in rainfall of more than 40 mm per year.
- Increase in the frequency of extreme rainfall events (20 mm of rain falling within 24 hours) over eastern parts during the summer months.
- Sea level rise and an increase in the frequency and intensity of sea storms, accompanied by increases in wave heights
- Increase in the number of high fire danger days over north-eastern region and along the Cape south coast and the south-western Cape.

Climate Risk Profile report for the West Rand District Municipality (WRDM) was compiled by the Council for Scientific and Industrial Research (CSIR) in 2024. The Climate Risk Profile report, as well as the accompanying Climate Change Adaptation Plan, were developed specifically for the WRDM, to support its strategic climate change response agenda. Both documents are primarily informed by the GreenBook, which is an open-access, online planning support system that provides quantitative scientific evidence in support of local government's pursuit in the planning and design of climate-resilient, hazard-resistant settlements.

An ensemble of very high-resolution climate model simulations of present-day climate and projections of future climate change over South Africa has been performed as part of the GreenBook. The regional climate model used is the Conformal-Cubic Atmospheric Model (CCAM), a variable-resolution Global Climate Model (GCM) developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). CCAM runs coupled to a dynamic landsurface model CABLE (CSIRO Atmosphere Biosphere Land Exchange model). GCM simulations of the Coupled Model Inter-Comparison Project 5 (CMIP5) and the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), obtained for the emission scenarios described by Representative Concentration Pathways 4.5 and 8.5 (RCP 4.5 and RCP 8.5) were first downscaled to 50 km resolution globally. The simulations span the period 1960–2100. RCP 4.5 is a high mitigation scenario (assuming a reduction in CO₂ emissions into the future), whilst RCP 8.5 is a low mitigation scenario (assuming “business as usual” emissions). After completion of the 50 km resolution simulations described above, CCAM was integrated in stretched-grid mode over South Africa, at a resolution of 8 x 8 km (approximately 0.08° degrees in latitude and longitude). The findings of the report which may affect the proposed activity are indicated below:

- Temperature:** The WRDM experiences average annual temperatures ranging between 16 and 18 °C, with lower averages found along the lower southeastern parts of Mogale City and the upper northeastern parts of Rand West City Local Municipality. The projections show average annual temperature increases of 2.5 °C across the district into the future including the study area, under a low mitigation, “business as usual” emissions scenario.
- Rainfall:** The WRDM experiences current GCM derived average annual rainfall of between 800 and 1200mm, with lower averages found along the central parts of the district, particularly in Rand West City's settlements of Azaadville, Randfontein and West Rand. Future projections show an average annual rainfall increase of between 100 and 200 mm, with most of the increase expected to occur in the southern parts of the district including the study area, under a low mitigation, “business as usual” emissions scenario.
- Heat:** Under baseline climatic conditions, there are no more than 10 very hot days experienced within the district. The number of very hot days are projected to increase by between 0 and 30 into the future, under an RCP8.5 emissions scenario. Most heatwaves days are likely to take place in the southern parts of the district, under baseline conditions mostly affecting Merafong City Local Municipality. Conversely, most of the increase in the number of heatwave days is projected to occur in the northern parts of West Rand, affecting large parts of Mogale City and the northern parts of Rand West City. The study area is expected to have low heat risk likelihood of increase in extreme heat.



- d) **Flooding:** The flood hazard index is based on the catchment characteristics and design rainfall, averaged at the Quinary catchment level. There is some variation of the flood hazard index across the district. Most parts of the district have a medium flood hazard index, with pockets of low, high, and very high flood hazard index. The settlements of Glen Harvie and Hills Haven in Rand West City are amongst those facing a high risk of flooding into the future, while the majority of settlements could face a low to moderate flood risk. The study area is predicated to have moderate flood risk likelihood.

The designs should take into consideration the climate change impacts to ensure there is less likelihood of structural / dam failure and/or risk of the TSF.

7.5 GEOLOGY

The geology of the study area has been described in detail by several authors and mine geologists. The following section describes the regional and local geology abstracted from the Baseline Report - Hydrogeological Assessment for The Proposed Tailings Redeposition on The Harmony Mponeng Lower Compartment Tailings Storage Facility (MvB Consulting, 2025).

The regional surface geology includes, in chronological order:

- Witwatersrand Supergroup.
- Ventersdorp Supergroup.
- Transvaal Supergroup.
- Karoo Supergroup.

The surface geology is presented in **Figure 47**.

7.5.1 WITWATERSRAND SUPERGROUP

Truswell (1977) describes the geology of the Witwatersrand Basin as follows:

The Witwatersrand Basin is a thick sequence of shale, quartzite and conglomerate. There are two main divisions, a lower predominantly argillaceous unit, known as the West Rand Group and an upper unit, composed almost entirely of quartzite and conglomerates, known as the Central Rand Group.

The West Rand Group is divided into three subgroups namely the Hospital Hill, Government Reef and Jeppestown. These rocks comprise mainly shale, but quartzite, banded ironstones, tillite and intercalated lava flows are also present. The rocks were subjected to low - grade metamorphism causing the shale to become more indurated and slaty. The original sandstone was recrystallised to quartzite.

The Central Rand Group is divided into the Johannesburg and Turffontein Subgroups and is composed largely of quartzite, within which there are numerous conglomerate zones. The conglomerate zones may contain any number of conglomerate bands, with individual bands interbedded with quartzite. The upper conglomerates are usually thicker with coarser fragments. An argillaceous zone known as the Booyens Shale (also known as the Kimberley Shale) separates the Johannesburg and Turffontein Subgroups.

The economic gold placers (reefs) are restricted to the Central Rand Group of the Witwatersrand Supergroup. A primary economic horizon that is mined in all the mines in the region is the Ventersdorp Contact Reef (VCR), at the base of the Ventersdorp lava. The Carbon Leader is also mined extensively in the region. Mponeng exploits the Ventersdorp Contact Reef (VCR) via a twin-shaft system to depths of between 2 800m and 3 400m below surface (AngloGold Ashanti, 2018).

7.5.2 VENTERSDORP SUPERGROUP

The younger Ventersdorp Supergroup overlies the Witwatersrand rocks. Although acid lavas and sedimentary intercalations occur, the Ventersdorp is composed largely of andesitic lavas and related pyroclastics. The Ventersdorp Supergroup consists of the Platberg Group and the Klipriviersberg Group. The Klipriviersberg Group consists of the Alberton and Westonaria Formations.



The Ventersdorp lava plays an important role in terms of groundwater ingress into the underground workings. As a rule of thumb, areas that have less than 50 m of lava have a greater risk of water ingress. This is especially the case where mining takes place above the Witwatersrand strata, such as mining of the VCR at the base of the Ventersdorp succession. The lava acts as an impermeable barrier, largely preventing water from the overlying dolomite aquifer entering the mine.

7.5.3 TRANSVAAL SUPERGROUP

Overlying the Ventersdorp Lavas are the Black Reef quartzite and dolomite of the Transvaal Supergroup. The Black Reef quartzite comprises coarse to gritty quartzite with occasional economically exploitable conglomerates (reefs). The entire area was peneplained in post-Ventersdorp time and it was on this surface that the Transvaal Supergroup was deposited, some 2200 million years ago. The deposition commenced with the Kromdraai Member with the Black Reef at its base. The Black Reef has eroded the Witwatersrand outcrop areas and as a result contains zones (reef) in which gold is present. The occurrence of the gold is not as widespread as in the Witwatersrand and mainly restricted to north-south trending channels. The Black Reef is overlain by a dark, siliceous quartzite with occasional grits or small pebble bands. The quartzite grades into black carbonaceous shale. The shale then grades into the overlying dolomite through a transition zone of approximately 10 m thick.

Overlying the Kromdraai Member is the dolomite of the Malmani Subgroup of the Chuniespoort Group. The dolomites vary between 200 m and 1 500 m in thickness. According to Parsons (1991) only the two lower formations of the Malmani Subgroup are present in the study area. The lowermost is the Oaktree Formation, which is succeeded southward by the Monte Christo Formation. The Oaktree Formation consists of chert-poor homogenous dark-grey dolomite containing interbeds of carbonaceous shale, which decrease in frequency and thickness from the base of the formation upwards. Columnar stromatolites are numerous within this sequence and the formation follows conformably on the Black Reef Formation with a transitional mixed zone consisting of carbonaceous and calcareous argillaceous and arenaceous sediments (Parsons, 1991).

The Monte Christo Formation follows conformably on the Oaktree Formation. The Monte Christo Formation consists of alternating chert-rich and chert-poor, dark to light-grey dolomite and has an estimated thickness of 700 m (Brink, 1979). A 1.5 m thick chert layer, consisting of 10 cm to 15 cm thick layers of chert separated by manganese-rich bands, is present towards the base of the formation. Layers of crystalline, coarse-grained dark dolomite, laminated calcareous shale, shaley dolomite and fine-grained white dolomite occur in the sequence, parts of which are chert-rich, containing numerous chert layers, 10 cm to 20 cm in thickness (Parsons 1991).

The Pretoria Group rocks overlie the dolomite aquifer and is also the surface geology at Mponeng mine. The Rooihoogte Formation forms the basal member of the Pretoria Group, consisting of the Bevets conglomerate, shale and quartzite. The Bevets conglomerate varies in thickness between 3 m and 60 m (Parsons and Killick, 1985). Overlying the Bevets conglomerate is shale and sporadically developed quartzite, referred to as the Pologround quartzite. Where developed the Pologround quartzite is overlain by 150 m – 200 m of pink to purple shales, forming the basis of the Timeball Hill Formation. The shale is overlain by quartzite, which forms the linear north-westerly trending ridges in the central portion of the study area.

Further south is the Hekpoort and Strubenkop Formations. These formations consist predominantly of andesite lava (Hekpoort Formation) and ferruginous shale (Strubenkop Formation). The weathering of the shale and the lava results in grey to dark grey silty sand and clay. The Hekpoort Andesite Formation is visible through a number of scattered lava outcrops, giving it an uneven landscape. The quicker erosion of the softer tuffaceous sediments, interbedded between the amygdaloidal lava flows is believed to be the cause of the topographical features. The weathering of the Hekpoort Andesite results in dark to reddish – brown silty sand. These can contain fragments of lava and quartz ranging between pebble to cobble size.

The Strubenkop Formation achieves a maximum thickness of 130 m and consists predominantly of ferruginous shale. The contact between the Hekpoort and Strubenkop Formations is difficult to identify in the field, especially in view of the fact that localised intrusions of younger dolerite occur. Most of these rocks, especially in the lower lying areas, are concealed beneath a cover of younger sedimentary rocks, residual soils and alluvium. There is also a significant accumulation of hillwash and transported sediments. The floodplains of the Loopspruit and its tributaries contain grey, silty to clayey soils.



7.5.4 KAROO SUPERGROUP

The Karoo Supergroup was deposited approximately 345 million years ago. It commenced with glacial period during which most of South Africa was covered by a thick sheet of ice. This ice cap slowly moved towards the south, causing extensive erosion as a result of accumulated debris at the base. This debris was eventually deposited as the Dwyka tillite. The Dwyka, which generally form an impermeable barrier to the downward percolation of groundwater, is absent in most parts of the study area. Younger superficial deposits cover the Karoo in places. The Karoo strata filled the extremely rugged paleo-topography of the underlying karst dolomite to form a relatively even topography that is visible today.

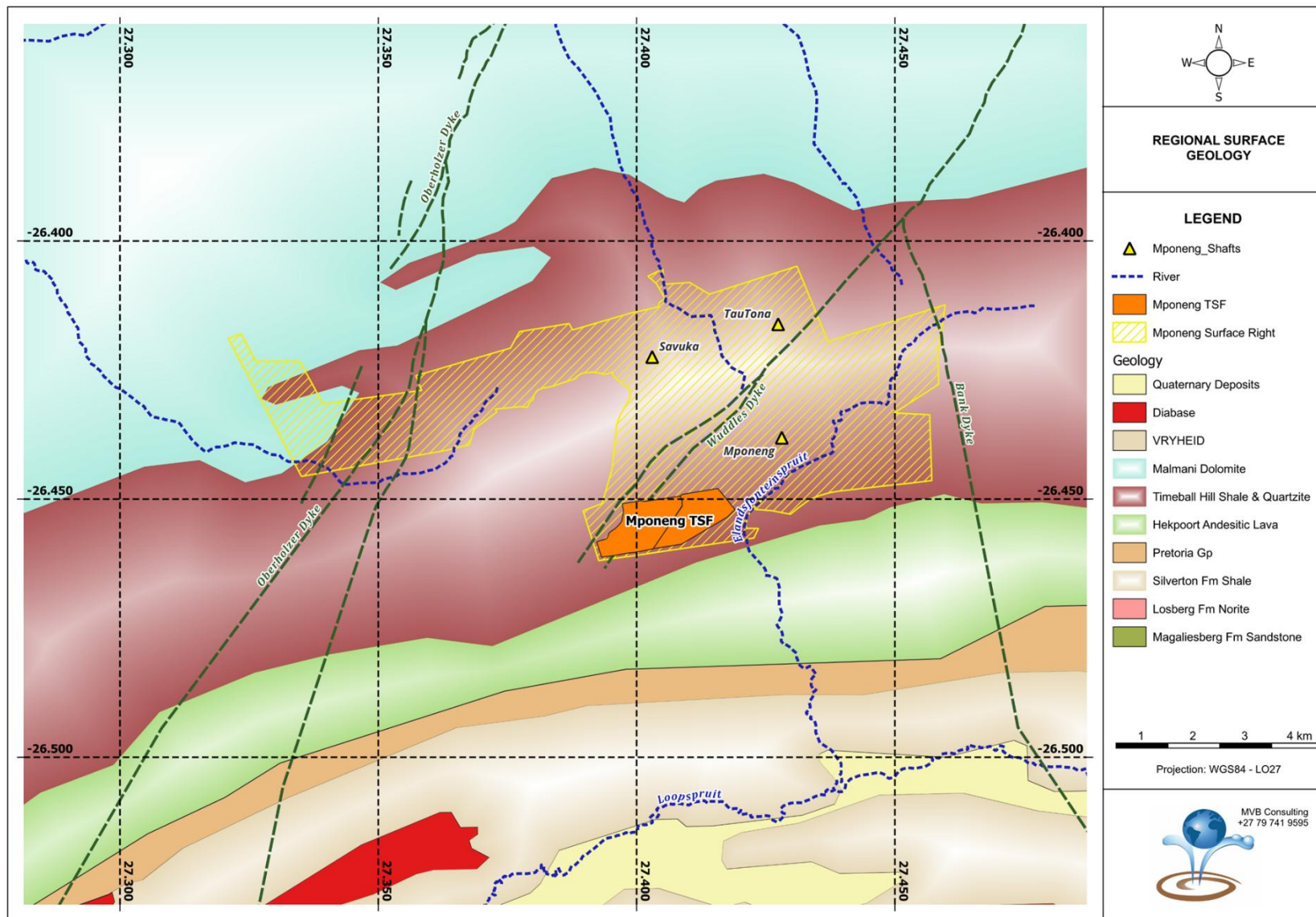


Figure 47: Regional surface geology (MvB Consulting, 2025)



7.6 SOILS AND AGRICULTURAL POTENTIAL

Based on the Soil and Agricultural Report for the proposed Mponeng Lower Compartment Tailings Storage Facility (The Biodiversity Company, 2025), the geology of the area includes the sedimentary rocks such as the shale and andesite from the Pretoria Group (Transvaal Supergroup). The area is also underlain by Malmani dolomites of the Chuniespoort Group (Transvaal Supergroup). The area is characterised by land type Fb and Ib, with shallow Mispah soils forms. According to the land type database (Land Type Survey Staff, 1972 - 2006) the assessment area to be focused on mainly falls within the Fb 5 and Fb 15 land types (**Figure 48**). The Fb 5 and Fb 15 land types consist of Mispah, Glenrosa, Hutton, Arcadia, Rensburg, Oakleaf and Dundee soil forms according to the Soil classification working group (1991), with the occurrence of other soils and rocky areas within the landscape. The Fb land types are characterised with shallow soils such as Glenrosa and Mispah soil forms. Lime is usually rare in the upper landscape but generally present in the lower terrains. The land terrain units for the featured land types are illustrated in **Figure 49** and **Figure 50**, with the expected soils listed in **Table 21** and **Table 22**.

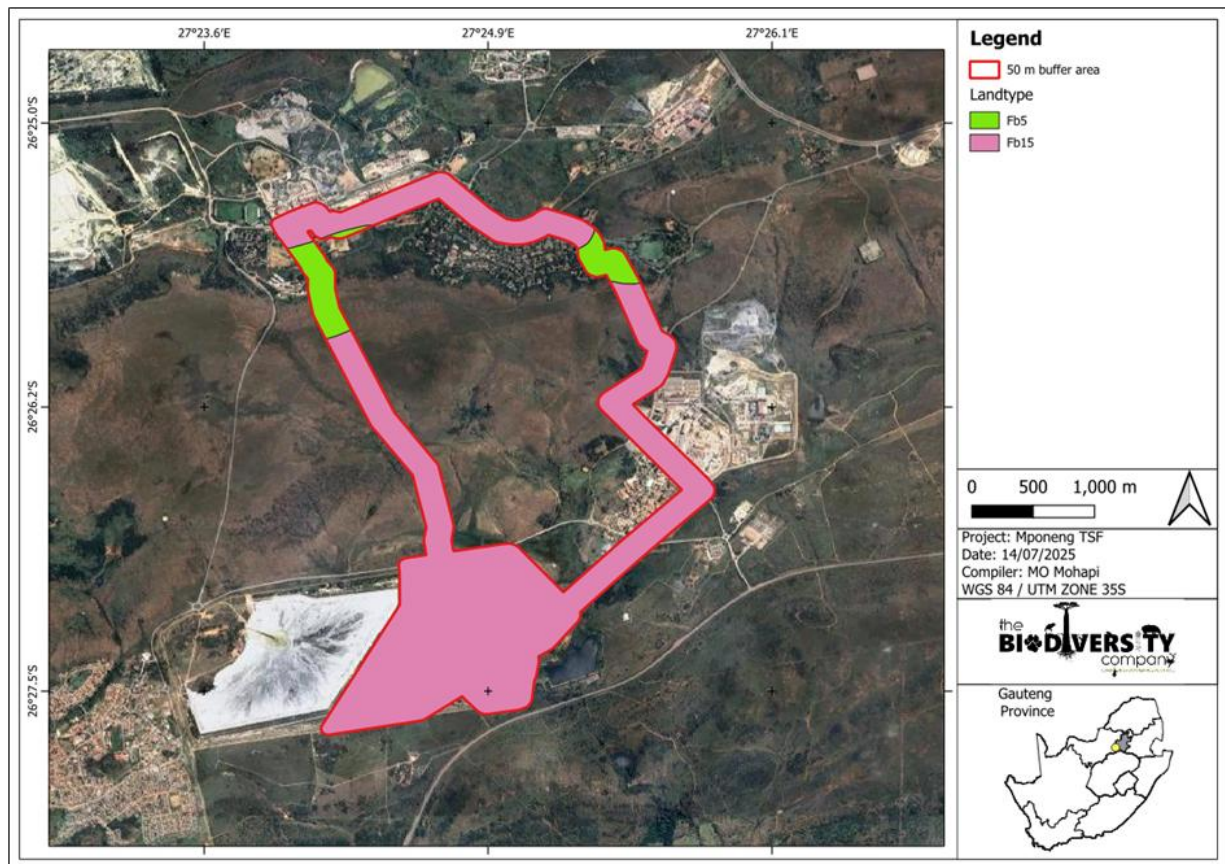


Figure 48: Land type associated with the proposed project area (The Biodiversity Company, 2025)

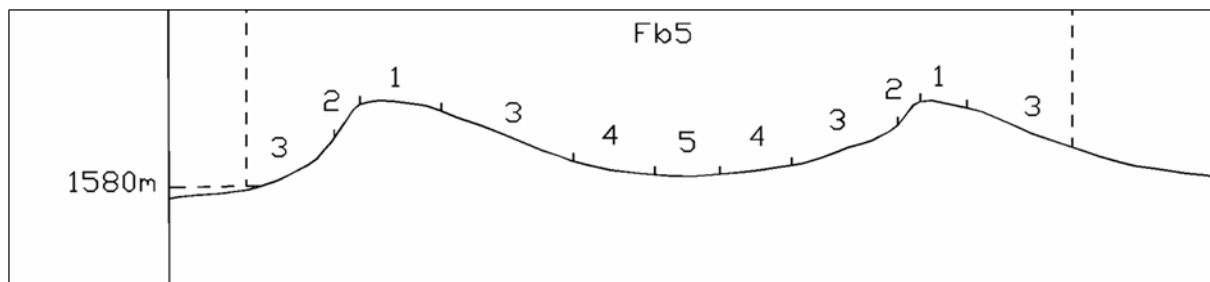


Figure 49: Illustration of land type Fb 5 terrain units (Land Type Survey Staff, 1972 – 2006)

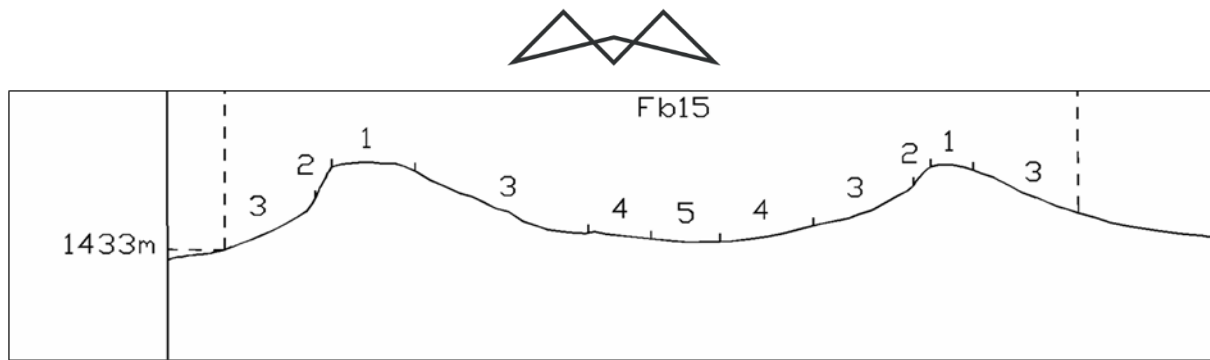


Figure 50: Illustration of land type Fb 15 terrain units (Land Type Survey Staff, 1972 – 2006)

Table 21: Soils expected at the respective terrain units within the Fb 5 land type (Land Type Survey Staff, 1972 - 2006)

TERRAIN UNITS									
1 (15%)		2 (5%)		3 (33%)		4 (42%)		5 (5%)	
Bare Rock	40%	Bare Rock	70%	Glenrosa	29%	Hutton	48%	Arcadia, Rensburg	52%
Mispah	33%	Mispah	20%	Mispah	25%	Glenrosa	12%	Mispah	16%
Glenrosa	23%	Glenrosa	10%	Hutton	23%	Mispah	11%	Bare Rock	12%
Hutton	4%			Bare Rock	21%	Clovelly	10%	Stream beds	10%
				Hutton, Shortland	2%	Oakleaf, Dundee	9%		
						Bare Rock	5%		
						Hutton, Shortland	3%		
						Avalon	2%		

Table 22: Soils expected at the respective terrain units within the Fb 15 land type (Land Type Survey Staff, 1972 - 2006)

TERRAIN UNITS									
1 (15%)		2 (5%)		3 (33%)		4 (42%)		5 (5%)	
Bare Rock	40%	Bare Rock	70%	Glenrosa	29%	Hutton	48%	Arcadia, Rensburg	52%
Mispah	33%	Mispah	20%	Mispah	25%	Glenrosa	12%	Mispah	16%
Glenrosa	23%	Glenrosa	10%	Hutton	23%	Mispah	11%	Bare Rock	12%
Hutton	4%			Bare Rock	21%	Clovelly	10%	Oakleaf, Dundee	10%
				Hutton, Shortlands	2%	Oakleaf, Dundee	9%	Avalon	10%
						Bare Rock	5%		
						Hutton, Shortlands	3%		
						Avalon	2%		

The six (6) representative soil forms identified within the proposed project area include the Carolina, Glenrosa, Mispah and three technosols (Witbank, Stilfontein and Johannesburg) soil forms (**Figure 51**). Based on the verified baseline findings, the proposed Lower Compartment TSF lower compartment was found to be dominated by the disturbed Witbank soils from the mine tailings deposits. The Witbank soils resulted due to human intervention and are collected from the surrounding mining dumps. Due to extensive disturbance, the



Witbank soils lack evidence of morphological order and are considered to have low suitability for agricultural potential. Artificial waterbodies with Stilfontein soils were also identified adjacent to the proposed Lower Compartment TSF lower compartment. The Stilfontein soils comprise of anthropogenic materials that have undergone saturation due to human activities. In addition, the northern portion of the proposed project area was found to be dominated by Johannesburg technosols. The Johannesburg technosols refers to urban developments such as roads, buildings, construction buildings and recreational areas. All the technosols for the purpose of this project are considered to have a low suitability, due to their morphological composition that extensively inhibits agricultural activities.

Furthermore, the proposed pipeline was found to be dominated by the semi-impermeable to impermeable Mispah and Glenrosa soil forms, while its significant portion comprised of Carolina soil forms. The Mispah soil form comprises of an orthic topsoil on top of a hard rock horizon. The Glenrosa soil form comprises of an orthic topsoil on top of a lithic subsoil horizon. Lastly, the Carolina soil form comprises of an orthic topsoil on top of a yellow-brown apedal subsoil that is underlain by a hard rock horizon. The Mispah soils are marked by shallow depth, impermeable underlying horizons, and the presence of parent materials. Due to their restricted permeability, the Mispah soils have limited root penetration and water movement, which inhibits crop production. Consequently, the soils are concluded to have a low sensitivity and low productivity, which are more suitable for grazing and supporting natural vegetation rather than intensive crop production. The identified Glenrosa soil forms are characterised by gleylithic subsoil, with signs of wetness. The gleylithic subsoil horizons were shallow with the presence of weathering parent material. Lastly, the Carolina soil form is characterised by very shallow apedal soils with freely drained upper horizons and restrictive underlying horizon. The soils are mostly suitable for shallow rooted crops and is considered to have a moderate agricultural potential. Some of the identified soil horizons within the proposed project area are illustrated in **Figure 52** and **Figure 53**.

Accordingly, following Smith, (2006) which the national Department of Agriculture, Forestry and Fisheries (DAFF), (2017) land capabilities protocols were further expanded from, the above-mentioned identified soil forms are restricted to land capability classes IV (i.e. Carolina soil form) categorised by LC 6-8 (Low to Moderate), land capability VI (i.e. Glenrosa and Mispah soil forms) categorised by LC 1-5 (Very low to Low), land capability VII (i.e. Stilfontein and Witbank soil forms) categorised by LC 1-5 (Very low), and land capability VIII (i.e. Johannesburg soil forms) categorised by LC 1-5 (Very low). The baseline soil land capability was aligned and compared to the National Land Capability data (DAFF, 2017). A climate capability level 8 has been assigned to the area given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates.

By using the determined land capability for the most sensitive soil (Carolina soil form) and the determined climate capability, a land potential of “L6” was calculated. Furthermore, the calculated land potential for less sensitive soils (i.e. Glenrosa and Mispah soil forms) is land potential L7, and technosols including Johannesburg, Stilfontein and Witbank is land potential L8. According to Smith (2006), the “L6” land potential is characterised by very restricted potential with regular and or severe limitations due to soil, slope, temperature or rainfall. The “L7” land potential level is characterised by a low potential with a severe limitation due to soil, slope, temperatures, or rainfall. The “L8” land potential level is characterised by a very low potential with very severe limitations due to soil, slope, temperatures, or rainfall. The areas associated with the “L6, L7 and L8” land potentials are considered to be non-arable (**Figure 54**). Therefore, **the proposed project area falls predominately on non-arable soils.**

The following land potential levels have been determined;

- Land potential level 6 (this land potential is characterised by very restricted potential. Regular and/ or severe limitations due to soil, slope, temperatures or rainfall). Non-arable;
- Land potential level 7 (this land potential is characterised by low potential. Severe limitations due to soil, slope, temperatures or rainfall). Non-arable; and
- Land potential level 8 (this land potential is characterised by very low potential. Very severe limitations due to soil, slope, temperatures or rainfall). Non-arable.

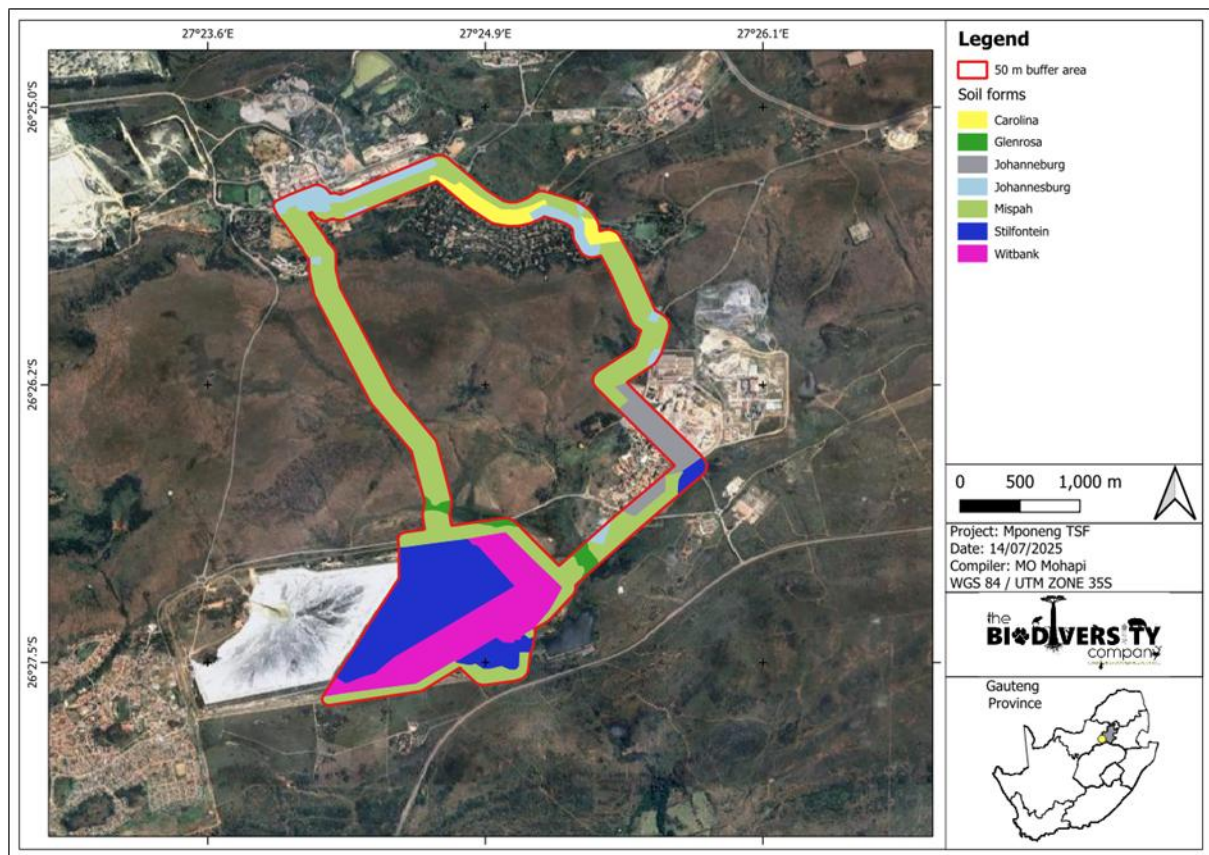


Figure 51: Soil forms found within the proposed project area (The Biodiversity Company, 2025)

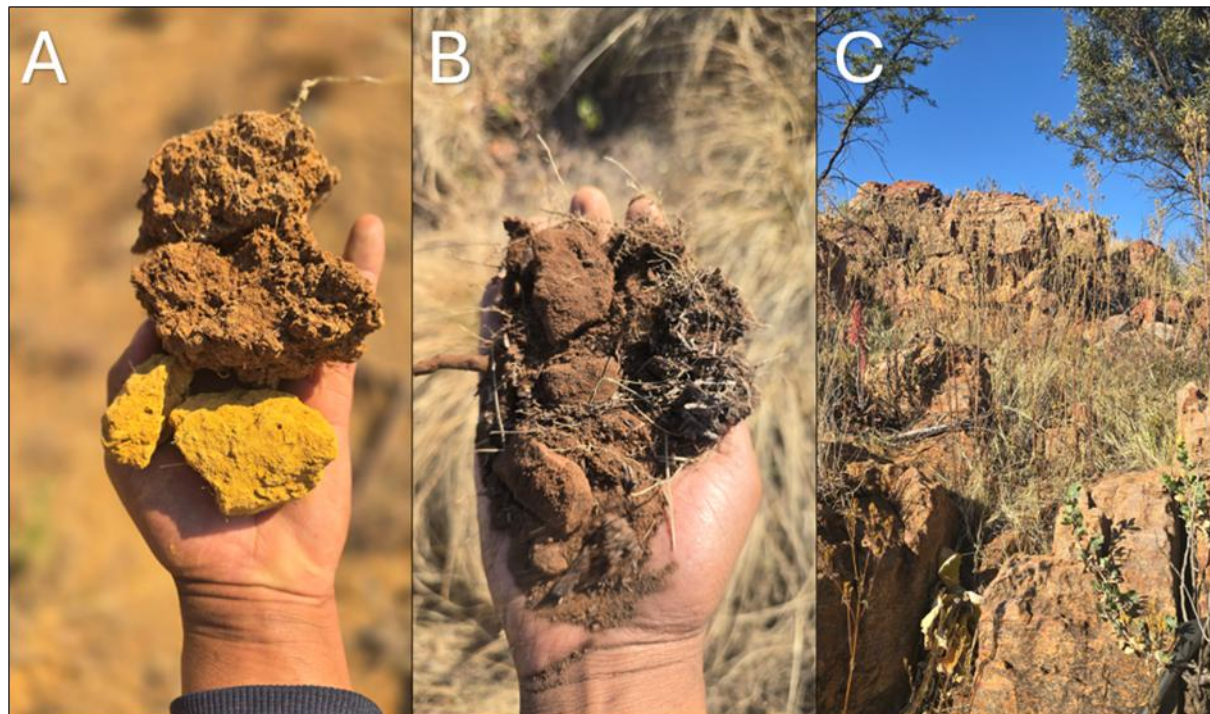


Figure 52: Soil forms found within the proposed project area; A) Carolina soil form; B) Glenrosa soil form; and C) Mispah soil form (The Biodiversity Company, 2025)

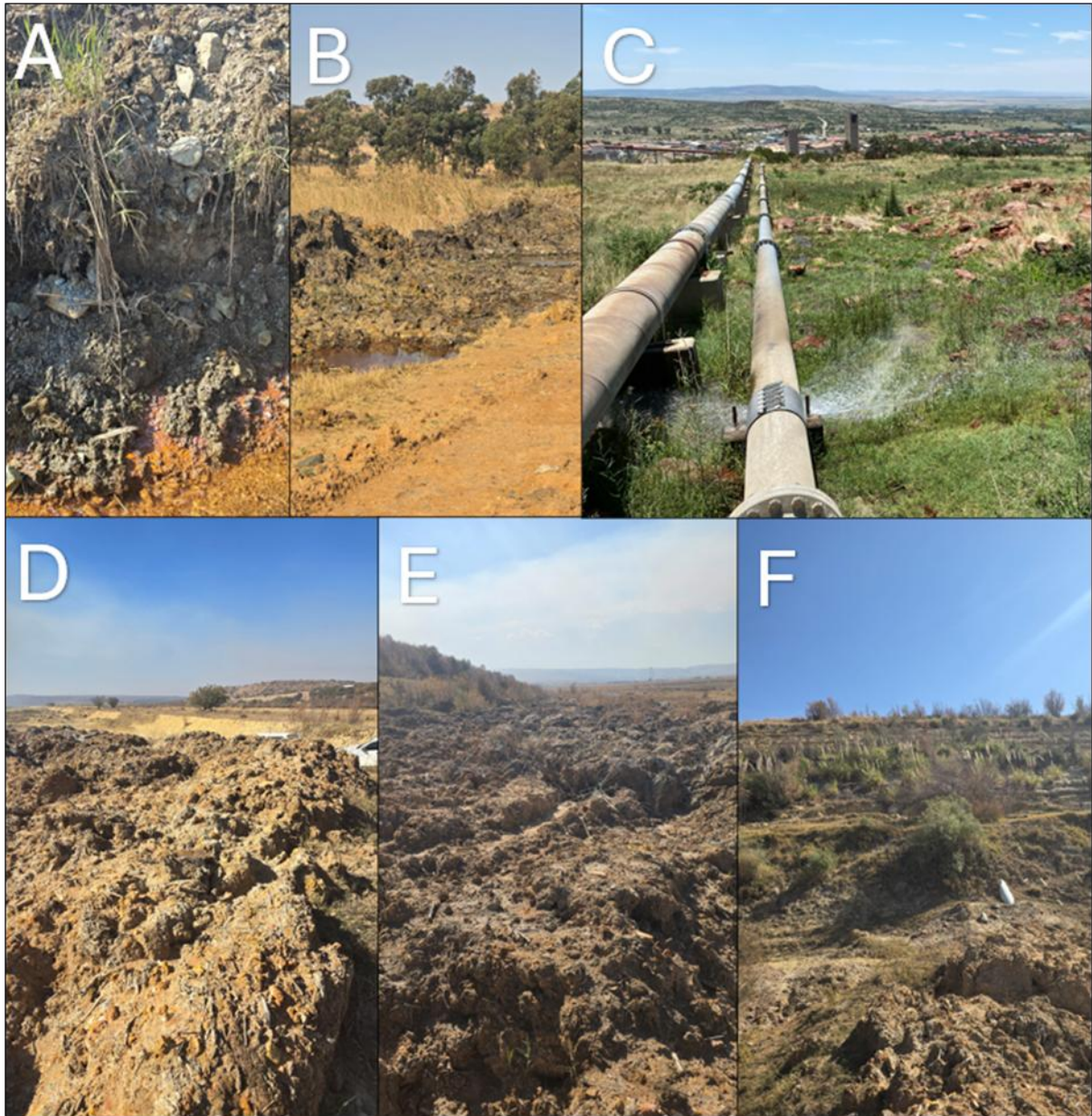


Figure 53: Anthrosols and Technosols; A and B) Stilfontein; C) Johannesburg; D to F) Witbank (The Biodiversity Company, 2025)

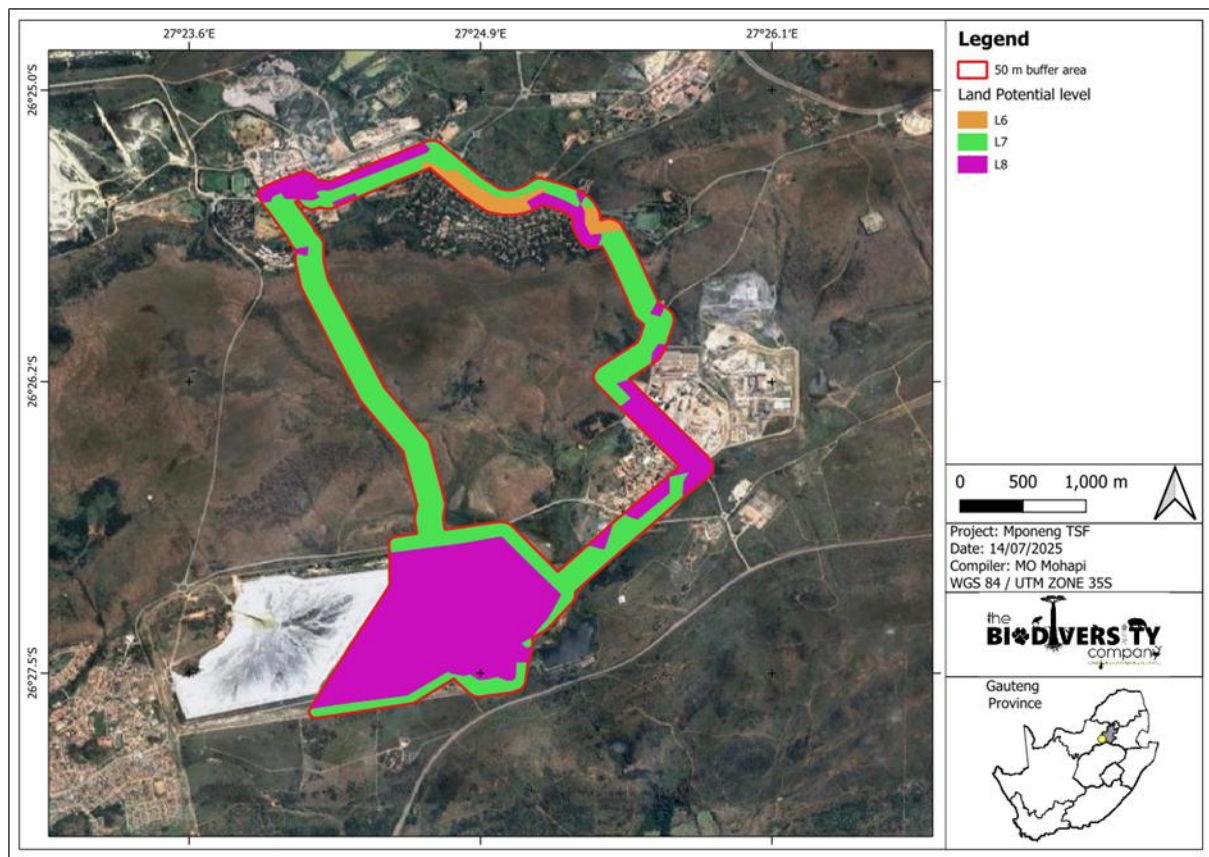


Figure 54: Land Potential of the proposed project area (The Biodiversity Company, 2025)

The land capability dataset (DAFF, 2017) indicates that the proposed project area falls evenly within the “Low to Moderate” land capability sensitivity and the “Moderate to High” land capability sensitivity, with a marginal having a “Very low to Low” land capability sensitivity (refer to the DFFE Screening Tool Report - **Appendix D**). No field crop boundaries were identified within the proposed project area, according to the agricultural screening tool (DFFE, 2025).

The baseline soil findings and the current land uses disputes all areas associated with the “Moderate to High” land capability sensitivity. It further concurs with the “Low to Moderate” land capability sensitivity to an extent and fully correlates with the demarcated “Very low to Low” land capability sensitivity. Based on the verified findings, the moderate to high land capability areas were found to be dominated by very low to low potential soils including the Glenrosa, Mispah and technosols. Furthermore, the marginal confirmed low to moderate land capability areas are comprised of moderate potential soils i.e. Carolina soil form. The remaining very low to low land capability areas are comprised of low potential soils including the Mispah and Glenrosa soil forms. The proposed project and the associated activities are expected to have acceptable changes to the soil resources, and they are anticipated to have minimal impact on the soil resources. Therefore, the overall site sensitivity of the proposed project area is concluded to be predominately “Low”, with a marginal “Medium” agricultural sensitivity along the pipeline alternative route 2 option in an area of residential development where the soil has already been disturbed and fragmented deeming it infeasible for cropping practices.

7.7 TERRESTRIAL BIODIVERSITY AND VEGETATION

Terrestrial biodiversity is the variety of life forms on the land surface of the Earth. High biodiversity is an indicator of a healthy ecosystem, which is directly linked to human health. Animals and plants are responsible for many vital services our lives depend on, including:

- oxygen production;
- water regulation;



- soil retaining; and
- providing flood protection.

Biodiversity is both a part of nature and affected by it. Some biodiversity loss is because of events such as seasonal changes or ecological disturbances (wildfires, floods, etc.), but these effects are usually temporary, and ecosystems have managed to adapt to these threats. Human-driven biodiversity loss, in contrast, tends to be more severe and long-lasting. The human-made climate crisis is leading to environmental destruction, habitat loss, and species extinction. Terrestrial biodiversity is decreasing rapidly through habitat loss: a process where a natural habitat becomes incapable of supporting its native species, which are consequently displaced or killed. In the recent past, there have been increased efforts implemented to prevent further loss of terrestrial biodiversity and the ecosystem services they provide. The characteristics and implications of the terrestrial biodiversity within the Mponeng Lower Compartment TSF are obtained from the Baseline Terrestrial Biodiversity Assessment for The Proposed Mponeng Lower Compartment Tailings Storage Facility undertaken by the Biodiversity Company, 2025 (**Appendix F**) are discussed below.

7.7.1 ECOLOGICALLY IMPORTANT LANDSCAPE FEATURES

The following features describe the general area and habitat, this assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and SANBI.

Table 23: Desktop and background spatial features examined

DESKTOP INFORMATION CONSIDERED	RELEVANT/IRRELEVANT: REASONING	SECTION IN REPORT
Ecosystem Threat Status (RLE 2021)	Relevant. The study area overlaps with a 'Least Concern' ecosystem.	7.7.2.2
Ecosystem Protection Level (NBA, 2018)	Relevant. The study area overlaps with a 'Poorly Protected' Ecosystem.	7.7.2.3
Provincial Conservation Plan (2024)	Relevant. The study area overlaps with Critical Biodiversity Area (CBA) 2, and Ecological Support Area (ESA) 1.	4.2.3
Gauteng Ridges (2019)	Relevant. The study area overlaps with a Class 2 ridge and is located adjacent to two Class 1 ridges.	4.2.5
Key Biodiversity Areas (KBA)	Irrelevant. Not located within 10 km of any KBA	Nil
South African Protected and Conservation Areas Databases (2024) (SAPAD and SACAD)	Irrelevant. The study area is not within range of any relevant SAPAD or SACAD areas. The Gauteng C-Plan does however show a Protected Area to the east of the study area.	Nil
National Protected Areas Expansion Strategy (NPAES)	Relevant. The study area overlaps with portions of NPAES areas.	7.8.4
Strategic Water Source Areas (SWSA)	Irrelevant. The study area does not transect any nor is within close proximity of National Freshwater Ecosystem Priority Areas.	Nil
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Relevant. The study area overlaps with CR SAIIE wetlands and a CR/EN River	7.8.5
National Freshwater Priority Area (NFEPA)	Relevant. The study area overlaps with unclassified NFEPA wetlands and a Class D: Largely Modified and a Class C: Moderately Modified River.	7.8.3



DESKTOP INFORMATION CONSIDERED	RELEVANT/IRRELEVANT: REASONING	SECTION IN REPORT
Mining and Biodiversity Guidelines	Relevant. The study area overlaps with areas rated as Moderate, High and Highest Biodiversity Importance with the correlating risks for mining.	4.1.5

7.7.2 THE NATIONAL BIODIVERSITY ASSESSMENT

The National Biodiversity Assessment (NBA) was completed as a collaboration between the SANBI, the DFFE and other stakeholders, including scientists and biodiversity management experts throughout the country over a three-year period. The purpose of the NBA is to assess the state of South Africa's biodiversity with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The two headline indicators assessed in the NBA are Ecosystem Threat Status and Ecosystem Protection Level (Skowno et al., 2019).

7.7.2.1 VEGETATION TYPE

The study area is situated within the Savanna biome. The Savanna biome of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include:

- a) Seasonal precipitation; and
- b) (Sub) tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

Most savanna vegetation communities are characterised by a herbaceous layer dominated by grasses and a discontinuous to sometimes very open tree layer (Mucina & Rutherford, 2006). The savanna biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layers, over-topped by a discontinuous, but distinct woody plant layer. At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (microphyllous) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by microphyllous woody plants of the Mimosaceae family (Common genera include Vachellia and Albizia) and a generally dense herbaceous layer (Scholes & Walker, 1993).

On a fine-scale vegetation type, the study area overlaps with Gauteng Shale Mountain Bushveld vegetation type (**Figure 55**). This vegetation unit occurs mainly on the ridge of the Gatsrand south of Carletonville-Westonaria-Lenasia. It also occurs as a narrow band along the ridge that runs from a point between Tarlton and Magaliesberg in the west, through Sterkfontein, Pelindaba, Atteridgeville to Klapperkop and southeastern Pretoria in the east. The altitude ranges between 1300 to 1 750m. It consists of low, broken ridges varying in steepness and with high surface rock cover. Vegetation is a short, semi-open thicket dominated by a variety of woody species. The understorey is dominated by a variety of grasses. Some of the ridges form plateaus above the northern slopes that carry scrubby grassland with high surface rock cover.

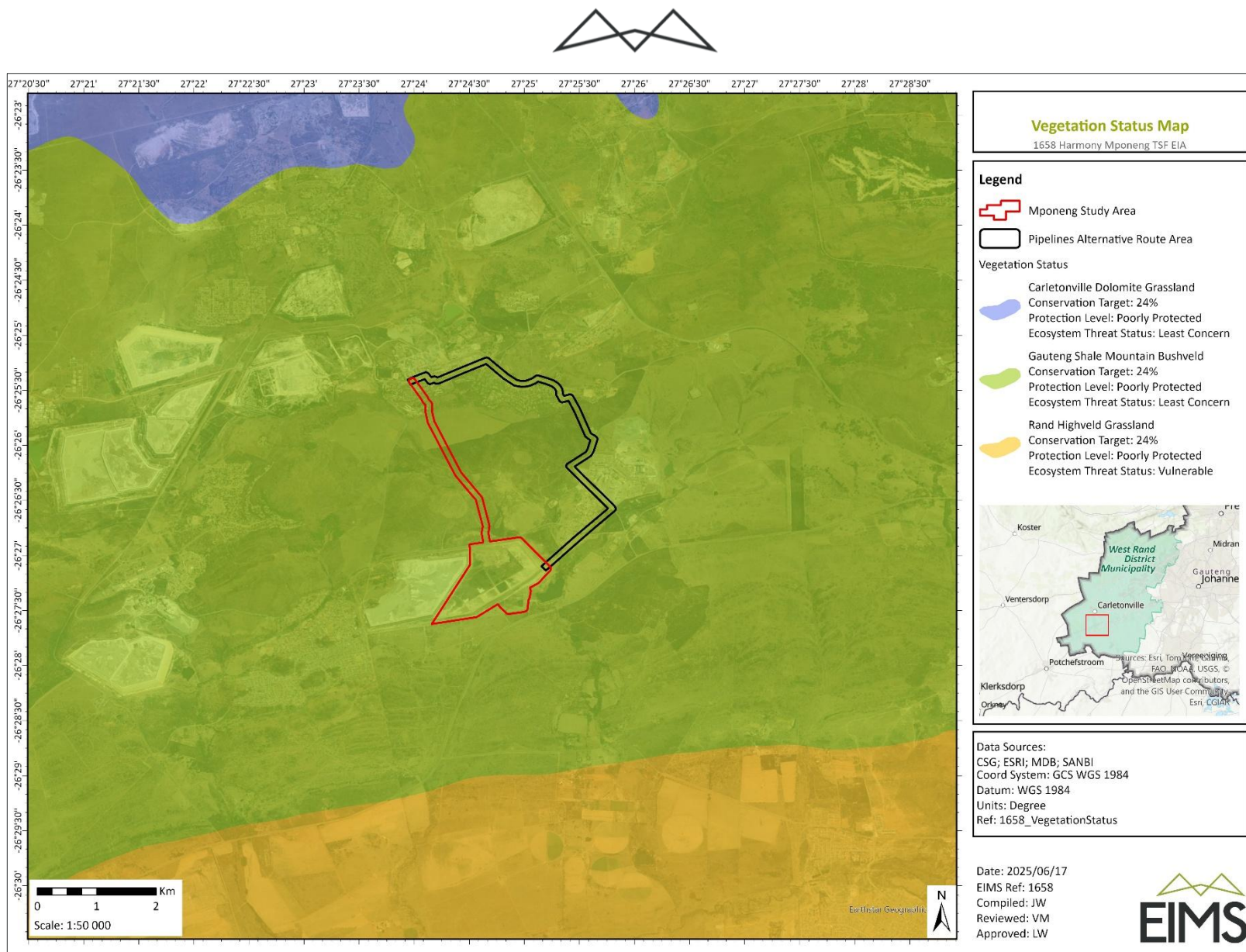


Figure 55: Site Vegetation Map



7.7.2.2 ECOSYSTEM THREAT STATUS - RED LIST OF ECOSYSTEMS

Ecosystem Threat Status (ETS) outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, and composition, on which their ability to provide ecosystem services ultimately depends. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of each ecosystem type that remains in a good or healthy ecological condition (Skowno et al., 2019). CR, EN, or VU ecosystem types are collectively referred to as threatened ecosystems. According to the National Vegetation Data (2018) obtained from SANBI, the proposed development site is located within the Gauteng Shale Mountain Bushveld vegetation type (**Figure 55**).

This vegetation type is classified as Least Concern (RLE, 2022). The national target for conservation protection for this vegetation type is 24%. Less than 1% is statutorily conserved, for example, the Skanskop and Hartbeesthoek Nature Reserves, Magaliesberg Nature Area and Groenkloof National Park. Additionally, over 1% conserved in other reserves including the John Nash Nature Reserve, Cheetah Park and Hartbeesthoek Radio Astronomy Observatory. About 21% transformed mainly by urban and built-up areas, mines and quarries, cultivation and plantations. Wattles a common invasive plant in places.

7.7.2.3 ECOSYSTEM PROTECTION LEVEL

Ecosystem Protection level (EPL) informs on whether ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Not Protected (NP), Poorly Protected (PP), Moderately Protected (MP) or Well Protected (WP), based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno et al., 2019). NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. According to the National Vegetation Data (2018) obtained from SANBI, the proposed development site is located within the Gauteng Shale Mountain Bushveld (**Figure 55**). The Gauteng Shale Mountain Bushveld is a PP ecosystem.

7.7.2.4 FLORAL ASSESSMENT

According to the Baseline Terrestrial Biodiversity Assessment undertaken by the Biodiversity Company (2025), the Global Biodiversity Information Facility (GBIF) database lists 98 flora species expected to occur within the area (refer to the baseline report in **Appendix F** for the full list). Four (4) of these species are considered as Species of Conservation Concern (SCC). Two (2) species were listed as per the DFFE Screening Tool Report (**Table 24**).

Please note that the Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly, and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. Such species have had their names obscured and are listed as sensitive plant unique number / sensitive animal unique number. As per the best practise guideline that accompanies the protocol and screening tool (Species Environmental Assessment Guideline, 2022), the name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain. It should be referred to as sensitive plant or sensitive animal and its threat status may be included, e.g. critically endangered sensitive plant or endangered sensitive animal.

Table 24: Threatened flora species that are expected to occur within the extended study area (The Biodiversity Company, 2025)

SPECIES NAME	REGIONAL	IUCN	HABITAT	SCREENING TOOL SENSITIVITY	LIKELIHOOD OF OCCURRENCE	REASON
<i>Adromischus umbraticola</i>	NT	NE	Plants grow on south-facing rock crevices on ridges	-	Confirmed	Suitable habitat within study area



<i>Khadia beswickii</i>	VU	CR	Open shallow soil over rocks in grassland.	Medium	Confirmed	Suitable habitat within study area
<i>Lithops leslie subsp. lesliei</i>	VU	NE	Occurs primarily in arid grasslands, usually in rocky places, growing under the protection of forbs and grasses	-	Moderate	Suitable habitat within study area
<i>Sensitive Species 1248</i>	VU	NE	-	Medium	Moderate	Suitable habitat within study area
Legend: VU = Vulnerable, CR = Critically Endangered, NT = Near Threatened and NE = Not Evaluated						

7.7.2.5 FAUNAL ASSESSMENT

7.7.2.5.1 AMPHIBIANS

Based on the FrogMap, 22 amphibian species are expected to occur within the extended study area. One (1) amphibian SCC, the *Pyxicephalus adspersus* (Giant Bull Frog) is expected to occur within the project area (**Table 25**).

7.7.2.5.2 REPTILES

Based on the ReptileMAP database, 67 reptile species are expected to occur within the area. Three (3) species are regarded as SCCs (**Table 25**). No species were listed by the Screening Tool.

7.7.2.5.3 MAMMALS

The MammalMap lists 108 mammal species that could be expected to occur within the area. This list excludes large mammal species that are normally restricted to protected areas. Fifteen (15) of these expected species are regarded as SCC (**Table 25**). Of these 15 SCCs, 11 have been assigned a low likelihood of occurrence based on the lack of suitable habitat in the project area. Four (4) species have been assigned a moderate likelihood of occurrence. Two (2) species were listed by the Screening Tool.

7.7.2.5.4 AVIFAUNA

The Southern African Bird Atlas Project (SABAP) 2 data indicate that 278 avifauna species are expected for the project area and surrounding areas. Of these, 27 are considered SCC (**Table 25**). The likelihood of occurrence within the project area is included. The Screening Tool lists three (3) avifauna SCC that could be expected to occur. Refer to the Baseline Terrestrial Biodiversity Assessment Report in **Appendix F** for the full list of species.

Table 25: Threatened flora species that are expected to occur within the extended study area (The Biodiversity Company, 2025)

SPECIES	COMMON NAME	CONSERVATION STATUS		LIKELIHOOD OF OCCURRENCE
		REGIONAL	GLOBAL	
SCC amphibian species that are expected to occur within the project area				
<i>Pyxicephalus adspersus</i>	Giant Bull Frog	NT	LC	Moderate
SCC reptile species that are expected to occur within the project area				
<i>Chamaesaura aenea</i>	Coppery Grass Lizard	LC	NT	Moderate
<i>Crocodylus niloticus</i>	Nile Crocodile	VU	LC	Low
<i>Homoroselaps dorsalis</i>	Striped Harlequin Snake	LC	NT	Moderate
SCC mammal species that are expected to occur within the project area				



SPECIES	COMMON NAME	CONSERVATION STATUS		LIKELIHOOD OF OCCURRENCE
		REGIONAL	GLOBAL	
<i>Aonyx capensis</i>	African Clawless Otter	NT	NT	Low
<i>Atelerix frontalis</i>	Southern African Hedgehog	NT	LC	Moderate
<i>Cloeotis percivali</i>	Percival's Short-eared Trident Bat	EN	LC	Low
<i>Crocidura maquassiensis</i>	Makwassie Musk Shrew	VU	LC	Moderate
<i>Crocidura mariquensis</i>	Swamp Musk Shrew	NT	LC	Low
<i>Eidolon helvum</i>	African Straw-colored Fruit Bat	LC	NT	Low
<i>Felis nigripes</i>	Black-footed Cat	VU	VU	Low
<i>Hydricotis maculicollis</i>	Spotted-necked Otter	VU	NT	Low
<i>Leptailurus serval</i>	Serval	NT	LC	Moderate
<i>Mystromys albicaudatus</i>	African White-tailed Rat	VU	EN	Low
<i>Otomys auratus</i>	Southern African Vlei Rat (Grassland type)	NT	NT	Moderate
<i>Panthera pardus</i>	Leopard	VU	VU	Low
<i>Pipistrellus rusticus</i>	Rusty Pipistrelle	LC	NT	Low
<i>Poecilogale albinucha</i>	African Striped Weasel	NT	LC	Low
<i>Rhinolophus blasii</i>	Blasius's Horseshoe Bat	NT	LC	Low
Threatened avifauna species that are expected to occur within the project area				
<i>Anhinga rufa</i>	African Darter	NT	LC	High
<i>Tyto capensis</i>	African Grass Owl	VU	LC	Confirmed
<i>Circus ranivorus</i>	African Marsh Harrier	VU	LC	Moderate
<i>Circus maurus</i>	Black Harrier	EN	EN	Low
<i>Nycticorax nycticorax</i>	Black-crowned Night Heron	NT	LC	Moderate
<i>Elanus caeruleus</i>	Black-winged Kite	NT	LC	High
<i>Glareola nordmanni</i>	Black-winged Pratincole	LC	NT	Moderate
<i>Spatula smithii</i>	Cape Shoveler	NT	LC	Moderate
<i>Gyps coprotheres</i>	Cape Vulture	VU	VU	Low
<i>Calidris ferruginea</i>	Curlew Sandpiper	VU	VU	Moderate
<i>Hydroprogne caspia</i>	Caspian Tern	VU	LC	Low
<i>Eupodotis senegalensis</i>	White-bellied Korhaan	VU	LC	Moderate
<i>Coracias garrulus</i>	European Roller	NT	LC	Moderate
<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck	NT	LC	Low
<i>Podiceps cristatus</i>	Great Crested Grebe	VU	LC	Low
<i>Ardea alba</i>	Great Egret	NT	LC	High
<i>Phoenicopterus roseus</i>	Greater Flamingo	NT	LC	Low
<i>Scopus umbretta</i>	Hamerkop	NT	LC	High
<i>Charadrius pecuarius</i>	Kittlitz's Plover	NT	LC	Moderate
<i>Sarkidiornis melanotos</i>	Knob-billed Duck	NT	LC	Moderate
<i>Falco biarmicus</i>	Lanner Falcon	NT	LC	Moderate



SPECIES	COMMON NAME	CONSERVATION STATUS		LIKELIHOOD OF OCCURRENCE
		REGIONAL	GLOBAL	
<i>Phoeniconaias minor</i>	Lesser Flamingo	VU	NT	Low
<i>Falco naumanni</i>	Lesser Kestrel	VU	LC	High
<i>Oxyura maccoa</i>	Maccoa Duck	VU	EN	Moderate
<i>Asio capensis</i>	Marsh Owl	NT	LC	High
<i>Mirafra cheniana</i>	Melodious Lark	NT	LC	Moderate
<i>Anas erythrorhyncha</i>	Red-billed Teal	NT	LC	High
<i>Sagittarius serpentarius</i>	Secretarybird	VU	EN	High
<i>Netta erythrophthalma</i>	Southern Pochard	NT	LC	Moderate
<i>Anas undulata</i>	Yellow-billed Duck	NT	LC	High
Legend: EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable				

According to the list of protected species under Schedule 6, if any individuals of these species are to be disturbed, permits must be obtained from the Provincial Department (GDARD). A Terrestrial Biodiversity Impact Assessment with components of flora, fauna and avifauna will be undertaken during the EIA phase. The study will identify the type, sensitivity and conservation status and/or implications thereof of the site-specific species and the potential impacts and mitigation associated with the proposed project.

7.8 SURFACE WATER AND WETLANDS

7.8.1 HYDROLOGY

South Africa is divided into nineteen (19) Water Management Areas (WMAs). The delegation of water resource management from central government to catchment level is achieved by establishing Catchment Management Agencies (CMAs) at WMA level. Each CMA progressively develops a Catchment Management Strategy (CMS) for the protection, use, development, conservation, management and control of water resources within its WMA. This is to ensure that on a regional scale, water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons. The main instrument that guides and governs the activities of a WMA is the CMS which, while conforming to relevant legislation and national strategies, provides detailed arrangements for the protection, use, development, conservation, management and control of the region's water resources.

According to Hydrologic Consulting (2025), the Mponeng Lower Compartment TSF is the site is located within the Highveld Ecoregion, within the Vaal-Orange WMA. The Vaal-Orange Water Management Area (WMA) is South Africa's largest and most economically significant WMA, formed by the merger of the Vaal and Orange River systems. It covers parts of six provinces and crosses international borders, impacting Botswana, Lesotho, Namibia, Zimbabwe, Mozambique, and Eswatini. Managed by the Vaal-Orange Catchment Management Agency (VOCMA), this area is vital for the nation's economy, serving major industrial, mining, and agricultural sectors, as well as urban and rural communities. The study area is located within the Upper Vaal-Orange WMA. The Upper Vaal-Orange WMA is the combined management area for the Upper Vaal WMA and the Upper and Lower Orange WMAs, now managed collectively as the Vaal-Orange WMA (WMA 4). It is a critical and central region in South Africa, encompassing the headwaters of the Vaal River and supporting the economic heartland of the country's urban, industrial, and mining sectors. This combined area is vital for national GDP, receives water from the Lesotho Highlands Water Project, and faces significant water resource challenges due to heavy development.

The study area is positioned within quaternary catchment C23J with the proposed pipelines extending to quaternary catchment C23E (see **Figure 56**). Quaternary catchment C23J is part of the Vaal River system, specifically within the Upper Vaal WMA, which is characterized by intensive industrial, mining, and urban water use, impacting its water resources and contributing significantly to South Africa's GDP. This catchment is a smaller hydrological unit that falls under the jurisdiction of the VOCMA, which is responsible for



managing the water resources within the Vaal-Orange WMA. The nearest River to the study area is the Elandsfonteinspruit River to the south-east of the site, however, this river is only labelled in the 1:500,000 river dataset for South Africa. The NGI's 1:50,000 topographical map data illustrates numerous nonperennial river systems to the north and south, both of which converge to the southeast of the site. The northern system feeds the Elandsfonteinspruit, enabling perennial flows (per the NGI's classification).

The northern and southern system are associated with a vlei to the east and dams both north and south to the site. There are upstream furrows directing runoff from part of the greater Mponeng Operation (south of the Old North Complex TSF) and along the Mponeng TSF trenches draining to the non-perennial rivers to the west. The southern system is characterised by two larger dams, one of which is listed as the proposed return water dam for the Mponeng TSF.

7.8.2 TOPOGRAPHICAL RIVER LINES AND INLAND WATER AREAS

The topographical inland and river line data for the "2627" dataset indicated several inland water areas, which were classified as numerous dams, one marsh vlei and three large reservoirs (**Figure 57**). Furthermore, several topographic non-perennial drainage features were identified within the study area, along with one perennial river, the Elandsfonteinspruit.

7.8.3 NATIONAL FRESHWATER PRIORITY AREA

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver et al., 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel et al., 2011).

Within the study area, several NFEPA features are evident (**Figure 58**). Notably, a channelled valley-bottom wetland, present in the southern portion of the study area. This wetland is associated with a network of non-perennial drainage lines and is situated adjacent to the main infrastructure footprint. In addition, several seep wetlands are distributed along the periphery of the study area, particularly to the north and east and, several wetland flats were identified within the study area. Furthermore, a NFEPA river (Elandsfonteinspruit), traverses the southeastern boundary of the study area, providing important ecological connectivity. According to the dataset, all identified wetlands have been classified as artificial and to have a "Z3 - Heavily to Critically Modified" condition and are classified as "non-priority" systems.

7.8.4 NATIONAL PROTECTED AREAS EXPANSION STRATEGY

The National Protected Area Expansion Strategy 2018 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with a strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2018). The study area overlaps with portions of NPAES areas (**Figure 59**).

7.8.5 SOUTH AFRICAN INVENTORY OF INLAND AQUATIC ECOSYSTEMS

Several wetland types are present, including channelled valley-bottom wetlands, unchannelled valley-bottom wetlands, and seep wetlands (**Figure 60**). The channelled valley-bottom wetlands are primarily concentrated along the eastern and southern boundaries of the study area, closely associated with the Elandsfonteinspruit river, which flows through the southeastern section of the study area. Unchannelled valley-bottom wetlands are scattered throughout the mid-western and northern portions of the study area, often following natural drainage lines. Seep wetlands are more isolated, occurring in smaller patches along the periphery of the site. The wetlands have been classified according to the dataset to either have a "A/B – Natural/Largely Natural", "C – Moderately Modified" or a "D/E/F – Largely/Seriously/Critically Modified" condition. Furthermore, all wetlands are



considered to be “Critically Endangered” and “Not Protected” with regard to Ecosystem Threat and Protection Status, respectively. According to the dataset, the Elandsfonteinspruit River is classified as a “Critically Endangered” ecosystem and is considered to be “Poorly Protected”.

7.8.6 WETLANDS SURVEY

Three (3) Hydrogeomorphic (HGM) units were identified within the encompassing 500 m Mponeng Lower Compartment TSF study area. These were classified as; one (1) channelled valley-bottom, one (1) unchannelled valley-bottom and one (1) Hillslope Seep (**Figure 61**). Several dams were identified within the study area, most of which were in-stream features with only one off-channel feature. In addition, several non-perennial drainage features were identified, none of which have any connectivity to a river. A summary of the wetland features is provided in **Table 26** below.

Table 26: Wetland classification as per SANBI guideline (The Biodiversity Company, 2025)

Wetland Unit	Level 1	Level 2		Level 3	Level 4		
	System	DWS Ecoregion/s	NFEPA Wet Veg Group/s	Landscape Unit	4A (HGM)	4B	4C
HGM 1	Inland	Highveld	Central Bushveld Group 1	Valley floor	Channelled valley-bottom	N/A	N/A
HGM 2	Inland	Highveld	Central Bushveld Group 1	Valley floor	Unchannelled valley-bottom	N/A	N/A
HGM 3	Inland	Highveld	Central Bushveld Group 1	Slope	Seep	Without channelled outflow	N/A

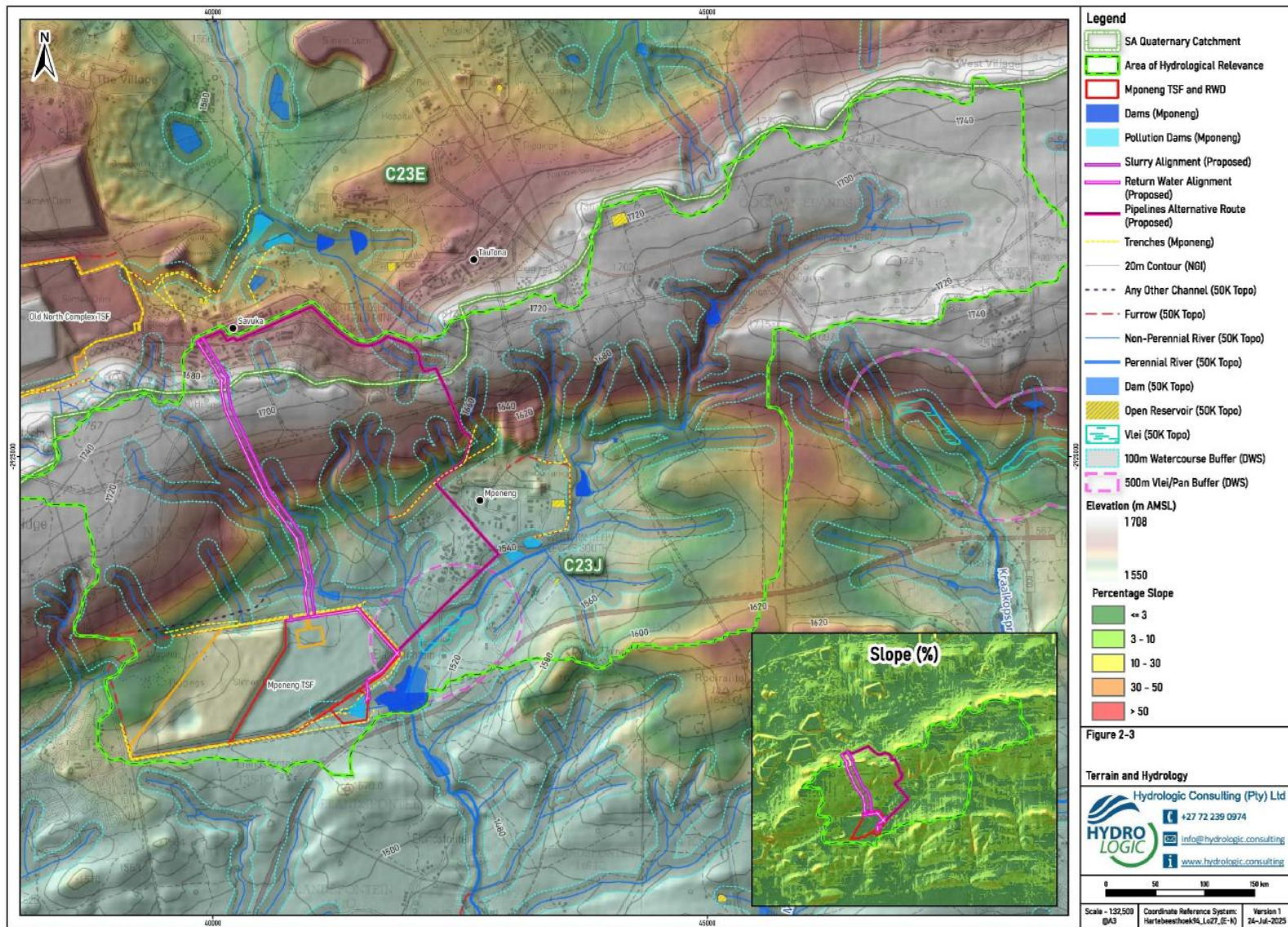


Figure 56: Hydrological setting of the site (Hydrologic Consulting, 2025)

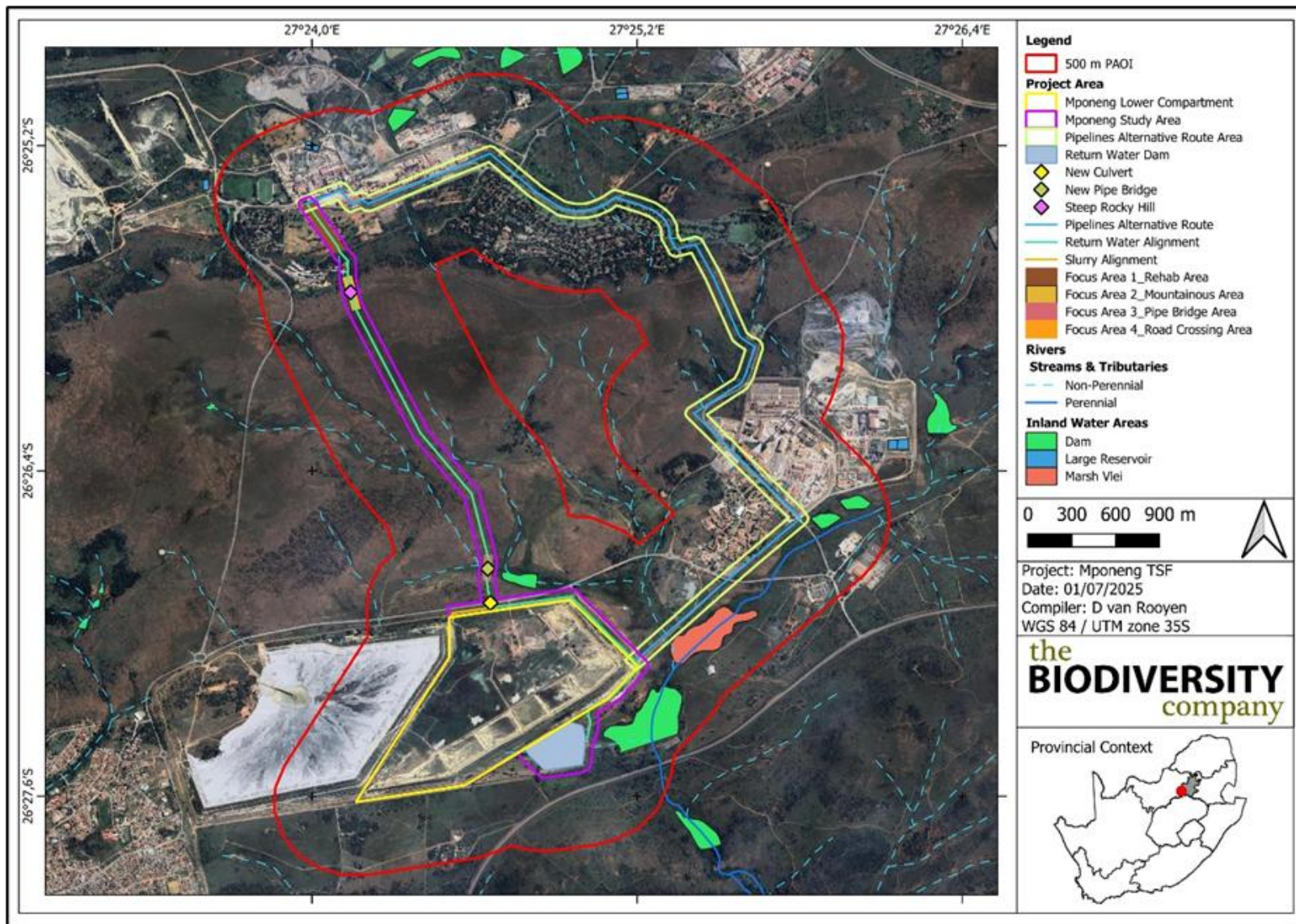


Figure 57: Topographical inland water areas and river lines that intersect the Project Area of Influence (The Biodiversity Company, 2025)

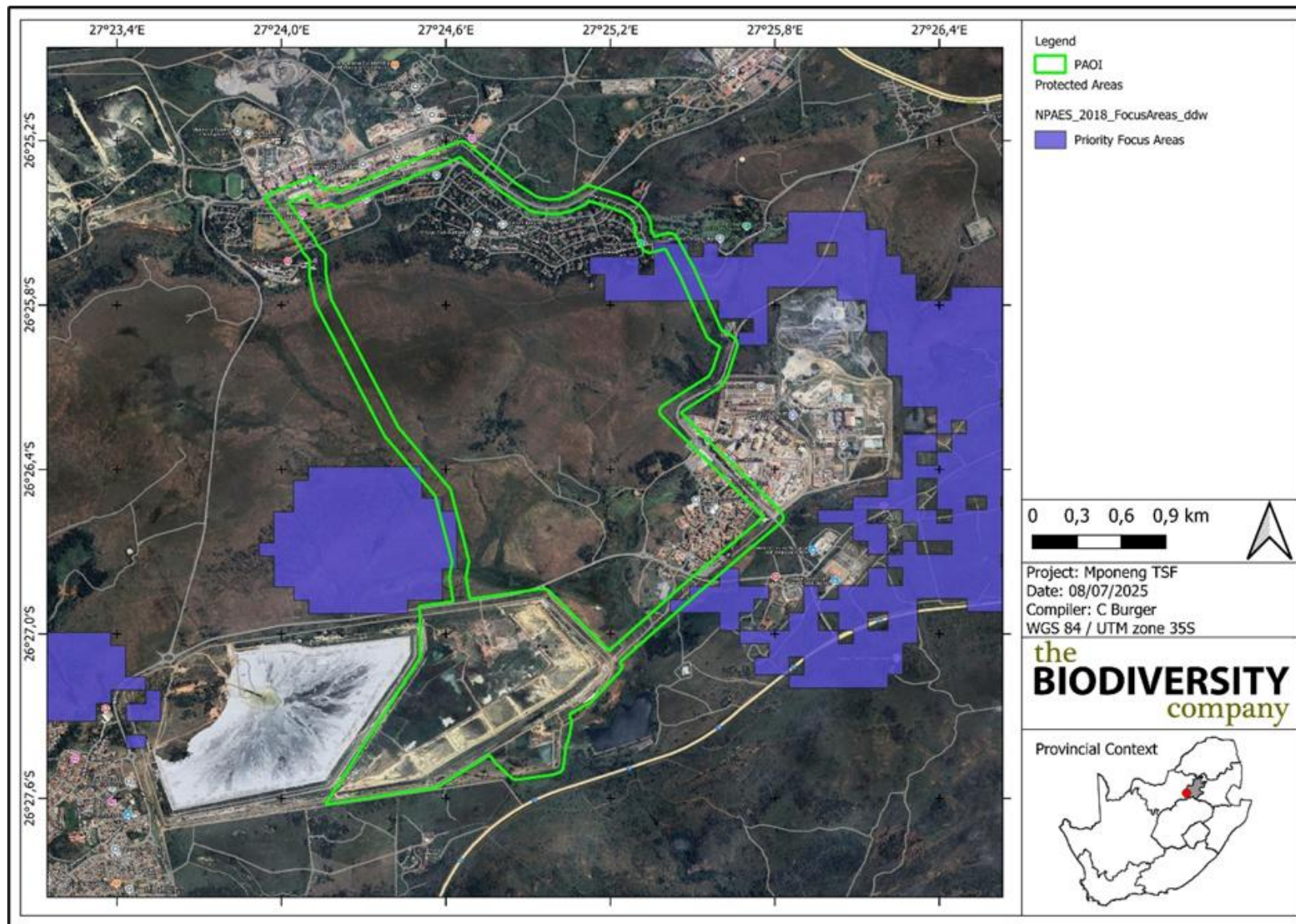


Figure 58: The study area in relation to the National Protected Area Expansion Strategy (The Biodiversity Company, 2025)

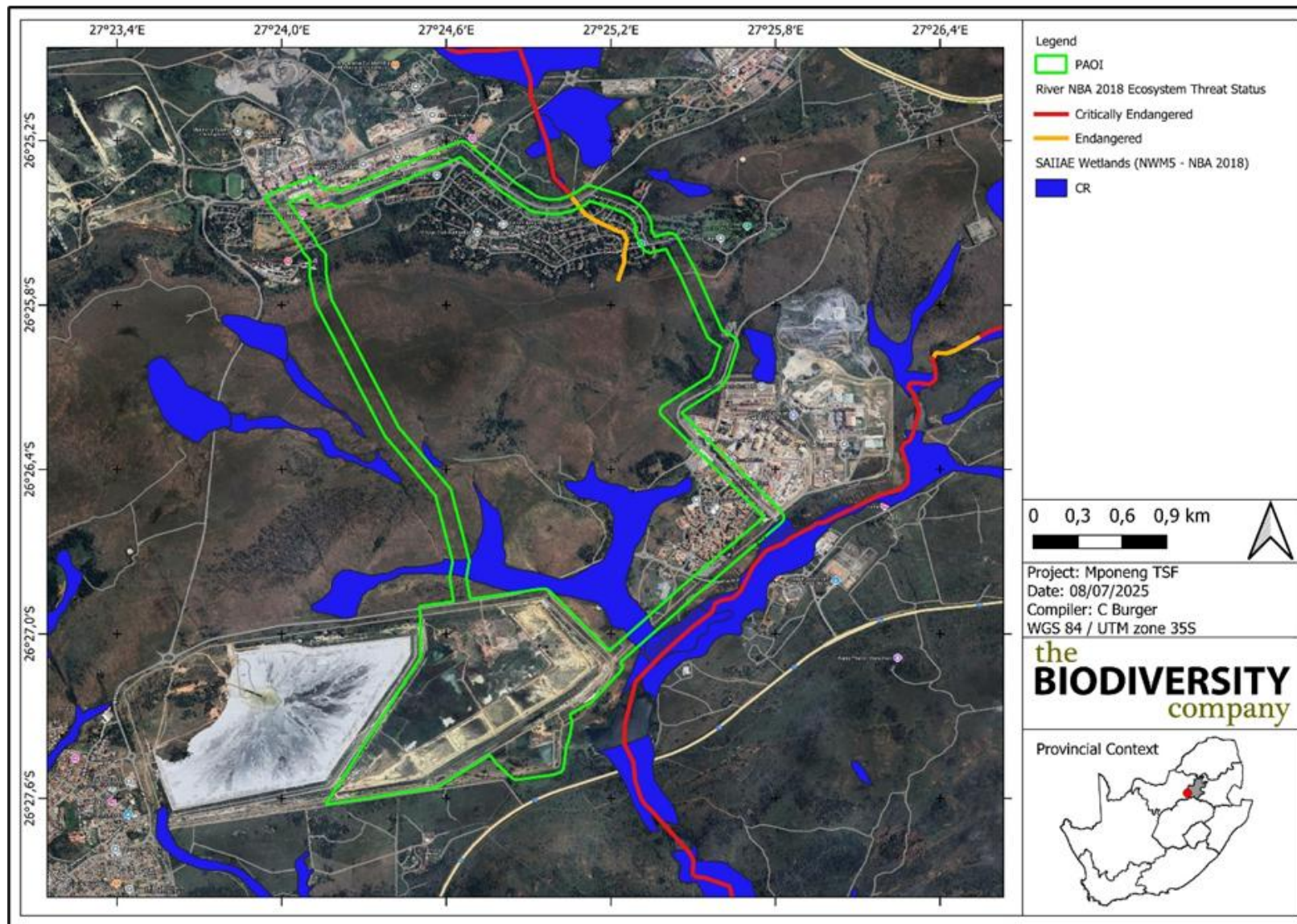


Figure 59: Map illustrating the SAIIE threat status of rivers and wetland systems within the study area (The Biodiversity Company, 2025)

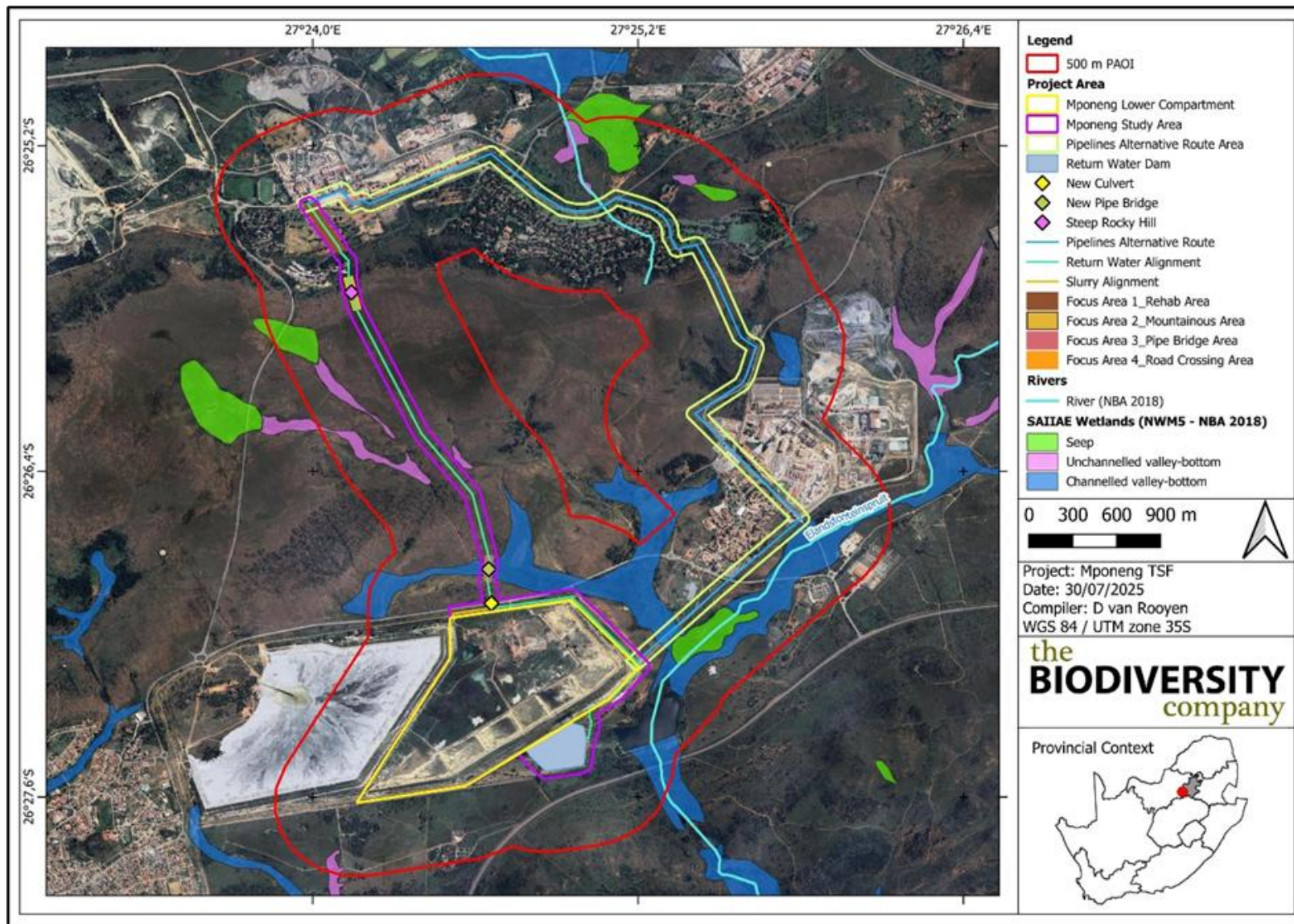


Figure 60: Wetland features identified within the study area (The Biodiversity Company, 2025)

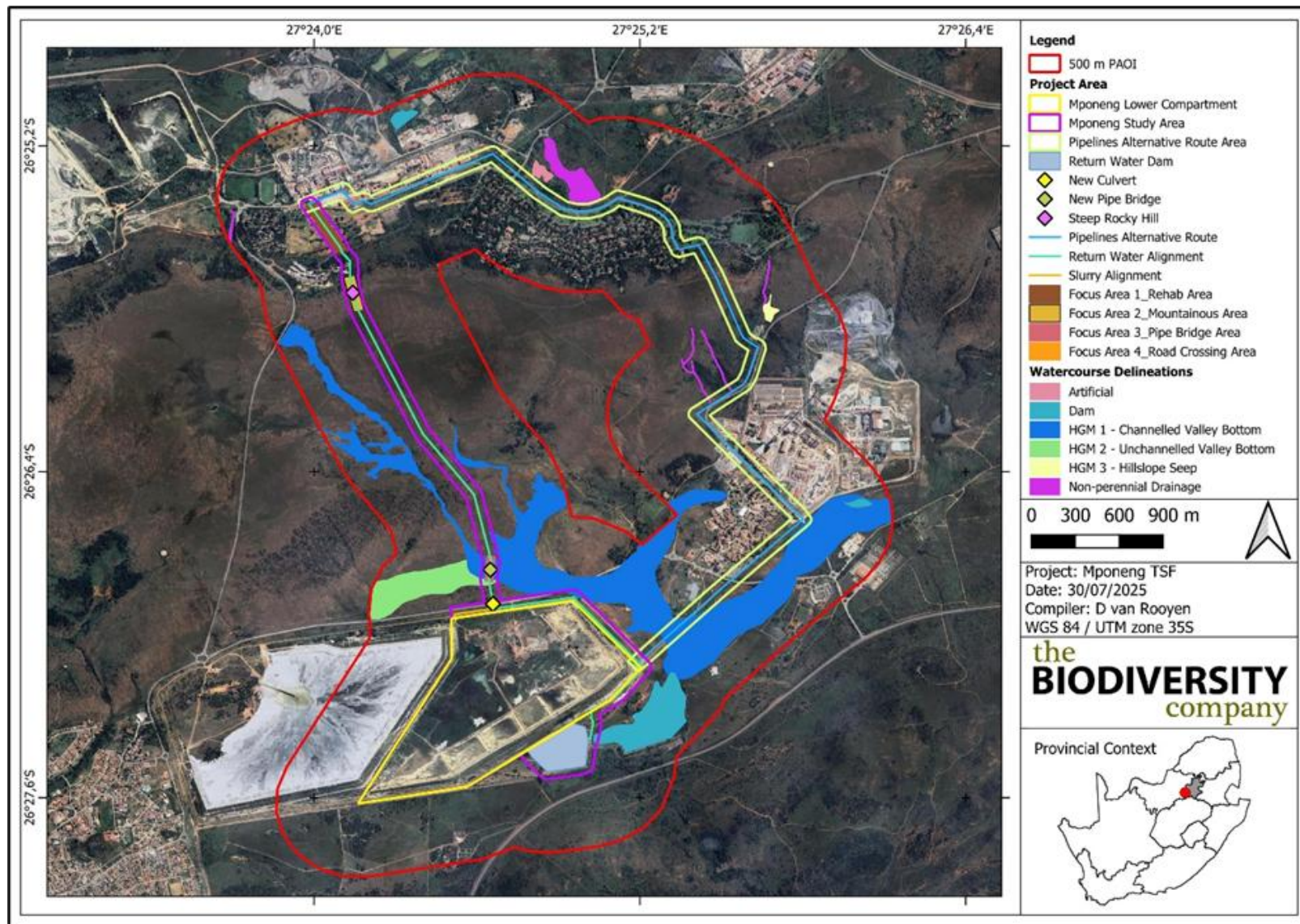


Figure 61: Delineation of watercourses within the study area (The Biodiversity Company, 2025)



7.9 GEOHYDROLOGY - GROUNDWATER

A final geohydrological specialist study will be conducted as part of the EIA and included in the EIA phase report. A description of the conceptual hydrogeological model is important to provide an understanding of the regional geology (refer to **Section 7.4.2**), which is the governing factor in both the aquifer formation and the movement of groundwater, as well as the hydrogeological setting and groundwater occurrence in the mining area. The hydrogeological setting and conceptual model of the study area is described according to the following criteria:

- Borehole information.
- Aquifer type.
- Groundwater use.
- Aquifer parameters.
- Aquifer recharge.
- Groundwater gradients and flow.
- Groundwater quality.
- Aquifer classification.

7.9.1 BOREHOLE INFORMATION

There are several groundwater monitoring boreholes in the vicinity of the Mponeng Lower Compartment TSF. No private boreholes could be located within a 2km radius of the TSF as there are no major groundwater users in the area. The localities of the available boreholes are shown on **Figure 62** and summarised in **Table 27**.

7.9.2 AQUIFER TYPE

Groundwater occurrences in the study area are predominantly restricted to the following types of terrains.

- Weathered and fractured rock aquifer in the Transvaal Formations.
- Dolomitic and Karst Aquifers.

Although the dolomite aquifer is the most prominent aquifer in the region, it does not play any role in the activities at the Mponeng Lower Compartment TSF. The Mponeng Lower Compartment TSF is predominantly located on the shale of the Timeball Hill formation. The dolomite is $\pm 400\text{m}$ below surface at the Mponeng TSF site. Evidence has shown that there is no connectivity between the weathered / fractured aquifer and the underlying dolomite aquifer. Even in compartments where the dolomite aquifer is dewatered the groundwater levels in the weathered / fractured aquifer remains unaffected.

7.9.2.1 WEATHERED AND FRACTURED AQUIFER

Groundwater occurs in the near-surface geology in the weathered and fractured sedimentary deposits (quartzite and shale) of the Transvaal strata. The lava of the Hekpoort Formation has similar weathering characteristics to that of the shale and is therefore deemed as the same aquifer. These formations are not considered to contain economic and sustainable aquifers, but localised high yielding boreholes may, however, exist where significant fractures are intersected. Groundwater occurrences are mainly restricted to the weathered formations, although fracturing in the underlying “fresh” bedrock may also contain water. Experience has shown that these open fractures seldom occur deeper than 60m. The base of the aquifer is the impermeable quartzite, shale and lava formations, whereas the top of the aquifer would be the surface topography. The groundwater table is affected by seasonal and atmospheric variations and generally mimics the topography. These aquifers are classified as semi-confined. The two aquifers (weathered and fractured) are mostly hydraulically connected, but confining layers such as clay and shale often separate the two. In the latter instance the fractured aquifer is classified as confined. The aquifer parameters, which includes transmissivity and storativity is generally low and groundwater movement through this aquifer is therefore also slow.

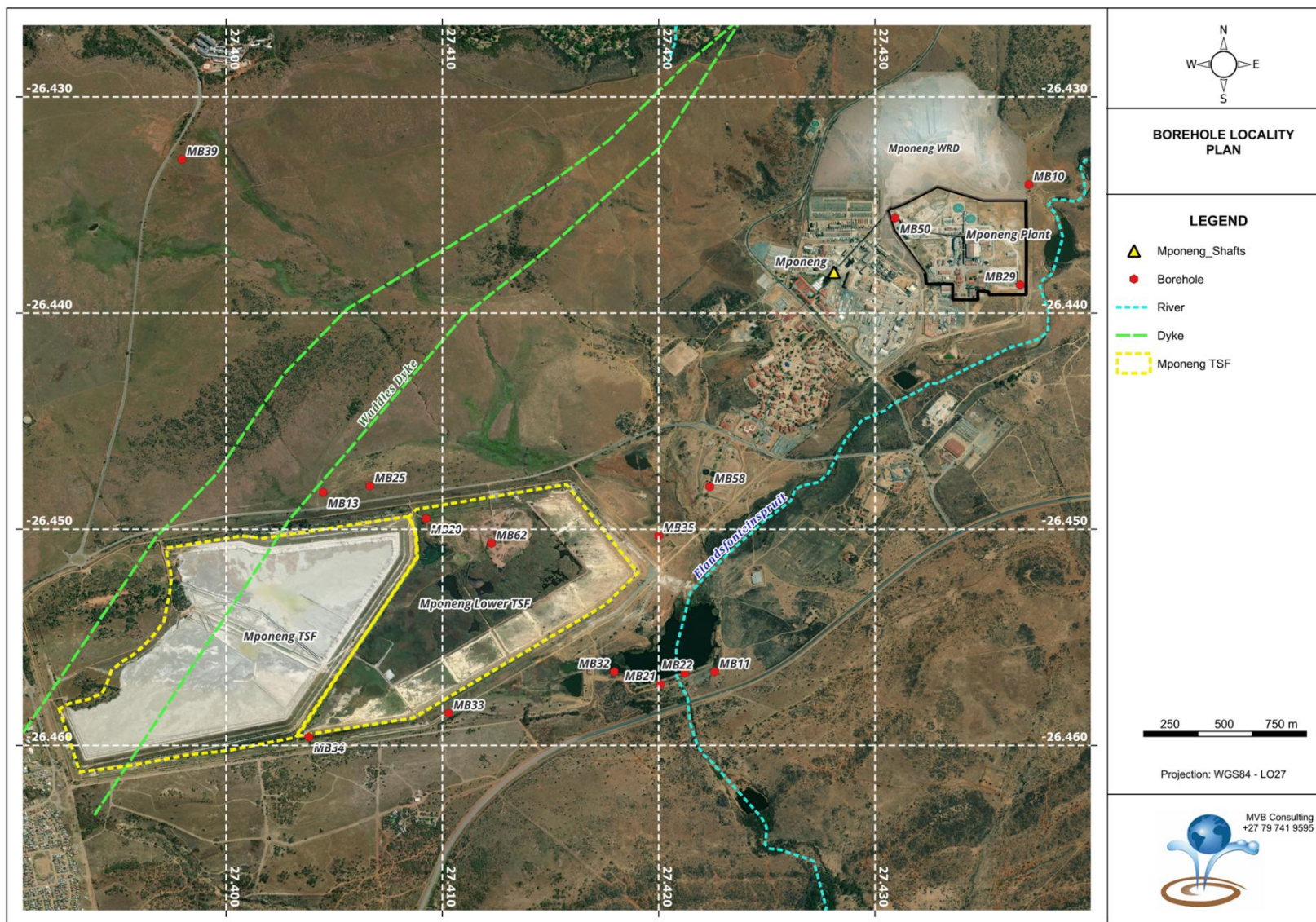


Figure 62: Monitoring boreholes in the vicinity of the Mponeng TSF (MvB Consulting, 2025)



Table 27: Mine monitoring boreholes (GCS, 2023)

BH ID	Longitude	Latitude	Z	Description	Borehole Depth (m)	Geology
MB10	27.43712	-26.43405	1569.26	SE of Mponeng RD; N of Mponeng GP	29.66	Timeball Hill Shale and Quartzite
MB11	27.42259	-26.45659	1499.16	SE of Mponeng TSF and Below aquatic Dam	30.00	Shales
MB13	27.40448	-26.44829	1560.05	N of Mponeng TSF, N road,	33.50	Timeball Hill Shale and Quartzite
MB20	27.40925	-26.44950	1541.87	Next to the eye (fountain),	30.00	Shales (weathered / fractured)
MB21	27.42008	-26.45717	1498.45	SE of Mponeng TSF, SE Mponeng RWD	30.00	Shales
MB22	27.42121	-26.45666	1497.81	SE of Mponeng TSF, SE Mponeng RWD	30.00	Shales and andesite lava
MB25	27.40665	-26.44800	1556.15	N of Mponeng TSF	100.00	Timeball Hill Shale and Quartzite
MB29	27.43672	-26.43869	1555.53	South of anti pollution dams at Mponeng Plant		-
MB32	27.41795	-26.45659	1507.50	S of S Mponeng RWD		-
MB33	27.41029	-26.45851	1524.70	South of South TSF below van Eeden dam		Borehole dry / blocked
MB34	27.40383	-26.45961	1535.43	South of South TSF below partition of 2 dams		Borehole dry / blocked
MB35	27.42000	-26.45030	1512.43	E of S s/dam next to soccer field	30.00	Timeball Hill Shale and Hekpoort Andesite
MB39	27.39796	-26.43289	1705.33	On Gatsrand up from Wadela circle to Savuka	114.00	Timeball Hill Shale
MB50	27.43093	-26.43560	1563.83	South-west (down gradient) of Mponeng waste dump	35.00	Timeball Hill Shale and Quartzite
MB58	27.42236	-26.44803	1516.85	Downstream of Mponeng (south) sewage works		Borehole locked
MB62	27.41227	-26.45065	1534.33	Downstream Mponeng Solid Waste Site at TSF Compartment		-



7.9.2.2 DOLOMITE AQUIFER

Dolomite aquifers in the region are known to contain large quantities of groundwater and are commonly associated with sustainable groundwater abstraction. The water that plaques the underground mining is primarily derived from the dolomite aquifer overlying the workings. The depth to groundwater in the region ranges from 4m to 41m below surface in the non-dewatered groundwater compartments (Zuurbekom and Boskop/Turffontein). This is in contrast to the groundwater levels in excess of 200 m in the dewatered compartments (Gemsbokfontein West, Venterspost, Bank and Oberholzer). The unsaturated zone in the dolomite aquifer ranges from weathered wad material and Karoo sediments within deep solution cavities or grykes (deeply weathered paleo-valley within the dolomite) to relatively fresh fractured dolomite between major solution cavities and at depth.

The shallow weathered dolomite aquifer has been formed because of the karstification which has taken place prior to the deposition of the Karoo sediments on top of the dolomites. There is general agreement that this aquifer is the significant source of water within the dolomite. The base of the weathered dolomite (aquifer) is irregular in nature and there are zones of deep weathering (grykes). The maximum depth to the base of this aquifer is in the order of 200m below surface. The non-weathered dolomite approximates a traditional fractured rock aquifer at depth where dissolution has been less pronounced. It is extremely unlikely that any significant groundwater flow occurs below these depths except along intersecting structural conduits to the underlying mine workings

7.9.2.3 RELATIONSHIP BETWEEN THE WEATHERED / FRACTURED AQUIFER AND THE DOLOMITE AQUIFER

Evidence has shown that there is no connectivity between the weathered / fractured aquifer and the underlying dolomite aquifer. Even in compartments where the dolomite aquifer is dewatered the groundwater levels in the weathered / fractured aquifer remains unaffected. **Figure 63** illustrates the relationship between the fractured and dolomite aquifers and also shows that the degree of karstification. Based on the exploration borehole information, it appears that the dolomite that that is covered by Transvaal strata is less karstified and the dolomite aquifer is therefore not as well developed. The mines situated south of the “Gatsrant” are generally dry mines with limited groundwater inflow, whereas the mines north of the “Gatsrant” is plagued by high groundwater inflow volumes. This is, in part, attributed to the well-defined karstification in the northern dolomites.

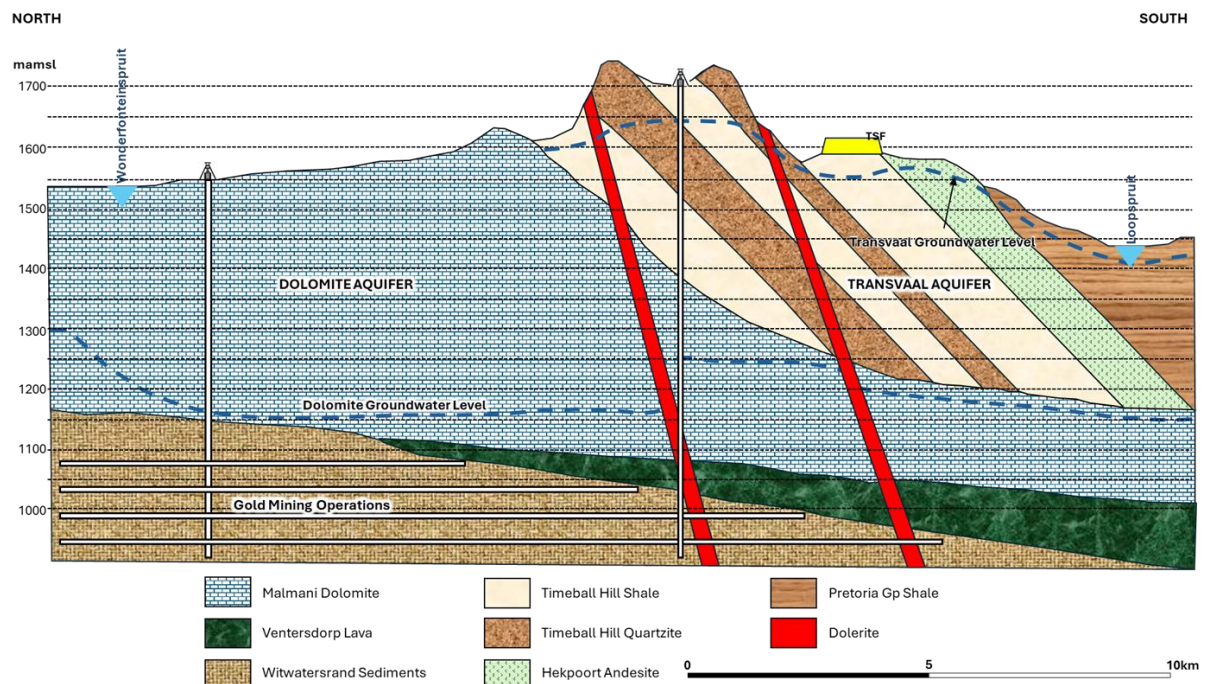


Figure 63: Graphical illustration of the aquifers in the study area (Van Biljon, 2018)



7.9.3 AQUIFER PARAMETERS

The newly drilled boreholes were pump tested. Important parameters that can be obtained from borehole or test pumping include Hydraulic Conductivity (K), Transmissivity (T) and Storativity (S). These parameters are defined as follows (Krusemann and De Ridder, 1991):

- **Hydraulic Conductivity:** This is the volume of water that will move through a porous medium in unit time under a unit hydraulic gradient through a unit area measured at right angles to the direction of flow. It is normally expressed in metres per day (m/day).
- **Transmissivity:** This is the rate of flow under a unit hydraulic gradient through a cross-section of unit width over the full, saturated thickness of the aquifer. Transmissivity is the product of the average hydraulic conductivity and the saturated thickness of the aquifer. Transmissivity is expressed in metres squared per day (m²/day).
- **Storativity:** The storativity of a saturated confined aquifer is the volume of water released from storage per unit surface area of the aquifer per unit decline in the component of hydraulic head normal to that surface. Storativity is a dimensionless quantity.

Pump testing that was undertaken by GCS (2019) estimated the aquifer parameters in the weathered and fractured aquifer to be as follows (**Table 28**).

Table 28: Transmissivity and hydraulic conductivity values in the weathered and fractured aquifers (GCS, 2019)

ID	Blow Yield (litre/hour)	Transmissivity (m ² /day)	Hydraulic conductivity (m/day)		Aquifer
			Constant Discharge Test	Recovery Test	
MB10	23 000	-	12.9	6.08	Timeball Hill Shale and Quartzite
MB11	150	0.07	-	-	Shale
MB12	400	0.01	0.052	0.0303	Shale
MB13	1 190	0.7	0.1194	0.0363	Timeball Hill Shale and Quartzite
MB19	100	-	-	-	Shale
MB20	100 000	337	11.6	14.38	Shale (weathered / fractured)
MB21	1 600	2	-	-	Shale
MB22	3 600	13	0.5573	0.4645	Shale and andesitic lava
MB35	-	-	0.47	1.86	Timeball Hill Shale and Hekpoort Andesite
MB39	-	-	0.04	-	Timeball Hill Shale
MB50	Seepage	-	-	-	Timeball Hill Shale and Quartzite
MB51	Seepage	-	-	-	Timeball Hill Shale and Quartzite
MB58	3 000	-	-	-	Timeball Hill Shale and Quartzite



7.9.4 AQUIFER RECHARGE

Recharge is defined as the process by which water is added from outside to the zone of saturation of an aquifer, either directly into a formation, or indirectly by way of another formation. According to the Groundwater Assessment Phase II (GRAII) the recharge is approximately 4% of mean annual precipitation. Groundwater recharge (R) for the area is also calculated using the chloride method (Bredenkamp *et al.*, 1995) and is expressed as a percentage of the Mean Annual Precipitation (MAP). The method is based on the following equation:

$$R = \frac{\text{Chloride concentration in rainfall}}{\text{Chloride concentration in ground water}} \times 100$$

According to Vegter (1995) the recharge in the fractured aquifer is 31 mm / annum with water occurring in the shallow weathered zone and water bearing fractures only. This is equal to approximately 4% of mean annual precipitation. The average rainfall in the area is approximately 646 mm / annum. The average chloride in rainfall for areas inland is approximately 1.0 mg/L and the harmonic mean of the chloride concentration values in groundwater samples obtained from the mining area is 25.88 mg/

$$R = \frac{1}{25.88} \times 100 = 3.9\%$$

This value corresponds with Vegter's value.

7.9.5 GROUNDWATER GRADIENTS AND FLOW

The first important aspect when evaluating the hydrogeological regime and groundwater flow mechanisms is the groundwater gradients. Groundwater gradients, taking into consideration fluid pressure, are used to determine the hydraulic head which is the driving force behind groundwater flow. The flow governs the migration of contaminants and a detailed assessment of the flow was required to determine subsurface flow directions from the TSF or any other potential contaminant source.

In most geological terrains, the groundwater mimics the topography and to test if this is the case within the study area the available groundwater levels were plotted against the topography (represented by the borehole collar elevations). Based on the assessment, a very good correlation (99%) between the topography and the groundwater level was identified, which suggests that groundwater flow will follow the topographical gradient.

Figure 64 depicts the groundwater level elevations, which as expected, mimics the surface contours. Groundwater flow is perpendicular to the groundwater contours and flows predominantly towards the south-west.

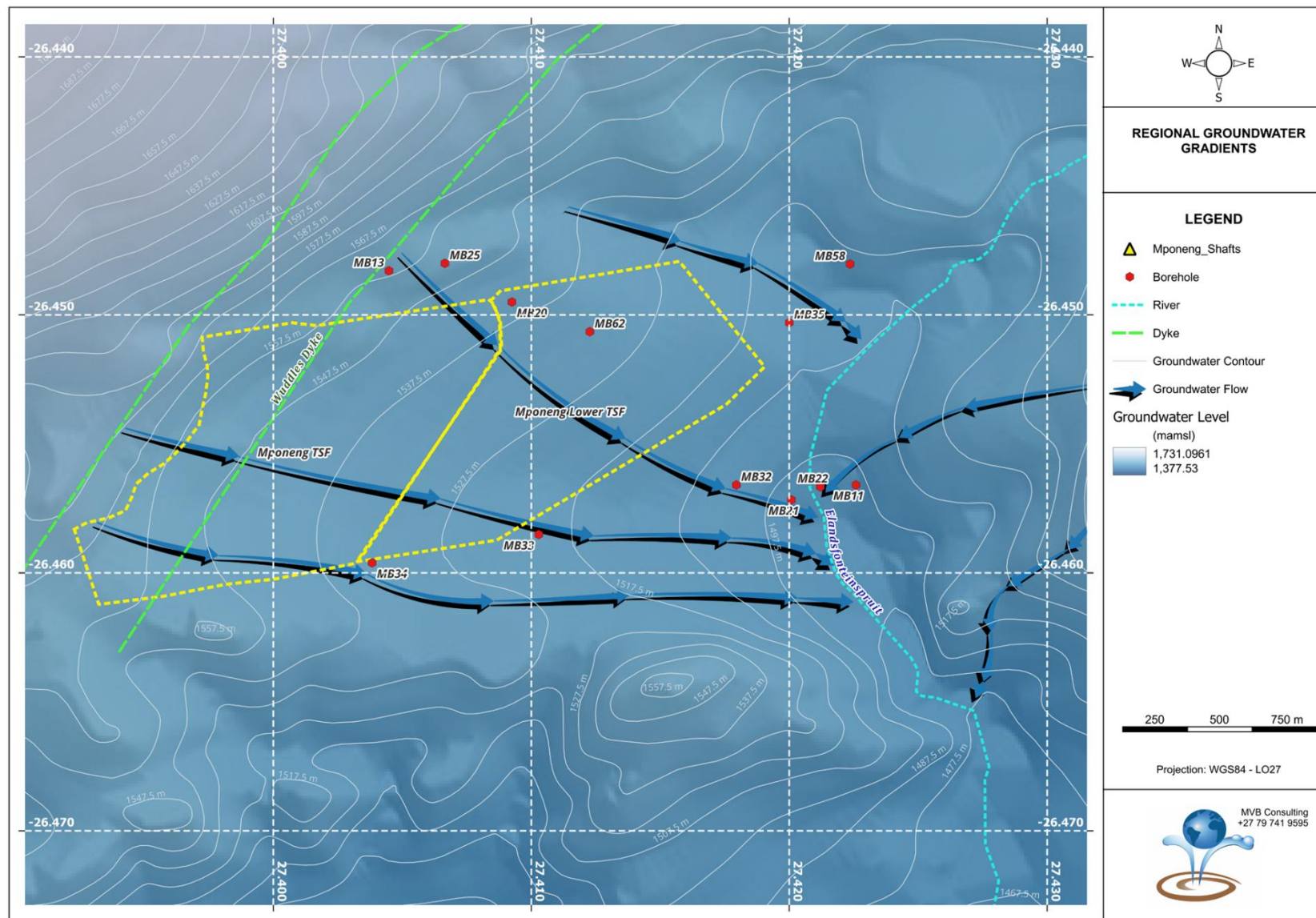


Figure 64: Regional groundwater gradient and borehole locations in relation to the TSF site (MvB Consulting, 2025)



7.9.6 GROUNDWATER QUALITY

The mine routinely monitors the groundwater quality in the vicinity of the Mponeng Lower Compartment TSF. This data was made available and is used to assess the current impacts from the TSF.

Since there are no groundwater users within a 1km radius from the Mponeng Lower Compartment TSF, the groundwater chemistry is compared to the South African Water Quality Guidelines (second edition) Volume 5: Agricultural Use: Livestock Watering (Department of Water Affairs and Forestry, 1996), as well as the SANS 241 (2015). The SANS 241 Drinking Water Specification is the definitive reference on acceptable limits for drinking water quality parameters in South Africa and provides guideline levels for a range of water quality characteristics. The SANS 241 (2015) Drinking-Water Specification effectively summarises the suitability of water for drinking water purposes for lifetime consumption.

The guideline for livestock watering represents the target water quality specified in the guidelines. The target water quality guidelines were obtained from the Department of Water Affairs and Forestry, 1996. South African Water Quality Guidelines (second edition). Volume 5: Agricultural Use: Livestock Watering. According to the guidelines (DWAF, 1996), the following constituents are of concern for livestock watering. The chemistry of the groundwater is presented in **Table 29**. Where either of the guidelines are exceeded, the values are highlighted in baby pink. With reference to **Table 29** the following is observed:

- Monitoring boreholes MB29 and MB50 in the plant area show an impact. This is, however, not applicable to the current investigation.
- Monitoring boreholes MB32 and MB35 show an impact from the up-gradient Mponeng TSF. This is in line with the expected groundwater flow paths.
- The groundwater flow is towards the Return Water Dams (RWD), but borehole BH35 shows that the impacted water passes underneath the RWD. The impact is therefore expected to flow into the Aquatic Dam, or it will form part of the baseflow of the Elandsfonteinspruit. The relatively good water quality in the Aquatic Dam suggests that the impacted groundwater forms part of the baseflow of the stream.

The distribution of the sulphate (SO_4) concentrations provides an aerial view of the impact areas, which is as expected along the eastern and south-eastern boundary of the TSF (**Figure 65**).



Table 29: Groundwater chemistry (MvB Consulting, 2025)

Analysis in mg/L (unless specified otherwise)	SANS 241	DWAF	MB39	MB10	MB29	MB32	MB50	MB11	MB13	MB62	MB20	MB21	MB22	MB25	MB35
Electrical Conductivity (mS/m)	170	-	2.4	4	219	313	228	118	2.2	7.7	1.5	109	98.5	2.1	435
Hardness Total			7	10	391	837	500	466	7	18	7	399	363	9.5	1434
pH	<5 - >9.7	-	6.5	6.6	5.7	6.6	5.7	7.7	6.3	6.8	6	7.2	6.9	5.8	4.8
Suspended Solids at 105°C	-	-	26	<25	94	<25	257	236	<25	408	358	260	220	1455	59
Total Dissolved Solids at 180°C	1 200	1 000	<100	<100	1 476	2 176	1 499	814	<100	<100	<100	760	682	165	2 971
Alkalinity Total	-	-	<30	<30	<30	57	<30	232	<30	<30	<30	190	156	<30	<30
Ammonia	1.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Calcium	-	1 000	<2.0	2.4	99	201	118	96	<2.0	2.6	<2.0	92	78	2.1	409
Chloride	300	1 500	<5	5	366	571	402	187	<5	12	<5	206	191	<5	814
Fluoride	1.5	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium	-	500	<2.0	<2.0	35	80	50	54	<2.0	2.7	<2.0	41	41	<2.0	99.6
Nitrate & Nitrite	11	100	0.8	1.6	11	7.6	54	1.7	1.1	1.7	<0.5	1.2	<0.5	0.9	<0.5
Orthophosphate	-	-	<0.05	<0.05	<0.05	0.1	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sodium	200	2 000	2.1	3.9	267	351	250	34	2.1	6.8	<2.0	37	32	2.2	396
Sulphate	500	1 000	<5.0	<5.0	468	775	334	94	<5.0	<5.0	<5.0	41	33	<5.0	1 261
Zinc	5	0.02	<0.10	<0.10	0.12	<0.10	0.19	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	1.1
Aluminium	0.3	5	<0.03	<0.03	0.04	<0.03	0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	<0.03	<0.03
Boron	2.4	5	<0.02	<0.02	0.08	0.05	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cadmium	0.003	0.01	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Copper	2	0.5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Cyanide Dissolved - CFA	0.2	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cyanide WAD - CFA	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron	2	10	0.05	<0.03	<0.03	0.03	<0.03	0.04	<0.03	0.09	3.5	0.7	4.5	<0.03	4.8
Lead	0.01	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	0.4	10	<0.03	<0.03	1	0.22	0.2	0.23	0.18	0.04	0.26	1.6	2.4	0.091	4.2
Nickel	0.07	1	<0.03	<0.03	0.07	0.05	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	0.05	<0.03	0.14
Uranium	0.03	-	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

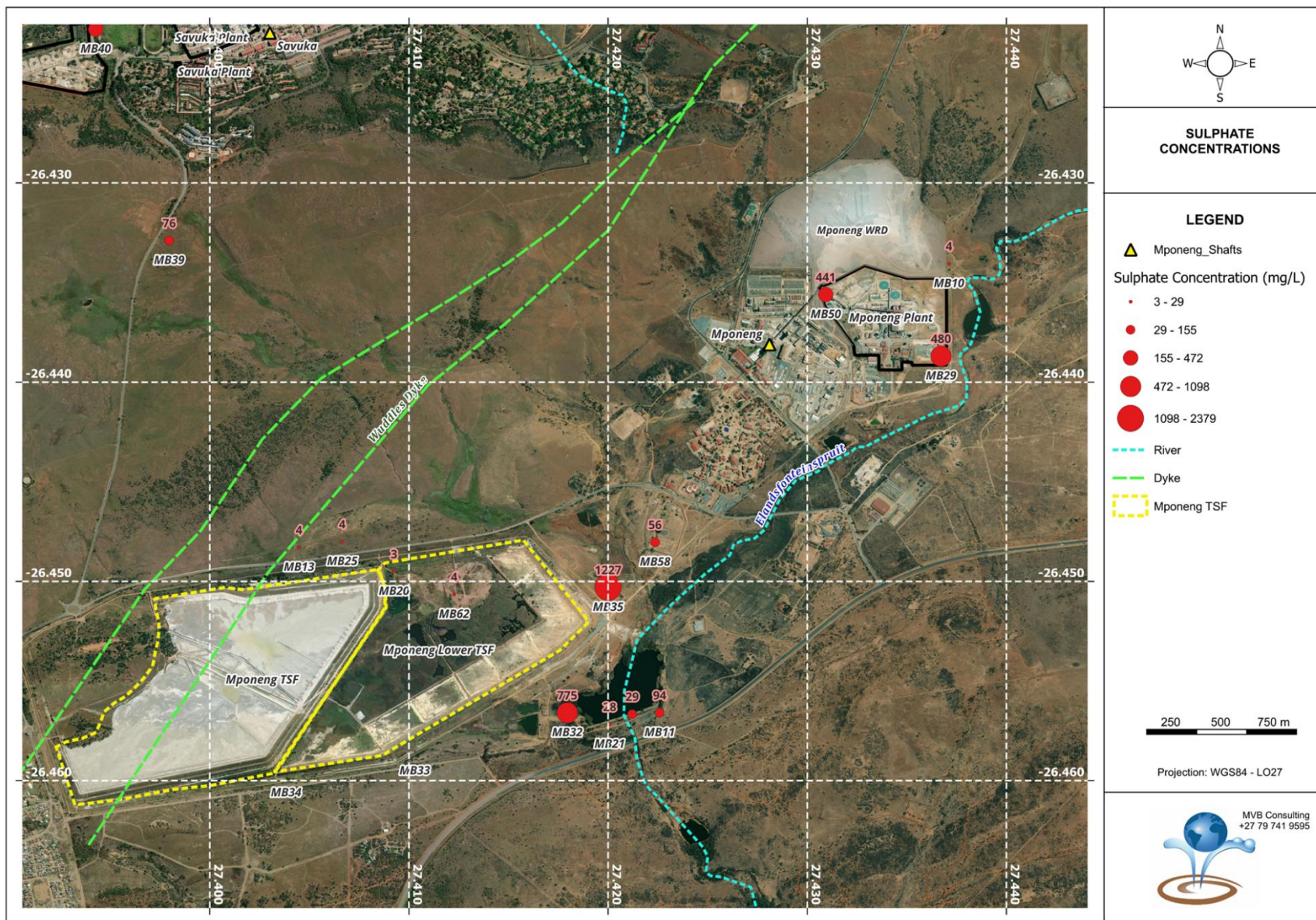


Figure 65: Sulphate concentration distribution in the groundwater monitoring boreholes (MvB Consulting, 2025)



7.9.7 AQUIFER CLASSIFICATION

An aquifer classification system provides a framework and objective basis for identifying and setting appropriate levels of groundwater resource protection. This would facilitate the adoption of a policy of differentiated groundwater protection.

The aquifer classification system used to classify the aquifers is the proposed National Aquifer Classification System of Parsons (1995). This system has a certain amount of flexibility and can be linked to second classifications such as a vulnerability or usage classification. Parsons suggests that aquifer classification forms a very useful planning tool that can be used to guide the management of groundwater issues. He also suggests that some level of flexibility should be incorporated when using such a classification system.

The South African Aquifer System Management Classification is presented by five major classes:

- Sole Source Aquifer System;
- Major Aquifer System;
- Minor Aquifer System;
- Non-Aquifer System; and
- Special Aquifer System.

The following definitions apply to the aquifer classification system:

- Sole source aquifer system: “An aquifer that is used to supply 50 % or more of domestic water for a given area, and for which there are no reasonable alternative sources should the aquifer become depleted or impacted upon. Aquifer yields and natural water quality are immaterial”.
- Major aquifer system: “Highly permeable formations, usually with a known or probable presence of significant fracturing. They may be highly productive and able to support large abstractions for public supply and other purposes. Water quality is generally very good”.
- Minor aquifer system: “These can be fractured or potentially fractured rocks that do not have a high primary permeability, or other formations of variable permeability. Aquifer extent may be limited and water quality variable. Although this aquifer seldom produces large quantities of water, they are both important for local supplies and in supplying base flow for rivers”.
- Non-aquifer system: “These are formations with negligible permeability that are generally regarded as not containing groundwater in exploitable quantities. Water quality may also be such that it renders the aquifer unusable. However, groundwater flow through such rocks does occur, although imperceptible, and needs to be considered when assessing risk associated with persistent pollutants”.
- Special aquifer system: “An aquifer designated as such by the Minister of Water Affairs, after due process”.

After rating the aquifer system management and the aquifer vulnerability, the points are multiplied to obtain a Groundwater Quality Management (GQM) index. The aquifers in the study area are classified as follows:

Table 30: Aquifer Classification (MvB Consulting, 2025)

Description	Aquifer	Vulnerability	Rating	Protection
Weathered Aquifer	Minor (2)	1	2	Low
Fractured Aquifer	Minor (2)	1	2	Low

7.10 AIR QUALITY

The information presented in this Section was largely obtained from the Air Quality Baseline Report for the Redeposition on Mponeng Lower Compartment (Airshed Planning Professionals (Pty) Ltd, 2025). Tailings Storage



Facility Air quality sensitive receptors (AQSRs) refer to places where humans reside. Ambient air quality guidelines and standards, as discussed under **Section 4.1.12**, have been developed to protect human health. Ambient air quality, in contrast to occupation exposure, pertains to areas outside of an industrial site or boundary where the public has access to and according to the Air Quality Act, excludes air regulated by the Occupational Health and Safety Act (Act No 85 of 1993).

7.10.1 ATMOSPHERIC DISPERSION POTENTIAL

In the assessment of the possible impacts from air pollutants on the surrounding environment and human health, a good understanding of the regional climate and local air dispersion potential of a site is essential. Meteorological characteristics of a site govern the dispersion, transformation, and eventual removal of pollutants from the atmosphere (Pasquill and Smith, 1983; Godish, 1990). The extent to which pollution will accumulate or disperse in the atmosphere is dependent on the degree of thermal and mechanical turbulence within the earth's boundary layer. The wind direction and the variability in wind direction, determine the general path pollutants will follow, and the extent of crosswind spreading (Shaw and Munn, 1971). While there is an on-site meteorological station at Mponeng, no recent data was available. Use was therefore made of modelled Weather Research and Forecasting Model (WRF) meteorological data for an on-site location for the period 1 January 2022 to 31 December 2024. No data was provided on the current ambient PM₁₀ and PM_{2.5} concentrations. Dustfall measurements were available for January 2022 to July 2025.

Savuka and Mponeng current surface operations cover an area of 62 square kilometres (km²) and is located approximately 6 km south of Carletonville (**Figure 66**). Other neighbouring towns include Fochville and Potchefstroom, situated 12 km and 50 km respectively to the south and west of the Mponeng operations (see **Figure 66**). The land use in the area comprises primarily of mining and agriculture. The topography is characterised by undulating hills ranging from 1 500 to 1 700 metres above mean sea level (mamsl).

The wind roses comprise 16 spokes, which represent the directions from which winds blew during a specific period. The colours used in the wind roses below, reflect the different categories of wind speeds; the yellow area, for example, representing winds between 5 and 7 m/s. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories. The frequency with which calms occurred, i.e. periods during which the wind speed was below 1 m/s are also indicated. The period wind field and diurnal variability in the wind field are shown in **Figure 67**, while the seasonal variations are shown in **Figure 68**. The wind field is dominated by winds from the northerly sector. The strongest winds (>6 m/s) occurred mostly from the north-northeasterly sector. Calm conditions occurred 3.5% of the time, with the average wind speed over the period of 3.63 m/s. Both daytime and night-time show dominant northerly wind fields, with calm conditions 4.4% during the day, and 2.52% during the night. The dominant northerly winds prevail throughout the seasons, with an increase in wind speeds during the spring months

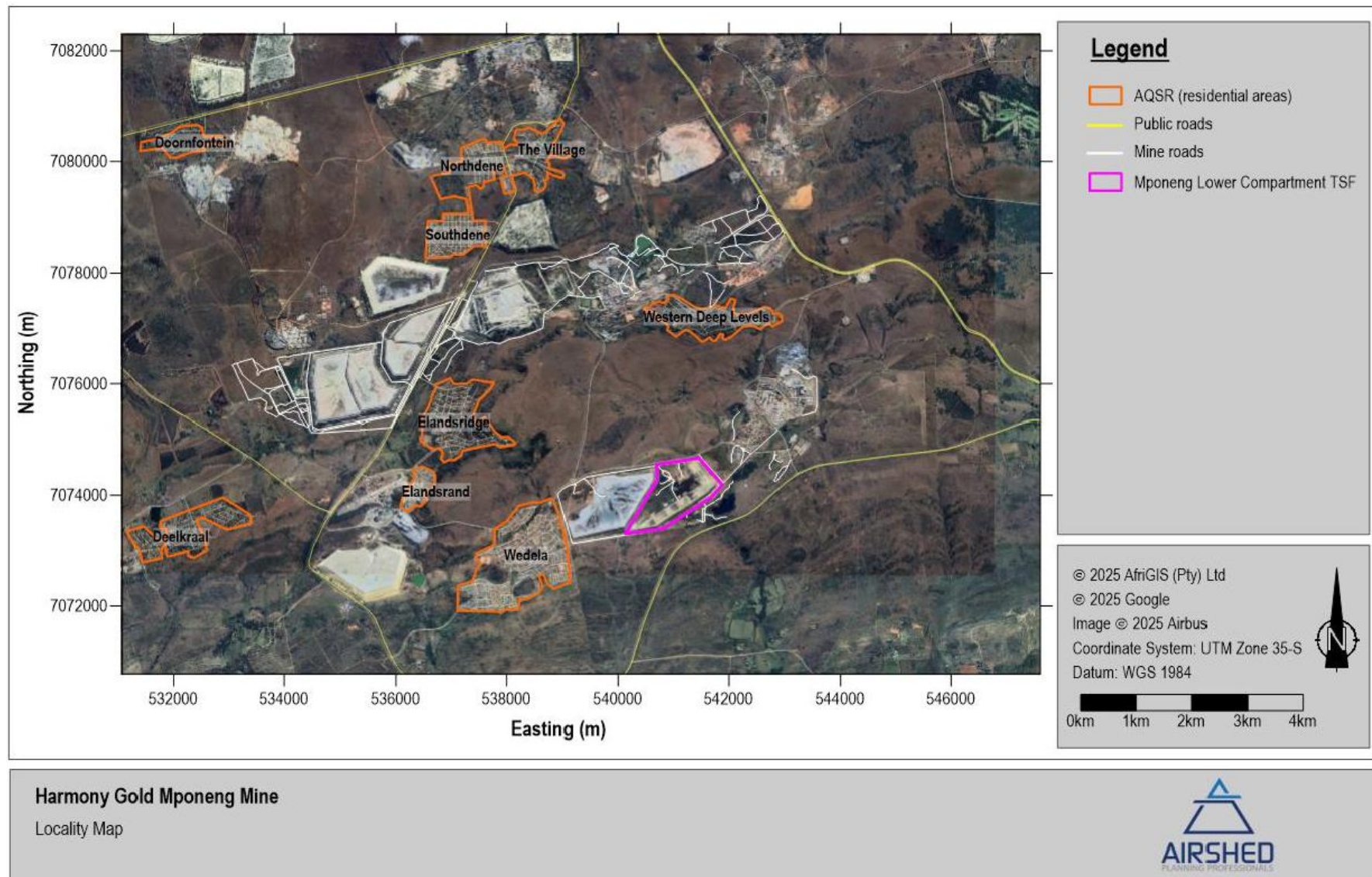


Figure 66: Location of sensitive receptor areas surrounding the current Savuka and Mponeng Mining Operations (Airshed Planning Professionals, 2025)

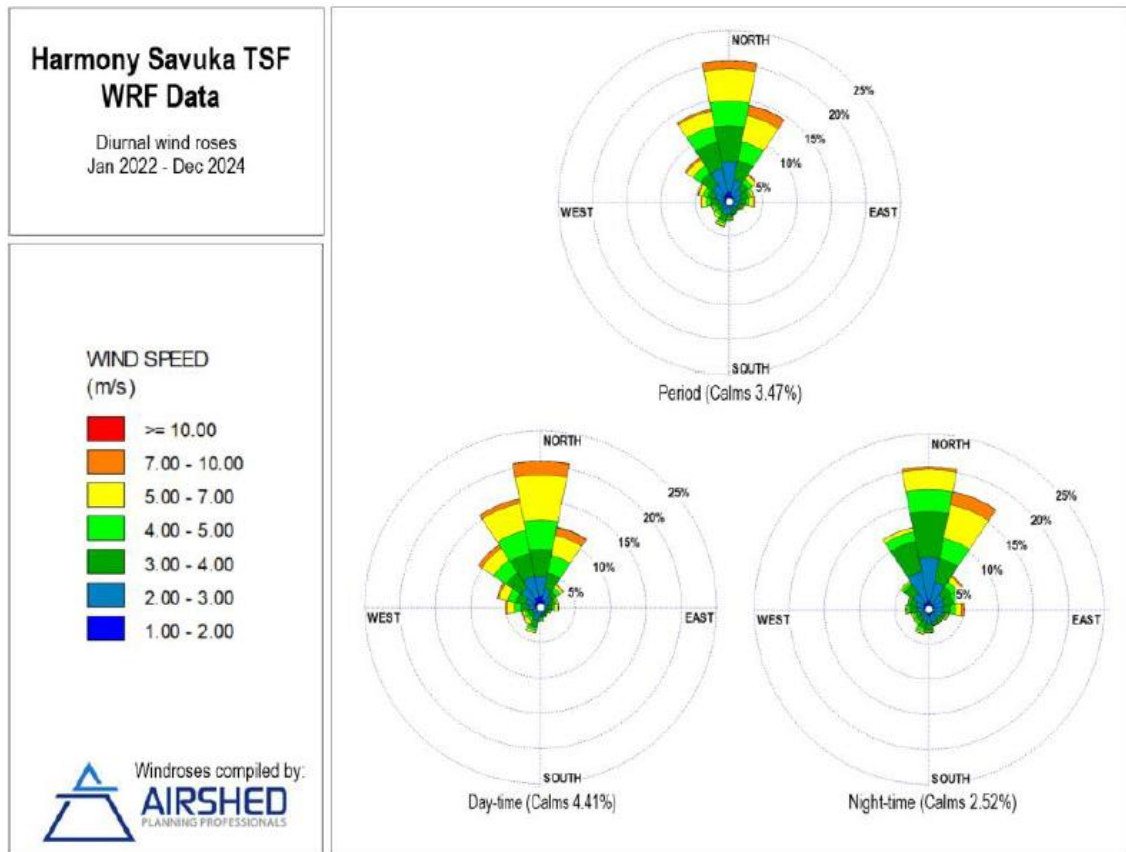


Figure 67: Period, day- and night-time wind roses (WRF data, January 2022 to December 2024)

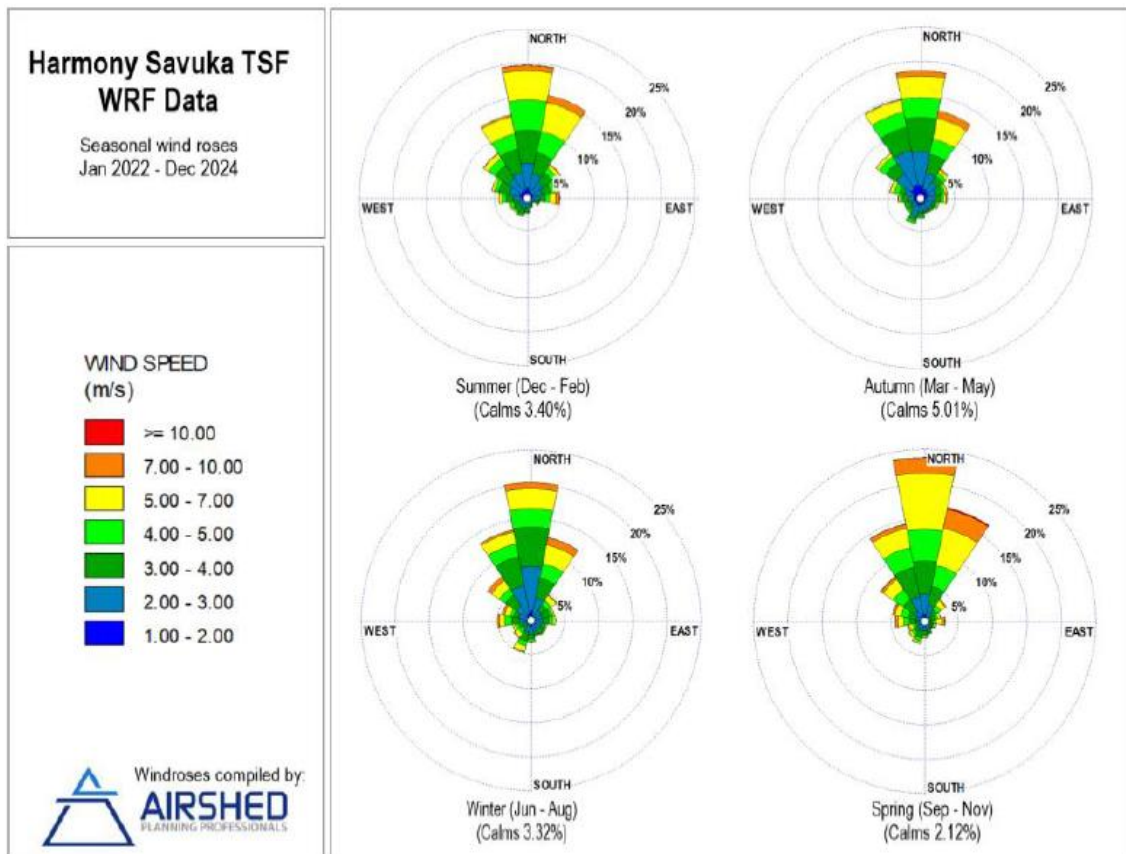


Figure 68: Seasonal wind roses (WRF data, January 2022 to December 2024)



7.10.2 EXISTING SOURCES OF AIR POLLUTION

The current air quality in the study area is mostly influenced by mining, deposition and reclamation activities at Savuka and Mponeng and other companies' mining operations, as well as farming activities, domestic fires, vehicle exhaust emissions and dust entrained by vehicles. These emission sources vary from activities that generate relatively coarse airborne particulates (such as farmland preparation, dust from paved and unpaved roads, and the mine sites) to fine Particulate Matter (PM) such as that emitted by vehicle exhausts, diesel power generators and processing operations.

Domestic households are known to have the potential to be one of the most significant sources that contribute to poor air quality within residential areas. Individual households are low volume emitters, but their cumulative impact is significant. It is likely that households within the local communities or settlements utilize coal, paraffin and/or wood for cooking and/or space heating (mainly during winter) purposes. Pollutants arising from the combustion of wood include respirable particulates, CO and SO₂ with trace amounts of polycyclic aromatic hydrocarbons (PAHs), in particular benzo(a)pyrene and formaldehyde. Particulate emissions from wood burning have been found to contain about 50% elemental carbon and about 50% condensed hydrocarbons.

Biomass burning includes the burning of evergreen and deciduous forests, woodlands, grasslands, and agricultural lands. Within the project vicinity, crop-residue burning and wildfires (locally known as veld fires) may represent significant sources of combustion-related emissions. The frequency of wildfires in the grasslands varies between annual and triennial. Biomass burning is an incomplete combustion process (Cachier, 1992), with carbon monoxide, methane and nitrogen dioxide gases being emitted. Approximately 40% of the nitrogen in biomass is emitted as nitrogen, 10% is left in the ashes, and it may be assumed that 20% of the nitrogen is emitted as higher molecular weight nitrogen compounds (Held, et al., 1996). The visibility of the smoke plumes is attributed to the aerosol (particulate matter) content.

Emissions from unpaved roads constitute a major source of emissions to the atmosphere in the South African context. When a vehicle travels on an unpaved road the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong turbulent air shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. Dust emissions from unpaved roads vary in relation to the vehicle traffic and the silt loading on the roads. Unpaved roads in the region are mainly haul and access roads. Emissions from paved roads are significantly less than those originating from unpaved roads, however they do contribute to the particulate load of the atmosphere. Particulate emissions occur whenever vehicles travel over a paved surface. The fugitive dust emissions are due to the re-suspension of loose material on the road surface. Paved roads in the region include the N12 to the south, the R501 to the north and R500 to the east.

7.10.3 PROJECT ACTIVITIES FROM AN AIR QUALITY PERSPECTIVE

The proposed activities will result in emissions to air from a variety of activities and sources. The only source of air emissions due to the Project is wind erosion due to the re-instatement of the Mponeng Lower TSF as a tailings deposit area, where it is currently used as a holdings dam and Landfill facility. Slurry and return water pipes will have to be constructed between the Savuka Plant and the Mponeng TSF. The main air pollution activities are listed in **Table 31**.

Table 31: Activities and associated air pollutants from the Savuka and Mponeng Operations (Airshed Planning Professionals, 2025)

ACTIVITY	ASSOCIATED POLLUTANTS
CURRENT OPERATIONS	
Underground Mining (emissions released via vent shafts)	



ACTIVITY	ASSOCIATED POLLUTANTS
Drilling and blasting	particulate matter (PM) ^{(a)(c)} , sulfur dioxide (SO ₂); oxides of nitrogen (NO _x); carbon monoxide (CO); Total Organic Compounds (TOC) and carbon dioxide (CO ₂) ^(b)
Loading and tipping of ore and waste	mostly PM, gaseous emissions from mining equipment (Diesel Particulate Matter [DPM], SO ₂ ; NO _x ; CO; CO ₂)
Primary crusher (assumed to be underground)	mostly PM, gaseous emissions from machinery (PM, SO ₂ ; NO _x ; CO; CO ₂)
Materials handling (loading of ore and waste)	mostly PM, gaseous emissions from Front-end-Loaders (FELs) (PM, SO ₂ ; NO _x ; CO; CO ₂)
Surface Operations	
Secondary & tertiary crushing and screening	mostly PM ^(c) , gaseous emissions from machinery (PM, SO ₂ ; NO _x ; CO; CO ₂)
Materials handling (loading & off-loading)	mostly PM ^(c) and windblown dust from storage piles
Trucks transporting ore and waste	PM from vehicle entrainment on unpaved road sections and gaseous emissions from truck exhaust (PM, SO ₂ ; NO _x ; CO; CO ₂)
Tailings Storage Facilities (TSFs)	PM ^(c) from windblown dust and radon
Marginal Ore Dumps (MOD)	PM ^(c) from windblown dust and radon
Processing plant stacks	PM ^(c) , SO ₂ ; NO _x ; CO; CO ₂

Notes: (a) Particulate matter (PM) refers to Total Suspended Particulates (TSP), PM₁₀ and PM_{2.5}

(b) CO₂ and methane are greenhouse gasses (GHG).

(c) Radionuclides associated with PM emissions

Airborne PM is the most significant pollutant of concern from the proposed redeposition at Mponeng Lower Compartment TSF. The impact of particles on human health is largely dependent on: (i) particle characteristics, particularly particle size and shape, and chemical composition; and (ii) the duration, frequency and magnitude of exposure. The potential of particles to be inhaled and deposited in the lung is a function of the particle size, shape and density. Airborne particulate matter may range from relatively uniform soil particles (e.g. during dust storms) to very complex mixtures of extremely small organic and inorganic particles and liquid droplets (e.g. industrial sites). These particles could be made up of several components, including salts and acids (such as sulfates and nitrates), organic chemicals, metals and radionuclides, and soil or dust particles. The nasal openings permit large dust particles (less than few mm's) to enter the nasal region, along with much finer airborne particulates. Larger particles are deposited in the nasal region by impaction on the hairs of the nose or at the bends of the nasal passages.

Smaller particles, typically less than 10 micrometres (µm), pass through the nasal region and are deposited in the tracheobronchial and pulmonary regions. Particles are removed by impacting with the wall of the bronchi when they are unable to follow the gaseous streamline flow through subsequent bifurcations of the bronchial tree. As the airflow decreases near the terminal bronchi, the smallest particles (less than 2.5 µm) are removed by Brownian motion, which pushes them to the alveolar membrane (CEPA/FPAC Working Group, 1998; Dockery & Pope, 1994).



Ambient air pollution PM can therefore be divided into three classes based on their size:

- Inhalable coarse particulate matter (PM₁₀) consists of particles with a diameter between 2.5 and 10 µm that deposit efficiently along the airways. Particles larger than 10 µm are generally not inhaled into the lungs. These particles are typically found near roadways and dusty industries.
- Fine particulate matter (PM_{2.5}) consists of particles with a diameter less than 2.5 µm and can be inhaled deeply into the lungs. These particles can be directly emitted from sources such as vegetation fires, or they can form when gases emitted from power plants, industries and automobiles react in the air.
- Ultrafine particles (PM₁) consist of particles with a diameter smaller than 0.1 µm and have widespread deposition within the respiratory tract. These particles are typically a result of secondary chemical reactions in the atmosphere.

Air quality standards and guidelines for airborne particulates are given for various particle size fractions, including total suspended particulates (TSP), and thoracic (PM₁₀) and respirable (PM_{2.5}) particulates. PM comprises a mixture of organic and inorganic substances. From gold mining and processing facilities the radioactive particles in the form of radionuclides and radon releases are of concern. These will be addressed in a separate radiation study to be conducted by AquSim Consulting (Pty) Ltd.

7.11 VISUAL LANDSCAPE

The information presented in this Section was largely obtained from the Visual Impact Assessment – Baseline/Scoping Report - Mponeng Lower Compartment Tailings Storage Facility (Graham Young Landscape Architect (GYLA), 2025)).

7.11.1 LANDSCAPE CHARACTER

The study area features a varied aesthetic and visual landscape, with mining activities predominating the western and northern sections of the study area and savannah-covered grassland and agriculture in the southern regions. The northwestern and western sections consist of gently undulating land that slopes westward and southward towards drainage lines that generally flow west and northwest. The topography rises in the central parts of the study area immediately north of the Project site, which is mostly undeveloped and composed of gentle rolling grassland. Residential areas, linked to the mines, are situated immediately west (Wedela), northwest (Harmony housing), and north of the Project site (Western Deep Levels housing). South of Wedela and the Project site is grassland with savannah-covered slopes. These areas are primarily used for grazing. The far southern sections of the study area comprise agricultural lands. The panoramas in **Figure 69** to **Figure 70** (refer to the Visual Impact Assessment – Baseline/Scoping Report for the location of the viewing points) show these characteristics. **Figure 71** below indicates the spatial distribution of the landscape character types and their associated scenic quality and sensitivities as they occur today. The study area can roughly be divided into the following landscape types:

- Savannah-covered slopes – high scenic quality – high visual sensitivity to change.
- Open grassland on higher land – moderate scenic quality – moderate visual sensitivity to change.
- Agricultural lands – moderate scenic quality – moderate visual sensitivity to change.
- Urbanisation and settlements – moderate to low scenic quality – moderate to low visual sensitivity to change
- Mining and degraded land - low scenic quality – low visual sensitivity to change (the project occurs in this landscape type).

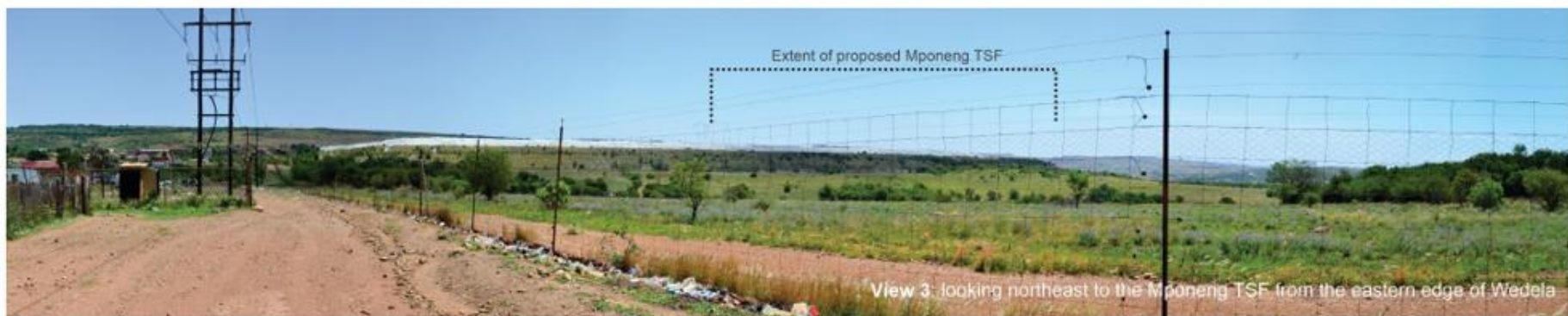
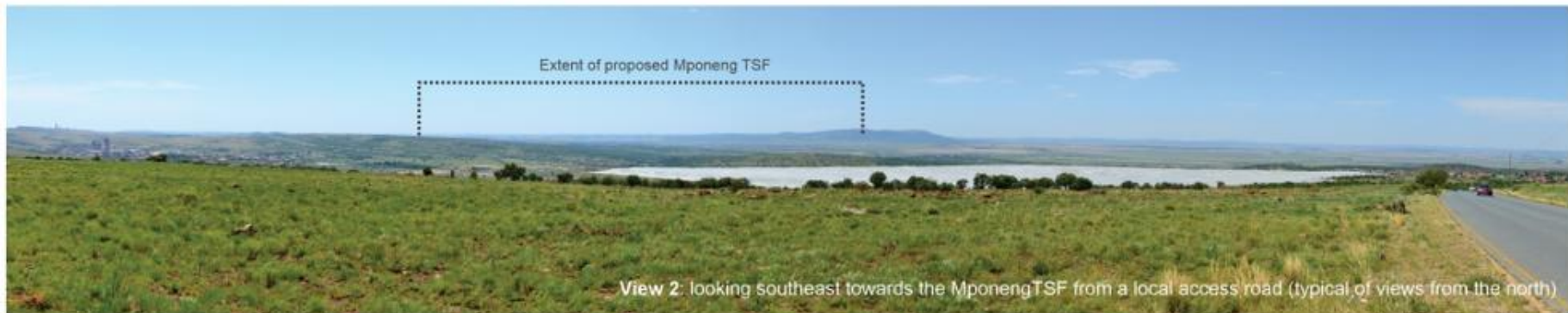
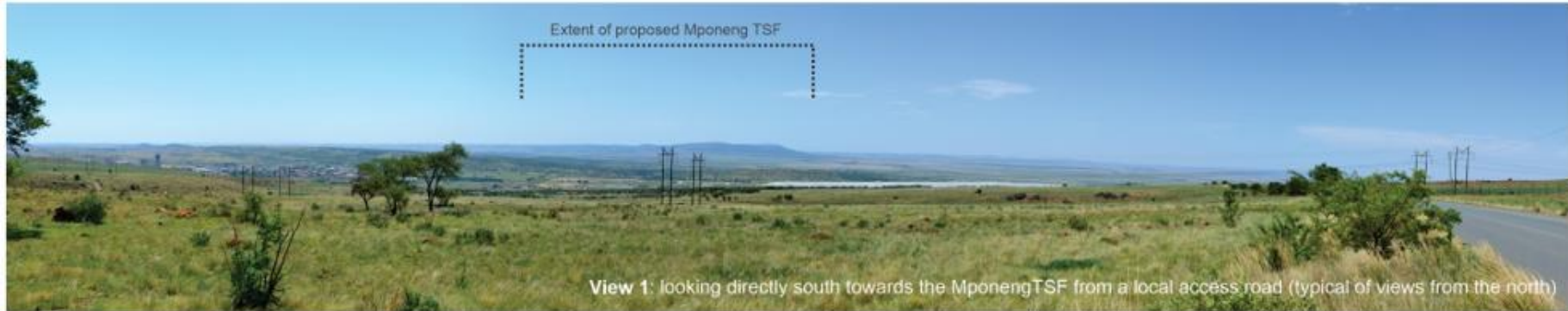


Figure 69: Landscape character - Views 1, 2 and 3 (Graham Young Landscape Architect, 2025)

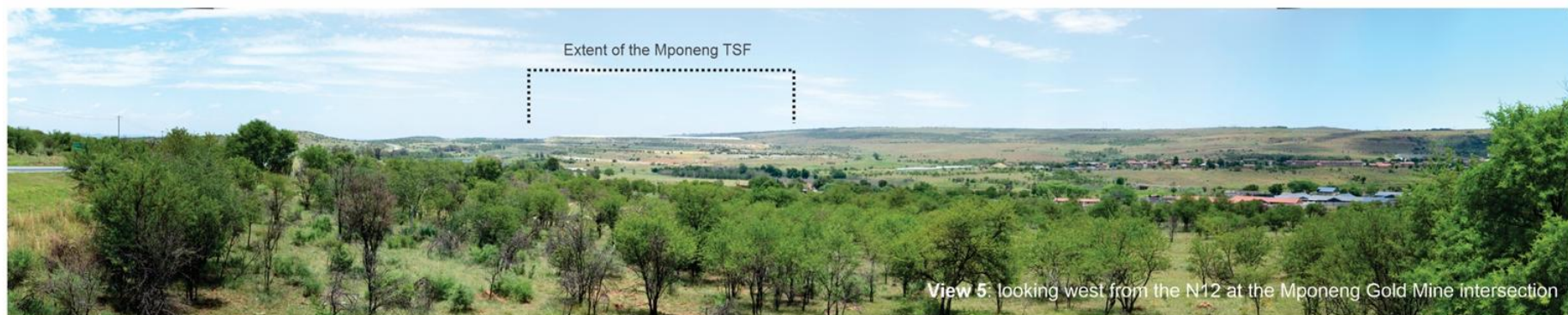
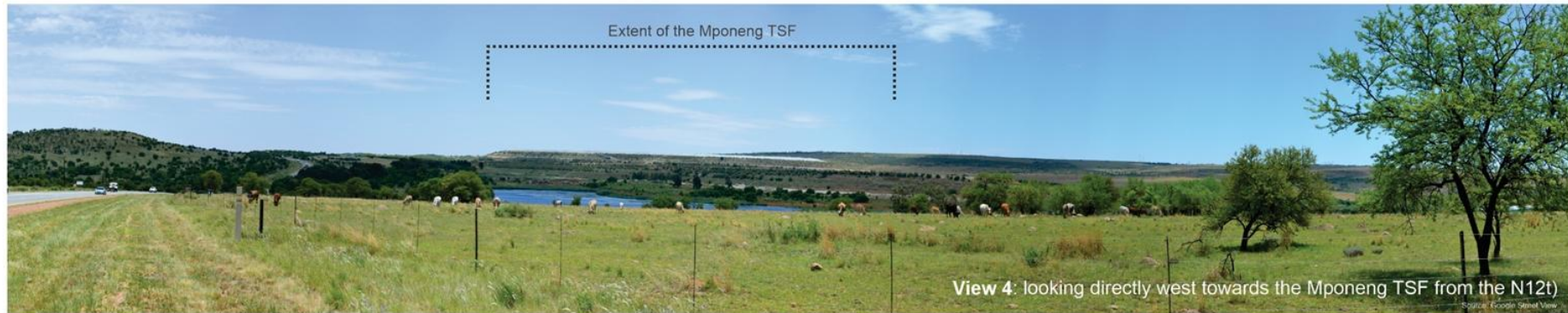


Figure 70: Landscape character - Views 4, 5 and 6 (Graham Young Landscape Architect, 2025)

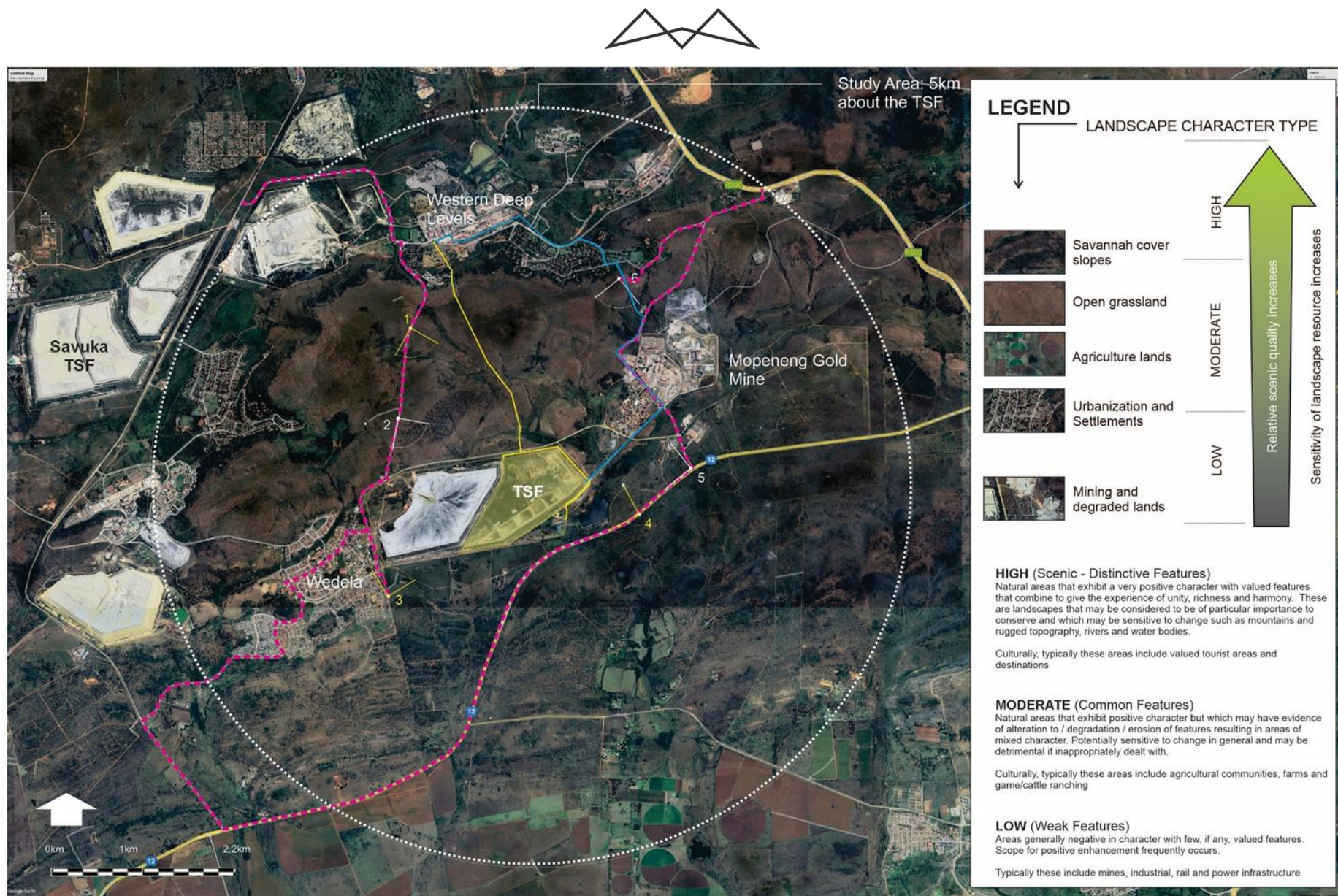


Figure 71: Landscape sensitivities (Graham Young Landscape Architect, 2025)



7.11.2 VISUAL RESOURCE VALUE, SCENIC QUALITY, AND LANDSCAPE SENSITIVITY

The value of the visual resource and its associated scenic quality assigned to the landscape character types described in **Section 7.11.1** is determined through the value of “individual contributors to landscape character, especially key characteristics, which may include individual elements of the landscape, particular landscape features, notable aesthetic, perceptual or experiential qualities, and combinations of these contributors” (LIEMA, 2013, p. 89). These primary features give the area typical characteristics and a sense of place. The sensitivity of the study area’s various landscape types is defined as high, moderate or low (as indicated below and in **Figure 71**) and is dependent on the following four factors:

- Character (does it contribute to the area’s sense of place and distinctiveness?)
- Quality – in what condition is the existing landscape?
- Value – is the landscape valued by people, the local community, and visitors, and is the landscape recognised locally, regionally, or nationally?
- Capacity – what scope is there for change (either negative or positive) in the existing landscape character? (LIEMA 2013).

When the criteria is considered and understood within the context of the subregion, the landscape types are assigned a visual resource value, as indicated in **Table 32**.

Table 32: Value of the Visual Resource (Graham Young Landscape Architect, 2025)

High	Moderate	Low
Savannah covered slopes	Open grassland and agricultural lands and Moderate to Low for areas of urbanisation.	Mines and associated infrastructure and degraded land
This landscape type is considered to have a <i>high</i> value because it is a: A distinct landscape that exhibits a positive character with valued features that combine to give the experience of unity, richness, and harmony. It is a landscape that may be important to conserve and has an intense sense of place.	These landscape types are considered to have a <i>moderate/low to moderate</i> scenic value because they are: Common landscape that exhibits some positive character, but which has evidence of alteration/degradation/erosion of features, resulting in areas of more mixed character.	This landscape type is deemed to have a <i>low</i> scenic value because it is a: Minimal landscape negative in character with few, if any, valued features.
Sensitivity: It is extremely sensitive to change in general. It will be detrimentally affected because the key characteristics of the landscape, considering its existing character and quality, have limited ability to accommodate change without adverse effects.	Sensitivity: It is moderately sensitive to change in general, and change may be detrimental because the key characteristics of the landscape have some ability to accommodate change, considering the existing character and quality of the landscape.	Sensitivity: It is generally less susceptible to change because the relevant characteristics of the landscape can accommodate change without adverse effects, considering its existing character and quality.

7.11.3 ASSESSING POTENTIAL VISUAL IMPACT

Visual impacts relate to the changes that occur in the composition of available views as a result of alterations to the landscape, to people’s responses to those changes, and to the overall effects on visual amenity. Visual impact is therefore measured by the change to the existing visual environment (caused by the physical presence of a new development) and the extent to which that change either undermines (negative impact), enhances (positive



impact), or maintains the visual quality of the area. To assess the potential visual impact of the Project, four main factors are considered. In this report, a professional opinion of the architect is given relative to potential visual impact. In the Assessment Phase, which is to follow, viewshed and simulation modelling will be used to confirm or refute the original risk prediction.

Visual Intrusion: The nature of intrusion or contrast (physical characteristics) of a Project component on the visual quality of the surrounding environment and its compatibility/discord with the landscape and surrounding land use.

Visibility: The area/points from which Project components will be visible.

Visual exposure: Visibility and visual intrusion are qualified with a distance rating to indicate the degree of intrusion.

Sensitivity: Sensitivity of visual receptors to the proposed development.

7.11.4 SENSITIVE RECEPTORS

Sensitive receptors are locations where people would most likely be susceptible to adverse changes in the landscape caused by the physical presence of the Project. The prominent locations of concern for the Mponeng Lower Compartment TSF are likely to be:

- Farmsteads near the N12 and south east of the Project site
- Travellers along the N12 Provincial Road.

All other areas are deemed not sensitive to the proposed development because views from these locations would come from areas related to existing mining activities. People living in or passing through these locations will experience only a minor change and negligible loss of the baseline landscape aesthetic due to the scale and extent of the proposed Mponeng TSFs' height extension. The high visual absorption capacity (VAC) of the existing landscape, when viewed from these locations, combined with the fact that deposition will occur on an existing footprint, means that potentially sensitive receptors would see the new facilities within the context of the current mining infrastructure with very little change. This change would take place over the life of the mine and beyond, as the TSF would remain as residual structures in the landscape and represent the worst-case scenario for the project.

Visual sensitivities could stem from receptors located in the study area that observe changes to the aesthetic baseline. The rising walls of the Mponeng TSF would largely blend into the visual landscape from these points, making the proposed Project moderately visible from parts of the N12 road and only minimally visible from the southeastern and southern edges of the study area, where a few farmsteads are situated. Refer to the viewshed analysis in **Figure 72**. The Mponeng extension would also be visible from the grassland plateau north of the site; however, there are no receptors in this area.

7.11.5 HIGH-LEVEL IDENTIFICATION OF POTENTIAL VISUAL IMPACT

The impact of lights at night is a sensitive issue associated with mining and disposal activities. I&APs consistently raises the effect of night lighting, specifically when they can be seen from tourist and/or residential sites and when the impact would continue for the mine's life. However, existing light pollution generated by nearby mining and urban areas would negate any real effect they may have. However, management measures, as proposed below, should be implemented to limit light spillage beyond the TSF's site boundaries and minimise cumulative light pollution.

The potential impact ratings are based on the worst-case scenario when considering all aspects of the Project together. It is expected that visual impacts could occur from activities and infrastructure throughout all Project phases, including operation and decommissioning. It is also noted that the Screening Report results for the Project did not identify visual and landscape impacts as being sensitive, nor did it identify a visual and landscape assessment for inclusion in the assessment report. The method used to assess the potential effects is detailed



in Appendix C of the Visual Impact Assessment – Baseline/Scoping Report - Mponeng Lower Compartment Tailings Storage Facility (**Appendix F**). This assessment approach allows for the evaluation of environmental impacts, including cumulative effects. Referencing previous sections, a high-level identification of potential visual impacts is forecasted. The estimated operational phase is approximately thirty years. The decommissioning phase is estimated to last eighteen months. **Table 33** below summarises the potential magnitude of visual impact for all phases of the project. The full scope of these impacts will, however, be identified and rated during the EIA Phase .

Table 33: Magnitude of Visual Impact (Graham Young Landscape Architect, 2025)

High	Moderate	Low	Negligible
None	None	For receptors travelling along the N12.	For receptors, southeast of the site at more than 3,0km from the closest edge of the TSF (i.e. background of a view)
Major loss of or alteration to the baseline's key elements/features/characteristics near the site. i.e., a pre-development landscape or view and/or introduction of elements considered uncharacteristic when set within the attributes of the receiving landscape.	Partial loss of or alteration to the baseline's key elements/features/characteristics. i.e., a pre-development landscape or view and/or introduction of elements that may be prominent but not necessarily problematic when set within the attributes of the receiving landscape.	Minor loss of or alteration to the baseline's key elements/features/characteristics. i.e., a pre-development landscape or view and/or the introduction of elements that may not be problematic when set within the attributes of the receiving landscape.	Negligible loss or alteration to the baseline's key elements/features/characteristics. i.e., a pre-development landscape or view and/or the introduction of elements that are not problematic within the surrounding landscape - approximating the 'no change' situation.
High visual impacts would result.	Moderate visual impacts would result.	Low visual impacts would result.	Negligible scenic quality impacts would result.

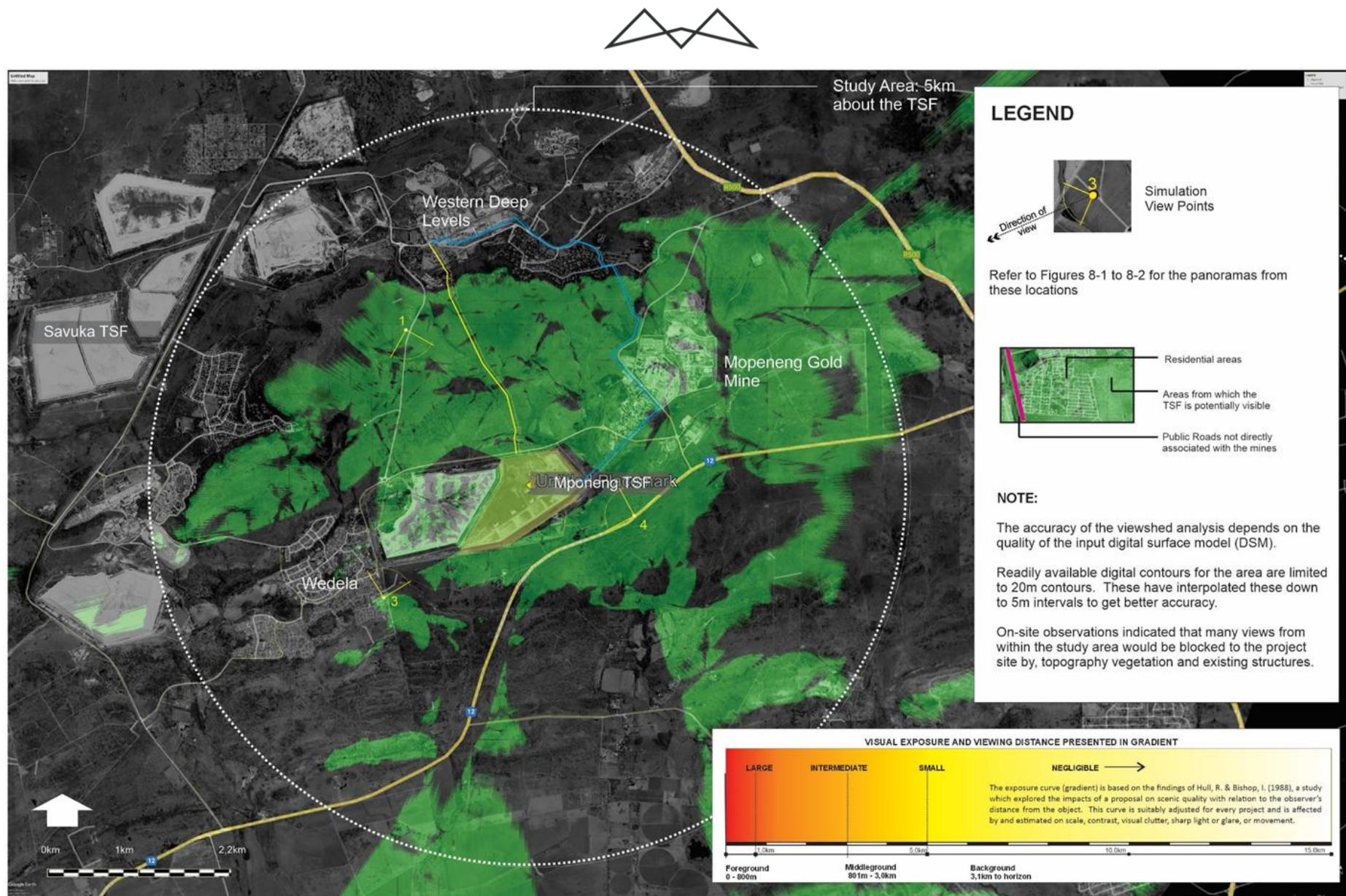


Figure 72: Mponeng Lower Compartment TSF Viewshed Analysis (Graham Young Landscape Architect, 2025)



7.12 SOCIO-ECONOMIC

The socio-economic baseline conditions relevant to the Project area are described in Equispectives (2015; 2020). The baseline socio-economic information was updated in 2022 through the 2022 South African Census (<https://census.statssa.gov.za/#/province/7/2>). The Draft Integrated Development Plan (IDP) for Merafong City 2025-26 best describes the socio-economic conditions for the Municipality (<https://merafong.gov.za/wp-content/uploads/2025/04/Draft-IDP-Document-March-2025-2026.pdf>). The Radiological Health Impact Assessment for Savuka TSF (Aquisim Consulting, 2025) provides a detailed summary of the conditions that serve as a basis for human behavioural conditions and their interaction with the environment (refer to <https://www.eims.co.za/2025/06/25/1657-harmony-savuka-ba-wula/> for the report). It should be noted that a Health Risk and Radiological Impact Assessment will be undertaken for Mponeng Lower Compartment TSF during the EIA Phase. The Savuka TSF Radiological Health Impact Assessment information provides input into the definition of receptor groups and their behaviour within the public exposure conditions.

7.12.1 MUNICIPAL PROFILE

According to the Draft Integrated Development Plan (IDP) for Merafong City 2025-26, Merafong City Local Municipality (MCLM) is a Category B municipality with an Executive Mayor Governance system. A Category B municipality, also known as a local municipality, is a type of local government in South Africa that shares executive and legislative authority with a Category C (district) municipality. These municipalities are the primary providers of local services, such as refuse removal, sewage, and water supply, operating within a broader district municipality framework for more regional functions like bulk water infrastructure and integrated development planning.

The Speaker is the Chairperson of Council and is responsible for overseeing the functioning of Council and its committees. The office of the Speaker is further responsible for the establishment and functioning of ward committees. The Chief Whip is responsible for ensuring compliance to the code of conduct by Councillors. MCLM covers an area of 1631.7km² and it comprises of twenty-eight (28) wards in terms of Section 18 (3) of the local government: Municipal Structures Act, 1998 (Act 117 of 1998) which constitutes 28 Ward Councillors and 24 Proportional Representative Councillors. MCLM is situated in the South-western part of Gauteng Province and form a part of West Rand District Municipality which consists of four local municipalities namely: Mogale City, Rand West Municipality and Merafong City. MCLM incorporates the following areas:

- Carletonville
- Khutsong
- Fochville
- Kokosi
- Greenspark
- Welverdiend
- Wedela
- Blybank
- Mining Towns

7.12.2 DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Population statistics are normally collected by way of a Census, however because Censuses are usually a huge logistical exercise, many Countries conduct a Census once every 5 to ten years. Between Censuses administrative data is collected by various agencies about population, events such as births, deaths and cross-border migration and these agencies are allowed to produce and use this data. It has been about 12 years since the 2011 Census has taken place, therefore the available data has become old and unreliable. In 2016 Statistics South Africa conducted a Community Survey to supplement the 2011 Census and the municipality has in the past used those



figures complemented by data released by other sources such as Quantec Survey of 2017. The most recent Census was undertaken in 2022 and some of the results have been released by Statistics South Africa.

7.12.2.1 POPULATION DYNAMICS

The West Rand population increased by 21,6% from 821 191 in 2011 to 998 466 in 2022 whereas Merafong population increased by 14,2% from 2011 to 2022 rising from 197 520 to 225 476. The West Rand is the least populated District in Gauteng with 0,9 million (988 466) people while Merafong City is the least populated Municipality in West Rand with 225 476 people. The research also shows that in most Wards, the majority of the population belongs to the Black population group. In Ward 12 more than half of the population belonged to the White population group, while in Ward 14 just over a third of the population belonged to the White population group. Ward 12 includes Deelkraal as well as Welverdiend (which is located outside the 5 km radius). Ward 14 includes West Wits Village, a portion of Fochville, the Numba Wani Residence and the Mohaleshoek Informal Settlement. At 85,5% the Black African population group constitutes the largest proportion of West Rand's population, followed by White (10,3%) and Coloured (2,8%). At 89,4% the Black African population group constitutes the largest proportion of Merafong's population, followed by White (8,8%) and Coloured (1,3%). Refer to **Figure 73** for the population by race dynamics.

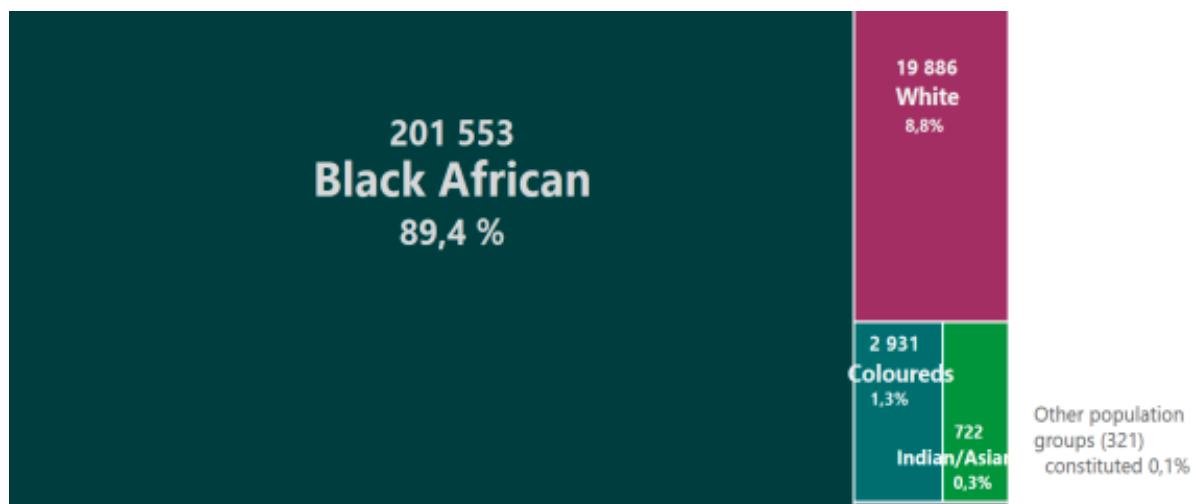


Figure 73: Merafong population groups (Statssa, Census 2022)

7.12.2.2 HOUSING DYNAMICS

Gauteng Households increased from 2,1 million in 1996 to 5,3 million in 2022. There were about 357 thousand households in West Rand 2022 with 77 599 thousand households located within Merafong City in 2022. The number of households in Merafong City increased by 16.5% from 66 624 in 2011. West Rand's average household size slightly decreased from 3,1 in 2011 to 2,8 in 2022 while the average household size in Merafong City also decreased slightly by 0.1 between 2011 and 2022. Households that resided in formal dwellings increased by 13,6 percentage points from 74,9% in 1996 to 88,5% in 2022 in Gauteng. There were more households that resided in formal dwellings in Merafong City in 2022 as compared to other municipalities in West Rand. Households that resided in formal dwellings increased from 60,4% in 1996 to 91,6% in 2022 in Merafong City.

7.12.2.3 COMMUNITY TYPES

Communities can be classified as belonging to one of the following groups (Equispectives, 2020):

a. Formal Residential Structure Communities

A formal dwelling can be described as "A structure built according to approved plans, i.e., house on a separate stand, flat or apartment, townhouse, a room in a backyard or rooms or flatlet elsewhere" (Statistics South Africa, 2012). In some areas, there may be a formal as well as an informal dwelling on a stand, creating a community with mixed dwelling types.



b. Informal Residential Structure Communities

An informal dwelling can be described as “A makeshift structure not approved by a local authority and not intended as a permanent dwelling. Typically built with found materials (corrugated iron, cardboard, plastic, etc.) and is contrasted with formal dwelling and traditional dwelling” (Statistics South Africa, 2012).

c. Commercial Agricultural Communities

Commercial agriculture includes farms where the farmer earns a livelihood from agriculture, such as crop, livestock, or game farming. Areas with smallholdings are categorised according to their character. If the residents of the smallholdings practise agriculture, they are grouped with commercial agriculture; if they just reside in the area or have a business on the smallholding not related to agriculture, the area is classified as formal residential.

d. Small-scale Subsistence Farming

Small-scale subsistence farming can be described as food gardening taking place on a large scale on a piece of land that is not in someone’s backyard. The land is usually cultivated by different members of the community, and they may belong to a formalised group. Food gardens in the backyard of an organisation, like a school or crèche, would also be grouped in this category. Keeping livestock in the community or on the outskirts of the community would form part of this group.

Agricultural projects conducted as part of a Social and Labour Plan of a mine can contain characteristics of both commercial agriculture and subsistence farming. To classify these projects, the following guideline is used: if the projects have reached a stage where it is sustainable and function with minimal to no input from the mine, they are classified as commercial agriculture. However, if the mine is still heavily involved, it is classified as small-scale subsistence farming, as the Project has not yet proved its sustainability.

Figure 74 shows a 5 km radius around the Project surface infrastructure, as well as the potentially sensitive receptors within a 5 km radius. The following residential areas were identified in 2015 near the Project:

a. AngloGold Ashanti residences (now part of GCTI operations)

The West Wits (GCTI) Operations had four residences for employees in 2015, namely Ntshonalanga, Matabong, Ekhayalihle and Numba Wani, which were converted to single rooms or family quarters. The family quarters were at Ekhayalihle and could host up to 25 people who became paraplegic after injuries on duty. Matabong housed employees from the TauTona mine, while Ntshonalanga housed employees who worked at the Savuka mine, which was integrated with the TauTona mine. Numba Wani hosted employees from the Mponeng mine. The operations also had facilities for visiting wives.

b. The TauTona and Savuka mines were placed in orderly closure in 2017, and as such, the only residence where the activity is expected is the Numba Wani residence. The Merafong City Local Municipality (2019/2020) has indicated that Mponeng has a good locality relative to the N12 that could be exploited once mine closure looms, and that there is possibly good potential for non-residential uses.

c. West Wits Village

In 2015, the West Wits Village housed employees of AngloGold Ashanti. The 2019/2020 IDP of the Merafong City Local Municipality indicates that township establishment is underway. The municipality is looking into the feasibility of a Mining Industrial Park as part of the second phase of Mining Phakisa implementation. The re-use potential of the area is considered good, with the possibility of developing into a significant node

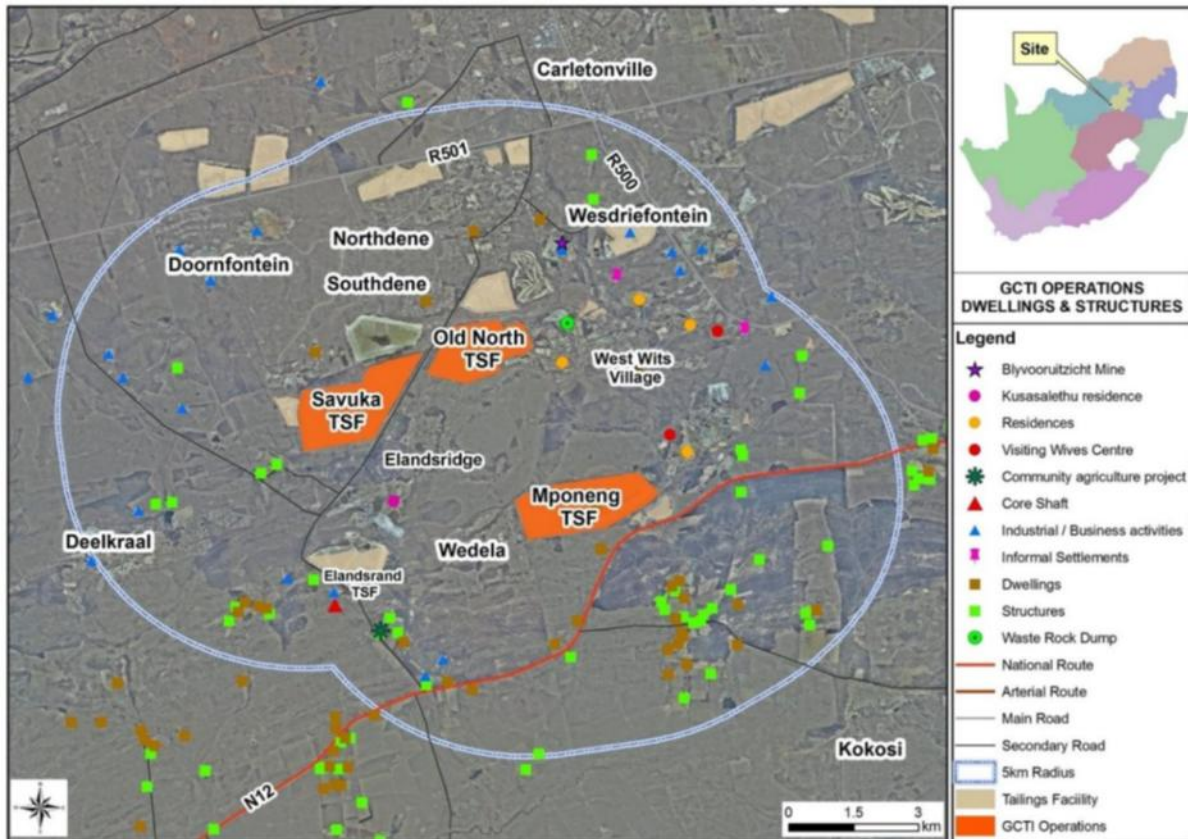


Figure 74: Map indicating the study Project Baseline Social and Land Use Assessment (Equispectives, 2020)

d. Deelkraal Estate

Deelkraal Estate used to be a mining village, but was in private ownership in 2015, with the owners being in the process of having the estate declared as a township. In the 2019/2020 IDP document of the Merafong City Local Municipality, Deelkraal is still indicated as a mining village with limited supportive land uses and limited economic potential. Although most residences are in fair condition, the municipality anticipates that the market for rental or buying in Deelkraal to collapse within the next few years due to new rental options in Carletonville and Fochville, as well as the mineshaft closure at Kusasaletu mine. The municipality will not take over services in the area and anticipates that Deelkraal will be demolished and that the area will be rehabilitated.

e. Elandsridge

Elandsridge/Elandsrand is a mining village where employees of Harmony's Kusasaletu mine reside. The Merafong City Local Municipality (2019/2020 IDP) has indicated that the Kusasaletu mine is expected to close within a few years, and if it does open again, it would be operated through mechanisation and automation. The municipality would not take over services, and the residential viability is regarded as low due to the lack of a new economic foundation, few facilities and the isolated location. It is anticipated that the area will be demolished and rehabilitated, possibly for agriculture or renewable energy.

f. Wedela

Wedela is situated between Harmony's Kusasaletu Operations and the Mponeng tailings storage facility. It was established in 1978 and granted municipal status in January 1990. Wedela is mostly a formal settlement, but there is an informal settlement on the edge of Wedela, and many houses have backyard shacks. It is currently located close to mining operations that will not be sustained indefinitely.

g. Mohaleshoek Informal Settlement



This informal settlement is located on private land adjacent to the R500, between the TauTona and Mponeng mines. Many residents are rumoured to be illegal immigrants. The Merafong City Local Municipality (IDP 2019/2020) has indicated that the informal settlements located at Blyvooruitzicht and Western Deep Levels can be accommodated at the West Wits township, either through subsidised housing or a CRU (Community Residential Units) project. The CRU programme aims to facilitate the provision of secure, stable rental tenure for lower-income individuals (www.gov.za).

h. Farming Community

The farming community consists of farms and smallholdings that are located in the Deelkraal area as well as adjacent to the Mponeng mine. Farming activities consist of crop farming, livestock, game breeding and hunting. Some of the farms offer tourist activities. Some farms have workers residing on the farm, while the workers from other farms do not reside on the farm, but somewhere else in the vicinity.

i. Residential areas around the Blyvooruitzicht mine

In 2015 people living in the area around the Blyvooruitzicht mine that was put in provisional liquidation in August 2013 lived in dire socio-economic conditions. The Merafong City Local Municipality (2019/2020 IDP) has indicated that the mine's gold mining component has been revived recently. According to the municipality, the village has significant potential to be integrated into Carletonville although buildings and infrastructure have been stripped and vandalised. The lawlessness that marked the area in 2015, seems to have been resolved by the new mine owner. There are dolomitic constraints in the area and the Housing Development Agency is conducting a feasibility study on the potential of reviving the village

Figure 74 also shows the location of dwellings and structures relative to the Project that are not located in a town or a village. The number of dwelling groups has remained more or less the same, as observed through aerial photography. At some of the dwelling clusters, new buildings have been observed. **Table 34** presents the breakdown for households according to geo types as per Census 2011.

Table 34: Breakdown of households according to geo types (source: Census 2011; Equispectives, 2020)

Geo Type	Merafong City Local Municipality	Mining Wards				Mixed Wards			
		Ward 5	Ward 11	Ward 14	Ward 27	Ward 12	Ward 20	Ward 22	Ward 23
Urban Area	68,199	2,431	3,586	4,575	3,827	1,475	3,234	2,040	2,402
Traditional Area	0	0	0	0	0	0	0	0	0
Farm Area	2,207	0	0	75	0	68	0	0	0
Total	70,406	2,431	3,586	4,650	3,827	1,543	3,234	2,040	2,402

It can be concluded that the land use near the Project is dominated by open grassland, agricultural (cultivated cropland), mining and residential land use conditions. Equispectives (2020) divided communities into those living in formal structures, communities living in informal structures, commercial agricultural communities, and small-scale subsistence farming communities.

7.12.2.4 SOCIO-ECONOMIC CONDITIONS

Gauteng is the economic hub of the country, with over 35% of the economic activity taking place in the province. However, Gauteng continues to bear the brunt of high poverty, inequality, and unemployment levels. At the centre of the development of the Growing Gauteng Together 2030 (GGT2030) strategy, which is the provincial expression of the National Development Plan (NDP), the provincial government aims to address the challenges



noted above. The GGT2030 goal is to reduce poverty to about 16 per cent of the total population by 2030 from 25.3 per cent in 2019. The plan also aims to reduce income inequality levels (as measured by the Gini coefficient) to 62 per cent in Gauteng. Since the dawn of democracy, significant progress has been made to reduce the high levels of poverty and inequality. However, the deterioration in economic performance in recent years due to domestic and external factors has regressed some of the progress made, with levels of inequality being more prevalent within population groups.

Table 35 shows different measures of poverty for the West Rand district and the local regions. In 2020, over 50 per cent of the districts were living below the UBPL. With economic activity in negative territory in the district before the pandemic and the unemployment rate at its highest level, these did not favour the initiatives targeted at reducing poverty in the district. The Upper-Bound Poverty Line (UBPL) was the highest in Rand West City at 54.2% in 2020, followed by Merafong City at 53.1%. Refer to **Table 35** for the poverty and inequality trends.

Table 35: Selected Poverty Indicators (source: Draft IDP Merafong City 2025-26)

Regions	2010	2012	2014	2016	2018	2020
Food Poverty Line (ZAR 624)						
West Rand	16,7%	14,8%	16,0%	19,2%	21,0%	24,3%
Mogale City	16,9%	14,6%	15,7%	18,7%	20,6%	24,0%
Merafong City	15,0%	14,0%	15,2%	18,6%	20,3%	23,2%
Rand West City	17,6%	15,6%	16,9%	20,2%	22,0%	25,3%
Lower Poverty Line (ZAR 890)						
West Rand	28,6%	26,4%	28,1%	31,5%	33,9%	37,6%
Mogale City	28,8%	26,1%	27,6%	30,7%	33,1%	36,9%
Merafong City	26,4%	25,3%	27,1%	31,1%	33,5%	36,9%
Rand West City	30,0%	27,6%	29,4%	32,9%	35,2%	38,9%
Upper Poverty Line (ZAR1 335)						
West Rand	45,0%	42,7%	44,0%	46,6%	49,0%	52,7%
Mogale City	44,5%	41,7%	42,9%	45,2%	47,6%	51,4%
Merafong City	43,8%	42,7%	44,0%	47,2%	49,5%	53,1%
Rand West City	46,7%	44,1%	45,5%	48,3%	50,6%	54,2%
Poverty Gap Rate						
West Rand	31,4%	30,4%	30,4%	30,7%	31,1%	31,8%
Mogale City	31,4%	30,4%	30,5%	30,8%	31,1%	31,8%
Merafong City	31,5%	30,4%	30,5%	30,9%	31,2%	32,0%
Rand West City	31,2%	30,2%	30,3%	30,6%	31,0%	31,7%

Based on the income inequality as measured by the Gini coefficient for the West Rand district and its local regions, over the period of 2012 to 2020, not much change or movement happened in all the regions, as the increases in later years were marginal. However, the numbers have maintained a level just above 0.6. Much of the inequality is in Mogale City, the region with relatively high activity in the whole district. The Gini coefficient in the region increased from 0.642 in 2012 to 0.644 in 2020.

The better-than-expected recovery in the first half of 2021 improved business activity in municipalities, amid a strong rebound in global demand and higher commodity prices. Going forward, the recovery in economic activity is dependent on various factors, including effective vaccination rollout and sustained provision of energy to all the sectors of the economy. Similarly, in the West Rand, like other regions, economic output has declined for several years, with negative growth rates going back to the start of the review period. The decline in the mining activity of the district over the years has resulted in reduced total output. Mining accounted for 31% of the West Rand's economic output in 1996; it shrunk to an estimated 19.5% by 2021. However, the sector still accounts for the second highest share of economic activity in the region (refer to **Figure 75**).

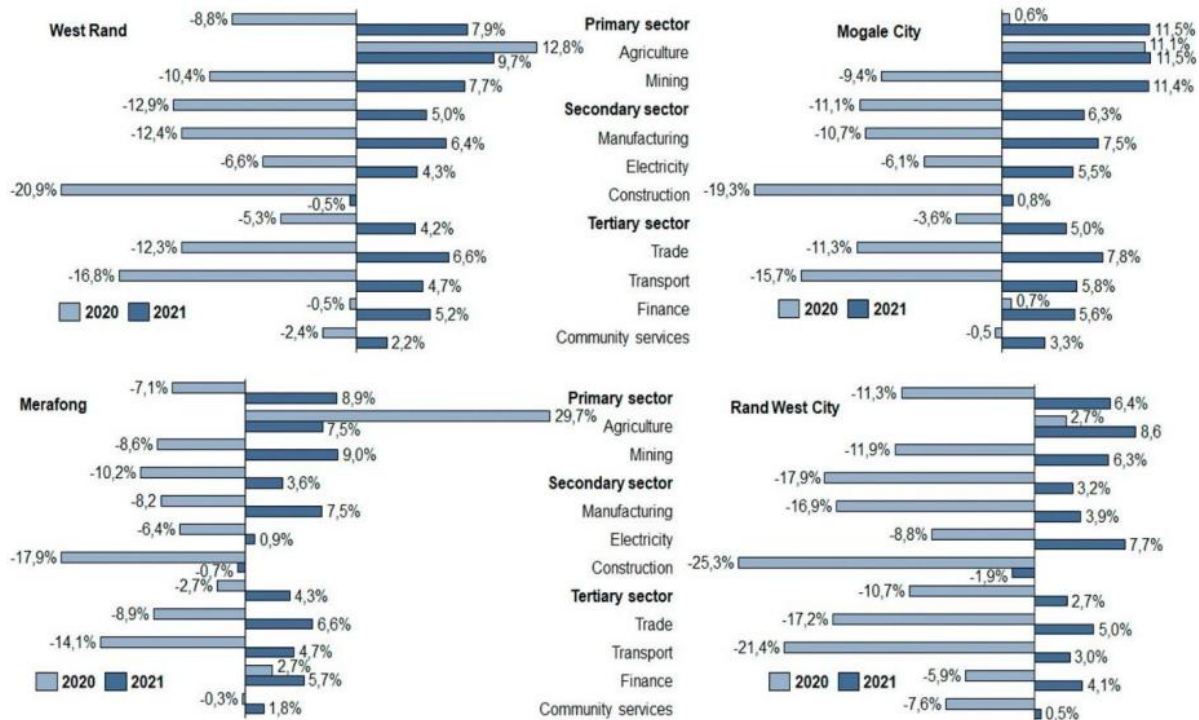


Figure 75: Sector Output Growth (IHS Markit, 2022; Draft IDP Merafong City 2025-26)

The district has also seen the highest contractions in the construction sector, recording a decline of 20.9 per cent in 2020 before a relative improvement however, still negative at 0.5 per cent. In Mogale City, construction decreased by 19.3 per cent, while it declined by 25.2 per cent in Rand West city and by 17.9 per cent in Merafong in the same period. The restriction of mobility of people and the halt of existing and planned projects affected the sector across regions. The agriculture sector has recorded growth for 2020 and is expected to record positive growth for 2021. Mining activity in the district region grew by 7.7 per cent, following a decrease of 10.4 per cent in 2020.

7.12.2.5 SERVICE DELIVERY

All Municipalities in West Rand had more than 90% of households having access to electricity for lighting in 2022. Merafong City had an increase from 82,8% in 2011 to 98,1% in 2022. West Rand District had the third highest (76,7%) proportion of households with access to piped water inside dwelling. Merafong City had the highest (81,9%) proportion of households with access to piped water inside the dwelling. While households using flush toilets only increased by 4,3 percentage points between 2011 and 2022 in Gauteng, households using flush toilets increased by 10 percentage points between 2011 and 2022 in West Rand. Households in Merafong City (94,1%) had the highest access to flush toilets than other municipalities. Approximately 84,3% of households in West Rand had their refuse removed by a local authority once a week. Refuse removal by local authority at least once a week increased from 77,7% in 1996 to 84,3% in 2022 in West Rand. Merafong City had the lowest percentage (81,9%) of refuse removal by local authority at least once a week as compared to other municipalities. Households with no access to internet declined by 40 percentage points, from 53,6% in 2011 to only 13,6% in 2022 in Gauteng Province.

7.13 CULTURAL HERITAGE RESOURCES

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 Act defines a 'heritage resource' as any place or object of cultural significance (aesthetic, architectural, historical, scientific, social, spiritual, linguistic, or technological value or significance). The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act. This section of the report presents the heritage status of the proposed Mponeng Lower Compartment TSF project.



7.13.1 REGIONAL HERITAGE

According to the Heritage Impact Assessment Report (PGS Heritage, 2025), the study area is situated in-between Klipsriviersberg (75km east) and Potchefstroom (56km west). This is important to note, as there is Sotho-Tswana stonewalling in the general area, which consists commonly of Klipsriviersberg stonewalling (SWS: 18th – 19th century) in the Klipsriviersberg area and Type Z (18th – 19th century) stonewalling near Potchefstroom. Since the site sits in between these areas, there is a possible influence from both types of stonewalling. However, Sadr (2012: 3) suggests Type Z is typically located south of the Vaal River. The Klipsriviersberg stonewalling (also known as SWS) contains an outer wall which commonly includes scallops which demarcate back courtyards, small stock kraals, and contains more linear stonewalls in between households to demarcate such areas (Sadr 2012: 3). Type Z settlements are typically more distributed and can contain narrow entrances for defensive purposes (Huffman et al., 2007).

Furthermore, there are Sotho-Tswana Iron Age stonewall ruins found 12km south of Carletonville, just outside Fochville, known as the Tlokwe Ruins. These ruins date to between the 1500s – 1820s. Based on the limited research conducted and available within the archaeological fraternity about Tolkwe, it is known that the people of the settlement grew sorghum and maize, and herded cattle within the region of the nearby fertile valley (Vorster 1969). When the Difaqane started and Mzilikazi pushed groups out of the area around the 1820s, the Sotho-Tswana people at Tlokwe were forced to move northward toward Brits. The hills surrounding Fochville, just south of the study area, were inhabited by the Bakwena baMare-a-Phogole people, who were known to have settled in the area during the LIA (Vorster 1969). However, during the late 1820s, when the Difaqane started, Kokosi, the chief of the baMare-a-Phogole people, was forced to lead his people north due to Mzilikazi and his people driving many Iron Age communities at the time out of the area (Sadr 2020). There are also some Later Iron Age sites located on the farm Kraalkop 8.9km south-east of the study area, which belonged to the baMare-a-Phogole people. As such, it is likely that the baMare-a-Phogole people also inhabited the area surrounding the study area due to the closeness in proximity. However, these Later Iron Age sites located on the farm Kraalkop are believed to be Molokwane type stonewalling, which, according to Huffman (2007), extends from Gauteng westwards towards Zeerust.

7.13.2 HERITAGE SCREENING

A heritage screening was conducted by means of the South African DFFE National Web-based Environmental Screening Tool as required by GN 982. According to the heritage screening report, the project area has a **Low Heritage Sensitivity (Figure 76)**. The fieldwork has shown that some archaeological and heritage resources were present in the area and thus have a higher rating than the original screening rating. This is in part due to the low resolution of the available data which the screening data is based.

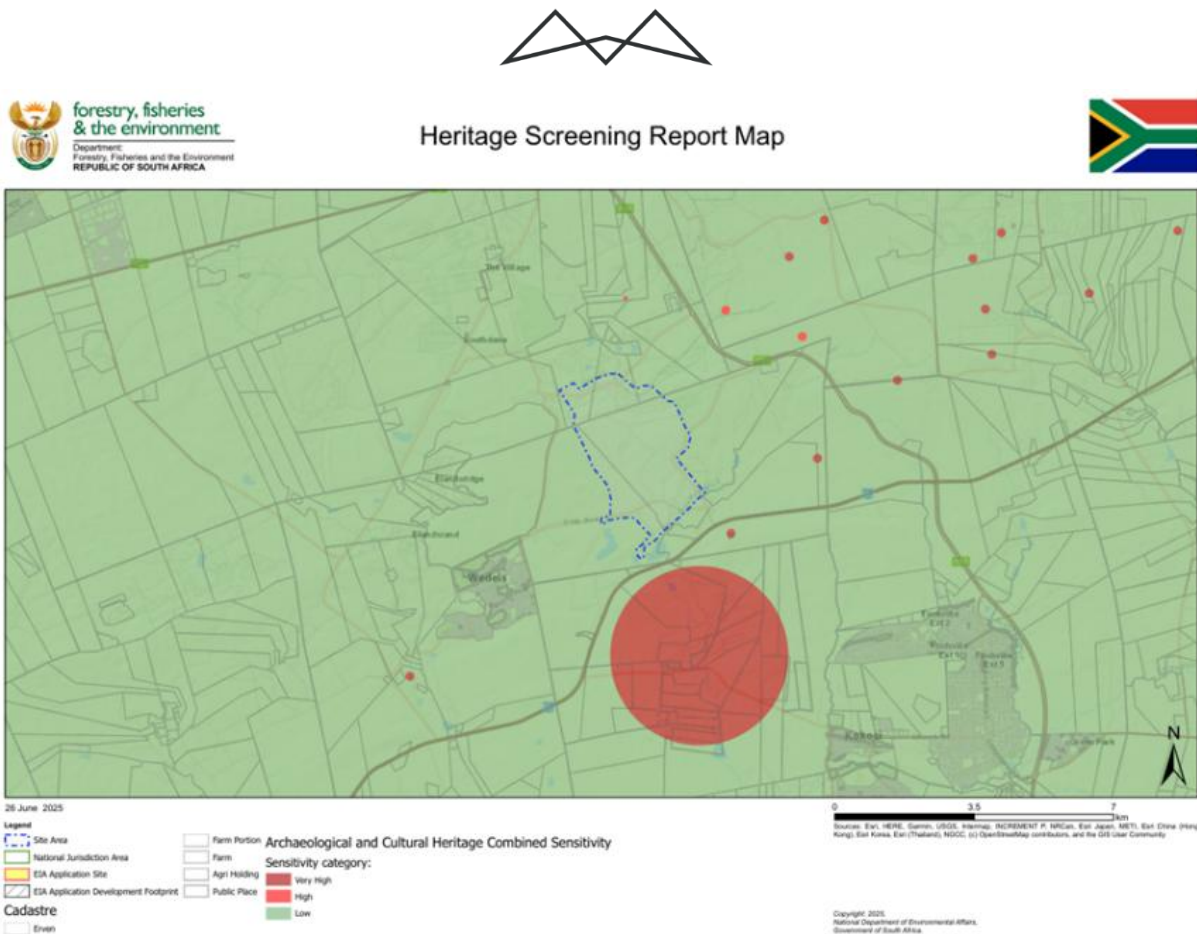


Figure 76: Map of relative archaeological and cultural heritage theme sensitivity (DFFE, 2025)

7.13.3 SITE-SPECIFIC HERITAGE

Site-specific fieldwork was conducted on 30th June 2025 by a PGS field team. During the fieldwork, a total of two heritage features were identified within the study area (see **Figure 77** and **Figure 78**). These consist of one stonewalling feature (MPnr1) and one stonewalling feature which contains four circular segments, some of which are likely kraals (MPnr2). MPnr1 is a more linear stonewalling of approximately 1m high and is constructed of medium – large compactly placed stones. MPnr1 is located down the hill from MPnr2. It is rated as high significance and graded as Grade IIIA, as through further investigation of satellite imagery of the area, it was determined that MPnr1 was a part of a full stonewalling circle, which is 15m in diameter. As such, it is hypothesised as possibly being a kraal. MPnr2 consists of four large, connected circles, which form one stonewalling feature. Each circle is 4m, 6m, 7m and 12m in diameter, respectively. These stonewalled circles are located on top of a hill, in relative proximity of MPnr1. It can be surmised that some of these circles of this stonewalling feature are kraals. As such, this feature is rated as **high significance** and is graded as **Grade IIIA** due to the traditional practice of many African cultures of burying their deceased within the kraal space. Furthermore, both sites were identified to be a part of a larger stonewalling group in the area, which is at present under-research within the archaeological fraternity. As such, the area has a high potential to yield valuable information, supporting the high significance rating.

However, due to the dense vegetation in the field, not all features were identified during the fieldwork but further sites were identified during further investigation utilising satellite imagery and background research of the area. As depicted in **Figure 79**, more stonewalled sites adjacent to the study area were located. As discussed at the onset of the report, it is likely that the area was inhabited by the baMare-a-Phogole people during the LIA (from about the 1500s to the late 1820s). The baMare-a-Phogole had built similar stonewalling 8.9km south-east on a farm called Kraalkop, as well as 12km south near Fochville at a site referred to as “The Tlokwe Ruins”. It is noted that some of these sites have already been destroyed in the surrounding local area. Due to the destruction of other similar stonewalled settlements in the area, as well as the relevance of these sites on a bigger scale, they have both a **high significance** and a **higher cumulative impact** (rating of 2). Consequently,



these sites hold the potential to yield information on a group of settlements for which little research has been completed and can offer deeper insight into the history of the local area.

The two archaeological sites MPnr1 and MPnr2 have a high heritage significance and are both graded as Grade IIIA due to their significance as part of a larger stonewalling group, as well as due to the possibility of burials within the kraal space.



Figure 77: View of MPnr1 (top) and MPnr2 (bottom) (PGS Heritage, 2025)

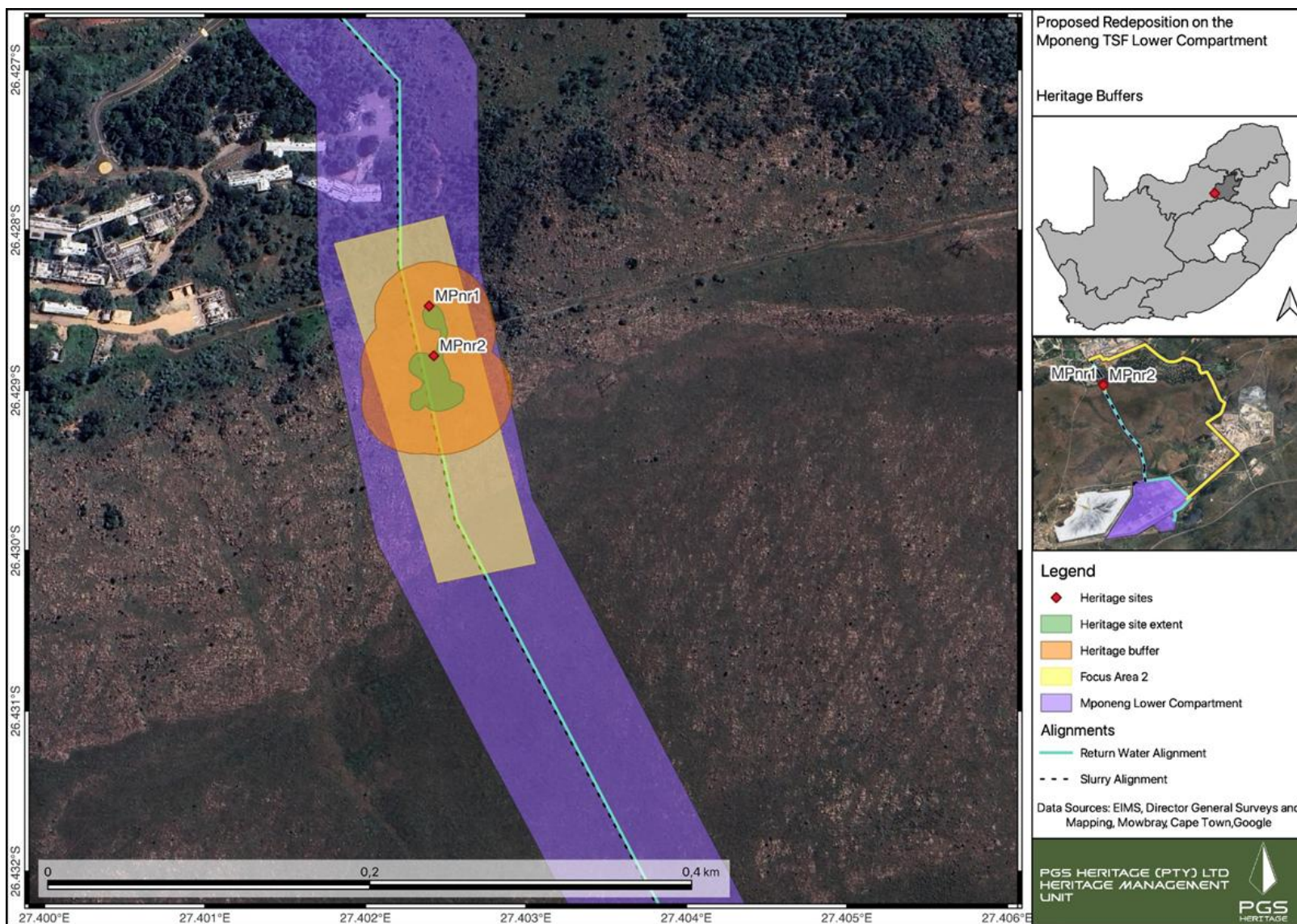


Figure 78: Identified heritage resources within the Mponeng TSF development area (PGS Heritage, 2025)

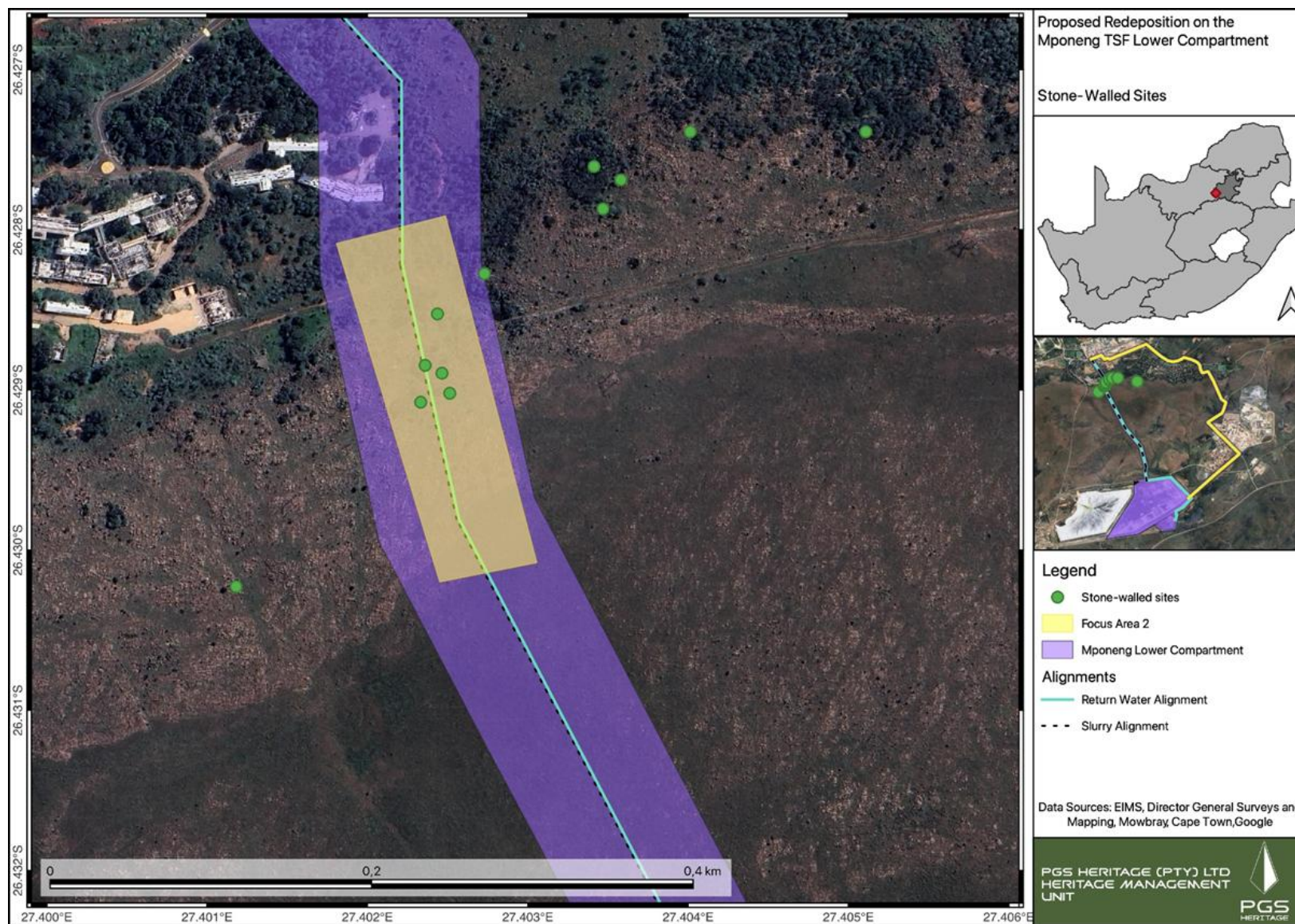


Figure 79: Stone-walled sites both within the Mponeng TSF development area and adjacent to the study area (PGS Heritage, 2025)



7.14 PALAEOLOGY

Cultural Heritage in South Africa, including all heritage resources, is protected by the National Heritage Resources Act (Act 25 of 1999) (NHRA). Heritage resources as defined in Section 3 of the Act include “all objects recovered from the soil or waters of South Africa, including archaeological and **palaeontological objects** and material, meteorites and rare geological specimens”. Palaeontological heritage is exceptional and non-renewable and is protected by the NHRA. Palaeontological resources and may not be unearthed, broken moved, or destroyed by any development without prior assessment and without a permit from the relevant heritage resources authority as per section 35 of the NHRA.

According to the Baseline Palaeontological Assessment Report (Banzai Environmental, 2025) attached in **Appendix F**, local geology comprises sedimentary and volcanic strata of the Pretoria Group, namely the Rooihooigte, Timeball Hill, and Hekpoort Formations (Vt and Vh), which form part of the Transvaal Supergroup, as well as post-depositional diabase (di) intrusions (**Figure 80**). According to the SAHRIS Palaeosensitivity map, the Rooihooigte and Timeball Hill Formations are classified as High sensitivity (orange), the Hekpoort Formation has a Moderate sensitivity (green), and the diabase is rated as having Zero palaeontological sensitivity (grey) (Almond *et al.*, 2013; SAHRIS website, **Figure 81, Table 36**). In alignment with these sensitivities, the Department of Forestry, Fisheries and the Environment (DFFE) screening tool identifies the broader study area as falling within a High (red) palaeontological sensitivity zone (**Figure 82**).

The Rooihooigte Formation is the earliest stratigraphic unit in the study area and is part of the Pretoria Group's lowermost succession. It is predominantly composed of reddish-brown to greenish-grey shales, ferruginous mudstones, and subordinate siltstones and sandstones, which were deposited in fluvial and deltaic environments. The preservation of palaeobiological structures, particularly Microbially Induced Sedimentary Structures (MISS) and rare stromatolitic horizons, has been facilitated by the fine-grained nature of these sediments. These structures represent some of the oldest preserved evidence of life on the Kaapvaal Craton (Altermann & Nelson, 1998; Button, 1986).

The Timeball Hill Formation, which is situated above the Rooihooigte Formation, is composed of well-bedded shales, mudstones, and characteristic banded iron formations (BIFs). These formations were deposited under low-energy, prodelta to distal marine shelf conditions. The unit is known for its preservation of rare acritarchs, stromatolites, and laminated organic-rich shales, which are microscopic organic-walled microfossils that are considered among the earliest indicators of eukaryotic life (Eriksson & Catuneanu, 2004; Altermann, 2001).

The Hekpoort Formation is primarily composed of subaerial basaltic and andesitic lava flows, with infrequent volcanoclastic interbeds, and it conformably overlies the Timeball Hill Formation. This formation, which dates back to approximately 2.05 billion years ago, documents a substantial volcanic event in the Pretoria Basin. The Hekpoort Formation is primarily unfossiliferous due to its status as an igneous unit. Nevertheless, rare instances of weathered interflow sedimentary horizons may contain microbial textures or MISS, which offer substantial but limited insights into the evolution of the terrestrial biosphere during the Paleoproterozoic (Eriksson *et al.*, 2001). This limited but scientifically pertinent potential is reflected in its Moderate palaeontological sensitivity rating.

The diabase intrusions in the study area are Jurassic in age and generally newer than the sedimentary and volcanic strata they cut. They were emplaced during later tectono-thermal events associated with Gondwana rifting. The sills and dykes formed by these medium-grained, mafic intrusive rocks are exclusively igneous in origin and, as a result, are considered palaeontologically sterile in nature. Furthermore, the placement of diabase may result in the local thermal alteration or obliteration of fossil preservation in the host rocks in the vicinity (Johnson *et al.*, 2006).



Table 36: Palaeontological Sensitivity according to the SAHRIS PalaeoMap (SAHRIS, 2025)

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.

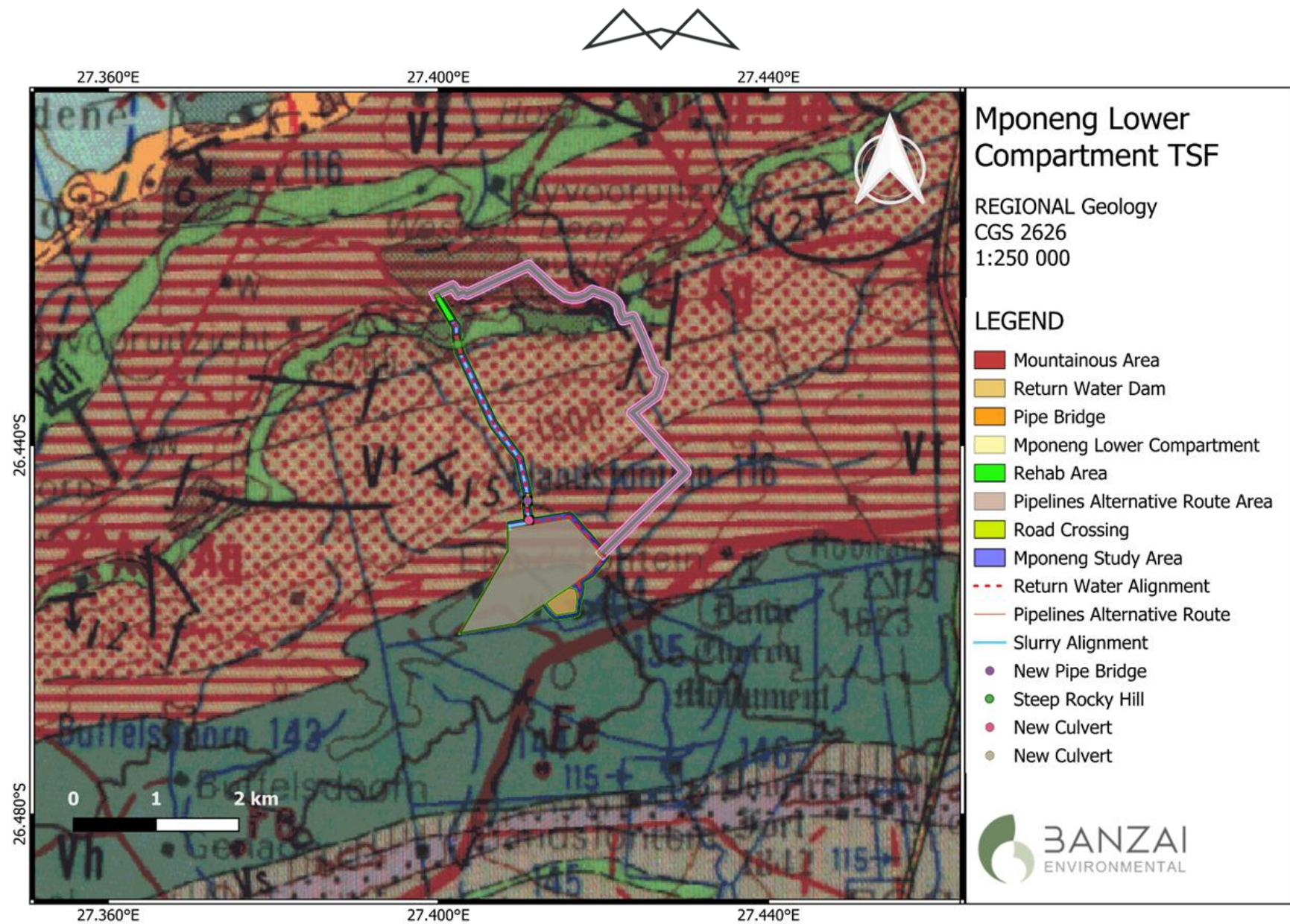


Figure 80: Extract of the 1:250 000 West Rand 2626 (1986) Geological Map (Council for Geosciences, 1986; Banzai Environmental, 2025)

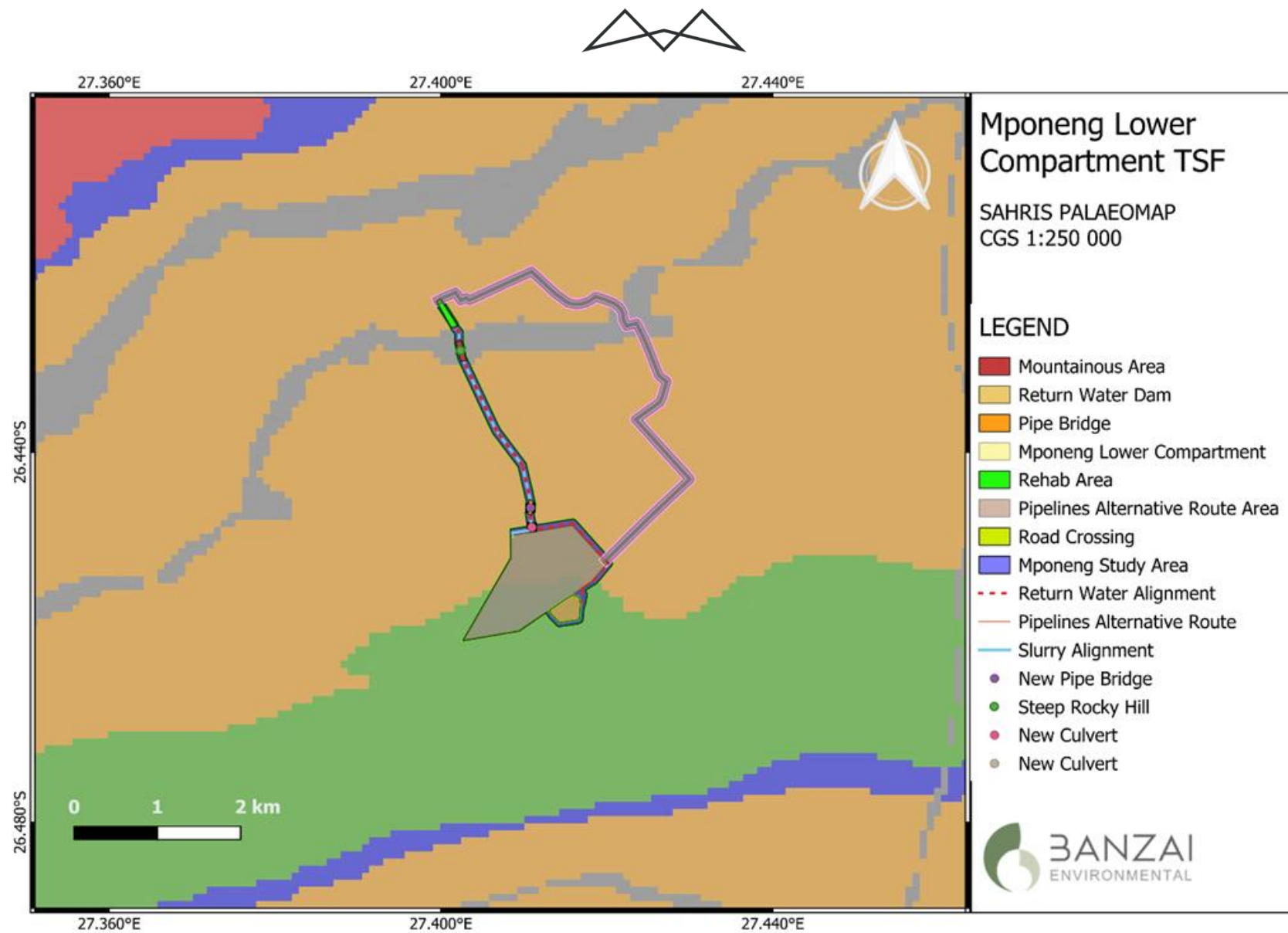
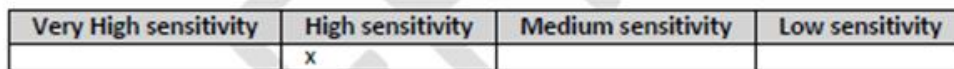


Figure 81: Extract of the SAHRIS PalaeoMap indicating the High (orange), Moderate (green) and Zero (grey) Palaeontological Sensitivity of the proposed study area (Banzai Environmental, 2025)



Sensitivity	Feature(s)
High	Features with a High paleontological sensitivity
Medium	Features with a Medium paleontological sensitivity

The SAHRIS PalaeoMap (**Figure 81**) indicates a High (orange) Palaeontological Sensitivity which is in agreement with the DFFE Screening Tool (**Figure 82**). No investigation was conducted for the current study but a Phase 1 field-based palaeontological assessment, at the Environmental Impact Assessment (EIA) level, is recommended to evaluate the significance and extent of fossil heritage within the proposed development area, as well as the potential impact of the project on these resources.



8 ENVIRONMENTAL IMPACT ASSESSMENT

This section aims to identify and do a preliminary assessment on the potential environmental impacts associated with the proposed Mponeng Lower Compartment TSF. This impact assessment will be used to guide the identification and selection of preferred alternatives, and management and mitigation measures, applicable to the proposed activities. The preliminary assessment will also serve to focus the subsequent EIA phase on the key issues and impacts.

8.1 IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The approach may be altered or substituted on a case-by-case basis if the specific aspect being assessed requires such- such instances require prior EIMS Project Manager approval. The broad approach to the significance rating methodology is to determine the significance (S) of an environmental risk or impact by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relating this to the probability/likelihood (P) of the impact occurring. The S is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the S to determine the overall final significance rating (FS). The impact assessment will be applied to all identified alternatives.

8.1.1 DETERMINATION OF ENVIRONMENTAL RISK

The final significance (FS) of an impact or risk is determined by applying a prioritisation factor (PF) to the post-mitigation environmental significance. The significance is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in **Table 37** below.

Table 37: Criteria for Determining Impact Consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)
	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality),



		or extends into different distinct geographical features, or extends between 5 and 50 km from the site).
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).
Duration	1	Immediate (<1 year, quickly reversible)
	2	Short term (1-5 years, less than project lifespan)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction/ operation/ decommissioning).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected, or affected environmental components are already degraded)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; moderate improvement for +ve impacts; or where change affects area of potential conservation or other value, or use of resources).
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease; high improvement for +ve impacts; or where change affects high conservation value areas or species of conservation concern)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts; or disturbance to pristine areas of critical conservation value or critically endangered species)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring very high time and cost.
	5	Irreversible Impact.

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per **Table 38**. It is noted that both environmental risks as well as environmental impacts should be identified and assessed. Environmental Risk can be regarded as the potential for something harmful to happen to the environment, and in many instances is not



regarded as something that is expected to occur during normal operations or events (e.g. unplanned fuel or oil spills at a construction site). Probability and likelihood are key determinants or variables of environmental risk. Environmental Impact can be regarded as the actual effect or change that happens to the environment because of an activity and is typically an effect that is expected from normal operations or events (e.g. vegetation clearance from site development results in loss of species of concern). Typically, the probability of an unmitigated environmental impact is regarded as highly likely or certain (management and mitigation measures would ideally aim to reduce this likelihood where possible). In summary, environmental risk is about what could happen, while environmental impact is about what does happen

Table 38: Probability Scoring / Likelihood Scoring

Probability	1	Improbable (Rare, the event may occur only in exceptional circumstances, the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <5% chance).
	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).
	4	High probability (Likely, it is most probable that the impact will occur- > 50 and <90% chance).
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).

The result is a qualitative representation of relative significance associated with the impact. Significance is therefore calculated as follows:

$$S = C \times P$$

Table 39: Determination of Significance

Consequence	5- Very High ¹	5	10	15	20	25
	4- High	4	8	12	16	20
	3- Medium	3	6	9	12	15
	2- Low	2	4	6	8	10
	1- Very low	1	2	3	4	5
		1- Improbable	2- Low	3- Medium/ Possible	4- High/ Probable	5- Highly likely/ Definite
	Probability					

The outcome of the significance assessment will result in a range of scores, ranging from 1 through to 25. These significance scores are then grouped into respective classes as described in **Table 40**.

¹ In the event that an impact or risk has very high or catastrophic consequences, but the likelihood/ probability is low, then the resultant significance would be Low-medium. This does in certain instances detract from the relative important of this impact or risk and must consequently be flagged for further specific consideration, management, mitigation, or contingency planning.



Table 40: Significance Scores

S Score	Description
≤4.25	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
>4.25, ≤8.5	Low-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>8.5, ≤13.75	High-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>13.75	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact significance will be determined for each impact without relevant management and mitigation measures (pre-mitigation significance), as well as post implementation of relevant management and mitigation measures (post-mitigation significance). This allows for a prediction in the degree to which the impact can be managed/mitigated.

8.1.2 IMPACT PRIORITISATION

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

- i. Cumulative impacts; and
- ii. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impacts' post-mitigation significance (post-mitigation). This prioritisation factor does not aim to detract from the significance ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the post-mitigation significance based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 41: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).



The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in **Table 41**. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{CI} + \text{LR}$$

The result is a priority score which ranges from 3 to 9 and a consequent PF ranging from 1 to 1.5 (Refer to **Table 42**).

Table 42: Determination of Prioritisation Factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance (FS), the PF is multiplied by the post-mitigation significance scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a higher significance).

Table 43: Final Environmental Significance Rating

Significance Rating	Description
<-25	Very High (Impacts in this class are extremely significant and pose a very high environmental risk. In certain instances these may represent a fatal flaw. They are likely to have a major influence on the decision and may be difficult or impossible to mitigate. Offset's may be necessary.
<-13.75 to -25	High negative (These impacts are significant and must be carefully considered in the decision-making process. They have a high environmental risk or impact and require extensive mitigation measures).
-8.5 to -13.75	Medium-High negative (i.e. Impacts in this class are more substantial and could have a significant environmental risk. They may influence the decision to develop in the area and require more robust mitigation measures).
<-4.25 to <-8.5	Medium- Low negative (i.e. These impacts are slightly more significant than low impacts but still do not pose a major environmental risk. They might require some mitigation measures but are generally manageable).
-1 to -4.25	Low negative (i.e. Impacts in this class are minor and unlikely to have a significant environmental risk. They do not influence the decision to develop in the area and are typically easily mitigated).



Significance Rating	Description
0	No impact
1 to 4.25	Low positive
>4.25 to <8.5	Medium-Low positive
8.5 to 13.75	Medium-High positive
>13.75	High positive

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

8.2 IMPACTS IDENTIFIED

This Section presents the potential impacts that have been identified during the scoping phase assessment. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final Scoping report submitted to the CA for adjudication. The results of the public consultation will be used to update the identified potential impacts which will be further refined during the course of the EIA assessment and consultation process.

Potential environmental impacts identified during the scoping process will be revised in the EIA Phase. These potential impacts identified by the EAP and the appointed specialists will take into consideration of other potential impacts identified by the public. **Table 44** provides the list of preliminary potential impacts identified. Without proper mitigation measures (preliminary proposed measures which will be further refined in EIA phase once detailed assessments are included) and continual environmental management, most of the identified impacts may potentially become cumulative, affecting areas outside of their originally identified zone of impact. The potential cumulative impacts have been identified, evaluated, and mitigation measures suggested which will be updated during the detailed EIA level investigation.

When considering cumulative impacts, it is important to bear in mind the scale at which different impacts occur. There is potential for a cumulative effect at a broad scale, such as regional deterioration of air quality, as well as finer scale effects occurring in the area surrounding the activity. The main impacts which have a cumulative effect on a regional scale are related to the transportation vectors that they act upon. For example, air movement patterns result in localised air quality impacts having a cumulative effect on air quality in the region. Similarly, water acts as a vector for distribution of impacts such as contamination across a much wider area than the localised extent of the impacts source. At a finer scale, there are also impacts that have the potential to result in a cumulative effect, although due to the smaller scale at which these operate, the significance of the cumulative impact is lower in the broader context.



Table 44: Identified potential environmental impacts

Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
Site preparation (Planning)	Vegetation clearance for pipelines, return water dam, pipeline bridge, pipeline culvert, TSF stabilization, access roads	<ul style="list-style-type: none"> ○ Surface contamination water 	<ul style="list-style-type: none"> ○ Temporary disturbance of wildlife 	<ul style="list-style-type: none"> ○ Employment opportunities 	<ul style="list-style-type: none"> ○ Disturbance / destruction of archaeological sites or historic structures ○ Disturbance/ destruction of fossils
	Planned placement of infrastructure				
	Decommissioning of landfill and removal of waste material				
	Stabilization of Landfill / TSF material				
	Topsoil stripping for pipelines and access roads				
Human resources management (Planning)	Employment/recruitment			<ul style="list-style-type: none"> ○ Employment opportunities 	
	I&AP consultations				
	Environmental awareness training				
	Integration with Municipalities' strategic long-term planning				
Earthworks (Construction)	Stripping and stockpiling of soils	<ul style="list-style-type: none"> ○ Erosion due to storm water runoff ○ Impact due to topsoil stripping ○ Surface contamination water ○ Loss of fertility ○ Loss of flow paths ○ Emissions and dust ○ Impacts on wetlands 	<ul style="list-style-type: none"> ○ Loss/ destruction of natural habitat ○ Introduction/ Invasion by Alien Species ○ Displacement of faunal species 	<ul style="list-style-type: none"> ○ Visual impact and impact on sense of place ○ Nuisance and impact on sense of place (i.e., noise, dust, etc.). ○ Health and safety aspects related to radiation and health as well as TSF stability ○ Impact on existing infrastructure (i.e., roads, fences, etc.) ○ Perceptions and expectations ○ Employment opportunities 	<ul style="list-style-type: none"> ○ Disturbance/ destruction of archaeological sites or historic structures ○ Disturbance/ destruction of fossils
	Levelling, grubbing and bulldozing				
	Removal of waste and cleared vegetation				
	Preparing trenches and foundations				
	Establishing storm water management measures				
	Establishment of firebreak				
Civil Works (Construction)	Establishment of infrastructure and services	<ul style="list-style-type: none"> ○ Erosion due to storm water runoff ○ Impact due to topsoil stripping 	<ul style="list-style-type: none"> ○ Loss/ destruction of natural habitat ○ Introduction/ Invasion by Alien Species 	<ul style="list-style-type: none"> ○ Visual impact and impact on sense of place ○ Nuisance and impact on sense of place (i.e., noise, dust, etc.). 	<ul style="list-style-type: none"> ○ Disturbance/ destruction of archaeological sites or historic structures ○ Disturbance/ destruction of fossils
	Mixing of concrete and concrete works				
	Establishment of surface and sub-surface dirty water systems				



Main Activity / Action / Process	Ancillary Activity	Geo-physical (geology, topography, air, water)	Biological	Socio-economic	Heritage and cultural
	Temporary sewage and sanitation	○ Surface water contamination	○ Displacement of faunal species	○ Health and safety aspects related to radiation and health as well as TSF stability	
	Establishment of waste area and upgrade of RWD	○ Ground water contamination		○ Impact on existing infrastructure (i.e., roads, fences, etc.)	
	Construction of bridge and culvert	○ Cone of depression		○ Perceptions and expectations	
	General site management	○ Loss of flow paths		○ Employment opportunities	
		○ Emissions and dust			
		○ Impacts on wetlands			
Deposition at TSF (Operation)	Deposition of tailings	○ Cone of depression		○ Visual impact and impact on sense of place	
	Maintenance and management of stormwater system	○ Impacts on surface water quality due to leachate		○ Nuisance and impact on sense of place (i.e., noise, dust, etc.)	
	Water management	○ Impacts on groundwater quality due to leachate		○ Health and safety aspects related to radiation and health as well as TSF stability	
		○ Loss of flow paths			
		○ Emissions and dust			
Closure and Rehabilitation of TSF (Decommissioning and Closure)	Revegetation	○ Emissions and dust	○ Alien and invasive species	○ Safety and security (i.e., access to properties, theft, fire hazards, etc.)	
	Slope stabilisation			○ Visual and dust	
	Erosion control				
Maintenance (Post closure)	Initiate maintenance and aftercare program	○ Surface and groundwater quality	○ Alien and invasive species	○ Visual	
	Environmental aspect monitoring			○ Site security and access control	
				○ Health and safety aspects related to radiation and health as well as TSF stability	



Table 45: Impact identification matrix

Phase	Activity	Environmental Component (- = negative impact; + = positive impact)													
		Air Quality (AQ)	Geology (G)	Hydrology (H)	Groundwater (GW)	Surface water/ wetlands (W)	Noise (N)	Soils (S)	Visual / Landscape (V)	Flora (FL)	Fauna (FA)	Health and safety (H&S)	Socio-economic (SE)	Palaeontology (P)	Cultural Heritage (C)
Construction	Site establishment	-			-	-	-	-	-	-	-		+	-	-
	Spring Diversion		-	-	-	-		-		-	-				
	Decommissioning of landfill and TSF Stabilization	-					-			-	-	+	+		
	Establishment of necessary infrastructure	-	-	-	-	-	-	-	-	-	-			-	-
Operation	Deposition of tailings onto existing TSFs	-		-	-		-		-			-	-		
	Maintenance and management of infrastructure				-	-		-		-	-				
	Clean and Dirty water management			-	-	-		-				+	+		
Closure and Rehabilitation	Revegetation	+				+		+	+	+	+	+	+		
	Erosion control			+	+	+		+		+	+	+	+		
Post Closure	Initiate maintenance and monitoring programmes				+	+		+		+	+	+	-		
	Environmental aspect monitoring and remediation	+		+	+	+		+	+	+	+	+	-		



8.3 DESCRIPTION AND PRELIMINARY ASSESSMENT OF IMPACTS

The following potential impacts were identified during the scoping phase assessment and were assessed in terms of nature, significance, consequence, extent, duration and probability. These preliminary impact calculations will be subject to amendment based on the EIA phase assessment and the results of public consultation undertaken during the Scoping as well as EIA phases. **Table 46** provides a description of each impact with preliminary mitigation measures and an indication of which impacts are to be assessed in greater detail in the EIA phase assessment. Preliminary mitigation / management measures to minimise potential negative impacts or enhance potential benefits are put forward in this Scoping Report and will be adjusted where relevant during the EIA phase once detailed specialist assessments are concluded and input from the public has been considered. Refer to **Appendix G** for the detailed impact assessment matrix.



Table 46: Preliminary impact assessment

#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
1	Disturbance / destruction of sites of heritage significance	Planning	Medium to low -	Medium to low -	Medium to low -	Two heritage features were identified within the study area (see Section 7.13.3). These consist of one stonewalling feature (MPnr1) and one stonewalling feature which contains four circular segments, some of which are likely kraals (MPnr2). The construction of pipelines alternative route 1 will have a direct impact on the heritage features and will either need to be deviated or permits need to be obtained. Other heritage features may be discovered during all phases of the project.	Detailed Heritage Impact Assessment EIA Phase impact assessment
		Construction	High -	Medium to low -	Medium to low -	Although pipelines route alternative 1 traverse a high heritage sensitive area, the pipelines will either be deviated to avoid the heritage features or alternative route 2 will be considered. Through the implementation of the proposed mitigation measures, this impact is considered to have an overall low negative cumulative impact significance subject to adherence of the mitigation measures.	
		Operational	Medium to low -	Low -	Low -	Preliminary mitigations include: <ul style="list-style-type: none"> Archaeological sites MPnr1 and MPnr2 are to be avoided by a 30m buffer as per s25 of the NHRA for pipelines route 1 (or alternatively a permit be obtained for its destruction through SAHRA); A Chance Finds Protocol is to be implemented for all project areas; Known heritage features must be marked as no-go areas. Known features to be impacted upon must first be authorized through a permit; If unearthed, under no circumstances shall any heritage, archaeological or paleontological artefact/ feature be removed, destroyed or interfered with by anyone on the site, unless such removal has been authorised by the heritage authorities; and Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts as set out in the NHRA (Act No 25 of 1999) Section 51 (1). 	
		Closure & Rehab	Medium to low -	Low -	Low -		
2	Disturbance / destruction of palaeontological resources	Planning	Medium to low -	Medium to low -	Medium to low -	According to the SAHRIS Palaeosensitivity map, the site associated geology namely the Rooihogte and Timeball Hill Formations are classified as High sensitivity (orange), the Hekpoort Formation has a Moderate sensitivity (green), and the diabase is rated as having Zero palaeontological sensitivity (grey). The construction activities will impact an area considered to be ranging from zero to high palaeontological sensitivity. Palaeontological heritage may be discovered and/or impacted during the project phases.	Palaeontological Impact Assessment EIA Phase impact assessment
		Construction	Medium to high -	Medium to low -	Medium to low -	The main impact on palaeontology remains (if any) will be the physical disturbance of the material and its context. The clearing of vegetation, excavations and/or borehole drilling may expose, disturb and displace archaeological sites/material. However, impact (if any) on palaeontological features will be local and not result in extensive significant loss of palaeontological features in the regional scale as there will likely be more similar features in the extended area. Therefore, the cumulative impact on palaeontological resources is low negative with mitigation.	



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
		Operational	Medium to low -	Low -	Low -	<p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none">The planning must take cognizance of the heritage sensitivities depicted on the heritage sensitivity maps;A Chance Finds Protocol must be implemented;The palaeontologist must apply for a valid permit from SAHRA for the collection / removal of fossils if necessary;All known heritage features should be retained and avoided with a buffer zone of 30m as per SAHRA guidelines;An independent and suitably qualified ECO must be appointed and should be able to recognise potential palaeontological features; andShould any palaeontological features be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the ECO shall be notified within 24hours, and a Chance Find Protocol must be implemented. The responsible heritage resources authority (PHRAG), as well as the South African Police Service (SAPS) must be notified within 72hours.	
		Closure & Rehab	Medium to low -	Low -	Low -		
3	Soils and Agriculture: Soil erosion and sedimentation & loss of soil fertility	Planning	Medium to low -	Low -	Low -	<p>Clearing of vegetation for the construction activities such pipelines, bridge and culvert will result in compaction of soils which will impact the soils and increase the rate of erosion, especially on sloping terrain.</p>	<p>Soils and Agricultural Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	Medium to low -	Low -	Low -	<p>The proposed activities and associated infrastructure will result in compaction and increased soil erosion during the project phases and accumulatively increase the erosion rate in the area through the removal of the vegetation, establishment of the bridge and culvert as well as compaction of the TSF. However, considering that the construction activities on or near watercourse will be short-term and erosion control measures such as gabions will be required, the risk of sedimentation of watercourses is considered low. Through the implementation of the proposed mitigation measures, this impact is considered to have an overall low negative cumulative impact significance subject to adherence of the mitigation measures.</p>	
		Operational	Medium to low -	Low -	Low -	<p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none">The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on soils;Best known techniques of soil erosion and management should be adopted for the project if necessary;Construction / exploration impacts associated with the proposed project must be contained within the footprint of the assessed areas;Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-habilitated to its pre-disturbed state as defined in the pre-drill survey; and	
		Closure &	Medium to low -	Low -	Low -		
4	Air quality: release of	Planning	Medium to low -	Low -	Low -	<p>The proposed activities entail the storage of tailings. Gold TSFs primarily contain finely milled ore waste, including silica (quartz), clays, unrecoverable metals and minerals (like iron, arsenic, lead, zinc, and copper), chemicals used in processing, and water. The proposed activities will result in emissions to air from a variety of activities and sources. The only source of air emissions due to the Project is wind erosion due to the re-instatement of the Mponeng Lower TSF as a tailings deposit area, where it is currently used as a holdings</p>	Air Quality Impact Assessment



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
5		Construction	Medium to low -	Medium to low -	Medium to low -	dam and Landfill facility. Airborne PM is the most significant pollutant of concern from the proposed redeposition at Mponeng Lower Compartment TSF. The impact of particles on human health is largely dependent on: (i) particle characteristics, particularly particle size and shape, and chemical composition; and (ii) the duration, frequency and magnitude of exposure. From gold mining and processing facilities the radioactive particles in the form of radionuclides and radon releases are of concern.	EIA Phase impact assessment
		Operational	Medium to high -	Medium to low -	Medium to low -	The area is a gold mining area with several existing TSFs including the Mponeng Upper Compartment TSF adjacent to the proposed project area. It is assumed that the cumulative impact on air quality will be low negative. However, the quantification of GHG for the project will only be undertaken during the impact assessment phase, the significance rating can only be provided once the impact assessment has been undertaken. No fatal flaws, however, are expected due to the climate impacts.	
		Closure & Rehab	Medium to low -	Low -	Low -	Preliminary mitigation measures include: <ul style="list-style-type: none"> Limit air emissions as far as practically possible through best practice design and implementation; Reduce to nuisance factor of dust to neighbouring residents; Implement dust suppression measures in all areas that will be affected by construction activities and where dust will be generated. Dust suppression must also be undertaken during windy and dry weather conditions; and Speed restriction of no more than 20 km/h must be implemented for all construction vehicles within the construction site. 	
	Health and Safety of the Community: Release of gases, pollution of surface water,	Planning	Medium to low -	Low -	Low -	As indicated in item 4 above and in Section 7.10 , various emissions can be expected from the project. Airborne PM is the most significant pollutant of concern from the proposed redeposition at Mponeng Lower Compartment TSF. The impact of particles on human health is largely dependent on: (i) particle characteristics, particularly particle size and shape, and chemical composition; and (ii) the duration, frequency and magnitude of exposure. From gold mining and processing facilities the radioactive particles in the form of radionuclides and radon releases are of concern. Another major concern associated with TSFs is the potential negative impacts to surface and groundwater, runoff from the TSF can enter the surface water bodies leading to contamination while leaching can result in infiltration of the groundwater. In addition, unstable and/or unsafe TSF practices can result in the TSF breaking the dam wall, resulting in massive sudden uncontrolled flood of liquid sludge. Fears of such an event occurring remains high especially amongst communities living within proximity of TSFs as result of the recent Jagersfontein TSF Dam Wall Collapse in September 2022. The failure resulted in the sudden and uncontrolled release of more than 6 million m ³ of liquid sludge, smothering nearly 200 nearby houses and	Health Risk & Safety Assessment
		Construction	Medium to high -	Medium to low -	Medium to low -		Engineering Designs EIA Phase Impact Assessment



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
6	Noise Pollution on Humans and Fauna	Operational	High -	Medium to high -	Medium to high -	<p>approximately 1600 ha of agricultural and grazing land (Marais et al., 2024). Two people died, and one person believed to have been swept away is still declared missing.</p> <p>The area is a gold mining area with several existing TSFs including the Mponeng Upper Compartment TSF adjacent to the proposed project area. As indicated in Section 2.2.5, there is a natural occurring spring on the northern edge of the TSF. The discovery of the spring resulted in activities to be stopped due to safety concerns relating to the stability of the TSF. The spring water is currently daylighting in the northern portion of the proposed footprint and will also require diversion around the TSF. The addition of the TSF in the area with the implementation of the necessary stabilization activities will therefore result in medium-low negative health and safety cumulative impact subject to adherence of the mitigation measures.</p>	
		Closure & Rehab	Medium to high -	Medium to low -	Medium to low -	<p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> Golden Core Trade and Invest must undertake the Dam Safety Technical Assessment and register with the DWS Dam Safety Office; Long term ground improvement, such as dynamic compaction must be implemented for the TSF; An adequate dedicated spring capturing and diversion system must be installed prior to the installation of sub-surface drains; Dedicated and adequate clean and dirty water management systems must be installed prior deposition; Installation of the geomembrane according to design specifications and industry best practice to prevent ultraviolet radiation exposure and/or instability of the TSF; Regular monitoring and maintenance of infrastructure based on the engineering specifications shall be undertaken; and Emergency preparedness plan shall be compiled and implemented throughout the lifetime of the project activities. 	
	Noise Pollution on Humans and Fauna	Planning	Medium to low -	Medium to low -	Low -	Noisy activities associated with the project will be limited to the planning and construction phases. During the planning phase, site establishment which may require vehicular movement and clearance of vegetation as well as establishment of temporary infrastructure. During the construction, noisy activities such as the drilling for the spring diversion, excavations for infrastructure and movement of heavy vehicles is expected. During the operation and decommissioning phase, minimal noise disturbance is expected due to the nature of the proposed activity.	<p>Terrestrial Biodiversity Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	Medium to low -	Medium to low -	Medium to low -	<p>Based on the environmental setting consisting of similar existing infrastructure and activities in the area and observations made during the site sensitivity verification, there are no adjacent communities and there is isolated minimal grazing activities with potential wild animals present on the ridge section. Therefore, with the proposed mitigations, it is anticipated there will be medium-low negative cumulative impact emanating from noise.</p> <p>Preliminary mitigation measures include:</p>	



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
		Operational	Medium to low -	Low -	Low -	<ul style="list-style-type: none"> The working hours stipulated in the Construction permit, where applicable, must be adhered to. Where this is not applicable, the following working hours must be adhered to: Monday to Friday from sunrise to sunset and where applicable on a Saturday which must be agreed upon between the affected parties and the Contractor; The contractor must attempt to restrict noisy activities as far as possible to times and locations whereby the potential for noise nuisance is reduced; and All construction plant and other equipment must be in a good working order to reduce possible noise pollution. 	
		Closure & Rehab	Medium to low -	Low -	Low -		
7	Nuisance and Impact on Sense of Place	Planning	Medium to low -	Low -	Low -	<p>The proposed activities will temporarily impact on the established sense of place of the Class 2 ridge and heritage sensitive area. The character of the area would change due to the activities being undertaken on that particular place. Additional vehicles, increased noise and dust, the removal of vegetation will all contribute to the alteration of the sense of place.</p> <p>The study area is generally a mining area in nature. Grasslands, naturally occurring dams, residential areas, watercourse, wetlands, mines and ridges are also located within and surrounding the study area. The larger area surrounding the proposed plant is classified as industrial in nature. Therefore, the additional activities largely on existing TSF will have minimal impacts on sense place. With the proposed exploration activities, minimal changes to the current sense of place are anticipated and low cumulative impact is expected.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-habilitated to its pre-disturbed state after completion of such activity; Disturbed areas must be rehabilitated to support its post-closure land use; All construction/operational and access must make use of the existing roads; Noise producing activities should be limited to day-time hours between 07h00 and 17h00 with the exception of necessary activities during the operational phase; Adequate dust suppression measures should be utilized to minimize dust production; The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on the area; and Areas outside the direct project footprint, should under no circumstances be disturbed 	EIA Phase impact assessment
		Construction	Medium to low -	Medium to low -	Medium to low -		
		Operational	Medium to high -	Medium to low -	Medium to low -		
		Closure & Rehab	Medium to low -	Low -	Low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
		Construction / Operational	Medium to high -	Low -	Low -		
8	Impact on Groundwater Quality and Quantity: Leaching and migration of radionuclides into groundwater, loss of flow path & cone of depression	Planning	Medium to low -	Low -	Low -	<p>A major concern associated with TSFs is the potential to contaminate groundwater. Based on previous geohydrological studies in the area (refer to Section 7.9), seepage rates are currently low—ranging from 12 to 20 mm/year—but are expected to increase moderately with the proposed elevation of the TSF. Seepage rates will remain fairly low for gold tailings, due the foundation geology (shales and andesites) and characteristics of the tailings material. Evidence has shown that there is no connectivity between the weathered / fractured aquifer and the underlying dolomite aquifer in the area. Even in compartments where the dolomite aquifer is dewatered the groundwater levels in the weathered / fractured aquifer remains unaffected. The recharge in the fractured aquifer is 31 mm / annum with water occurring in the shallow weathered zone and water bearing fractures only. This is equal to approximately 4% of mean annual precipitation. However, there is always a risk of seepage from the TSF to the groundwater regardless of the geohydrological conditions. There are two options currently being assessed by the hydrogeologist, the lined and unlined options. The outcome of the assessment will inform the preferable option. Worst case scenario for the environment would be a no liner requirement while best case would be for a liner to be installed. Regardless of the option to be perused in consultation with DWS, there will always be a risk of seepage from the TSF the groundwater. In addition, the activities propose a spring diversion through the installation of abstraction boreholes which will discharge the water into the aquatic dam around the TSF.</p> <p>The proposed spring diversion and potential seepage during the operation phase poses a potential significant impact on groundwater. Considering that the Mining Best Practice Guidelines (MBPG) and that mining activities must comply with the National Water Act (NWA), which includes regulations related to water use and pollution, the applicant will be required to ensure compliance with the MBPG and NWA and subsequently preventing any adverse impacts on groundwater quantity and quality for surrounding groundwater users. Furthermore, a monitoring programme is proposed in the EMPr for the continued monitoring of surface and groundwater quantity and quality. As such, this impact is anticipated to have a medium-low negative cumulative significance through the implementation of these mitigation measures.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> • Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes; • Ensure that all mitigation measures as stipulated in the EMPr relating to the activities as well as the MPRDA regulations are adhered to; 	<p>Hydrogeological Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	Medium to low -	Medium to low -	Medium to low -		
		Operational	Medium to high -	Medium to low -	Medium to low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
		Closure & Rehab	Medium to low -	Low -	Low	<ul style="list-style-type: none"> The best drilling fluid option should be selected during construction of spring diversion system to minimize the potential for groundwater contamination; Excavations should be open for as short period as practically possible and rehabilitated; Construction vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum; Spill trays must be provided if refuelling of drilling rig and vehicles are done on site; Chemical sanitary facilities should be provided for the crew. Construction workers should only be allowed to use temporary chemical toilets on the site. Chemical toilets shall not be within close proximity of the drainage system. Frequent maintenance should include the removal without spillages; Adequate fuel containment facilities to be used during exploration phase; The use of all materials, fuels and chemicals which could potentially leach into the environment must be controlled; All materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from spillages and leakages; No potential formation water must be discharge into the environment, it was be manged as a hazardous waste and disposed at a registered hazardous waste disposal facility; No uncontrolled discharges from the site shall be permitted; and Any spills that occur during the exploration phase must immediately be cleaned up and the contaminated soils, etc. suitably disposed of at a registered waste disposal facility; and Sound groundwater management measures need to be developed based on the results of the impact assessment. 	
9	Impact on Surface water Quality and Quantity: Introduction of pollutants to water environment, wetland	Planning	Medium to low -	Low -	Low -	<p>When surface water becomes polluted by contaminants, it puts strains on local and regional drinking water supplies and aquatic ecosystems that rely on surface water environments. Because of their geographical location, surface waters easily become polluted, and some leading causes of water pollution come from contaminated rainwater runoff, from fertilizers and other harmful chemicals that are used on farms, in homes, industries, and on infrastructure such as roads. Surface water pollution can also come from sewage leaks and waste products that leach into the environment.</p> <p>Surface water may be impacted through the clearing of vegetation close to the water resource habitat, introduction of pollutants onto the water resource (i.e. leak from chemical toilets) and/or hydrocarbon spills from drill rig, bridge, culvert heavy or heavy vehicles or supporting plant. This disturbance may also result in the proliferation of alien and invasive species within the surrounding watercourses. There are concerns surrounding the potential for contamination of water resources (including surface water resources). For the proposed activity, surface water may be negatively impacted throughout all the project phases, during the planning phase there may be contamination of surface water during the site establishment, during the construction phase watercourse and wetlands will be impacted through the establishment of bridge, culvert, spring diversion, etc. and during the operation phase, there may be</p>	<p>Hydrological Impact Assessment</p> <p>Freshwater and Wetlands Impact Assessment</p> <p>EIA Phase impact assessment</p>



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
		Construction	Medium to high -	Medium to low -	Medium to low -	<p>run-off of contaminants into the watercourse from the TSF while during decommissioning, contaminants may be indirectly introduced into the watercourse during backfilling or revegetation.</p> <p>Although the Mponeng Lower Compartment TSF would be an additional TSF and expected to cumulatively add to the surface water quality and quantity impacts, the TSF material is existing on the same footprint and there are several proposed measures which will mitigate the impact on surface water such as the clean and dirty water systems, spring diversion, sub-surface drainage and consistent dust suppression which will aid in reducing the impact on the water resource. Therefore, the accumulative surface water impact associated with the proposed development is low and this impact has been rated with a low negative significance.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> • Ensure that detailed baseline water quality and quantity samples are obtained and analysed for reference purposes; • Drilling of the boreholes should preferably not be conducted during rainy days. If drilling is to be undertaken during rainy days, additional precautionary measures in consultation with the ECO must be implemented to prevent contamination on surface water; • The pipes at the bridge section should have a pipe containment to provide secondary protection against leaks from a primary piping system directly into the watercourse; • Ensure that all mitigation measures as stipulated in the EMPr relating to the activities are adhered to; • The best drilling fluid option should be selected during construction of spring diversion system to minimize the potential for groundwater contamination; • Excavations should be open for as short period as practically possible and rehabilitated; • Construction vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum; • Spill trays must be provided if refuelling of vehicles is done on site; • Chemical sanitary facilities should be provided for the crew. Construction workers should only be allowed to use temporary chemical toilets on the site. Chemical toilets shall not be within close proximity of the drainage system. Frequent maintenance should include the removal without spillages; • Adequate fuel containment facilities to be used during exploration phase; • The use of all materials, fuels and chemicals which could potentially leach into the environment must be controlled; • All materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from spillages and leakages; • No potential formation water must be discharge into the environment, it was be manged as a hazardous waste and disposed at a registered hazardous waste disposal facility; • No uncontrolled discharges from the site shall be permitted; and • Any spills that occur during the exploration phase must immediately be cleaned up and the contaminated soils, etc. suitably disposed of at a registered waste disposal facility; and • Sound groundwater management measures need to be developed based on the results of the impact assessment. 	
		Operational	Medium to high -	Medium to low -	Medium to low -		
		Closure & Rehab	Medium to low -	Medium to low -	Medium to low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
10	Impacts on natural habitat: Destruction, loss and fragmentation of natural habitats	Planning	Medium to high -	Medium to low -	Medium to high -	<p>The proposed activities will lead to localised disturbance to the TSF Footprint area (already disturbed), RWD (partially disturbed) and pipeline routes (largely intact). There will possibly also be damage to habitats associated with the new activities especially on the Class 2 Ridge environment. The activities will fragment these habitat units regarded as important consisting of CBAs and ESA, not only within the within the local landscape, but also regionally as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by mining to more natural areas where they may reproduce.</p> <p>Although the proposed activities on site will lead to localised disturbance along the new pipeline routes and RWD expansion area, the ridge habitat has already been transformed, the pipelines will be aboveground on concrete plinths resulting in less impact whereas the RWD area has largely been disturbed due to the existing Northern and Southern RWDs and maintenance activities. Therefore, the proposed project is anticipated to have a low negative cumulative impact on natural habitats upon implementation of the mitigation measures.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> Minimise vegetation clearance. Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-habilitated to its pre-disturbed state or to support its post-closure land use; An Invasive Species Management Plan must be compiled and implemented during the lifecycle of the project; The use of the existing roads must be prioritised as far as possible; A suitable qualified Environmental Officer (EO) or Environmental Compliance Officer (ECO) must be appointed prior to the planning phase. Monthly compliance monitoring and reporting must be undertaken by the ECO; No sensitive vegetation or floral SCC are to be impacted unless permits have been obtained; Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further; Areas rated as High sensitivity outside of the direct development footprint should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent development access to these areas from construction workers and machinery; and All laydown, chemical toilets etc. should be restricted to low / medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. 	<p>Terrestrial Biodiversity Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	High -	Medium to low -	Medium to low -		
		Operational	Medium to low -	Medium to low -	Medium to low -		
		Closure & Rehab	Medium to low -	Low -	Low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
11	Impacts on Vegetation and Flora species: Loss of floral SSC species, Introduction or spread of alien plant species	Planning	Medium to high -	Medium to low -	Medium to low -	<p>The proposed activities will lead to localised disturbance to the TSF Footprint area (already disturbed), RWD (partially disturbed) and pipeline routes (largely intact). There will possibly also be damage to habitats associated with the new activities especially on the Class 2 Ridge environment. The activities will fragment these habitat units regarded as important consisting of CBAs and ESA, not only within the within the local landscape, but also regionally as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by mining to more natural areas where they may reproduce.</p> <p>Localised loss of floral habitat and diversity may occur within areas of increased ecological sensitivity, such as the rocky grassland and water resource habitat. Due to the clearance of indigenous vegetation for new temporary access roads clean and dirty water systems, pipelines, bridge and culvert, and vehicular movement, disturbance and mortalities of flora species is anticipated. Clearing of vegetation for construction purposes as well as compaction of soils due to vehicular movement will result in reduced floral habitat availability and re-establishment success post closure and rehabilitation phase. Disturbances to soil and vegetation on site will also favour alien plants in places.</p> <p>The proposed activities will result in a loss of vegetation supporting the floral and fauna. However, due to the small scale of clearing required within intact vegetation areas for the proposed activities, the short duration thereof and the rehabilitation that will occur, this impact is anticipated to have a low negative cumulative impact significance.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-habilitated to its pre-disturbed state or to support its post-closure land use; An Invasive Species Management Plan must be compiled and implemented during the lifecycle of the project; The use of the existing roads must be prioritised as far as possible; A suitable qualified EO or ECO must be appointed prior to the planning phase. Monthly compliance monitoring and reporting must be undertaken by the ECO; No sensitive vegetation or floral SCC are to be impacted; Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed; Areas rated as High sensitivity outside of the direct footprint should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent impacts and access to these areas from construction workers and machinery; and All laydown, chemical toilets etc. should be restricted to low / medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. 	<p>Terrestrial Biodiversity Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	High -	Medium to low -	Medium to low -		
		Operational	Medium to low -	Medium to low -	Medium to low -		
		Closure & Rehab	Medium to low -	Medium to low -	Medium to low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
12	Impacts on Fauna species: Loss of Fauna SCC, loss of fauna community, mortality / disturbance of wildlife due to increased human presence and use of machinery and vehicles	Planning	Medium to high -	Medium to low -	Medium to low -	<p>The proposed activities will lead to localised disturbance to the TSF Footprint area (already disturbed), RWD (partially disturbed) and pipeline routes (largely intact). There will possibly also be damage to habitats associated with the new activities especially on the Class 2 Ridge environment. The activities will fragment these habitat units regarded as important consisting of CBAs and ESA, not only within the within the local landscape, but also regionally as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by mining to more natural areas where they may reproduce. Localised loss of modified habitat may occur within the remaining areas providing shelter for faunal species due the clearance of vegetation and construction activities. The loss of habitat will directly result in the loss of fauna community (i.e., reptiles, amphibians and birds, etc.). Loss of habitat also means loss of food and nesting resources, cover and movement corridors, which could lead to the disappearance of the affected species from the area.</p> <p>Although fauna species will be negatively impacted due to the construction, there is a high likelihood that they can easily relocate to the adjacent properties and may even resettle during the post construction phase of the project. The cumulative impact for impact on fauna species is, therefore, expected to be low negative with mitigation.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> • The duration of the construction / exploration should be minimized to as short term as possible, to reduce the period of disturbance on fauna; • Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals; • No trapping, killing, or poisoning of any wildlife is to be permitted on site; • Outside lighting should be designed and limited to minimize impacts on fauna; • Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-habilitated to its pre-disturbed state or to support its post-closure land use; • The use of the existing roads must be prioritised as far as possible; • A suitable qualified EO or ECO must be appointed prior to the planning phase. Monthly compliance monitoring and reporting must be undertaken by the ECO • No sensitive, protected or SCC fauna species are to be directly impacted; • Areas rated as High sensitivity outside of the direct development areas should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent impacts / access to these areas from construction workers and machinery; and • Identified protected or SCC fauna species that will be impacted upon must be relocated by a suitably qualified environmentalist / ecologist. 	<p>Terrestrial Biodiversity Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	High -	Medium to low -	Medium to high -		
		Operational	Medium to low -	Medium to low -	Medium to low -		
		Closure & Rehab	Medium to low -	Medium to low -	Medium to low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
13	Visual - Change of Landscape Character	Planning	Medium to low -	Medium to low -	Medium to low -	<p>The study area features a varied aesthetic and visual landscape, with mining activities predominating the western and northern sections of the study area and savannah-covered grassland and agriculture in the southern regions. The northwestern and western sections consist of gently undulating land that slopes westward and southward towards drainage lines that generally flow west and northwest. The topography rises in the central parts of the study area immediately north of the Project site, which is mostly undeveloped and composed of gentle rolling grassland. Residential areas, linked to the mines, are situated immediately west (Wedela), northwest (Harmony housing), and north of the Project site (Western Deep Levels housing). South of Wedela and the Project site is grassland with savannah-covered slopes. These areas are primarily used for grazing. The far southern sections of the study area comprise agricultural lands.</p> <p>In a relatively flat landscape, the scale and nature of the TSF will be impossible to screen however the site is already surrounded by other TSFs. As discussed in Section 7.11, sensitive receptors are locations where people would most likely be susceptible to adverse changes in the landscape caused by the physical presence of the Project. The prominent locations of concern for the Mponeng Lower Compartment TSF are likely to be; Farmsteads near the N12 and south east of the Project site; and Travellers along the N12 Provincial Road. The Baseline Visual Assessment (Appendix F), identifies the impact of lights at night as a sensitive issue associated with mining and disposal activities. I&APs consistently raises the effect of night lighting, specifically when they can be seen from tourist and/or residential sites and when the impact would continue for the mine's life. However, existing light pollution generated by nearby mining and urban areas would negate any real effect they may have. The proposed project aims to recommence deposition which will increase the height of the existing TSF. Therefore, the overall effect of the project, which is also near existing mine activities, would be LOW. That is, considering potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will lead to spatial and temporal cumulative change. Subsequently, the existing mining and TSF fabric and the mitigation of night light impact, the cumulative visual impact is anticipated to be low negative.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> • Apply dust suppression methods to limit the dust generated during the establishment phase. • Ensure the post-closure rehabilitation plan is geared toward acceptable topographic and ecological conditions; • Where new vegetation is proposed to be introduced to the site (on the rising side slopes), an ecological approach to rehabilitation should be adopted. For example, communities of indigenous plants (primarily grasses) will enhance biodiversity, a desirable outcome for the area. This approach can significantly reduce long-term costs as less maintenance would be required over conventional landscaping methods, and the introduced landscape would be more sustainable; • Good housekeeping procedures should be developed for the project to ensure that the Project site and adjacent lands are kept clean of debris and that dust generation is limited; • Should light fixtures be installed, ensure precisely directed illumination to reduce light spillage beyond the site's immediate surroundings; • Avoid high pole-top security lighting along the periphery of the site and use only lights that are activated upon illegal entry; and • Minimise the number of light fixtures to the bare minimum, including security lighting. 	<p>Visual Impact Assessment</p> <p>EIA Phase impact assessment</p>
		Construction	Medium to low -	Medium to low -	Medium to low -		
		Operational	Medium to low -	Medium to low -	Medium to low -		
		Closure & Rehab	Medium to low -	Low -	Low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
14	Impacts on Traffic and road infrastructure	Planning	Medium to low -	Low -	Low -	<p>The movement of construction vehicles during the construction of the proposed roads can result in an increase in traffic congestion on local roads. Activities during the planning and construction phase of the project such as the movement of abnormal loads of infrastructure in and out of the development area and/or temporary lane closures during the construction of the culvert and bridge can impact on the overall traffic and subsequently damage to the road infrastructure. However, it was noted during the site inspection that the road leading to the TSF was in poor condition and movement of heavy vehicles associated with the exploration activities may cause further degradation. However, during visits to the study area, it was also noted that there is minimal traffic in and out of the area limited to the flowing traffic on the N12, south of the TSF</p> <p>The short duration of potential increased traffic as a result of the construction works is not anticipated to have a significant impact on the existing road networks and subsequent damage to road infrastructure. Therefore, it is anticipated that there will be low negative cumulative impact on traffic and damage to road infrastructure. However, the applicant must monitor the condition of roads to ensure that any damage caused by the construction works is adequately rectified.</p> <p>Preliminary mitigation measures include:</p> <ul style="list-style-type: none"> • All construction and vehicles using public roads must be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport; • Damage caused to public roads as a result of the construction activities must be repaired in consultation with the relevant municipal authorities; • The working hours stipulated in the Construction permit, where applicable, must be adhered to. Where this is not applicable, the normal construction working hours (Monday – Friday: 07H00 -17h00) must be adhered to; and • Construction vehicles must not exceed speed limits of 20 km/h within the construction site. 	EIA Phase impact assessment
		Construction	Medium to low -	Low --	Low -		
		Operational	Medium to low -	Low -	Low -		
		Closure & Rehab	Low -	Low -	Low -		



#	Impact	Phase	Pre-mitigation	Post-mitigation Risk	Final Significance	Description of Impact, Assessment of Cumulative Impact and Preliminary Mitigation	Further Assessment
15	Socio-economic: Upliftment of communities / employment opportunities, integration of Merafong City IDP and perceptions relating to the risk of TSF failure	Planning	Medium to low +	Medium to low +	Medium to low +	As the proposed TSF forms part of an existing mining operation, the potential for new job creation is limited. Some jobs will be created during planning and construction. The majority of the employment opportunities are related to the future ongoing operation of the Savuka and Mponeng Plant which requires additional deposition space in order to continue operations. Employment opportunities for some unskilled, skilled labour as well as providing services during construction (e.g. accommodation, transportation, etc.) may arise from this project. It is important to note that employment opportunities for locals will be minimal as the project entails aspects which require qualified and skilled personnel especially for the operational phase. The proposed activities also cover a small footprint and a short period of construction. Therefore, there will be minimal opportunities for locals for tasks largely related to unskilled labour, resulting in low positive cumulative impact on socioeconomics.	Engineering Designs EIA Phase impact assessment
		Construction	Medium to low +	Medium to low +	Medium to low +	As indicated on item 5 above, unstable and/or unsafe TSF practices can result in the TSF breaking the dam wall, resulting in massive sudden uncontrolled flood of liquid sludge. Fears of such an event occurring remains high especially amongst communities living within proximity of TSFs as result of the recent Jagersfontein TSF Dam Wall Collapse in September 2022. The failure resulted in the sudden and uncontrolled release of more than 6 million m ³ of liquid sludge, smothering nearly 200 nearby houses and approximately 1600 ha of agricultural and grazing land (Marais et al., 2024). Two people died, and one person believed to have been swept away is still declared missing. The surrounding communities may have negative perceptions relating to the risk of TSF failure which Golden Core Trade and Invest should address.	
		Operational	Medium to low +	Low +	Low +	Golden Core Trade and Invest must put a communication strategy in place that will communicate in an open and honest way on the kind of jobs that will be created, who will qualify and how the recruitment process will work. Heavy vehicles should travel during off peak times and should be clearly marked. Relevant mitigation proposed in the biophysical studies should be adhered to. Surrounding communities should be educated regarding the risk of TSF failure. A community safety strategy with regard to TSF failure should be developed and shared with the community. Develop & implement an Influx Management Strategy as per IFC Guidelines. Contractors should be required to make use of a certain proportion of local labour as far as possible. Jobs should be advertised in a way that is accessible to all members of society. Preference should be given to local labour that is within easy travelling distance from the site of work. If necessary, skills development programmes should be put in place to develop local skills.	
		Closure & Rehab	Low +	Low +	Low +	Preliminary mitigation measures include: <ul style="list-style-type: none"> • Developer must undertake the Dam Safety Technical Assessment and register with the DWS Dam Safety Office; • Developer should make the reports relating to structural monitoring and integrity of the TSF available the I&APs to address the negative perceptions relating to the risk of TSF failure; • Developer must allow for a transparent employment opportunity for locals; and • Local suppliers and workers must be prioritised as far as possible for economic and professional growth. 	



9 SENSITIVITY MAPPING

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets in a region. The sensitivity mapping technique integrates numerous datasets (base maps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is refined by specialists' input within each respective specialist field based on aerial or ground-surveys. Therefore, the sensitivity mapping exercise assists in the identification of sensitive areas within and surrounding the proposed application area. **Table 47** provides an overview of the sensitivity ranking system.

This sensitivity mapping approach allows for the identification of lower risk areas for positioning the project infrastructure whilst protecting identified sensitive environmental areas/ features through more rigorous mitigation (where possible). Areas identified as no-go would be fully excluded from any project related development regardless of the level of mitigation put forward. Furthermore, environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of environmental assessment processes.

The compilation of this map has taken into consideration the individual raking of sensitivity by all the identified specialist disciplines (e.g. Air Quality, Geohydrology, Terrestrial and Aquatic Ecology, Heritage, Social, etc.). Work within the various sensitivity rankings must be managed according to the EMP as well as the recommendations in the individual specialist reports.

This sensitivity mapping approach allows for the proposed activities to be undertaken whilst protecting identified sensitive environmental areas / features. Furthermore, environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of Environmental Assessment processes. **Table 47** below provides a breakdown of the sensitivity rating and weightings applied to determine the sensitivity score of each aspect. **Figure 83** presents the desktop sensitivity map for the project. The map has not been assigned sensitivity ratings as the information is largely based on existing datasets some of which are outdated and could be misleading. Preliminary identified sensitivities indicated in **Figure 83** include the following:

- High Heritage Sensitivity on pipeline route 1 (Mnr1 and Mnr2);
- Class 2 Gauteng Ridge;
- Critical Biodiversity Areas 2 and Ecological Support Areas 1; and
- Watercourses including Elandsfonteinspruit and Channelled Valley Bottom Wetlands.

These areas and sensitivities will be assessed and assigned ratings accordingly in the EIA phase once further detailed assessments are completed. This map will then be updated for the EIA phase of the based on input from the specialists including site-specific specialist data.

Table 47: Sensitivity rating and weighting

Sensitivity Rating	Description	Weighting
Least concern	The inherent feature status and sensitivity is already degraded. The proposed development will not affect the current status and/or may result in a positive impact. These features would be the preferred alternative for mining or infrastructure placement.	0
Low	The proposed development will have not have a significant effect on the inherent feature status and sensitivity.	1
Medium	The proposed development will negatively influence the current status of the feature.	2



High	The proposed development will negatively significantly influence the current status of the feature.	3
No-Go	The proposed development cannot legally or practically take place. No development permitted under any circumstances.	99

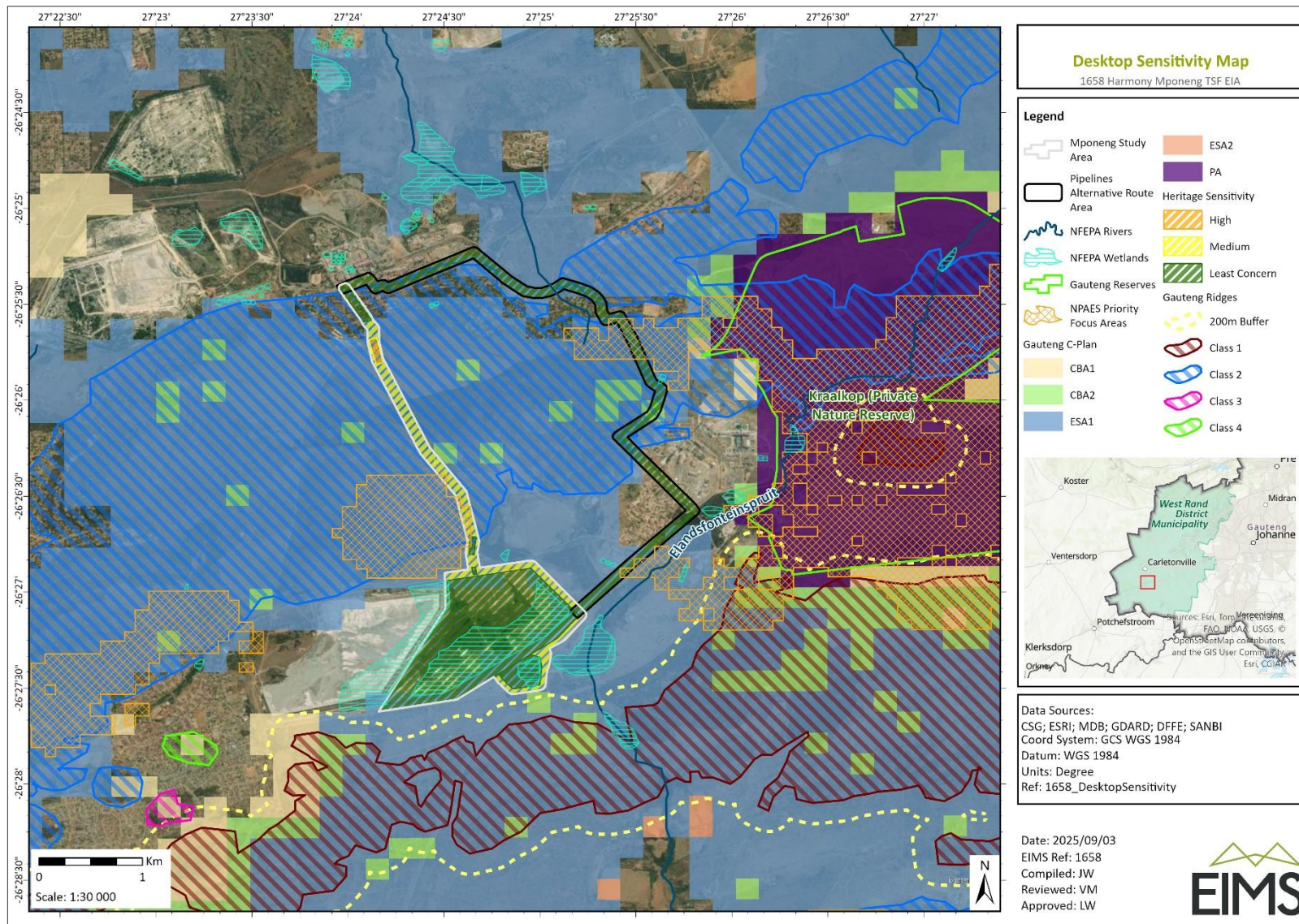


Figure 83: Desktop scoping sensitivity map



10 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

The section below outlines the proposed plan of study which will be conducted for the various environmental aspects during the EIA Phase. It is also important to note that the plan of study will also be guided by comment obtained from I&AP's and other stakeholders during the PPP.

10.1 DESCRIPTION OF ALTERNATIVES TO BE CONSIDERED IN EIA PHASE

Owing to the nature of the proposed TSF there are limited reasonable or feasible alternatives that can be considered as per the motivation provided in **Section 5**. The EIA process being undertaken includes the assessment of potential impacts and the identification of environmental sensitivities within and in the vicinity of the proposed project area thereby allowing for the recommendation of mitigation measures towards the avoidance, minimisation and / or management of the anticipated impacts. The layout and design will be planned to avoid any no-go areas identified from the various specialist studies, if required, and the design, including the height and slope of the TSF, will cater for the volume of tailings required; otherwise apart from the design requirements no additional alternatives are considered applicable to this application.

10.2 DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE EIA PROCESS

The following aspects will be assessed further during the EIA phase investigation to be undertaken:

- Soils and Agricultural Impact Assessment;
- Air Quality Impact Assessment;
- Surface Water (Hydrological) Assessment;
- Geohydrological (groundwater) Impact Assessment;
- Aquatic Ecology and Wetland Impact Assessment;
- Terrestrial Biodiversity Assessment;
- Cultural and Heritage Resources Assessment;
- Visual Impact Assessment;
- Health Risk & Radiological Impact Assessment; and
- Palaeontology Assessment.

In addition to the above specialist studies, Engineering Designs and Closure and Rehabilitation Plan will also be undertaken to inform the EIA.

10.3 ASPECTS TO BE ASSESSED BY SPECIALISTS

Table 48 below details the various aspects of the project to be addressed in the EIA phase through detailed specialist studies.



Table 48: Details of specialist input during the EIA phase

Aspect	Component	Scope of Work / Terms of Reference
Air quality	Air Quality Impact Assessment	<p>The following will be undertaken as part of the EIA phase study:</p> <ul style="list-style-type: none"> • Quantification of air emissions from the project; • Discussion of meteorological parameters required to establish the atmospheric dispersion potential; • Calculation of the air concentrations from the project using a suitable atmospheric dispersion model; and, • Assessment of the significance of the impact through the comparison of simulated air concentrations with local National Ambient Air Quality Standards (NAAQS) (for compliance) and dustfall rates with the National Dust Control Regulations (NDCR); • Mitigation and management measures; and • Compilation of a comprehensive Air Quality Impact Assessment Report
Biodiversity (Aquatic and wetlands)	Aquatic and Wetland Biodiversity Assessment	<p>The areas will be traversed on foot to identify local freshwater resources. The following will be achieved to supplement the approach:</p> <ul style="list-style-type: none"> • A desktop assessment of all available datasets; • GIS processing to preliminary identify water accumulation areas; • The delineation of water resources in accordance with the DWAF (2005) guidelines, whereby the outer edges will be identified; and • A functional and integrity assessment of the water resources. <p>The “Preliminary Guideline for the Determination of Buffer Zones for Rivers, Wetlands and Estuaries” (Macfarlane, <i>et al.</i>, 2014) will be used to determine the appropriate buffer zone for the proposed activity.</p> <p>The risk assessment will be completed in accordance with the requirements of the DWS General Authorisation (GA) in terms of Section 39 of the NWA for water uses as defined in Section 21(c) or Section 21(i) (GN 509 of 2016).</p> <p>An aquatics and wetlands assessment report will be written. This report will be compiled according to the necessary requirements and standards.</p>



Aspect	Component	Scope of Work / Terms of Reference
Biodiversity (Terrestrial)	Terrestrial Biodiversity Assessment	<p>The surveys will include the following:</p> <ul style="list-style-type: none"> • A survey for Red and Orange Data plant species; • Vegetation units will be identified, classified and delineated; and • Habitat types will be classified and delineated. <p>The floristic survey should be conducted during the growing season (the rainy season when most plants are in flower or seeding), over the project areas. These will give an indication of the actual species present on site and will be discussed in context of plant communities (should the area support distinct communities) within the ecosystem of the area.</p> <p>Protected, endemic, exotic, alien invasive and culturally significant species will also be discussed as separate issues and related back to relevant legal requirements. Furthermore, the identification of red data and protected species as listed according to the IUCN List, NEMBA and other Provincial and National legislation will be completed.</p> <p>Depending on the vegetation and terrain, the timed meander sampling could be used during vegetation assessments, however, should dominant vegetation types require other methods be used, then these shall be motivated.</p> <p>The surveys will include the following:</p> <ul style="list-style-type: none"> • The identification of these features and delineation thereof; and • The location of any unique or protected habitat features. <p>All sensitive areas, as described by the provincial and national legislation, will be identified. The locality and extent, as well as species composition of sensitive areas such as the wetlands or pans, streams, rivers and rocky outcrops will be conducted to identify and map all such sensitive areas present. Sensitive areas will be identified and delineated.</p> <p>A terrestrial ecology assessment report will be written. This report will be compiled according to the necessary requirements and standards.</p>
Closure and Rehabilitation	Engineering Designs and Financial	<p>A closure plan and closure cost estimate in support of the TSF application will be undertaken. This report will address the closure measures that will be implemented and provides the cost of environmental rehabilitation at closure. The closure costing will be calculated according to the escalated DMPR rates.</p>
Geohydrology	Geohydrological Assessment	<p>The aim of the geohydrological study is the following:</p>



Aspect	Component	Scope of Work / Terms of Reference
		<ul style="list-style-type: none"> • Assessment of the geohydrological environment in terms of aquifer development, aquifer hydraulics, groundwater flow and groundwater chemistry. • Assessment of the potential short and long-term impact from the TSF on the groundwater environment. • Modelling and assessment of plume migration with and without a liner; and • Recommended management measures to mitigate potential impacts. <p>The study will include the following:</p> <ul style="list-style-type: none"> • Desktop study of existing information. Conceptual model of the groundwater system. • Numerical groundwater flow and mass transport model. • Plume migration modelling; and • Risk assessment and reporting.
Heritage	Heritage Impact Assessment	<p>The following is included in the HIA which will inform the EIA phase of the project:</p> <ul style="list-style-type: none"> • Desktop Study An archaeological and historical desktop study will be undertaken by utilising the previous studies conducted. This will be augmented by an assessment of old topomaps and previous archaeological and heritage impact assessments undertaken for the study area and surroundings. • Fieldwork: An experienced fieldwork team from PGS Heritage undertook an archaeological and heritage site survey to identify the heritage resources within the study area. Tracklogs were recorded and the locations of all heritage resources identified during the fieldwork were documented using a hand-held GPS. Furthermore, the documentation reflects a brief qualitative description and statement of significance for each site and includes a photographic record of all the sites. • Report: A Heritage Impact Assessment has been prepared for the EIA Phase. This report was compiled according to the necessary requirements and standards.
Hydrology	Hydrological Assessment	<p>The following scope of work for the Geohydrologist:</p> <ul style="list-style-type: none"> • Review of applicable legislation; • Interrogation and extrapolation of observed climatic data where possible, to provide appropriate estimates for site;



Aspect	Component	Scope of Work / Terms of Reference
		<ul style="list-style-type: none"> • Determination of design rainfall depth/duration/frequency estimates necessary for implementing stormwater management on site; • Catchment delineation and associated drainage for appropriate areas using site survey data, or other applicable elevation datasets where necessary; and • Mapping of both regional and local surface water features and buffering of local surface water features to provide a high-level assessment of possible areas of flooding. <p>A specialist surface water report to inform and contribute towards the application in terms of NEMA will be produced. This report will meet the requirements of Appendix 6 of GN.R982 (as amended) of NEMA. A detailed evaluation of the predicted impacts of the project on the receiving environment, or of the receiving environment on the project as per the methodology that uses the criteria of extent, duration and intensity to quantify the significance of the potential impact. The evaluation of impacts will include:</p> <ul style="list-style-type: none"> • An assessment of impacts during the construction, operation phases and decommissioning phases; • An assessment of the probability of each impact occurring, the reversibility of each impact and the level of confidence in each potential impact; • An assessment of the significance of each impact before and after mitigation; • The identification of any residual risks that will remain after implementation of any mitigation of an impact; and • The cumulative impact in terms of the current and proposed activities in the area. <p>Recommendations to avoid negative impacts or where this will not be possible, then practical mitigation, management and/or monitoring options to reduce negative impacts and enhance positive impacts. Recommendations on the preferred placement of infrastructure will be provided if any watercourses intersect sensitive infrastructure (as determined by river buffers or flood-lines if available). An outline of recommended measures to manage residual impacts will be provided where necessary (i.e. impacts that remain after optimisation of design and planning) for the construction, operation and decommissioning phases.</p> <p>Where required, a surface water monitoring plan will be included with an indication of the following:</p> <ul style="list-style-type: none"> • Aspects to be measured; • Responsible person/body; • Frequency of monitoring actions; • Standards to be met; and



Aspect	Component	Scope of Work / Terms of Reference
		<ul style="list-style-type: none"> • Reporting requirements. • The conditions, in respect of the surface water environment, for inclusion in the Environmental Authorisation. <p>A sensitivity map will be produced outlining area of increased surface water sensitivity (low, medium and high).</p>
Health Risk and Radiological	Health Risk and Radiological Assessment	<p>The overall framework within which the radiological public safety and impact assessment will be consistent with international practice (e.g., IAEA ISAM Safety Assessment Methodology), the following logical elements will be included in the scope of the assessment:</p> <ul style="list-style-type: none"> • Definition of the assessment context: High-level definition of what will be included and excluded in the assessment, and justification for the choices made. This will include a definition of the regulatory framework within which the assessment will be performed based on international guidelines and requirements. • High-level description of the system: The system as used here refers to the mining operation and associated activities, the potentially affected environment, as well as the public habits and behavioural conditions that might determine their potential levels of radiological exposure. • Definition of exposure conditions: During this step, assessment context and system description information will be used to define a limited number of credible public exposure conditions associated with the mining operations. • Development of conceptual and mathematical models: The development of conceptual and mathematical models for each exposure condition will be done systematically and transparently to increase general confidence in the assessment results. Parameter values will be assigned using site-specific conditions, or if not available, will be justified using literature values. • Consequence analysis: During this step, the mathematical models will be used to evaluate the radiological consequences of each exposure condition defined for the workers and public, both for the operational and post-operational periods. • Interpretation of the results: During this step, the results will be interpreted in terms of the assessment context defined in the first step.
Palaeontology	Palaeontology Impact Assessment	<p>The following is included in the PIA for the EIA phase of the project:</p> <ul style="list-style-type: none"> • A PIA desktop study will be undertaken by utilising available data. • A site survey will be undertaken. <p>A Palaeontological Impact Assessment will be compiled according to the necessary requirements and standards.</p>



Aspect	Component		Scope of Work / Terms of Reference
Soils and Agriculture	Soils and Agriculture		<p>The following will be undertaken as part of the EIA phase study:</p> <ul style="list-style-type: none">• Land use identification using aerial imagery and ground-truthing;• Confirmation of “Low” and “High” sensitivities• Identifying the effects that the proposed activities will have on agricultural production in the area;• Outline potential mitigation measures to be included in the EMPr.; and <p>Compilation of a comprehensive report.</p>
Visual / Landscape Impact Assessment	Visual Assessment	Impact	<p>The following will be undertaken as part of the EIA phase study:</p> <ul style="list-style-type: none">• Site visit;• Mapping;• Viewshed and Building of Computer Model; and <p>Compiling of an impact assessment report.</p>



10.4 PROPOSED METHOD OF ASSESSING ENVIRONMENTAL ASPECTS

The same method of assessing impact significance as was used during the Scoping phase will be applied during the EIA phase. This methodology is described in detail in **Section 8.1** of this report.

10.5 PROPOSED METHOD FOR ASSESSING DURATION AND SIGNIFICANCE

The significance of environmental impacts will be rated before and after the implementation of mitigation measures. These mitigation measures may be existing measures or additional measures that may arise from the impact assessment and specialist input. The impact rating system considers the confidence level that can be placed on the successful implementation of the mitigation. The proposed method for the assessment of environmental issues is set out in the **Section 8.1**. This assessment methodology enables the assessment of environmental issues including: the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

The specialist studies will recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts, enhance beneficial impacts, and assist project design. If appropriate, the studies will differentiate between essential mitigation measures, which must be implemented and optional mitigation measures, which are recommended.

10.6 STAGES AT WHICH COMPETENT AUTHORITIES WILL BE CONSULTED

Competent authorities have been and will be consulted during the initial notification period, the scoping phase as well as during the EIA phase.

10.7 PROPOSED METHOD OF EIA PHASE PUBLIC PARTICIPATION

The proposed public participation process to be followed for the EIA phase is provided below.

- The commenting periods that will be provided to the I&AP's (and the competent authorities) will be 30 days as per the relevant legislative requirements.
- The dates of the review and commenting period for the draft EIA/EMPr will be determined at a later date and communicated to all registered I&AP's through faxes, emails, SMS's and/or registered letters.
- The location at which the hard copy of the EIA report will be made available is at the same public places in the project area that the Scoping Report was made available (refer to **Section 6.3**), sent electronically to stakeholders who request a copy, and placed on the EIMS website: <https://www.eims.co.za/public-participation/>.
- The public participation will be undertaken in compliance with NEMA GNR 982 (Chapter 6).
- A public meeting will be held during the review period for the EIA report. Focus group meetings will also be held with key stakeholders as and when necessary.
- All comments and issues raised during the comment periods will be incorporated into the final EIA Report.

10.8 DESCRIPTION OF TASKS THAT WILL BE UNDERTAKEN DURING THE EIA PROCESS

The plan of study detailed in the above sections and is summarised below. The following tasks will be undertaken as part of the EIA phase of the project:

- EIA-phase specialist studies.
- Public consultation:



- Notification of the availability of the EIA Report for review and comment to all registered I&AP's;
- Public and focus group meetings.
- Authority consultation:
 - Consultation with DMPR, DWS, GDARD, PHRAG and other commenting authorities; and
 - Authority consultation (including meetings where necessary) to provide authorities with project related information and obtain their feedback.
- Document compilation:
 - The EIA and EMPr will be compiled in line with the requirements of Appendix 3 and 4 of the NEMA EIA Regulations.
 - The EIA and EMPr will be made available for public comment for a period of 30 days.
 - The EIA and EMPr will be finalised and submitted to the DESTEA and DMRE for adjudication and decision making.

10.9 MEASURES TO AVOID, REVERSE, MITIGATE, OR MANAGE IMPACTS

All comments received from I&APs during the Scoping Report review will be taken into consideration and where applicable inform the high-level mitigation measures. Detailed mitigation measures will be further developed as part of the EIA phase. The potential impacts will further be assessed in terms of the mitigation potential, taking into consideration the following:

- Reversibility of impact:
 - Reversible;
 - Partially reversible.; and
 - Irreversible.
- Irreplaceable loss of resources:
 - Replaceable;'
 - Partially replaceable; and
 - Irreplaceable.
- Potential of impacts to be mitigated:
 - High;
 - Medium; and
 - Low.

More detailed assessment findings for each identified impact taking the above into consideration will be provided in the EIA Report and associated EMPr.



11 UNDERTAKING REGARDING CORRECTNESS OF INFORMATION

I **Vukosi Mabunda** herewith undertake that the information provided in the foregoing report is correct to the best of my knowledge, and that the comments and inputs from stakeholders and Interested and Affected Parties has been correctly recorded in the report where applicable.

.....


Signature of the EAP

Date: 2025/09/29

12 UNDERTAKING REGARDING LEVEL OF AGREEMENT

I **Vukosi Mabunda** herewith undertake that the information provided in the foregoing report is correct, and that the level of agreement with Interested and Affected Parties and stakeholders has been correctly recorded and reported herein.

.....


Signature of the EAP

Date: 2025/09/29



13 REFERENCES

- Airshed Planning Professionals. 2025. Baseline Air Quality Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- Almond, J., Pether, J, and Groenewald, G. 2013. South African National Fossil Sensitivity Map. SAHRA and Council for Geosciences. Schweitzer *et al.* (1995) pp p288.
- Altermann, W. 2001. The oldest fossils of Africa – a brief reappraisal of reports from the *Archaean*. *African Earth Sciences* 33, 427-436.
- Altermann, W. & Nelson, D.R. 1998. Detrital zircon age patterns of the Kaapvaal Craton and their significance for the crustal evolution of southern Africa. *Precambrian Research*, 91, 193–228.
- AngloGold Ashanti. 2018. Operational Profile 2019 – Mponeng South Africa. Available online: <https://www.aga-reports.com/19/download/AGA-OP19-mponeng.pdf> (Accessed 3 September 2025).
- Banzai Environmental. 2025. Baseline Palaeontology Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- Brink, A. B. A. 1979. Engineering Geology of Southern Africa, Vol. 1 – The first 2 000 million years of geological time. Building Publications, Pretoria.
- Button, A. 1986. Transvaal Supergroup. In: An Explanation of the 1:1,000,000 Geological Map, Council for Geoscience, South Africa.
- Cachier, H. (1992). Biomass burning sources.
- Council for Geoscience. 1998. 1:250 000 West Rand 2626 Geological series. Council For Geoscience, Pretoria.
- Council for Scientific and Industrial Research. 2024. West Rand District Municipality: Climate Risk Profile Report. Climate and Disaster Resilience Fund & Santam
- Department of Agriculture, Forestry and Fisheries. 2017. *National land capability evaluation raster data: Land capability data layer*, 2017. Pretoria
- Department of Environmental Affairs. 2013. List of Activities which Result in Atmospheric Emissions which have or may have a Significant Detrimental Effect on the Environment, Including Health, Social Conditions, Economic Conditions, Ecological Conditions or Cultural Heritage. Government Gazette No. 37054.
- Department of Environmental Affairs. 2013. National Dust Control Regulations. Government Gazette No. 36974.
- Department of Environmental Affairs. 2018. South Africa's Third National Communication Under the United Nations Framework Convention on Climate Change.
- Department of Environment, Forestry and Fisheries. 2020. Protocols for Specialist Assessments. Published in Government Notice No. 320 Government Gazette 43110.
- Department of Water Affairs and Forestry, 1998. National Water Act, Act 36 of 1998
- Department of Water Affairs and Forestry, 1999, "Government Notice 704 (Government Gazette 20118 of June 1999)
- Driver, A., Nel, J., Snaddon, K., Murray, K., Roux, D., Hill, L., Swartz, E., Manuel, J., & Funke, N. 2011. Implementation Manual for Freshwater Ecosystem Priority Areas.
- Eco Elementum and Engineering (Pty) Ltd. 2025. Mponeng Lower Compartment Tailings Storage Facility Pre-Feasibility Study Report.



- Eriksson, P.G. & Catuneanu, O. 1999. The sequence stratigraphic concept and the Precambrian rock record: an example from the 2.7-2.1 Ga Transvaal Supergroup, Kaapvaal craton. *Precambrian Research* 97, 215-251.
- Eriksson, P.G., Catuneanu, O., Nelson, D.R., Elburg, M.A. & Hatton, C.J. 2001. *The Transvaal Supergroup and its Precursors*. *Journal of African Earth Sciences*, 33(3-4), 237-281.
- Fourie, W. 2008b. Archaeological Impact Assessments within South African Legislation in South African Archaeological Bulletin, 63(187): 77 – 85.
- Graham A Young Landscape Architect. 2025. Baseline Visual Impact Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- Haldar, S. K. 2018. (2nd Edition) Mineral Exploration - Chapter 13 - Mineral Processing, p 259-290. Available online: <https://www.sciencedirect.com/science/article/pii/B9780128140222000137> (accessed 01 September 2025).
- Huffman, T.N. 2007. Handbook to the Iron Age: The archaeology of Pre-Colonial Farming Societies in Southern Africa. University of KwaZulu-Natal Press, Scottsville.
- Hydrologic Consulting. 2025. Baseline Hydrological Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) 2006. The Geology of South Africa. Geological Society of South Africa, Johannesburg and Council for Geoscience, Pretoria.
- Krusemann, G.P.; De Ridder, N.A. 1991. Analysis and evaluation of pumping test data - ILRI Publications, No. 47, 2. Ed., 377 pages, Wageningen.
- Land Type Survey Staff. 1972 - 2006. Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.
- Marais, L., Kemp, D., van der Watt, P., Matebesi, S., Cloete, J., Harris, J., Li Ern M., Owen, J. 2024. *The catastrophic failure of the Jagersfontein tailings dam: An industrial disaster 150 years in the making*, *International Journal of Disaster Risk Reduction*, Volume 109. Available online: <https://www.sciencedirect.com/science/article/pii/S2212420924003479> (accessed 01 September 2025).
- Merafong City Local Municipality Draft Integrated Development Plan 2025-2026. Available online: <https://merafong.gov.za/wp-content/uploads/2025/04/Draft-IDP-Document-March-2025-2026.pdf> (accessed 01 September 2025).
- Mucina, L. & Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.
- MvB Consulting. 2025. Baseline Geohydrological Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- Parsons C. F., and Killick A. M. 1985. The Surface Geology of Part of the W.A.G.M. Property and Environs. J.C.I. Research Unit Report 200 (unpublished report).
- Parsons, C. F. 1991. The Geology of the Gembokfontein Dolomitic Groundwater Compartment and Possible Effects of Dewatering. JCI Report No. 210.
- Parsons R. 1995. A South African Aquifer System Management Classification. WRC Report No KV 77/95, Pretoria.
- PGS Heritage. 2025. Heritage Impact Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- SANS 241-2. (2011). South African National Standard. Drinking Water – Part 2: Application of SANS 241-1.
- Schulze, R.E. and Lynch, S.E., 2006. "South African Atlas of Climatology and Agrohydrology", WRC Report 1489/1/06,



- Smith, B. 2006. The Farming Handbook. Netherlands & South Africa: University of KwaZulu-Natal Press & CTA
- Soil Classification Working Group. 1991. Soil Classification: A Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.
- Soil Classification Working Group. 2018. Soil Classification a Taxonomic system for South Africa. Pretoria: The Department of Agricultural Development.
- South African Heritage Resources Agency 2012. Minimum standards: palaeontological component of heritage impact assessment reports, 15 pp. South African Heritage Resources Agency, Cape Town.
- South African National Biodiversity Institute - South African National Biodiversity Institute, 2018, "Vegetation Map of South Africa, Lesotho and Swaziland 2018"
- The Biodiversity Company. 2025. Baseline Aquatic Biodiversity and Wetlands Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- The Biodiversity Company. 2025. Baseline Soils and Agriculture Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- The Biodiversity Company. 2025. Baseline Terrestrial Ecology Assessment for the Harmony Mponeng Lower Compartment TSF, Gauteng.
- Truswell, J.F. .1977. The geological evolution of South Africa.
- Water Research Commission, Pretoria Water Research Commission 2002. "Design Rainfall Estimation in South Africa". WRC Report No. K5/106