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**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND
ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT (EIAR & EMPR)
FOR THE APPLICATION OF THE INTEGRATED ENVIRONMENTAL
AUTHORISATION
UMGALA MINING RIGHT – RE-COMMISSIONING OF COAL MINING ACTIVITIES
AT THE UMGALA OPERATION (INCL. WASTE MANAGEMENT LICENCE
APPLICATION)**

FEBRUARY 2026

COMPILED FOR

WELGEDACHT EXPLORATION CO PROPRIETARY LIMITED

KZN 30/5/1/2/2/122 (10125) MR

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REPORT DETAILS

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- I have no bias with regard to this project or towards the various stakeholders involved in this project.
- I have no, and have not engaged in, conflicting interests in the compilation of this report.
- I have not received, nor have I been offered, any form of inappropriate reward for compiling this report.

Renate Steffens
February 2026



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT AND ENVIRONMENTAL MANAGEMENT PROGRAMME

SUBMITTED FOR AN INTEGRATED ENVIRONMENTAL AUTHORISATIONS IN TERMS OF THE
NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL
MANAGEMENT WASTE ACT, 2008 AND THE MINERAL AND PETROLEUM RESOURCES
DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

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DMR REFERENCE NUMBER: KZN 30/5/1/2/2/122 (10125) MINING RIGHT (MR)

EXECUTIVE SUMMARY

1. Project Description

The Umgala operation has a long mining history, with both underground and open-pit mining carried out between 1964 and 2004. Welgedacht Exploration Company Proprietary Limited (Welgedacht), a subsidiary of Unyezi Coal Proprietary Limited (Unyezi Coal), which in turn is affiliated with Kangra Coal Proprietary Limited within the broader Menar Group, holds the Mining Right KZN 30/5/1/2/2/122. A renewal application is currently underway (DMRE reference: KZN 30/5/1/2/2/10125MR).

Welgedacht Exploration Company (Pty) Ltd has submitted an Integrated Environmental Authorisation (IEA) application for the re-commissioning of coal mining operations at the Umgala Operations, located near Utrecht in northern KwaZulu-Natal (see Figure 1 and Figure 2). The application, lodged under the National Environmental Management Act (NEMA, 1998), the National Environmental Management: Waste Act (NEMWA, 2008), and the Mineral and Petroleum Resources Development Act (MPRDA, 2002, as amended), includes a Waste Management Licence and a Water Use Licence.

Following a period of care and maintenance, significant updates to legislation and mine planning have necessitated the execution of this new EIA/EMPr process.

GCS Water and Environmental Consultants (GCS) prepared the initial draft Scoping Report for the Project for public review, and the public participation process concluded in October 2024. The final Scoping Report was submitted to the DMRE and accepted on 10 January 2025, with conditions requiring additional studies to be incorporated into the EIA phase. After the Scoping Phase, GCS withdrew as the Environmental Assessment Practitioner (EAP), and Elemental Sustainability Proprietary Limited (Elemental-S) was appointed to facilitate the remainder of the IEA application process. In addition, the Knights Hill element was subsequently excluded from the Project. Going forward, the Project will encompass only the Umgala operations, including the reclamation and transport of material from the Zimbutu Discard Dump to the Umgala Plant.

The relationship between the proposed infrastructure, the Mining Right boundary, historic workings, and the planned underground operations is illustrated in the site layout figures (Figure 3 - Figure 5).

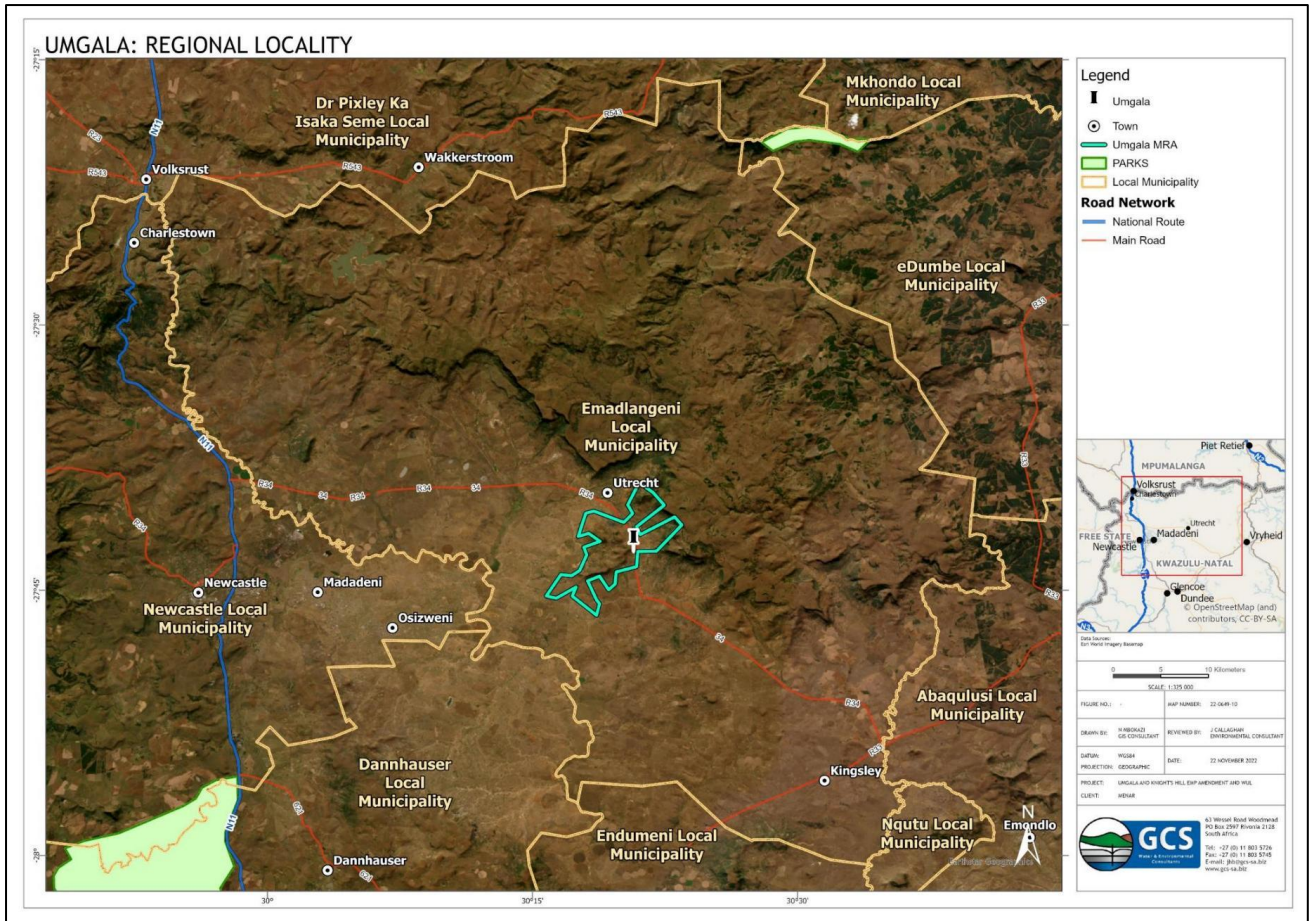


Figure 1: Regional Locality of Umgala Mining Right Area (source: GCS, 2024)

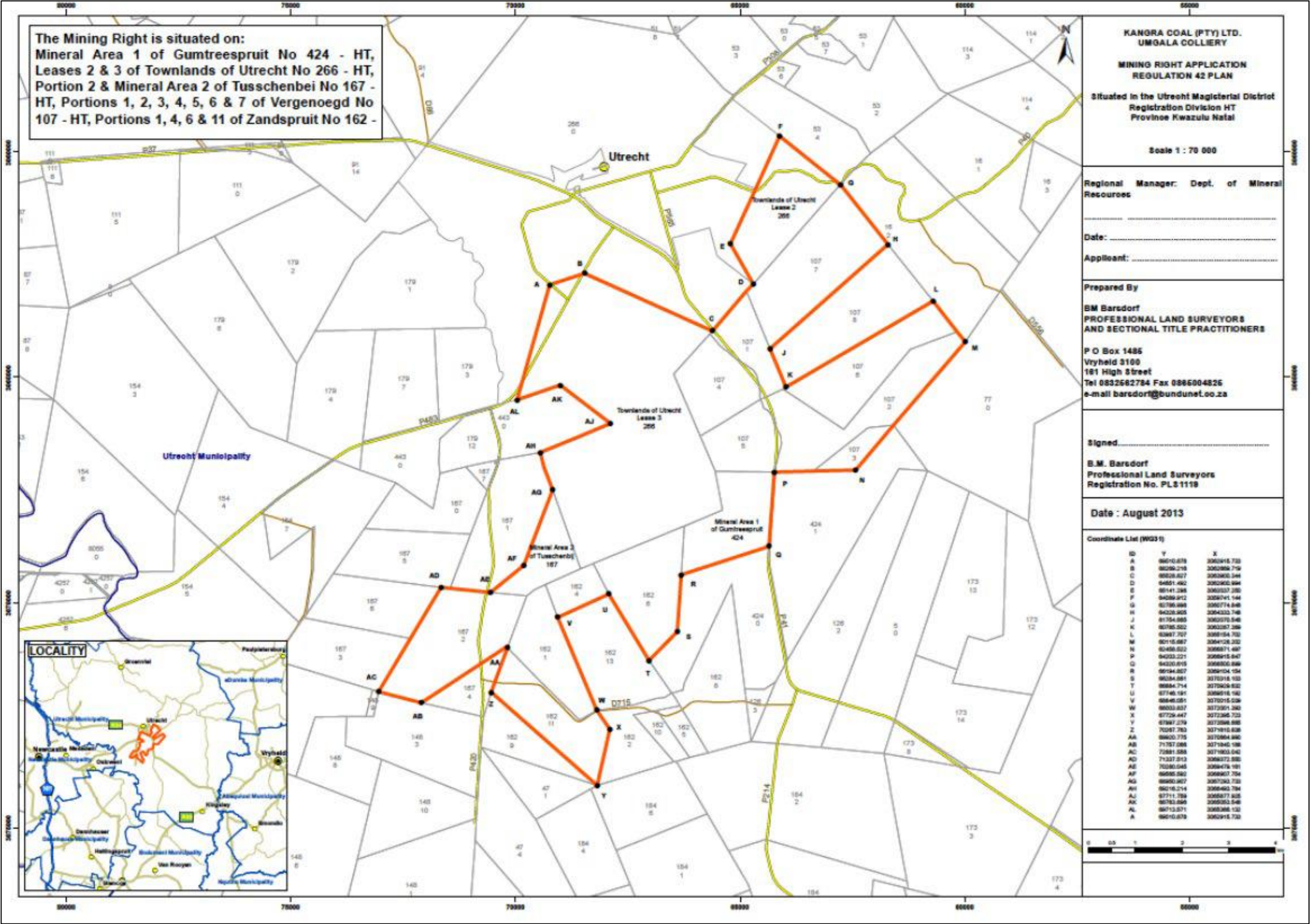


Figure 2: Regulation 2(2) Plan

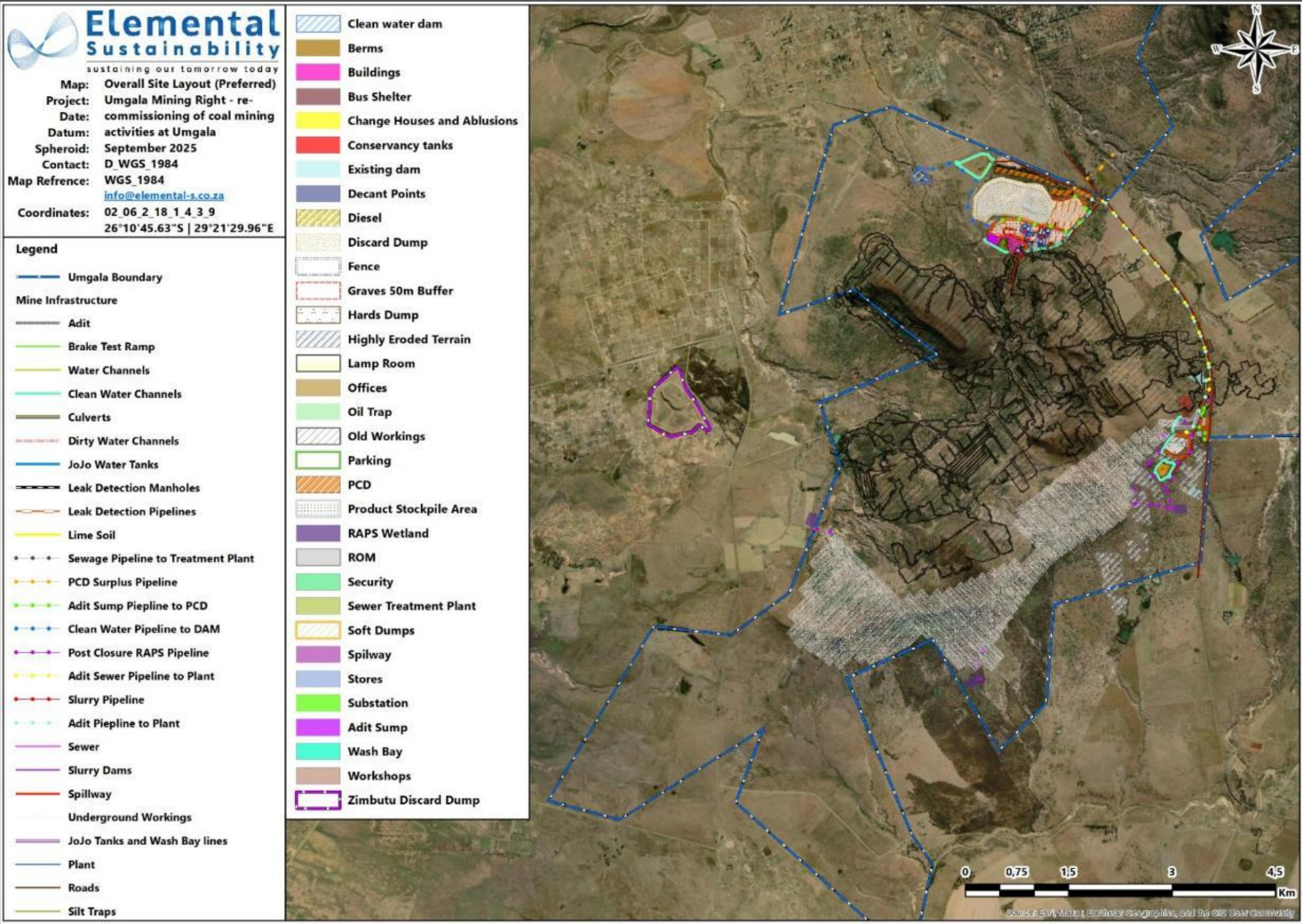


Figure 3: Umgala Site Layout Map

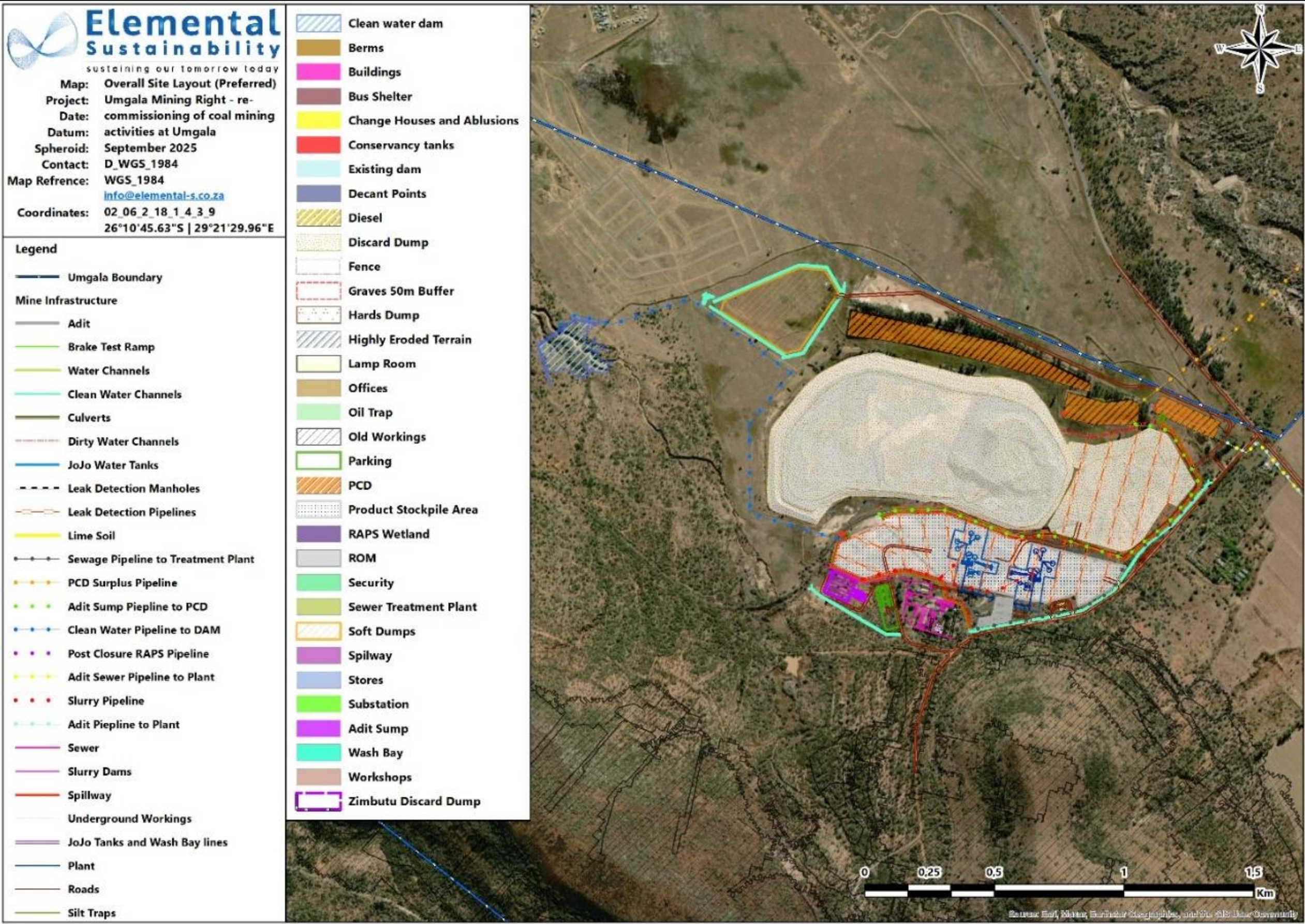


Figure 4: Umgala Site Layout Map (northern section)

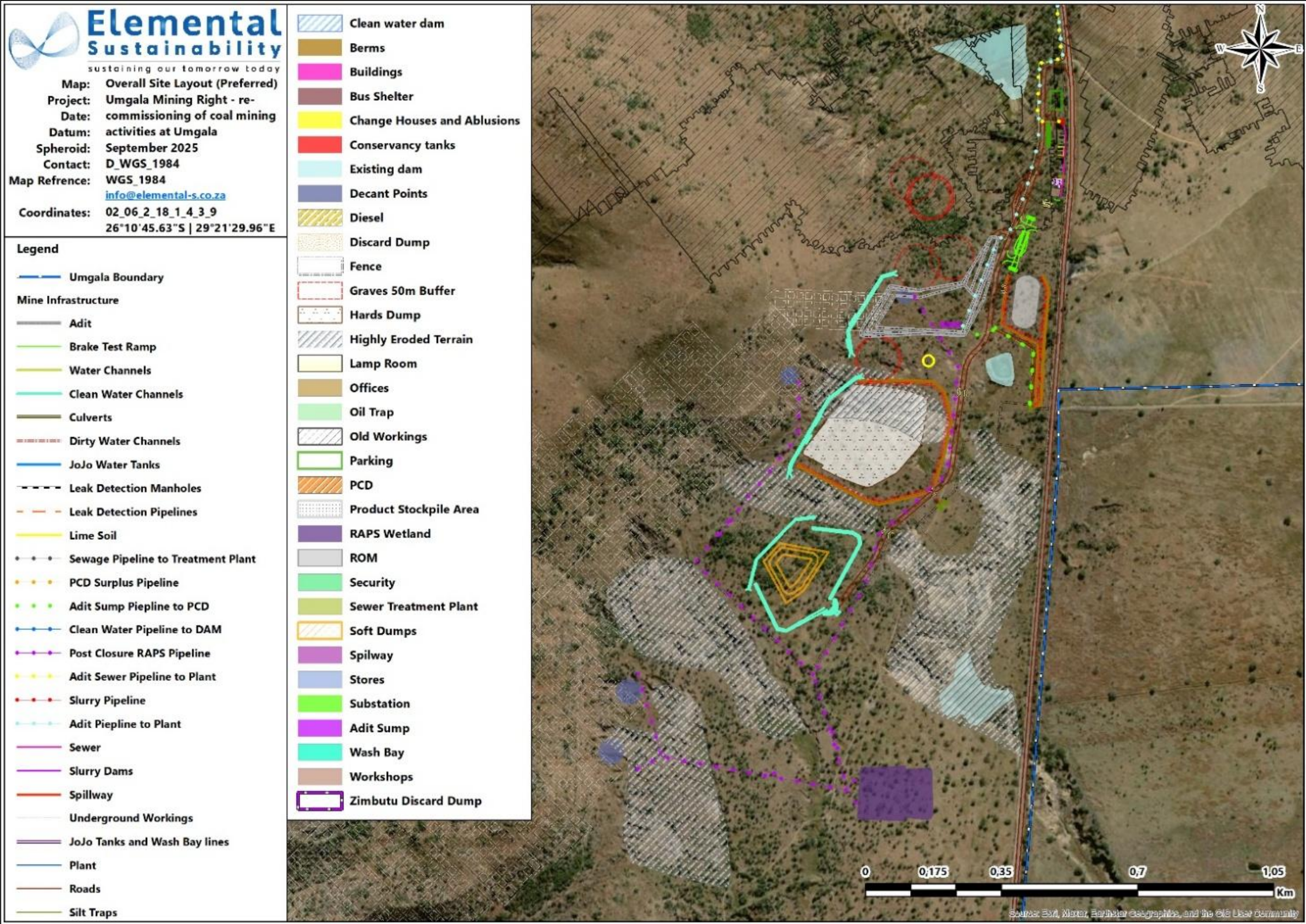


Figure 5: Umgala Site Layout Map (southern section)

2. Proposed Activities (Summary)

The project entails the re-commissioning of underground mining and the development and operation of associated surface infrastructure and services. The key activities described in this EIAr and EMPr include:

- Recommissioning underground mining via a new adit;
- Construction of supporting surface infrastructure, including:
 - a processing plant,
 - stockpiles,
 - a discard facility,
 - a sewage treatment plant, and
 - stormwater control infrastructure;
- Reclamation of material from the Zimbutu Discard Dump for processing at the Umgala Plant

3. Objectives of the EIAr and EMPr

This Environmental Impact Assessment Report (EIAr) and associated Environmental Management Programme (EMPr) have been compiled to support decision-making and authorisation for the proposed re-commissioning project by:

- Presenting the project and its components as part of an application for an Integrated Environmental Authorisation in terms of NEMA (1998), NEMWA (2008) and the MPRDA (2002) (as amended);
- Addressing the fact that, following care and maintenance, changes in legislation and mine planning require that the project be assessed through a new EIA/EMPr process;
- Assessing the proposed re-commissioning and associated infrastructure (including underground access via a new adit; plant, stockpiles, discard facility, sewage treatment plant and stormwater controls; and the associated water systems); and
- Supporting the integrated authorisation process which also includes a Waste Management Licence and a Water Use Licence as part of the overall application package.

4. Legislative And Policy Context

The project triggers listed activities under NEMA, NEMWA, and the NWA, requiring authorisations for mining-related infrastructure, discard and waste management, and water uses. A summary of the activities triggered in terms of NEMWA, NEMA, NWA are provided below.

- NEMA Listing Notice 1 (GNR 983):
 - Listed Activity 9
 - Listed Activity 10
 - Listed Activity 11
 - Listed Activity 12
 - Listed Activity 14
 - Listed Activity 19
 - Listed Activity 24

- Listed Activity 25
- NEMA Listing Notice 2 (GNR 984):
 - Listed Activity 4
 - Listed Activity 6
 - Listed Activity 15
 - Listed Activity 17
 - Listed Activity 25
- NEMA Listing Notice 3 (GNR 985):
 - Listed Activity 4
 - Listed Activity 12
 - Listed Activity 14
- NEMWA (GN 921):
 - Category B: Activity 9
 - Category B: Activity 10
 - Category B: Activity 11.

5. Alternatives Considered

Several alternatives were assessed, including site layout, infrastructure placement, and the “no-go” option. Recommissioning of the Umgala Operations have been considered since 2019, and as a result, various factors and assessments led to the preferred layout provided in this report. Mainly, the preferred layout was determined by considering the addition of infrastructure in lower sensitive areas (such as the exclusion of Knights Hill), while also considering optimal access to coal reserves.

6. Environmental Baseline and Specialist Studies

Specialist assessments were undertaken on climate change, air quality, noise, water resources, soils, wetlands, biodiversity, traffic, heritage, visual impacts, blasting, and socio-economic conditions. Key findings include:

- Biodiversity and wetlands: Clearance of indigenous vegetation and direct disturbance of wetlands and aquatic ecosystems will result in a permanent loss of sensitive habitats. Up to 22.55 ha of wetlands are expected to be lost, with moderate to high ecological importance in certain areas.
- Aquatic resources: Acid mine drainage, sedimentation, and altered flow regimes pose significant risks to downstream watercourses and associated ecosystems.
- Heritage: Several sites of archaeological and palaeontological significance were identified.
- Air quality & Noise: Predicted dust and noise levels can be reduced to within acceptable standards through standard mitigation (e.g., water spraying, mufflers, restricted operating hours).
- Socio-economic: The project is expected to generate local employment and procurement opportunities, with positive contributions to municipal revenue.

7. Impact Assessment and Mitigation

The impact assessment applied a standard significance rating methodology to evaluate potential impacts before and after mitigation. The impacts and significance before and after mitigation are provided in Table 1 below with a summary of the impact assessment as follows:

- Most construction and operational phase impacts can be reduced to low or medium significance through mitigation.
- Socio-economic benefits (employment, procurement, and local economic stimulus) are rated as high positive significance.
- Some impacts remain high significance even after mitigation:
 - Biodiversity: The irreversible loss of wetland and terrestrial habitats of conservation concern, leading to residual high impacts on local ecosystems.
 - Wetland and aquatic systems: Loss of wetlands, wetland geomorphological alteration, groundwater ingress due to underground mining coal.
 - Heritage: If graves are located within the identified heritage sites, they remain of high significance and the potential impact high, regardless of mitigation.

While the Project is economically feasible and majority of the risks can be reduced through mitigation, residual risks to biodiversity, aquatic ecosystems, and cultural heritage must be acknowledged as highly significant impacts. Long-term monitoring, additional studies, offset initiatives, and compliance with legislation are critical to address these impacts.

Table 1: Impact Assessment for the proposed activities in their respective phases

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Construction phase				
Construction activities	Construction activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air Quality	M	L
Noise generating construction activities including traffic, earthworks, mobile construction equipment, metal and concrete works.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	L	L
Construction of the adit for underground mining works	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	M	M
Clearing of areas and construction for mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	M	M
Stockpiling of soil	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	L	L
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Agricultural Resources and Infrastructure	Soil Agricultural Potential	L	L
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Land Capability	Soil Agricultural Potential	L	L
Vegetation Clearance and Earthworks, including excavation and infilling	Clearance of vegetation during site preparation, excavation, infilling and shaping of landscape. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may result in the temporary disturbance of Wetlands.	Wetlands	L	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Vegetation clearance, construction vehicle traffic and earthworks	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation by construction vehicle traffic. During the construction phase, the clearance of vegetation and compaction of soil may result in increased run-off and erosion, altering hydrological and geomorphological processes.	Wetlands	L	L
Clearance of vegetation and compaction of soil	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation and soil by construction vehicle traffic. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may reduce ecological connectivity and disturb the watercourse/terrestrial edge.	Wetlands	L	L
Preparation, storage and transportation of construction materials. Potential oil leaks from construction vehicles and equipment	Accidental spillages of wet concrete and chemical / hazardous substances. During the construction phase, accidental spillages of wet concrete and chemical /hazardous substances may result in soil and groundwater contamination, adversely affecting the aquatic ecosystems in the broader area.	Wetlands	L	L
Demarcation of buffer zones and no-go areas and the creation of spoil sites (topsoil separate from subsoil)	Input of droppers for demarcation Tape and Erection of silt fencing around all spoil sites (including coverage), Dumping of spoil at the designated sites using haulage routes. Disruption of the soil profile and thus creation of excess sediment; Potential disturbance to native and/or indigenous plant species; Aesthetic and potentially noise disturbance within the area.	Wetlands	L	L
Construction of Mine Support Infrastructure (Buildings, Conveyor Belts, Dirt Roads and Fences)	Permanent change in the surface hydrology from hardened surfaces. Reduced infiltration rates and increased risk of erosion from permanent change in the surface hydrology from hardened surfaces.	Wetlands	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Establishment Mining Area Footprint	Open cast mine establishment through excavation, blasting and stabilisation activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems.	Wetlands	M	L
Land and riparian clearing activity	Water quality deterioration	Aquatic	M	L
Construction activities	Building materials & solid waste (plastics, polystyrene, etc.) entering / disposed of in wetlands	Aquatic	H	L
Construction activities	Contamination (oils, fuels, chemicals) - Surface water pollution	Aquatic	H	L
Construction activities	Soil contamination from chemicals	Aquatic	M	L
Construction activities	Human waste - Surface water pollution	Aquatic	M	L
Construction activities	Increased turbidity - Surface water pollution	Aquatic	H	L
Construction activities	Increased turbidity - Wetland geomorphological alteration	Aquatic	H	H
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types.	Terrestrial biodiversity theme	M	L
	Loss and deterioration of habitat included in local and regional conservation categories (e.g., CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.)	Terrestrial biodiversity theme	L	L
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint	Terrestrial biodiversity theme	L	L
	Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of	Terrestrial biodiversity theme	L	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
	surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes			
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - south)	Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types	Terrestrial biodiversity theme	M	L
	Loss and deterioration of habitat included in local and regional conservation categories (e.g., CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.)	Terrestrial biodiversity theme	M	M
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint	Terrestrial biodiversity theme	M	L
	Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes	Terrestrial biodiversity theme	M	L
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Loss of threatened plant species or other species of conservation importance (i.e., provincially protected), and/ or habitat associated with these taxa	Plant species theme	L	L
	Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity).	Plant species theme	L	L
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns.	Plant species theme	L	L
	Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of	Plant species theme	L	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
	movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns.			
	Introduction and exacerbation of exotic and invasive species to the area	Plant species theme	L	L
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - south)	Loss of threatened plant species or other species of conservation importance (i.e., provincially protected), and/ or habitat associated with these taxa	Plant species theme	M	L
	Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity)	Plant species theme	M	L
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns	Plant species theme	L	L
	Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns.	Plant species theme	L	L
	Introduction and exacerbation of exotic and invasive species to the area	Plant species theme	M	L
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Direct and permanent loss of natural fauna habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.	Animal species theme	L	L
	Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases	Animal species theme	L	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
	Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc	Animal species theme	L	L
	Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability	Animal species theme	M	L
	Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site	Animal species theme	L	L
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - north)	Direct and permanent loss of natural fauna habitat, in particular threatened invertebrate habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.	Animal species theme	H	H
	Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases	Animal species theme	M	L
	Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc	Animal species theme	L	L
	Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability	Animal species theme	M	L
	Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site	Animal species theme	L	L
Dewatering	Lowering of water levels due to dewatering of excavations for construction.	Geohydrology	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	L	L
Construction	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices.	Geohydrology	L	L
Construction and vegetation clearing	Increased runoff from the site as a result of vegetation clearing and construction activities.	Geohydrology	L	L
Earthworks and Development	Disturbing vadose zone soils during excavations/construction activities.	Vadose zone soils and subsequent aquifer (groundwater table)	L	N
Earthworks and Development	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.	Vadose zone soils and subsequent aquifer (groundwater table)	L	N
Earthworks and Development	Surface water contamination and sedimentation from the following activities: – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Contaminant transport in runoff – To date, no sedimentation has taken place (i.e. no evidence observed during the site walkover assessment)	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	N	N
Earthworks and Development	– Poor quality seepage from machinery used to excavate soils. – Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.	Groundwater aquifer	L	N
Site preparation, including placement of contractor laydown areas and storage (i.e. temporary stockpiles, bunded areas etc.) facilities.	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydro-pedological flow paths. – Impacts on the macro-soil structure.	Soil quality, soil structure and land capability and soil interflow processes	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Disturbing vadose zone during soil excavations/infilling activities	- Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: - Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. - Vegetation loss. - Soil compaction; and - Soil erosion.		M	L
Vegetation clearing & soil stockpiling	Soil quality: - Natural nutrient content decreases due to soil exposure. - Loss of natural bio-organisms essential to soil processes.		M	L
Earthworks	Oil & fuel spills from vehicles parked at the site may compromise soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table.	Soil quality	M	N
Earthworks	Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	N	N
Earthworks	The presence of shallow soils and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	M	L
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impacts on aesthetics	Visual and landscape character	M	M
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character	M	M
Movement of construction vehicles and heavy machinery for site clearance	Change of visual character from a natural landscape to a built landscape	Visual and landscape character	M	M
Design of supporting infrastructure	Landscape visual change	Visual and landscape character	M	M

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Construction activities	The construction phase of the proposed mines will generate additional traffic on the surrounding road network within the study area	Surrounding road network	L	L
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	H	NA
Construction and operation of the mining operations	– Possibility of political interference, corruption, and fraud. – Blasting impacting on housing stability – Increased demand on already strained electricity supply – Increase in health & safety – Incidents on the mine – Increased traffic – Impact on livestock and agriculture – Stability of land because of underground mining and blasting operations – Limitations on development expansions of the municipality – Loss of grazing land (subsistence) – Leadership conflict – Increased tension due to influx of non-residents	Local communities	M	L
All construction and operational activities related to the Project.	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	H	H
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: – Stone walled kraal – terracing (for a house) – two possible graves – undecorated, thin-walled pottery	Cultural and Heritage aspects	H	H
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	L	L
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling	Cultural and Heritage aspects	H	H

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
	- Graves - Terracing - Stone cairns - Pottery			
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	H	H
	Potential disturbance to finds, stone cairns, pottery, open MSA scatters	Cultural and Heritage aspects	L	L
Operational Phase				
Operation of mining infrastructure	Release of GHG emissions to atmosphere	Climate Change	H	M
Operations of the mine infrastructure	Fugitive dust and combustion emissions from the project was shown to result ambient concentrations at sensitive receptors above NAAQS for NO ₂ , PM ₁₀ , and NDCR.	Air Quality	M	L
Noise generating operational activities including coal handling and transport; coal feeders, crushers, screens; conveyors; underground mine ventilation; diesel generators; mobile equipment; ancillary services at workshops and offices	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	L	L
Operation of underground mine workings	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	M	L
Operation of mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	L	L
Operation of PCD, Discard dump, and ROM areas	Contamination of soil resources below these facilities as well as adjacent to these facilities due to contaminated runoff.	Soil Agricultural Potential	M	M
Dust suppression of haul roads	Often waste water is used as dust suppression water spray. These could lead to the build-up of contaminants in the road	Soil Agricultural Potential	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
	surface as well as adjacent to the road in areas of concentrated runoff.			
Operation of Mining Support infrastructure (Buildings, Conveyor Belts, Waste Dams, Haulage/Dirt Roads and Fences)	Movement and Vehicle access in and around the Support infrastructure. Impeding the flow of water. Damage to banks. Siltation of water course. Erosion of water course. Flow sediment equilibrium change	Wetlands	H	H
Operation of the mining activities	Open cast mining activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems	Wetlands	H	H
Operation of the mining activities	Above mentioned variables – surface water pollution	Aquatic	H	M
Seepage	Poor quality seepage from the existing underground workings into the weathered and fractured aquifer	Geohydrology	L	L
Systematic removal of the seam reserve by underground mining methods	Groundwater ingress due to underground mining of coal.	Geohydrology	H	H
Dewatering	Lowering of the water table due to dewatering.	Geohydrology	L	L
Seepage	Poor quality seepage from the proposed PCD's, sumps, ROM stockpiles, softs dump, hards dump, top-soils dump, workshops, fuel storage, ablutions (septic tanks), dirty water trenches and processing plant into the aquifer.	Geohydrology	H	L
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	H	L
Groundwater abstraction to supplement water needs at the mine	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices	Geohydrology	L	L
Groundwater abstraction to supplement water needs at the mine	Dewatering the local aquifer to supply the mine with operational water.	Geohydrology	L	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Site activities	Disturbing vadose zone soils during mining	Vadose zone soils and subsequent aquifer (groundwater table)	H	M
Site activities	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer and drainage system.	Vadose zone soils and subsequent aquifer (groundwater table)	M	L
Site activities	Stormwater Runoff – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Increased runoff due to compaction of surfaces and changes in surface topography	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	M	L
Site activities	Water quality – Contaminant transport in runoff from sediment to oil and fuel spills – Spillage of PCDs, slurry dams and stormwater conduits	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	H	M
Site activities	AMD – Contaminant transport in runoff from overburden dumps	Water environment	H	M

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Site activities	Disturbing the inner-soil architecture of the original soil profile will disturb natural flow processes (i.e. a result of infilling or cut-and-fill activities). Excavated soil will be placed in other areas (i.e. on top of other soils) and will have an impact on the flow dynamics of the soil it is dumped on top of. This may reduce rainfall infiltration and induce runoff. Impermeable areas will decrease rainfall infiltration into soils, and hence reduce interflow (A/B and A/bedrock) or lateral flow to downstream wetland areas.	Soil interflow processes	H	M
Site activities	The presence of adit, PCD and stockpiles will have long-term implications in terms of altering the natural hydrogeological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes	H	M
Site activities	Seepage/leakages/overland flow from the PCD and stockpiles may impact soil quality.	Soil quality	L	N
Site activities	The presence of shallow soils will and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	M	L
Transport and movement of vehicles during operational activities	The additional traffic generated by the proposed mining operations will have some impact on the space available for pedestrians.	Existing pedestrians	L	L
Transport and movement of vehicles during operational activities	The proposed mines are expected to generate moderate traffic volumes, which may have a limited effect on prevailing safety conditions	Road safety	L	L
Transport and movement of vehicles during operational activities	There will be a moderate impact on the road network condition due to the additional heavy vehicle traffic generated during the operational phase	Condition of the Road Surface	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Daily operational activities	Negative impacts on aesthetics	Visual and landscape character	M	M
Daily operational activities of the Mine and associated infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character	M	M
Movement of heavy machinery	Change of visual character	Visual and landscape character	M	L
Night lighting for security and operational activities	Light pollution (Glare, spill light, sky glow)	Visual and landscape character	M	L
Daily operational activities of the Mine, and associated infrastructure.	Landscape visual change	Visual and landscape character	M	M
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	H	NA
Construction and operation of the mining operations	– Possibility of political interference, corruption, and fraud. – Blasting impacting on housing stability – Increased demand on already strained electricity supply – Increase in health & safety – Incidents on the mine – Increased traffic – Impact on livestock and agriculture – Stability of land because of underground mining and blasting operations – Limitations on development expansions of the municipality – Loss of grazing land (subsistence) – Leadership conflict – Increased tension due to influx of non-residents	Local communities	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
All construction, operational and decommissioning activities related to the Project.	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	H	H
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: – Stone walled kraal – terracing (for a house) – two possible graves – undecorated, thin-walled pottery	Cultural and Heritage aspects	H	H
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	L	L
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling – Graves – Terracing – Stone cairns – Pottery	Cultural and Heritage aspects	H	H
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	H	H
	Potential disturbance to finds, stone cairns. Pottery, Open MSA scatters	Cultural and Heritage aspects	L	L
Blasting	Ground Vibration - Exceeding Limits and Possible Damage to sites 1 – 12, 14 -17, 19, 21 -47 (as per the Blasting Impact Assessment report)	Existing infrastructure, potential sites of cultural significance, people and animals	L	L
Blasting	Ground Vibration - Exceeding Limits and Possible Damage to sites 13, 18, 20 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	M	L
Blasting	Air Blast - Exceeding Limits and Possible Damage to sites 1 – 36, 38 – 47 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural	L	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
		significance, people and animals		
Blasting	Air Blast - Exceeding Limits and Possible Damage to sites 37 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	M	L
Blasting	Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 1,2, 4 - 27 and 47 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	M	L
Blasting	Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 3, 28 – 46 (as per the Blasting Impact Assessment report).	Existing infrastructure, potential sites of cultural significance, people and animals	L	L
Decommissioning phase				
Decommissioning activities	Decommissioning activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air quality	M	L
Noise generating construction and closure activities including traffic, earthworks, mobile construction equipment, metal and concrete works and demolition.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	L	L
Removal of the infrastructure	Compaction and contamination of areas through heavy machinery movement and hydrocarbon spills.	Soil Agricultural Potential	M	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Rehabilitation of excavated areas as well as disturbed footprint areas.	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	M	L
Rehabilitation finalization	Re-establishment of semi-natural conditions to provide a sustainable non-degrading disturbance footprint area.	Soil Agricultural Potential	M	N/A
Decommissioning of the Mine and Repurposing of Support Infrastructure	– Decrease erosion potential; Increase biodiversity; – Remove all potential contaminants – Reinststate natural topography.	Wetlands	L	N/A
Infiltration of groundwater into underground workings	Groundwater pollution plume (AD/ND/SD) is generated by the underground workings.	Geohydrology	H	M
Decant or seepage	Contaminated decant might flow into neighboring streams or seep back into the aquifer. Decant is likely at the adit, and poor-quality seepage is likely at several positions where the topography is <30m from the coal floor (i.e., if the system is under pressure diffuse seepage, may occur).	Geohydrology	M	L
Cessation of mining	Recovery of groundwater levels after cessation of mining.	Geohydrology	L	N/A
Decommissioning of non-essential infrastructure to rehabilitate and close the Adit and associated infrastructure	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses.	Soil interflow processes, soil structure and land capability and soil quality.	H	N/A
Re-Disturbing vadose zone during soil excavations/ infilling activities	– Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss.	Soil interflow processes, soil structure and land capability and soil quality.	H	N/A

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Significance after mitigation
Re-vegetation and rehabilitation	– Soil compaction; and – Soil erosion. – Soil quality: – Natural nutrient content decreases due to soil exposure. – Loss of natural bio-organisms essential to soil processes.	Soil interflow processes, soil structure and land capability and soil quality.	H	N/A
Site activities	The presence of the Adit will have long-term implications in terms of altering the natural hydrogeological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes, soil structure and land capability and soil quality.	M	M
Decommission of infrastructure	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	H	H
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: – Stone walled kraal – terracing (for a house) – two possible graves – undecorated, thin-walled pottery	Cultural and Heritage aspects	H	H
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	L	L
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling – Graves – Terracing – Stone cairns – Pottery	Cultural and Heritage aspects	H	H
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	H	H
	Potential disturbance to finds, stone cairns. Pottery, Open MSA scatters	Cultural and Heritage aspects	L	L

8. Public Participation

Extensive stakeholder engagement was undertaken during the Scoping phase, including public notices, newspaper adverts, meetings with authorities and affected communities, and circulation of reports. Key issues raised included water quality, wetland loss, employment, land use conflicts, and cumulative impacts. All comments and responses have been recorded in the Comments and Responses Report (CRR) which have been attached to the Final Scoping report. The Final Scoping report was accepted by the DMRE on 10 January 2025. Additional public participation will be undertaken during this EIA Phase from **27 February 2026 until 30 March 2026**. Details of the engagement processes including focus groups meetings and public meetings will be included in the final EIAr and EMPr.

9. Conclusion and Reasoned Opinion of the EAP

Based on the findings of the impact assessment in Section 12.7 (Table 56 - Table 58) and considering the current conditions of the site, it is clear that the proposed activities are associated with a number of high environmental impacts. However, the removal of Knights Hill from the application has resulted in the avoidance of particularly sensitive areas, thereby reducing the overall risk footprint of the Project.

While some residual negative impacts remain, the specialist studies indicate that most of these can be reduced to acceptable levels through the diligent implementation of the mitigation and monitoring measures outlined. These measures must be made legally binding and closely monitored to ensure compliance throughout the operational and decommissioning phases. Where impacts cannot be mitigated, such as the case with the animal theme within the Umgala 2 – Southern Section, additional detailed studies including biodiversity offset and feasibility studies, are required to be undertaken before commencement of any activities within the highly sensitive areas, after which additional recommendations should be made and considered.

The EAP is of the opinion that the Project can be authorised, provided that further biodiversity offset studies are undertaken in line with specialist recommendations to assess feasibility and identify an appropriate offset site. In addition, it should only be authorised provided that the necessary mitigation measures, monitoring programmes, and offset programmes be implemented as per the EMPr.

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APPENDICES

Appendix I: Qualifications and Resume of EAP
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ABBREVIATIONS

AD	Acid Drainage
ADT	Articulated Dump Truck
AEL	Atmospheric Emission Licence
AIR	Atmospheric Impact Report
AOI	Area of Impact
AQMS	Air Quality Monitoring Station
CO	Carbon monoxide
ARC	Agricultural Research Council
DEM	Digital Elevation Model
DME	Department of Minerals and Energy (<i>former designation</i>)
DMR	Department of Mineral Resources (<i>now DMRE</i>)
DMRE	Department of Mineral Resources and Energy
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EI	Ecological Importance
EIA	Environmental Impact Assessment
EIA/EMP	Environmental Impact Assessment and Environmental Management Programme
EIS	Ecological Importance Sensitivity
ELM	Emadlangeni Local Municipality
EMPr	Environmental Management Programme
EMPR	Environmental Management Programme Report
ES	Ecological Sensitivity
FEPA	Freshwater Ecosystem Priority Area
GCS	GCS Water and Environmental Consultants Proprietary Limited
GDP	Gross Domestic Product
GPS	Global Positioning System
GVA	Gross Value Add
Ha	Hectare
HDPE	High-Density Polyethylene
HRU	Hydrological Response Unit
KZN	KwaZulu-Natal
LM	Local Municipality
LoM	Life of Mine
mamsl	Metres Above Mean Sea Level
MAP	Mean Annual Precipitation
MAR	Mean Annual Runoff
MPa	Megapascal
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MR	Mining Right
NAAQS	National Ambient Air Quality Standards
NEMA	National Environmental Management Act 107 of 1998
NFEPA	National Freshwater Ecosystem Priority Area
NOx	Nitric Oxide and Nitrogen Dioxide
OMC	Optimum Moisture Content
PCD	Pollution Control Dam

PES	Present Ecological State
PIA	Palaeontological Impact Assessment
PPP	Public Participation Process
PM	Particulate Matter
PM2.5	Particulate Matter with a diameter of 2.5 micrometers or smaller
PM10	Particulate Matter with a diameter of 10 micrometers or smaller
(Pty) Ltd	Proprietary Limited
PVC	Polyvinyl Chloride
REC	Recommended Ecological Category
RoM	Run-of-Mine
RQO	Resource Quality Objectives
RWD	Return Water Dam
SABS	South African Bureau of Standards
SAHRIS	South African Heritage Resources Information System
SANS	South African National Standard
SDF	Spatial Development Framework
SLP	Social Labour Plan
TDS	Total Dissolved Solids
TIA	Traffic Impact Assessment
UV	Ultraviolet
VOCs	Volatile Organic Compounds
WMA	Water Management Area

PART A: ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1. INTRODUCTION

The Welgedacht Exploration Company Proprietary Limited (Welgedacht), a subsidiary of Unyezi Coal Proprietary Limited (Unyezi Coal), which is an affiliate company of Kangra Coal Proprietary Limited that falls within the greater Menar Group structure, is the holder of the Mining Right (KZN 30/5/1/2/2/122) with a renewal application underway (DMRE ref no: KZN 30/5/1/2/2/10125MR). Welgedacht has been operating in the vicinity of Utrecht since 1963, although mining activities have been prevalent in the area since 1914. Welgedacht's mining interests in the area comprise the following mining areas:

- Aasvoelkrans
- Umgala / Knight's Hill
- Utrecht
- Zimbutu

Underground mining was undertaken at Umgala between 1964 and 1997. Opencast mining took place between 1997 and 2004, when the mine was placed under Care and Maintenance (C&M). The operation of the processing plant and disposal on the discard dump at Umgala also ceased in 2004. The old Umgala underground workings can no longer be accessed as they were closed and secured according to DMRE specifications, and backfilling of several of the highwall areas and inclined roadways has already been completed.

Welgedacht proposes to re-open the Umgala Colliery and construct the Knight's Hill adit area immediately north of Umgala. The Umgala / Knight's Hill Mining Project consists of two geographically distinct coal mining operations, namely Umgala Operation and Knight's Hill Operation, functioning under one Mining Right (KZN 30/5/1/2/2/122) (renewal ref no: 10125MR).

It was the intention of Welgedacht to re-open and extend its mining operations at Umgala and Knight's Hill in 2006. GCS Water and Environmental Consultants Proprietary Limited (GCS), independent consultants acting on behalf of Welgedacht, completed and submitted the Environmental Impact Assessment and Environmental Management Programme (EIA/EMP) in accordance with the requirements of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA), for the Umgala / Knight's Hill Mining Project in May 2006.

Subsequently, and in response to then KwaZulu-Natal (KZN) DME's request that the EIA/EMP be re-submitted and the 2006 public participation process be re-initiated, GCS undertook the re-submission of the EIA/EMP and public participation process during 2009. The then Department of Mineral Resources (DMR) approved the Umgala / Knight's Hill MR and associated EIA/EMP (dated February 2009) in 2013. Mining activities have, however, not commenced since approval in 2013.

Since then, significant changes in the overall mine plan as well as changes in legislation occurred, which mandate the updating of the 2009 EMP. This required a new environmental authorisation and waste management licence in the form of an integrated environmental authorisation (IEA), as detailed in the application submitted in September 2024 by GCS (known as 'the Project').

GCS compiled the associated draft Scoping Report for the Project for public review and the public participation process concluded in October 2024. The final Scoping Report was submitted to the DMRE and accepted on 10 January 2025, with conditions for inclusion of additional studies in the EIA Phase. Since the approval of the final Scoping Report, GCS has withdrawn as the Environmental Assessment Practitioner (EAP) and Elemental Sustainability Proprietary Limited (Elemental-S) was appointed as the new EAP to facilitate the remainder of the IEA application process. In addition, after the Scoping Phase, it was determined to exclude the Knights Hill operation from the Project. The Project (going forward) therefore entails the operations associated with Umgala only, including the reclamation and transport of material from Zimbutu Discard Dump to the Umgala Plant.

After acceptance of the Scoping Report, the Applicant requested an extension on submission of the final EIAr and EMPr to the DMRE with a new date for final submission on 17 April 2026.

The Project is currently in the EIA Phase and this report serves as the draft Environmental Impact Assessment report and Environmental Management Programme report (EIAr & EMPr) for public comment, in fulfillment of the requirements of EIA Process.

2. CONTACT PERSON

2.1. DETAILS OF THE APPLICANT

Table 2 provides the details of the applicant and relevant contact person.

Table 2: Details of the Applicant

Project applicant:	Welgedacht Exploration Company Proprietary Limited		
Registration no (if any):	2018/513084/07		
Trading name (if any):	N/A		
Responsible Person (e.g. Director, CEO, etc):	Sarah Wanless		
Contact person:	Sarah Wanless		
Physical address:	13 Fredman Drive, Fredman Towers, 7th Floor, Sandown, 2196, Johannesburg, South Africa		
Postal address:	PO Box 2632 Saxonworld		
Postal code:	2132	Cell:	072 664 1680
Telephone:	011 783 7996	Fax:	N/A
E-mail:	sw@menar.com		

2.2. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

Table 3 provides the details of the environmental assessment practitioner (EAP) and co-author of this report.

Table 3: Details of EAP

Company Name:	Elemental Sustainability Proprietary Limited
Name of the EAP:	Renate Steffens (EAPASA reg no: 2020/1557)
Tel No.:	083 969 4407
E-mail address:	renate@elemental-s.co.za
Peer reviewer:	Corlien Lambrechts (EAPASA reg no: 2020/935)
Tel No.:	064 618 2646
E-mail address:	corlien@elemental-s.co.za

2.2.1. Expertise of the EAP

Refer to Appendix I for further details, CV, qualifications, and registrations. Renate Steffens has the following qualifications and professional affiliations:

- BSc Honours Environmental Management, University of Pretoria, 2014
- BSc Geography, University of Pretoria, 2013
- Environmental Assessment Practitioner of South Africa (2020/1557).

2.2.2. Summary of the EAP's past experience

Renate is an environmental assessment practitioner (EAPASA registration number 2020/1557) with more than 10 years' experience working in multidisciplinary Projects across Southern Africa and more recently, the Middle East. She has experience in leading and compiling Environmental and Social Impact Assessments (ESIAs/EIAs) and other environmental reports such as Statement of Environment Effects (SEE) reports, Basic Assessment reports (BARs), Scoping reports (SRs), Environmental Management Programme reports (EMPRs), Framework Environmental and Social Management Plans (F-ESMPs), Due Diligence reports, Environmental, Social, Governance (ESG) reports and Integrated Water and Waste Management Plans (IWWMPs). Renate also has experience in leading environmental audits such as external water use licence audits, environmental authorisation audits, environmental management programme audits, air emission licence audits and environmental legal compliance audits and assisting in ISO 14001 audits. She possesses expertise in Geographic Information Systems (GIS), adept at utilising ArcGIS software to create regional maps, locality maps, and site layout plans.

2.3. THE SPECIALIST TEAM

Details of the specialist team that forms part of the Project are provided in Table 4 below.

Table 4: Details of the Specialist Team

Specialist Study	Independent Specialist
Atmospheric Impact Assessment	

Specialist Study	Independent Specialist
Full name:	Soundscape Consulting Proprietary Limited – Nicolette von Reiche
Qualification:	B Eng Honours Mechanical Engineering
Experience (years):	18 years
Registrations (if applicable)	N/A
Noise Impact Assessment	
Full name:	Soundscape Consulting Proprietary Limited – Nicolette von Reiche
Qualification:	B Eng Honours Mechanical Engineering
Experience (years):	18 years
Registrations (if applicable)	N/A
Soils, Land Capability and Land Use Assessment	
Full name:	Eco-Assist Environmental Consulting – Wayne Jackson
Qualification:	BSc Soil Science & Hydrology
Experience (years):	15 years
Registrations (if applicable):	Cert.Sci.Nat. (119037)
Geohydrological Assessment	
Full name	GCS Water and Environmental Consultants - Tarika Issac and Henrik Botha
Qualification	BSc (Honours) Environmental and Engineering Geology MSc Environmental Sciences (Hydrology and Geohydrology)
Experience (years)	10 years
Registrations (if applicable)	Pri. Sci. Nat. (400139/17)
Hydropedology	
Full name	GCS Water and Environmental Consultants - Hendrik Botha
Qualification	MSc Environmental Sciences (Hydrology and Geohydrology)
Experience (years)	10 years
Registrations (if applicable)	Pri. Sci. Nat. (400139/17)
Aquatic Assessment	
Full name:	The River Guy – Jaco du Plessis
Qualification:	BSc Honours Zoology
Experience (years):	9 years
Registrations (if applicable):	Pr. Sci. Nat (118234)
Wetlands Assessment	
Full name:	Conservation Exposure Education and Training (CEET) – Lumko Mboyi

Specialist Study		Independent Specialist
Qualification: BSc Honours Environmental Science		Conservation Exposure Education and Training (CEET) – Lumko Mboyi
Experience (years):		10 years
Registrations (if applicable):		Pr. Sci. Nat. (122876)
Terrestrial Biodiversity Impact Assessment		
Full name		Bathusi Environmental Consulting – Riaan Robbeson & Lukas Niemand
Qualification		Riaan Robbeson - B. Sc (Botany and Zoology), B.Sc Hons Plant Ecology, MSc. (Plant Ecology) Lukas Niemand - MSc. (Restoration Ecology)
Experience (years)		Riaan Robbeson – 20 years Lukas Niemand – 10 years
Registrations (if applicable)		Riaan Robbeson – Pri. Sci. Nat: 400005/03 Lukas Niemand - Pri. Sci. Nat: 400095/06
Social Impact Assessment		
Full name:		Urban-Econ Development Economists – Paul van Heerden
Qualification		MSc Development Studies
Experience (years)		10 years
Registrations (if applicable)		-
Traffic Impact Assessment		
Full name		Emaan Traffic Engineers - Faisal Barakzai
Qualification		MSc Civil Engineering
Experience (years)		8 years
Registrations (if applicable)		Engineering Council of South Africa (ECSA) Professional Civil Engineer Associate Member, South African Institution of Civil Engineering (SAICE)
Heritage Assessment		
Full name		Umlando Archaeological Surveys and Heritage Management - Gavin Anderson
Qualification		M Phil (Archaeology & Social Psychology)
Experience (years)		30 years
Registrations (if applicable)		Principal Investigator, Association of Professional Archaeologists of Southern Africa
Climate Change Impact Assessment		

Specialist Study	Independent Specialist
Full name	Rayten Engineering – Jessica Burger
Qualification	PhD Air Quality
Experience (years)	2 years
Registrations (if applicable)	
Blasting Risk Assessment	
Full name	Blast Management and Consulting - J.D. Zeeman
Qualification	BA Degree, University of Pretoria Diploma: Explosives Technology, Technikon Pretoria Advanced Certificate in Blasting, Technikon SA
Experience (years)	30 years
Registrations (if applicable)	Member: International Society of Explosives Engineers
Hydrology Assessment	
Full name	GCS Water and Environmental Consultants - Chané de Bruyn and Henrik Botha
Qualification	MSc Environmental Sciences (Hydrology and Geohydrology)
Experience (years)	10 years
Registrations (if applicable)	Pri. Sci. Nat. (400139/17)
Visual Impact Assessment	
Full name	Liezl Landman
Qualification	BSc, BSc Hons, MSc – Environmental Ecology
Experience (years)	10 years
Registrations (if applicable)	Pr.Sci.Nat. (118084)
Conceptual Acid Mine Drainage Management Plan (CAMDMP) and Decant Management Plan (CDMP)	
Full name	Hendrik Botha
Qualification	MSc Environmental Sciences (Hydrology and Geohydrology)
Experience (years)	10 years
Registrations (if applicable)	Pr.Sci.Nat. (118084)

3. DESCRIPTION OF THE PROPERTY

3.1. LOCATION AND FARM PORTIONS

The Project site is situated at 27°42'30.25"S and 30°20'57.72"E, approximately 45 km from Newcastle and 3 km from Utrecht town, Emadlangeni Local Municipality in the Amajuba District Municipality, KwaZulu-Natal Province of South Africa. Umgala lies south-southeast of Utrecht on the southern side

of the regional arterial road R34. The Zimbutu Discard Dump is located to the west of the Umgala operations and outside of the Umgala-Knights Hill Mining Right.

Table 5 details the location of the proposed activities, including the details of the farm portions included in the application.

The regional locality and regional municipal boundaries of the Project area are depicted in Figure 6 and Figure 7 respectively. A prominent topographical feature in the vicinity of the Umgala mining infrastructure site is Zimbutu Mountain. The Project site falls within the Buffalo River catchment, a part of the Tugela River basin.

Table 5: Property Description of the location of the Project area

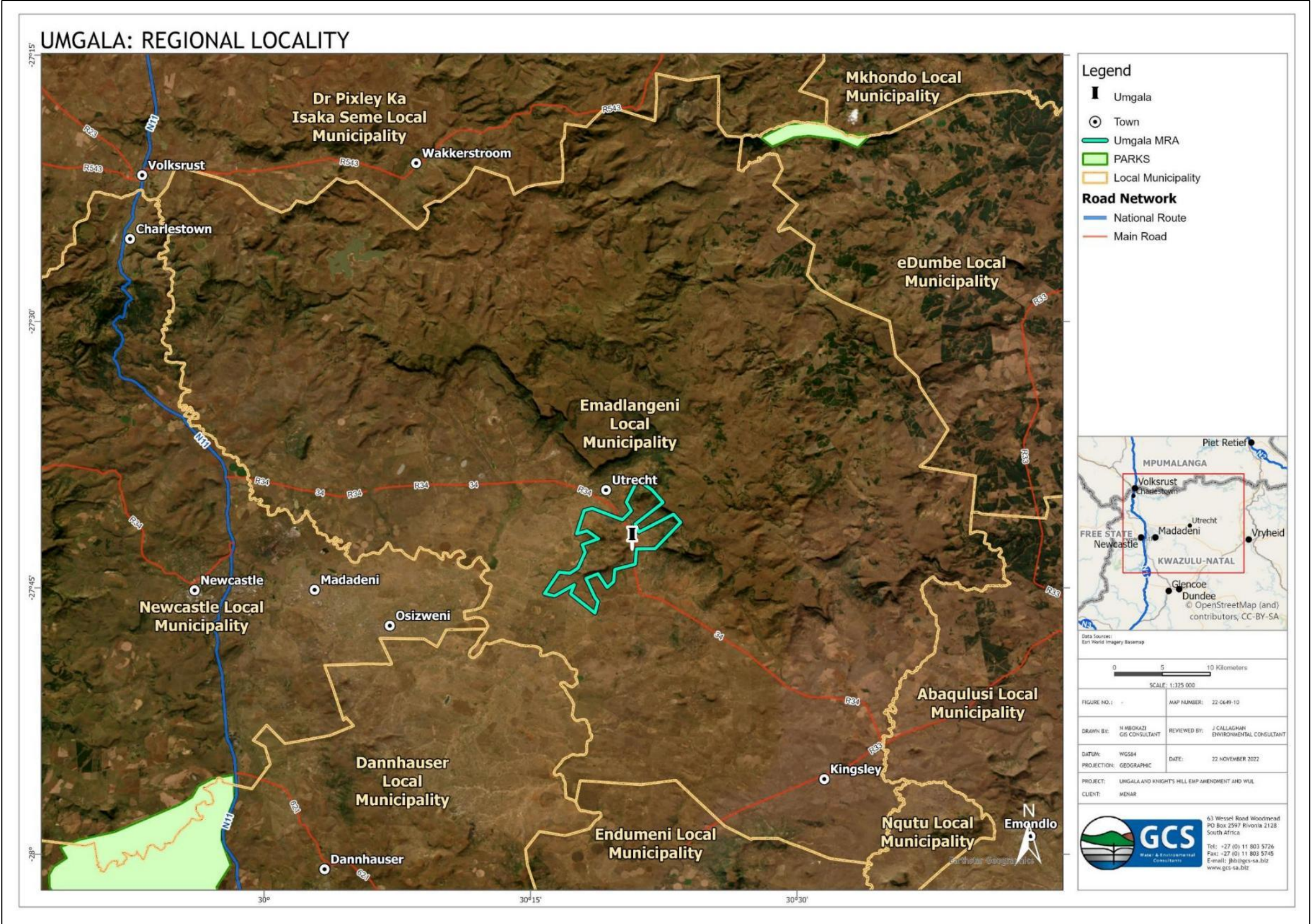
Application area (farm portions applicable to the Project are shown in bold)	Farm	Portion	Total Area (ha)
	Vergenoegd 107 HT	Portion 1	148.9
	Vergenoegd 107 HT	Portion 2	388.9
	Vergenoegd 107 HT	Portion 3	152
	Vergenoegd 107 HT	Portion 4	236.9
	Vergenoegd 107 HT	Portion 5	170
	Vergenoegd 107 HT	Portion 6	337.9
	Vergenoegd 107 HT	Portion 7	468.1
	Zandspruit 162 HT	Portion 1	255.7
	Zandspruit 162 HT	Portion 4	80.9
	Zandspruit 162 HT	Portion 6	311.6
	Zandspruit 162 HT	Portion 11	255.7
	Tusschenbij 167 HT	Portion 1	531.9
	Tusschenbij 167 HT	Portion 2	426.3
	Gumtreespruit 424 HT	Remainder of Gumtreespruit 424 HT	759.6
	Utrecht 266 HT	Townlands of Utrecht 266 HT	3645.5
	Berouw 179 HT¹	Portion 12	128.0597
Magisterial district	Amajuba District Municipality		
Distance and direction from nearest town	Approximately 3 km south-east of Utrecht		

¹ This farm portion is located outside of the Umgala-Knights Hill MR.

21-digit Surveyor General Code for the Mining Right area (the farm portions applicable to the Project are indicated in bold)	Farm	SG Code	Ownership
	Vergenoegd 107 HT: portions 1	NOHT00000000010700001	Christoffel Boshoff Davel
	Vergenoegd 107 HT: portions 2	NOHT00000000010700002	Indus Davel Trust
	Vergenoegd 107 HT: portions 3	NOHT00000000010700003	Marthinus Wessel Jordaan
	Vergenoegd 107 HT: portions 4	NOHT00000000010700004	Christoffel Boshoff Davel
	Vergenoegd 107 HT: portions 5	NOHT00000000010700005	Indus Davel Trust
	Vergenoegd 107 HT: portions 6	NOHT00000000010700006	Indus Davel Trust
	Vergenoegd 107 HT: portions 7	NOHT00000000010700007	Christoffel Boshoff Davel
	Zandspruit 162 HT: portions 1	NOHT00000000016200001	Steven Mkhanyiselwa Mazibuko
	Zandspruit 162 HT: portions 4	NOHT00000000016200004	Welgedacht Exploration Company Pty Ltd
	Zandspruit 162 HT: portions 6	NOHT00000000016200006	Welgedacht Exploration Company Pty Ltd
	Zandspruit 162 HT: portions 11	NOHT00000000016200011	Steven Mkhanyiselwa Mazibuko
	Tusschenbij 167 HT: portions 1	NOHT00000000016700001	Gert Jakobus Grobler
	Tusschenbij 167 HT: portions 2	NOHT00000000016700002	Gert Jakobus Grobler
	Remainder of Gumtreespruit 424 HT	NOHT00000000042400000	Boshoff Davel Trust-Trustees
	Townlands of Utrecht 266 HT	NOHT00000000026600000	eMadlangeni Municipality
	Berouw 179 HT, portion 12	NOHT00000000017900012	Welgedacht - Exploration Co Ltd

* All properties associated with the Mining Right area are included in the table, however, the properties where activities take place are indicated in **bold**. The farm portion Berouw 179 HT is not part of the

Mining Right area, however is owned by the Applicant and will be a source of the material to be used in the plant.



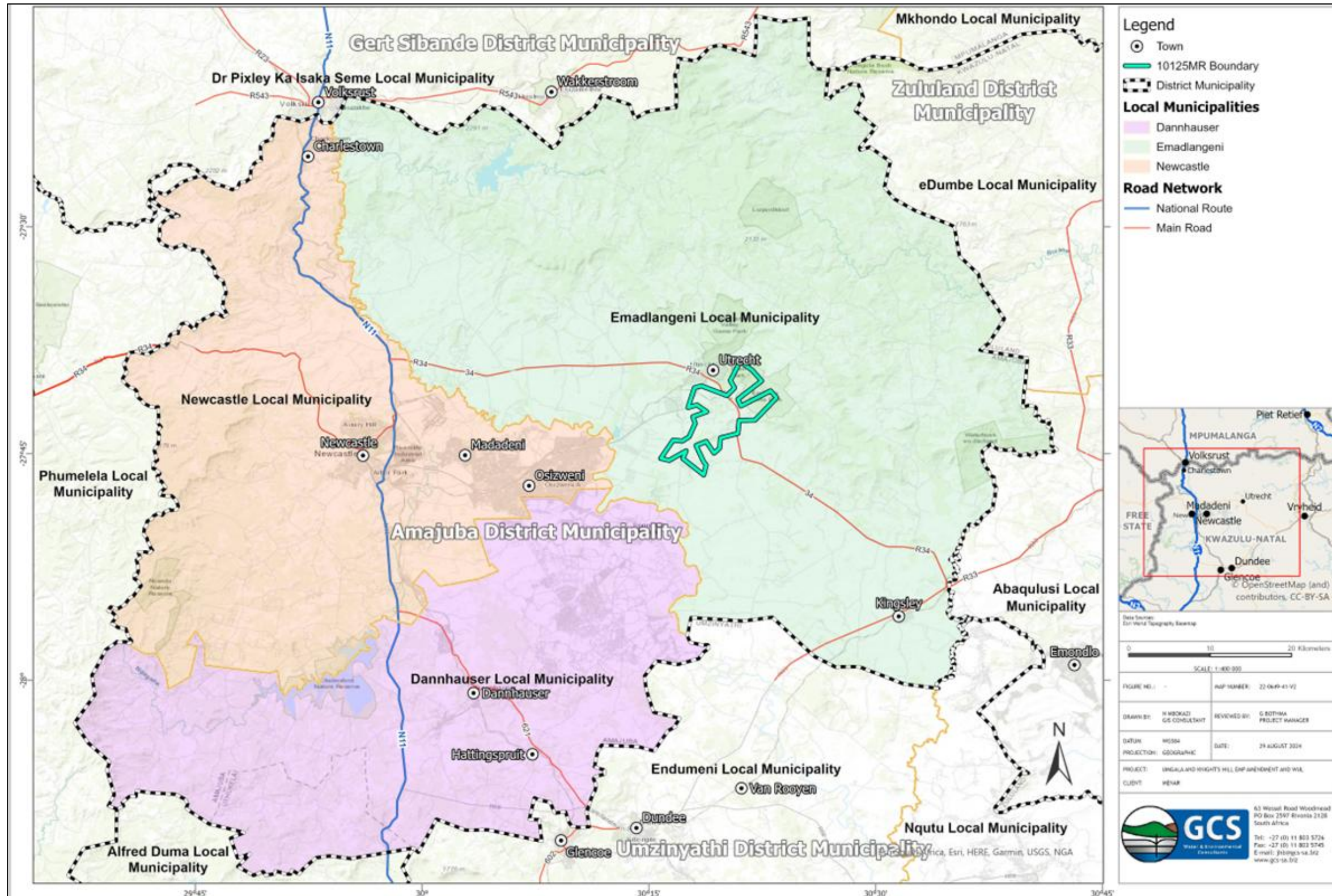


Figure 7: Local Municipality Map (source: GCS, 2024)

4. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

4.1. EXISTING AUTHORISATIONS

Welgedacht a subsidiary of Unyezi Coal and affiliate of Kangra Coal within the Menar Group, is the holder of a Mining Right (KZN 30/5/2/2/1/122 MR) that was granted 2013 for the Umgala and Knight's Hill coal mining operations. An application for a Mining Right renewal was lodged to the DMRE in 2023 with reference number (KZN 30/5/1/2/2/10125 MR). The initial Mining Right was granted in 2013 following the approval of an EIA and Environmental Management Programme (EIA/EMP), originally submitted in 2006 and re-submitted in 2009 in line with the DMR's requirements. The approved 2009 EMP includes both existing and proposed mining activities and infrastructure at Umgala and Knight's Hill, although operations have not yet commenced. The company also holds separate MRs for other mining areas in the region, including Aasvoelkrans.

4.2. REQUIRED AUTHORISATIONS

To enable the re-commissioning of the Umgala operation, Welgedacht must secure the necessary environmental and water-related authorisations. GCS was previously appointed to lead the environmental assessment and licensing processes. This included the application for an integrated environmental authorisation to amend the existing Umgala-Knight's Hill Project, water use licences for both Umgala and Knight's Hill operations, and a WML for the reprocessing of material from the Zimbutu Discard Dump and continued operation of the Umgala discard facility. These authorisations are critical to ensure legal compliance and the environmentally responsible implementation of the proposed activities and associated infrastructure across the Project areas. Since the acceptance of the Final Scoping Report by the DMRE, the Applicant has decided to exclude the activities associated with Knights Hill from this application. Proposed activities at Knights Hills will be applied for separately at a later stage.

4.3. LISTED AND SPECIFIED ACTIVITIES

Various activities and/or infrastructure are planned for the re-commissioning of the mine. These include:

- Construction of facilities approved in 2009 EMPR
- Various upgrades/refurbishments/rebuilding of existing structures/infrastructure within the old mine complex
- New Processing Plant
- Reclamation of the Zimbutu Discard Dump (includes receiving, processing and disposing material at Umgala)
- Discard Dump extension
- Additional Access Road
- Additional Security / Access control office
- Additional Office complex (incl. general & bus/taxi parking areas, lamp room, change room, workshop, wash bay, ablution facilities, stores and offices)
- New Fuel depot

- New Adit & adit sump
- New underground workings
- Various additional overburden stockpiles
- Additional Haul roads, brake test ramp & hard park area
- New sewage management system
- Additional stormwater infrastructure
- Two new PCDs
- Ericson Dam
- New ROM & Product Stockpile Areas
- Pipeline from Umgala adit to the plant

The above intended activities/infrastructure required for the re-commissioning of the mine was inter alia included, either as existing or planned activities/infrastructure in the approved 2009 EMPr, although it was not as clearly defined as required for full operational efficiency.

In addition, the existing discard disposal facility was commissioned in the early 1970s and has been dormant since the beginning of 2004. Discard material was dumped at very steep angles in an uncontrolled form during the initial operations. During later years a discard buttress was formed around this dump and slurry and discard were co-disposed to the west of the initial dump. Concurrent rehabilitation took place to the outer embankments.

It is proposed to extend the discard disposal facility to the east. This will enhance the stability on the eastern side of the facility in accordance with the Department of Water and Sanitation (DWS) Standards.

The extension to the east will be utilised for the first 6 years and will be filled with the elevation of the existing facility. This will give the slurry ponds time to dry out and strengthen. Thereafter, the entire top surface of the discard disposal facility will be utilised for the life of mine.

The Listed Activities that form part of the Project and require authorisation are provided in Table 6 below.

Table 6: Listed Activities to be authorised under the National Environmental Management Act, 1998 (Act No. 108 of 1998) and the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)

Description of Activity	Applicable Listed Activity	Listed Activity Description as per Regulations / Notice
Listed Activities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) Environmental Impact Assessment (EIA) published in Government Notice Regulations (GNR 982) of 4 December 2014, as amended		
Listing Notice 1 (GNR 983)		
Installation and operation of pipelines with a diameter of more than 0,36m and throughput of more than 120l/s for the supply of water/stormwater reticulation.	Listed Activity 9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.
Installation and operation of pipelines with a diameter of more than 0.36m and throughput of more than 120l/s for the supply of process/waste/return water or effluent reticulation.	Listed 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 – (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.
New electricity distribution lines (or upgrades) exceeding 1km in length will be developed.	Listed Activity 11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.
A small portion of the existing discard dump, the proposed expansion as well as both PCDs and the softs dump encroach delineated wetlands on site. The combined footprint of these disturbances within wetlands exceeds 100m ²	Listed 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; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.
The new fuel depot proposed at the Umgala operation will involve the bulk storage and handling of diesel or other fuels, which are classified as dangerous goods under the relevant South African legislation (SANS 10228 and associated standards). The total storage capacity of the tanks or containers used for fuel and lubricants is greater than 80m ³ but does not exceed 500m ³ .	Listed Activity 14	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.
The PCDs, softs dump, pipelines, stormwater infrastructure and internal roads will require the deposition and removing of soil within regulated areas/watercourse.	Listed 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.
New haul roads, access roads, and hard park areas for both operations would likely meet or exceed the road reserve or width thresholds.	Listed Activity 24	The development of a road — (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 metres, or where no reserve exists where the road is wider than 8 metres.

Description of Activity	Applicable Listed Activity	Listed Activity Description as per Regulations / Notice
Any upgrades of old mining roads that meet these criteria will trigger this activity including access and haul road between Zimbutu and Umgala.		
The new sewage management system at Umgala will likely exceed the 2000l/day threshold, especially if the sewage management system supports workshops, ablutions, and offices.	Listed Activity 25	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2 000 cubic metres but less than 15 000 cubic metres.
Listing Notice 2 (GNR 984)		
The proposed new fuel depot at Umgala would likely involve the storage of diesel or other fuels classified as dangerous goods. If the combined capacity of storage tanks exceeds 500 m³, this activity is triggered.	Listed Activity 4	The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.
The coal processing plant (new or refurbished), fuel depot, PCDs, stormwater and sewage systems, and discard dump extension all have the potential to generate effluent, emissions or waste requiring licensing under NEMAQA, NWA, or NEM:WA. The reprocessing of both the existing Umgala Discard and the Zimbutu Discard Dump at the Umgala plant will require a waste management licence, which triggers this activity. In addition, the treatment plan will also trigger this activity.	Listed 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.
The cumulative area required for the Umgala infrastructure, including haul/access roads, discard dump extension, RoM and product stockpiles, processing plant, workshops, and overburden stockpiles, will exceed 20 hectares.	Listed Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.
The re-commissioning of Umgala and development requires a Mining Right and includes mainly underground mining of coal (anthracite and bituminous). Umgala has an existing MR, however, a Mining Right renewal was also submitted for in 2023. This is the core mining activity and is directly applicable.	Listed Activity 17	Any activity including the operation of that activity associated with the primary processing of a mineral resource including winning, reduction, extraction, classifying, concentrating, crushing, screening and washing but excluding the smelting, beneficiation, refining, calcining or gasification of the mineral resource in which case activity 6 in the Notice applies.
If the sewage treatment system (proposed for Umgala) is designed for more than 15 000 m ³ /day throughput (i.e., servicing multiple industrial facilities and staff components), this activity will apply.	Listed Activity 25	The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of 15 000 cubic metres or more.

Description of Activity	Applicable Listed Activity	Listed Activity Description as per Regulations / Notice
Listing Notice 3 (GNR 985)		
New access roads and internal haul roads are planned at Umgala. Access and Haul roads between Umgala and Zimbutu will also be upgraded and/or established to facilitate the transportation of discard material to Umgala processing plant. These are likely to exceed 4 m in width (e.g., to allow for two-way traffic, haul trucks, etc.)	Listed Activity 4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. d. <u>KwaZulu-Natal</u> i. In an estuarine functional zone; ii. Trans- frontier protected areas managed under international conventions; iii. Community Conservation Areas; iv. Biodiversity Stewardship Programme Biodiversity Agreement areas; v. World Heritage Sites; vi. A protected area identified in terms of NEMPAA; vii. Sites or areas identified in terms of an international convention; <u>viii. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</u> ix. Core areas in biosphere reserves; x. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; xi. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; <u>xii. Outside urban areas:</u> <u>(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or</u> (bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or xiii. Inside urban areas: (aa) Areas zoned for use as public open space; (bb) Seawards of the development setback line or within 100 metres from the high-water mark of the sea if no such development setback line is determined; or (cc) Within urban protected areas.
Vegetation clearance will be necessary for (among others): – New adits – Discard dump expansion – PCDs and stormwater infrastructure – Stockpile areas – Overburden dumps These developments occur within sensitive zones, such as Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), or within 100m of a watercourse, this activity will be triggered.	Listed 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. d. <u>KwaZulu-Natal</u> i. Trans-frontier protected areas managed under international conventions; ii. Community Conservation Areas; iii. Biodiversity Stewardship Programme Biodiversity Agreement areas; iv. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; <u>v. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</u> vi. Within the littoral active zone or 100 metres inland from high-water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the

Description of Activity	Applicable Listed Activity	Listed Activity Description as per Regulations / Notice
		development setback line on erven in urban areas; vii. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; viii. A protected area identified in terms of NEMPAA, excluding conservancies; ix. World Heritage Sites; x. Sites or areas identified in terms of an international convention; xi. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; xii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; or xiii. In an estuarine functional zone.
Several structures with a surface area exceeding 10 square meters will occur within 32m of a delineated water course or within the buffer zones of wetlands.	Listed Activity 14	The development of — (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or (ii) <u>infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs —</u> a. within a watercourse; b. in front of a development setback; or c. <u>if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</u> excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour. d. <u>KwaZulu-Natal</u> i. In an estuarine functional zone; ii. Community Conservation Areas; iii. Biodiversity Stewardship Programme Biodiversity Agreement areas; iv. A protected area identified in terms of NEMPAA, excluding conservancies; v. World Heritage Sites; vi. Sites or areas identified in terms of an bioregional plans; viii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; ix. Core areas in biosphere reserves; x. Outside urban areas: (aa) <u>Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</u> or (bb) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or xi. Inside urban areas: (aa) Areas zoned for use as public open space; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose

Description of Activity	Applicable Listed Activity	Listed Activity Description as per Regulations / Notice
Listed Activities in terms of the National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) List of Waste Management Activities That Have, Or Are Likely to Have, A Detrimental Effect on The Environment published in Government Notice 921 of 29 November 2013, as amended.		
This activity is triggered where a general waste disposal facility (including mineral waste like discard) is constructed, with: – >50 m² footprint, and – >25 000 tonnes total disposal capacity The discard disposal facility at Umgala is being extended to the east. Given the long-term use and scale, the volume of discard to be deposited will exceed 25 000 tonnes, and the footprint will exceed 50 m². In addition, residue stockpiles (ROM) will also be established.	GNR 921 Category B: Activity 9	The construction of a facility for the disposal of general waste to land covering an area in excess of 50 m² and with a total capacity exceeding 25 000 tonnes.
As part of the Project, the Umgala Discard Dump will be extended. In addition, ROM will be established and this activity will be triggered.	GNR 921 Category B: Activity 10	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).
Existing discard at Umgala will be reclaimed. As part of the Zimbutu Discard Dump closure and rehabilitation, the Zimbutu Discard Dump will also be reclaimed and material will be transported to the Umgala Plant for processing.	GNR 921 Category B: Activity 11	The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

Project activities trigger various water uses as defined in Section 21 of the NWA and will require licensing. These are provided in Table 7 below.

Table 7: Water Uses in Terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998) that are Associated with the Proposed Project

Section 21 Water Use	Proposed Project Activity
Section 21 (a) -Taking water from a water resource.	Abstraction of water for mining operations, dust suppression, processing plant operations, and domestic use at the mine. Clean water abstraction from in-stream dam to be constructed.
Section 21 (b) - Storing of water	– Storage of clean water in a new Clean Water Dam (Raw Water Dam)
Section 21 (c)-Impeding or diverting the flow of water in a watercourse	– Any modifications to stormwater infrastructure, including culverts, drains, or flood control measures that may impact natural water flow. – Activities such as new access roads, adits, conveyor systems, or pipelines crossing or running parallel to a watercourse.
Section 21(g) –Disposing of waste in a manner which may detrimentally impact a water resource.	– Extension of the discard dump and reclamation activities that may lead to seepage affecting groundwater or surface water. Establishment of stockpiles/residue all trigger this water use. – Wastewater and sewage treatment systems potentially impacting water quality.
21 (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.	– Dewatering of underground workings at both Umgala to ensure safe mining conditions. – Pumping out water from the adit sumps and underground operations.

5. DESCRIPTION OF THE ACTIVITIES TO BE UNDERTAKEN

The information provided in this section was extracted from the Proposed Umgala Plant and Adit Civil Infrastructure Report, compiled by GFK consulting Engineers in 2025. The full report is attached under Appendix IV.

5.1. PURPOSE OF PROJECT

The primary objective of the proposed Project is to expand coal mining and processing operations by utilising existing infrastructure while developing new underground mining facilities. This initiative aims to enhance coal extraction and processing efficiency while optimising resource utilization. The Project will involve the establishment of the Umgala Plant processing facility within a previously developed mine and plant area. This facility will house two new coal processing plants dedicated to coal washing activities, ensuring improved product quality and operational efficiency. Additionally, the Umgala Adit site will support underground mining operations through the development of a new adit, with coal being transported to the processing plant via interlink trucks.

Further, the reclamation of material from both the existing Umgala Discard Dump and the Zimbutu Discard Dump for reprocessing at the Umgala Plant will contribute to meeting the mine's overall rehabilitation requirements.

By implementing these developments, the Project seeks to maximise coal extraction, enhance processing capabilities, and ensure the sustainable utilisation of coal resources while leveraging existing infrastructure to minimise environmental and operational impacts.

5.2. PROPOSED OPERATIONS

The activities associated with the Project will be conducted in two phases: construction and operational. During the construction phase, critical infrastructure will be established, which includes the development of the Umgala adit. This phase will require activities such as topsoil clearing, drilling, blasting, excavation, and the transport of materials. In addition, the construction of stockpiles/dumps will be necessary to accommodate the mined material.

The operational phase will see the mining of coal from the Umgala adit, utilising both the continuous miner and the board and pillar mining method. The Umgala operation, with a Life of Mine (LoM) of approximately 7 years, will produce around 1.2 million tonnes of RoM coal annually, with a product yield ranging between 70% and 78%.

The underground mining operations will be equipped with shuttle cars and other essential machinery for modernised coal mining. The mined coal will be transported to the surface via conveyor belts and then hauled to the Umgala coal processing plant for further processing. At the plant, the RoM coal will undergo crushing and washing to meet the specifications required for the different processing circuits, which include the drum plant, spiral plant, and cyclone plant. The final product will consist of coal nuts (-150 mm +25 mm), spiral product (-1 mm), peas (-25 mm +6 mm), and duff (-6 mm +1 mm). The coal discard will be placed on the Umgala Discard Dump. It is projected that the plant will produce approximately 13.2 million tonnes of coal product over the Project's 15-year life, with peak production reaching 930,000 tonnes per year. The plant will operate for around 550 hours per month, with downtime occurring for approximately 35 days annually.

The infrastructure to be established for Umgala includes the construction of new facilities, refurbishments of existing structures, a new processing plant on the current plant's footprint, an extension of the discard dump, additional access roads, and enhanced security and office complexes. Other key infrastructure upgrades include a new fuel depot, an additional sewage management system, two new PCDs, RAP system, and a new pipeline from the Umgala adit to the processing plant.

Additionally, Welgedacht plans to utilise the Umgala coal washing plant to reprocess discard from both the existing discard present at Umgala and the nearby Zimbutu Discard Dump and, eventually, process RoM coal from the Aasvoelkrans Colliery. The reclamation and processing of discard from both Zimbutu and Aasvoelkrans will form a critical part of the ongoing mine operations, contributing to the overall sustainability and profitability of the Project as well as reducing material in these areas and thereby reducing environmental risks and liabilities.

5.3. PROCESSING PLANT

5.3.1. Adit Sump

A 2500m³ adit sump will be required at the adit site. This sump is designed to accommodate the 1:50-year instantaneous flood from both the adit and adit ramp areas. Additionally, groundwater from the underground workings will be pumped into the sump for temporary storage before being transferred to the PCDs and subsequently to the Umgala Plant for further use and management.

When operating close to empty, the adit sump will be capable of holding approximately 5 days' worth of maximum predicted groundwater dewatering flows at 483 m³/day before the water is pumped to the PCD. This capacity allows for potential pump downtime during emergency situations. As an operating guideline, the sump should not be filled to its full capacity. Instead, it is recommended to maintain a minimum operational level to ensure that the 1:50-year instantaneous flood can be contained, preventing flooding of the adit area.

In the event of a flooding incident, the sump is designed such that it will not spill into the clean natural veld area, as it is situated below the natural ground level.

The sump will be lined with Gunitite (shotcrete) according to BS 8007 water retaining specifications. This lining will be implemented with side slopes to minimise seepage into the underground workings from the sump.

5.3.2. Pollution Control Dams

Table 8 and Table 9 details the specifications PCDs that will be utilised at the Umgala Plant Area and the Adit Area. The PCDs at the Umgala Plant Area will feature a concrete lining with an underdrainage leakage detection system. In contrast, the PCDs at the Umgala Adit Area will incorporate a Class C HDPE-Clay liner, also equipped with an underdrainage leakage detection system.

Table 8: Umgala Plant Area Pollution Control Dams (PCD's) Specifications

Umgala Plant

Description	Capacity	Class C Liner Type	Inside Wall Slopes	Freeboard (m)	Min Spillway Capacity (1:100 year return flow)	Emergency Spillway Capacity (1:100-year return flow)	Emergency Spillway minimum width for indicated freeboard (m)
PCD 1A	13 500	Concrete	1:2	1	10.9	11.09	6
PCD 1B	30 000	Concrete	1:2	1.6	14.1	17.08	3.5
RWD 1	167000**	Concrete	1:2	0.8	13.4	16.4	6.5 (per cell)*
RWD 2	34 700	Concrete	1:2	0.8	0.9	3.29	2

* RWD Consists of 2 Cells (Cell 1 & Cell) and emergency spillway of 6.5m for 0.8m freeboard is required per cell to achieve the 16.4m³/s capacity

** Cell 1 (86 000m³) and Cell 2 (81 000m³)

Table 9: Umgala Adit Area Pollution Control Dams (PCD's) Specifications

Umgala Adit Area							
Description	Capacity	Class C Liner Type	Inside Wall Slopes	Freeboard (m)	Min Spillway Capacity (1:100 year return flow)	Emergency Spillway Capacity (1:100-year return flow)	Emergency Spillway minimum width for indicated freeboard (m)
PCD A1	3 000	Clay-HDPE Geomembrane	1:3	0.94	1.4	4.09	2
PCD A2	8 000	Clay-HDPE Geomembrane	1:3	0.8	6.4	6.57	5

5.3.2.1. Umgala Plant Area

A Class C equivalent liner is proposed for the PCD 1 and PCD 3 in the Umgala Plant Area, which will consist of the following components:

- Underdrainage system with leakage monitoring, including 110mm perforated drain pipes placed on the basin of the PCD. Minimum 300x4.5mm thick wick drains (or similar approved) will be installed under the concrete on the side slopes, with drains placed directly under concrete joints, spaced 4.5 metres apart.
- 150mm Thick floor and 100mm thick walls (1:2 slopes), Class 30MPa/19mm concrete with 900g/m³ polypropylene micro fibres with Ref 245 reinforcing on the dam basin floor and side slopes, as well as spillway.

Although no seepage through the Class C equivalent liner is expected, the underdrainage system will effectively direct any leaks to the monitoring borehole. The groundwater table beneath the PCD is anticipated to be lower than the PCD basin invert. However, provisions have been made to divert any groundwater should this not be the case.

The suppliers of the proposed HDPE synthetic barriers for the PCDs typically provide up to 10 years of guarantees against failure due to environmental exposure. However, the expected service life of the PCD is up to 29 years, with UV exposure likely reducing the lifespan of the HDPE liner. If HDPE is used, it would require replacement after 10-15 years. Alternatively, the liner would need to be covered with geocells filled with cement-stabilised material to protect it.

A concrete-lined PCD is preferred due to the long Project life, as it allows the PCD to be desilted using a TLB/Front-End Loader, including the addition of a ramp. In contrast, a HDPE-lined PCD would not allow for this maintenance. Therefore, a concrete-lined facility is recommended to ensure the PCDs remain operational without the need for re-lining throughout the lifespan of the project.

5.3.2.2. Umgala Adit Area

A Class C double barrier system is required for the PCDs at the Umgala Adit Area. The system includes the following components:

- Underdrainage System with Leakage Monitoring: This includes 110mm diameter perforated drain pipes arranged in a herringbone pattern, discharging into a collector drain.
- Clay Liner: A 300mm thick clay layer consisting of two 150mm compacted layers, with a minimum 95% Proctor density at optimum moisture content (OMC). The Geotechnical Investigation will provide the permeability values of the in-situ clays, which can be used as the clay liner.
- HDPE Geomembrane Liner: A 1.5mm thick, textured liner on both sides.
- Ballast Layer: A 300mm thick ballast layer, hand-raked to level across the PCD basin.
- Geocell Protection: Non-woven geotextile geocells (200x200mm grid, 250mm deep) will be placed on the side slopes and filled with soilcrete (washed river sand and Portland cement) to achieve a strength of 5MPa, nominally compacted, and raked flush. This is necessary to prevent UV degradation of the HDPE liner, especially since the service life is expected to exceed 10 years.

The service life of the liner and operating period is estimated to be 15 years, covering the LoM, construction ramp-up, and closure phases. Suppliers of the proposed synthetic barriers typically provide guarantees for up to 10 years against environmental exposure, which will be required for barrier suppliers.

While temperature fluctuations will not affect the HDPE liner, exposure to UV rays may reduce its lifespan, generally aligning with the 10-year guarantee period. However, the geocell UV protection layer above the geomembrane will extend the HDPE's lifespan beyond the 10 years, ensuring it lasts the full 15-year service life. Monitoring of the liner's condition will be required to determine if replacement is necessary. The typical interface strength of textured HDPE is a 19-degree shear angle with 23 kPa cohesion, and for residual values, a 22-degree shear angle with zero cohesion.

5.3.2.3. *Silt Traps at the Pollution Control Dams*

For all proposed Pollution Control Dams (PCDs) at Umgala, dirty water channels will be directed to the PCDs via a concrete silt trap. Where feasible, two silt traps per PCD are recommended to facilitate continuous operation and maintenance, allowing one trap to remain functional while the other undergoes cleaning.

The concrete silt traps will feature ramps with a 1:6 slope to enable easy access for cleaning. A 14-day cleaning interval should be maintained during periods of high storm flow to ensure effective silt removal. During drier months, this interval may be extended based on operational requirements. The estimated runoff silt volume is 22m³/ha/annum. Figure 8 provides an illustration of a typical silt trap design.

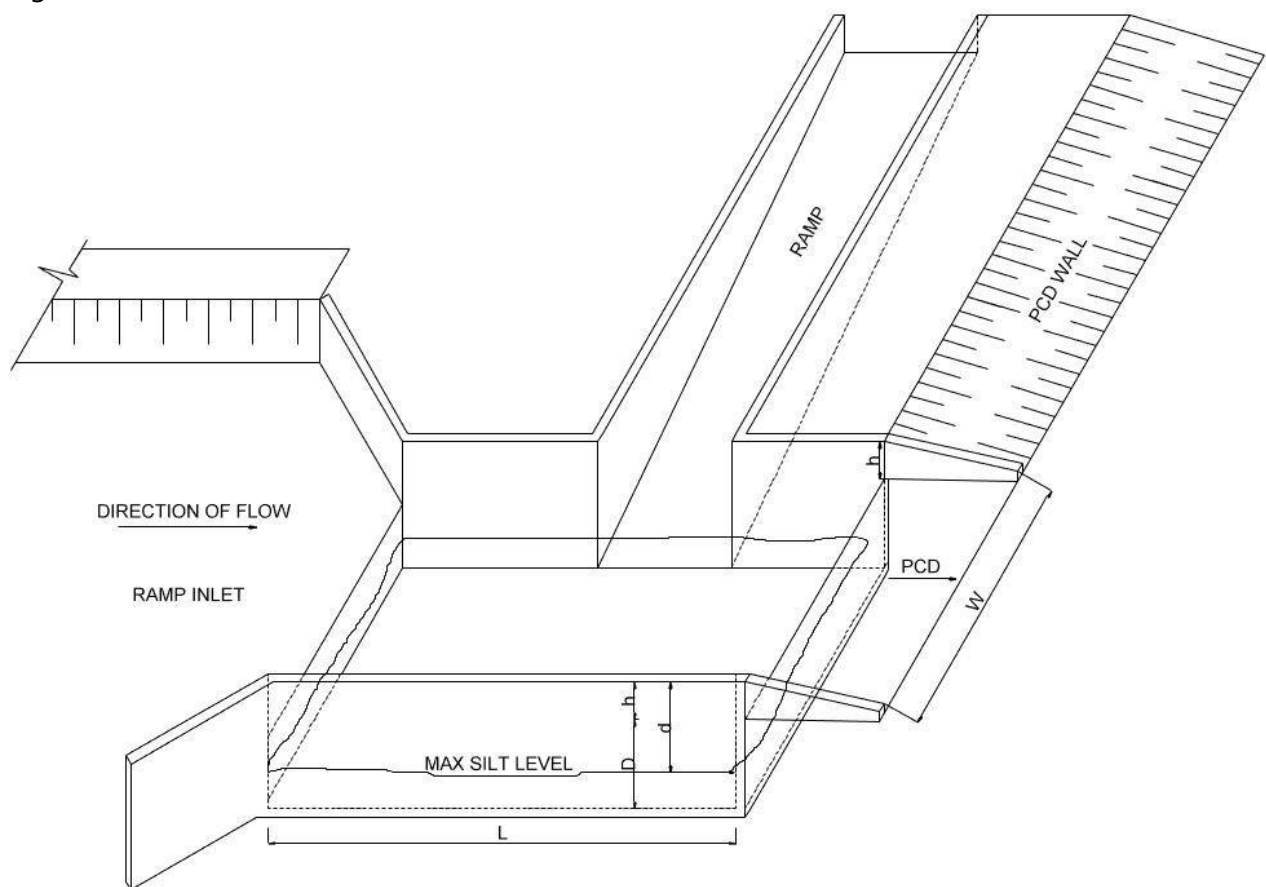


Figure 8: Typical Silt Trap Detail

2.1.1 **Ponds / Dams Associated with the Process Plant**

5.3.2.4. *Return Water Dams*

The Umgala Plant site currently has two Return Water Dams (RWDs) that collect surface water and seepage from the existing discard dump. According to the GCS Annual Monitoring Report, the water quality in these dams is substandard, with elevated concentrations of electrical conductivity (EC), total dissolved solids (TDS), calcium, magnesium, sodium, potassium, chloride, and fluoride, exceeding the Mean Ambient Surface Water Quality standards (GCS, 2024a).

To mitigate the environmental risks associated with runoff and seepage of contaminated water, the RWDs will be lined to appropriate standards. These dams will continue to serve as surplus water storage facilities for plant operations. A Class C equivalent liner is proposed for RWD 1 and RWD 2, featuring:

- Underdrainage system with leakage monitoring, including 110mm perforated drain pipes and 300x4.5mm wick drains positioned beneath concrete joints.
- Structural enhancements, such as a 150mm thick concrete floor and 100mm thick walls (1:2 slope) made of Class 30MPa/19mm concrete, reinforced with 900g/m³ polypropylene microfibres and Ref 245 mesh.
- Seepage control measures, ensuring any potential leakage is directed to a monitoring borehole for collection and reintegration into the RWD.

While HDPE liners are an alternative, they are susceptible to UV degradation, requiring replacement every 10–15 years. A concrete-lined facility is preferred due to its extended lifespan and durability, eliminating the need for frequent relining. Furthermore, the RWDs are expected to remain post-mining rehabilitation to capture potential seepage from the discard dump.

5.3.2.5. *Slurry Dams*

A filter press will be installed at both the Umgala Plant and Adit Areas to reduce the water content in slimes. The slurry dams will serve as a secondary system to the primary drying process, acting as a backup during maintenance or filter press downtime, which is assumed to last up to two weeks.

5.3.2.5.1. *Slurry Storage Requirements*

In the event of a worst-case filter press breakdown at both plants, the following slurry volumes must be accommodated:

- 100t/hr plant (discard washing) – 2,500m³ for two weeks
- 350t/hr plant (RoM washing) – 8,750m³ for two weeks
- Total required capacity – 11,250m³

To ensure adequate capacity, the slurry dams will be designed for a total volume of 11,500m³, divided into two separate cells of 5,750m³ each.

5.3.2.5.2. Slurry Dam Construction

- The dams will store Type 3 waste, requiring a Class C liner.
- HDPE lining is not recommended as it would be damaged by excavation during sludge removal.
- Concrete-lined dams will be constructed for durability and ease of maintenance.
- Each cell will measure 35.5m (width) × 92m (length, including ramp) × 2.8m (depth, including 0.8m freeboard).
- The walls and floor will be a minimum of 250mm thick, with 75mm concrete cover over the reinforcing steel to prevent corrosion. Class 30MPa/19mm reinforced concrete will be used.
- Acid-resistant sealant and rubber water stops with expanded polypropylene backing will be applied to all expansion and construction joints to ensure watertightness.

5.3.2.5.3. Structural and Drainage Considerations

- Construction will adhere to BS 8007 (Concrete for Water Retaining Structures), ensuring compliance with crack width calculations.
- A ramp will be constructed for sludge removal.
- Overflow system: Precast penstock rings will direct supernatant water to a silt trap, which will channel the water to PCD 1 via a dirty water channel.
- Underdrainage and Leakage Monitoring:
 - 110mm perforated drainpipes will discharge to leakage detection manholes, which must be regularly monitored.
 - The system will also prevent uplift pressure on the concrete structure in the presence of groundwater.

5.4. DISCARD DUMP STOCKPILE FACILITY

A coarse discard dump will be utilised for the entire 27-year life of the project, depending on the mining sequence and coal transport logistics. This dump will remain on the surface indefinitely after the project ends and will require rehabilitation. The applicant also intends to reduce the existing material on the discard dump by reprocessing and redisposing to the extension where it will be lined in accordance with specifications set out in the Waste Classification. The dump will also receive additional material incoming from other sections surrounding the mine, such as Zimbutu and Aasvoelkrans.

5.4.1. Rehabilitation and Cover Requirements

The discard will be covered with at least 600mm of soil within three months of forming terraces to prevent spontaneous combustion and support rehabilitation. A deficit of approximately 67,000m³ of cover material is expected, which must be sourced from the Umgala Adit softs dump or an approved borrow pit.

5.4.1.1. Discard Dump Specifications

5.4.1.1.1. Coarse discard generation:

- 100 tph plant: 16,000m³/month.
- 350 tph plant: 55,000m³/month.
- Total required storage capacity: 9,103,400m³.
- Compacted SG of discard: 1.4.
- Current storage capacity available: 2,700,000m³.
- Total dump height: 59.4m.
- Cover material required: 170,000m³.
- Cover material available: 103,000m³ (69,000m³ under the dump footprint + 34,000m³ from existing topsoil/softs dump).
- Deficit of cover material: 67,000m³ to be sourced externally.

5.4.1.1.2. Liner and Drainage System

The discard dump will be lined with a Class C liner, as required for Type 3 waste, following DWS domestic waste liner specifications. The liner system consists of:

- Underdrainage System & Leakage Monitoring:
 - 110mm perforated drainpipes placed every 80m in a herringbone pattern.
 - Drainpipes will discharge to dirty water channels, ensuring leak detection and containment.
 - Drainpipes placed in 19mm stone wrapped in geotextile or washed river sand.
- Liner Structure
 - 300mm compacted clay layer (two 150mm layers, 95% Proctor density).
 - 1.5mm double-textured HDPE geomembrane, meeting SANS 1526:2015 & SANS 10409:2020 standards.
 - 200g/m² non-woven geotextile (Rock-Grid PC 50/50 or similar) placed on the HDPE to prevent punctures.
- Protective Layers
 - 150mm selected sandy material, compacted to 90% Proctor density (placed using end-tipping to avoid damage).
 - Two layers of 300mm coarse discard placed on sandy material as protection and drainage (600mm total thickness, extendable to 1000mm).

As the HDPE liner will always remain covered with a minimum of 600mm of discard material and the dump will be fully covered and rehabilitated, minimal to no degradation of the liner is expected.

According to HDPE suppliers, when the geomembrane is not exposed to direct sunlight and remains covered, its lifespan ranges from 40 to 400 years. Consequently, the service life of the liner post closure is considered indefinite, as the rehabilitated dump will remain permanently in place. Any surface water or infiltrated water within the coarse discard layer will be directed into concrete-lined polluted water channels, which will ultimately discharge into the PCD, ensuring effective water management and environmental protection.

5.5. RUN-OF-MINE PRODUCT STOCKPILE FACILITY AND PLANT AREA LINER

The terrain in the proposed stockpile area has been significantly altered due to previous mining activities. As a result, a platform is required to facilitate proper site shaping and enable the construction of a dirty water channel that will discharge into the PCD. Without this platform, achieving gravity flow from the stockpile area to the PCD would be challenging due to space constraints imposed by the existing discard dump and flat terrain (with slopes of less than 0.4% on the northern side).

Given the anticipated material shortages for discard dump cover and adit void rehabilitation, it is recommended that the platform be constructed using coarse discard sourced from the existing discard dump. Approximately 385,400m³ of discard will be required for its construction. The platform will be built on top of a Class C lined barrier, ensuring that contamination is prevented. Additionally, a 600mm to 1000mm sacrificial discard layer will be placed atop the HDPE liner to protect it from potential damage caused by vehicular and plant movement.

5.5.1. Class C Barrier System for the RoM, Product, and Plant Areas

The Class C barrier, similar to that of the discard dump, will be applied to the Run-of-Mine (RoM), Product, and Plant areas, and will consist of the following layers:

- Underdrainage System with Leakage Monitoring:
 - 110mm perforated drain pipes will be installed at 80m intervals as primary collector pipes.
 - Additional 110mm perforated pipes will be incorporated in a herringbone pipe system, where required.
 - The primary collector pipe will discharge into a 160ND bulk solid pipeline, positioned below ground level at the downstream toe of the product stockpile area.
 - Leakage monitoring manholes will be installed, fitted with a submersible pump to monitor and redirect any leaks to the PCD.
- Liner and Protection Layers:
 - 300mm clay layer, consisting of two 150mm layers, compacted to a minimum of 95% Proctor density at Optimum Moisture Content (OMC).
 - 1.5mm thick, double-textured HDPE geomembrane, meeting SANS 1526:2015 and SANS 10409:2020 specifications.
 - Rock-Grid PC 50/50 200g/m² geotextile, or an approved non-woven geotextile, will be placed directly on the HDPE to prevent punctures.
 - The geotextile will be temporarily secured with 30kg sand-filled ballast bags until protective soil layers are applied.

- 150mm of selected sandy material, lightly compacted to 90% Proctor density, will be placed on top of the geotextile using an end-tipping method. No heavy equipment or vehicles will be allowed to drive directly on the HDPE or geotextile.
- A minimum of three 300mm coarse discard protection layers will be applied and compacted to 90% Proctor density. This protection layer can be extended to 900mm–1000mm, using an end-tipping placement method.

5.6. MINE SITE INFRASTRUCTURE AND SERVICES

5.6.1. Mining Camp (Hard Park)

5.6.1.1. Umgala Adit Area

A fully equipped mining camp will be developed at the Umgala Adit site. The facilities will include offices, stores, parking, a bus shelter and drop-off point, workshop, wash bay, diesel bund, oil trap tank system with a silt trap, water storage tanks, and male/female ablution and shower facilities. Sewage will be managed via a 63 m³ conservancy tank with an associated sewage sump. A designated hard park area will be cleared to accommodate ADTs and tipper trucks. Additionally, a brake test ramp—designed with a gradient steeper than the mine's steepest slope (likely the adit ramp)—will be constructed between the mining camp and the adit access ramp.

5.6.1.2. Umgala Plant Area

A similar mining camp will be established at the Umgala Plant Area, comprising offices, stores, parking, a bus shelter and drop-off point, workshop, wash bay, diesel bund, oil trap tank system with a silt trap, water storage tanks, and gender-separated ablution and shower facilities. A 52.5 m³/day capacity sewer treatment plant will be installed to manage wastewater. As no active mining is planned at this location, a brake test ramp will not be required.

5.6.2. Security

Access to the Umgala site will be monitored and controlled 24/7 by security personnel stationed at the mine's single access point. To enhance security and prevent unauthorised entry, the following measures will be implemented:

- Perimeter Security: A security fence will be constructed around all mine infrastructure to restrict access for livestock, pedestrians, and vehicles.
- Additional Fencing: Security fencing will also be installed around the PCD to ensure restricted access.
- Safety Measures for Sumps and Tanks: These structures will either have closed tops or be equipped with safety railings and locked gates to prevent unauthorised access.
- Safety Berms: Where fencing is impractical, safety berms will be installed to prevent entry. Given the risk of fence theft, security berms may also be used as an alternative protective measure.
- Warning Signage: Warning signs will be prominently displayed in English and the local native language, cautioning pedestrians against attempting to bypass fences or safety berms.

These security measures will ensure continuous monitoring, controlled access, and enhanced safety at the mining sites.

5.6.3. Waste Storage and Management

5.6.3.1. Umgala Plant Area

The disposal of general and hazardous waste will not be permitted on site. All waste will be collected in designated skips and transported off-site for disposal at suitably licensed waste management facilities, in full compliance with regulatory requirements. At the Plant Area, an existing discard dump and a RWDs are already present. All new plant infrastructure will be constructed within this previously disturbed area, which will undergo upgrades and refurbishment to meet the latest seepage control standards.

5.6.3.2. Stockpiling and Waste Management

- RoM coal, product, and discard will be stockpiled at the Plant Area, requiring suitable barriers and liners to prevent contamination and ensure safe storage.
- A soft overburden dump will also be established within the Plant Area. This dump will temporarily store material excavated from beneath the newly proposed discard dump. The overburden will later be used as cover material for the discard dump as part of rehabilitation efforts.

5.6.3.3. Pollution Control and Water Management

To prevent polluted water from leaving the site or contaminating nearby streams, the following measures will be implemented:

- Pollution Control Dams (PCDs): New PCDs will be established to collect stormwater from the mine operational areas and discard dump. These dams will also store water pumped from Knights Hill and Umgala Adit underground workings for reuse at the plant.
- Return Water Dam (RWD) Lining: Where necessary, existing unlined return water dams will be lined to meet industry standards and reduce seepage, preventing potential groundwater contamination.
- Pollution control measures at Zimbutu will re-commence to ensure proper stormwater management as part of the process of collecting material from the Zimbutu Dump for reprocessing at Umgala Plant.

5.7. POST-MINING REHABILITATION

Upon completion of mining operations, all plant infrastructure will be systematically decommissioned and removed in a controlled and regulated manner. However, the discard dumps (both existing and newly constructed) will remain in place and undergo rehabilitation, including the application of a cover layer to minimise environmental impact.

The RWD and PCDs will continue to function as seepage collection systems, particularly for the existing discard dump, ensuring that any potential contamination does not enter surface or groundwater systems.

5.7.1. Umgala Adit Area

As part of this Project, an adit will be developed at the site, necessitating the creation of stockpile dumps for topsoil, soft overburden, and hard overburden. Topsoil will be utilised to construct a protective berm around the adit.

These materials will be temporarily stored on the surface until underground mining operations are completed, after which the adit will undergo rehabilitation. Reference should be made to the discard dump design outlined in a later section, as material from the soft overburden dump will be required for use as cover material at the Umgala Plant discard dump. Should this material be used for discard dump rehabilitation, a shortage of cover material may occur for the final rehabilitation of the void.

5.7.1.1. Material and Water Management

- Coal discard and product will not be stored at the adit site. Only RoM coal will be temporarily stockpiled before being transported to the Umgala Wash Plant for processing.
- Polluted water must not be allowed to leave the site or enter natural watercourses. To manage this, PCDs will be constructed to collect stormwater from mine operations and overburden dump areas, as well as to store pit water. This water will then be pumped to the Plant Area for further use and management.
- The PCDs will require regular maintenance to ensure optimal functionality and to prevent soil and land degradation both on site and in surrounding areas.

5.7.1.2. Post-Mining Rehabilitation

At the conclusion of mining activities, all infrastructure at the adit site will be systematically decommissioned and removed in accordance with regulatory guidelines. The overburden material will be backfilled into the adit, ensuring that no material remains in the stockpile dumps post-mine closure.

The disturbed areas will undergo landscaping, ripping, and reseedling with indigenous vegetation to restore the environment as closely as possible to its pre-mining condition. The stormwater management infrastructure will only be removed following the successful implementation of these rehabilitation measures.

5.8. WATER SUPPLY AND MANAGEMENT

5.8.1. General and Water Quality and Supply

It is anticipated that domestic water requirements at both the Plant Area and Adit Area will be met through boreholes drilled on site. To ensure compliance with water quality standards, it is recommended that:

- Drinking and potable water be supplied at Class I standard, in accordance with SANS 241.
- Water for showers and other non-potable uses meet at least Class II standards.

At the time of this report, the exact locations of domestic boreholes had not been identified and will be finalized as part of the WUL application. Therefore, reference is made to the GCS Groundwater Study and Hydrocensus to evaluate groundwater quality for potential domestic use (GCS, 2024).

5.8.2. Final Borehole Selection and Water Treatment Measures

During the final design phase, the selected borehole(s) must undergo yield testing to verify that they can meet the required water demand. Additionally, comprehensive water quality testing must be conducted and compared against the SANS 241 standard to confirm suitability for human consumption.

If elevated concentrations of specific contaminants are detected, appropriate filtration and treatment systems must be implemented to ensure compliance with drinking water standards. Furthermore, once operations commence, regular monitoring and testing of borehole water will be required to maintain water quality standards and detect any potential contamination.

5.8.3. Contingency Measures in Case of Groundwater Contamination

To prevent groundwater contamination, strict control measures will be enforced. However, if contamination occurs and drinking water cannot be economically treated to meet required standards, a dual water supply system will be introduced:

- Non-potable water system: Used for showers and other non-drinking applications, designed to prevent accidental consumption.
- Drinking water system: Ensuring potable water of Class I quality is supplied separately.

The non-potable water system will be designed to make drinking from it impractical or difficult, particularly at showers and similar outlets. Warning signs will be installed at locations where unintentional consumption is possible. However, all tap water will meet Class I standards. These measures will only be implemented if contamination is confirmed.

5.8.4. Wash Bay, Workshop, and Diesel Bund Wastewater

Wastewater from these areas will be conveyed through 160mm ND PVC pipelines to a proposed concrete silt trap. From there, the pre-treated water will be directed to an oil/fuel separator tank system with a 7500 litre capacity.

5.8.5. Ablution Block Wastewater

An estimated 3,285m³ per annum of wastewater generated from the ablution facilities will be collected in a 10m³ concrete sump. From this sump, the wastewater will be pumped via a 90mm ND HDPE pipeline to the Umgala Sewage Treatment Plant for proper treatment and disposal.

This approach ensures efficient water resource management, compliance with environmental regulations, and adherence to water quality standards for both potable and non-potable water use.

5.9. SEWAGE TREATMENT FACILITY

5.9.1. Umgala Adit Area

A 110mm uPVC pipeline will be installed to convey all sewage and grey water from the Umgala Adit Area to a conservancy tank. The sewage and grey water collected in this tank will ultimately be transported from the adit area for treatment at the proposed sewage treatment plant (STP) located in the Plant Area.

It is recommended that a 110mm PVC pipeline be constructed from the Umgala Adit Area to the Plant Area. This pipeline can be laid within the same trench as the surplus water pipeline being constructed along the same route. Alternatively, the conservancy tank may be emptied using a vacuum tanker (honey sucker) to transport the sewage from the adit area to the STP. The final decision on whether to implement the sewer pipeline or rely on vacuum tankers will be based on financial and economic considerations at the time of project implementation.

Based on the daily sewage generation rate of 15.7m³ and the requirement to store wastewater for four days before the conservancy tank is emptied, a conservancy tank with a capacity of approximately 63m³ is required to accommodate the expected sewage volume while ensuring adequate storage before scheduled emptying. Figure 9 illustrates the expected sewer influent for the Umgala Adit Area.

ITEM	NO	USES PER DAY	L/USE	TOTAL	L/S AVG	L/MIN/ITEM	PROBABILITY	MAX L/SEC	M ³ /H
TOILETS	6	116	10	1164	0.03	5.00	0.50	0.25	0.90
SHOWERS	2	80	60	4800	0.13	15.00	0.80	0.40	1.44
HAND WASH BASINS	2	180	5	900	0.03	10.00	0.50	0.17	0.60
URINALS	9	180	3	540	0.02	5.00	0.50	0.38	1.35
LAUNDRY	5	4	60	240	0.01	2.50	0.50	0.10	0.4
WORKSHOP WASH	1	1	1000	1000	0.03	20.00	1.00	0.33	1.20
GARDEN SPRINKLERS	0	1		0	0.00		1.00	0.00	0.00
CAR WASH	1	10	500	5000	0.14	15.00	1.00	0.25	0.90
TOTAL				13644	0.38			1.9	6.8
15% ADDED				15690				2.16	7.8

CONSERVANCY TANK SIZE	16 m ³
DAYS STORAGE REQUIRED	4
TOTAL SIZE	63 m ³

Figure 9: Sewer Influent - Umgala Adit Area

5.9.2. Sewer Management Umgala Plant Area

A sewage treatment plant (STP) will be constructed at the Umgala Plant Area. This facility will not only treat wastewater generated from immediate plant operations but will also process sewage from multiple project locations, including Zimbutu and the Umgala Adit Area.

A 110mm ND PVC pipeline will transport sewage from the plant operations area, including ablution facilities, to the STP. Additionally, as recommended, a pipeline will be installed to transport sewage from the Umgala Adit Area to the STP. Furthermore, a 90mm ND HDPE pipeline will convey sewage from Knights Hill to the treatment plant. Wastewater from Zimbutu will be transported to the STP via vacuum tankers.

The expected sewer influent to the STP from the immediate plant working areas is indicated in Figure 10.

SEWAGE FLOW									
ITEM	NO	USES PER DAY	L/USE	TOTAL	L/S AVG	L/MIN/ITEM	PROBABILITY	MAX L/SEC	M ³ /H
TOILETS	5	96	10	964	0.03	5.00	0.50	0.21	0.75
SHOWERS	2	60	60	3600	0.10	15.00	0.80	0.40	1.44
HAND WASH BASINS	1	140	5	700	0.02	10.00	0.50	0.08	0.30
URINALS	7	140	3	420	0.01	5.00	0.50	0.29	1.05
LAUNDRY	5	3	60	180	0.01	2.50	0.50	0.10	0.4
WORKSHOP WASH	1	1	1000	1000	0.03	20.00	1.00	0.33	1.20
GARDEN SPRINKLERS	0	1		0	0.00		1.00	0.00	0.00
CAR WASH	1	10	500	5000	0.14	15.00	1.00	0.25	0.90
TOTAL				11864	0.33			1.7	6.0
15% ADDED				13643				1.92	6.9

Figure 10: Sewer Influent - Umgala Plant Area

5.9.3. Sludge Management

The proposed septic tank component of the package plant will have the capacity to accommodate approximately 55 m³ of sludge over a one-year period. To ensure proper maintenance and operational efficiency, sludge removal from the septic tank will be required once per year. This process will be carried out by an approved and licensed contractor.

The removed sludge will be transported to a designated regional sewage treatment facility or an approved lagoon disposal site capable of handling liquid sludge. The disposal process will adhere to industry best practices and regulatory guidelines. Specifically, the procedures outlined in "Disposal of Wastewater Sludge: Volume 1" by HG Snyman and JE Herselman, Water Research Commission, in collaboration with Golder Associates Africa, will be followed to ensure compliance with environmental and health standards (Snyman, 2005).

6. POLICY AND LEGISLATIVE CONTEXT

The South African environmental regulatory framework was promulgated with the aim of environmental protection. The regulatory framework provides requirements and guidelines for

environmental and social management.

Table 10 provides a list of applicable legislative requirements, guidelines as well as a description of how the proposed Project complies with and responds to the policy and legislation context.

Table 10: Policy and Legislative Context

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Legislation			
Chapter 2, section 24 and section 32 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996).	Chapter 2 of the Constitution is the cornerstone of democracy in South Africa. The Chapter enshrines the rights of all people living in South Africa and affirms the democratic values of human dignity, equality and freedom. Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or wellbeing; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that - – Prevent pollution and ecological degradation; – Promote conservation; and – Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. Section 24 guarantees the protection of the environment through reasonable legislative (and other measures), and such legislation is continuously in the process of being promulgated. Section 32 provides for access to information, held by any person or organ of state, where such information is	This report was prepared, submitted and considered within the constitutional framework set by <i>inter alia</i> sections 24, 32 and 33 of the Constitution.	This Project aligns with the constitutional imperative to promote sustainable development, prevent pollution and ecological degradation, and secure ecologically sustainable use of natural resources (Section 24). The Scoping and Environmental Impact Assessment (S&EIA) process conducted as part of this report identifies potential environmental and social risks associated with the proposed project. Through the inclusion of mitigation measures (outlined in Section 12.7 of this report), the project seeks to manage impacts to acceptable levels. This directly supports the rights enshrined in Sections 24 and 33 of the Constitution, by ensuring that development is undertaken transparently, and in a manner that safeguards environmental rights for current and future generations.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	required to exercise or protect the rights of any other person. The Promotion of Access to Information Act (Act No. 2 of 2000) gives effect to the provisions of this right.		
Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	The Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (Act No. 28 of 2002) (MPRDA, 2002) regulates various matters relating to the mineral and petroleum resources of South Africa and in the preamble of the MPRDA it is stated that the purpose of the MPRDA is, inter alia, to “protect the environment for the benefit of present and future generations, to ensure ecologically sustainable development of mineral and petroleum resources and to promote economic and social development”. Furthermore, Section 5A of the MPRDA provides that: <i>No person may prospect for or remove, mine, conduct technical cooperation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto on any area without –</i> <i>(a) an environmental authorisation;</i> <i>(b) a reconnaissance permission, prospecting right, permission to remove, mining right, mining permit, retention permit, technical cooperation permit, reconnaissance permit, exploration right or production right, as the case may be; and</i>	This report was prepared, submitted and considered within the MPRDA.	The Project will be undertaken within the existing Umgala Mining Right (KZN 30/5/1/2/2/10125 MR), issued by the Department of Mineral Resources and Energy (DMRE) to Welgedacht Exploration Company Proprietary Limited (Welgedacht), the authorised right-holder in terms of the MPRDA. Although no new mining right or permit is required, the development activities proposed (e.g. construction of new infrastructure/layout changes, re-commissioning of operations) have not been previously authorised under the existing EMPr approved in 2009. Therefore, in compliance with the MPRDA, Welgedacht is applying for an EA to update the environmental management measures and ensure alignment with current regulatory standards. This process demonstrates adherence to the principles of sustainable development and responsible resource utilisation embedded in the MPRDA.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	<i>(c) giving the landowner or lawful occupier of the land in question at least 21 days written Notice.</i> Environmental issues are comprehensively regulated in South Africa in municipal, regional and national legislation. In the case of mining operations, there is a multiplicity of applicable legislation. Mining activities are regulated by the provisions in the MPRDA, however, compliance with other legislation such as, for example, The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) (NEMA, 1998), The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) (NEM:WA, 2008) and the National Water Act, 1998 (NWA) (Act No. 36 of 1998) (NWA, 1998) is also mandatory. Prior to 8 December 2014, mining activities were primarily approved under environmental management programmes or environmental management plan in terms of the now repealed section 39 of the MPRDA (EMPr) and it could be argued that separate Environmental Authorisation (EA) and Waste Management Licences (WML) were not viewed as being required for activities authorised in EMPrs		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	Any person applying for, inter alia, a mining right or a prospecting right after 8 December 2014 (this date being the date on which the EIA Regulations, 2014 came into operation) (EIA Regulations, 2014) is required to apply for an EA in accordance with the provisions of NEMA, read with the EIA Regulations, 2014. The obligation to obtain an EA for mining or prospecting activities has replaced the existing regime under the MPRDA where EMPs were submitted and approved in terms of the MPRDA and EAs and WMLs were not required for mining activities.		
National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) ² . Environmental Impact Assessment (EIA) Regulations, 2014 (Government Notice Regulation (GN) R982 of 2014, as amended in June 2021) ³ .	The NEMA can be regarded as the most important piece of general environmental legislation. The overarching principle of the Act is sustainable development. It defines sustainability as meaning the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure the development serves present and future generations. The Act provides a framework for environmental law reform and covers three areas, namely: Land, planning and development;	– This entire report was prepared, submitted and considered within the prescripts of the NEMA; – The Listed Activities which are potentially triggered under the Listing Notices are provided in Table 6 of this report; and	The EIA process was undertaken in respect of the authorisation process of the proposed Project and is in compliance with the NEMA requirements read with the EIA Regulations of 2014, as amended. In terms of section 24(1) of the NEMA, the potential consequences for or impacts on the environment of inter alia listed activities must be considered, investigated, assessed and reported on to the Minister responsible for mineral resources, except in respect of those

² The National Environmental Laws Amendment Act, 2022 (Act No 2 of 2022) was signed into law on 24 June 2022. Except for sections 11, 35(a), 57, 60, 61(c), 61(j), 61(k), 62, 63, 64, 65, 66, 72, 76, 77, 86, 87 and 88 pertaining mostly to changes to the NEMWA, the NEMLAA came into effect on 30 June 2023 as per Proclamation Notice 125 of 2023, published in GG 48869.

³ GN R982 of 4 December 2014 as amended by GN R326 of 7 April 2017, GN 706 of 13 July 2018, GN 599 of 29 May 2020 and GN 517 of 11 June 2021.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
EIA Regulations Listing Notice 1 of 2014 (GN R983 of 2014, as amended)⁴. EIA Regulations Listing Notice 2 of 2014 (GN R984 of 2014, as amended)⁵. EIA Regulations Listing Notice 3 of 2014 (GN R985 of 2014, as amended)⁶. Financial Provisioning Regulations, 2015 (GN R1147 of 2015, as amended)⁷.	The use and conservation of natural and cultural resources; and Pollution control and waste management. Section 24 of the NEMA sets out the provisions which are to give effect to the general objectives of Integrated Environmental Management (IEM) and laid down in Chapter 5 of the NEMA. In terms of section 24(1), the potential impact on the environment of Listed Activities must be considered, investigated, assessed and reported on to the Competent Authority charged by the NEMA with granting of the relevant EA. In terms of section 24F(1) of the NEMA no person may commence an activity listed or specified in terms of section 24(2)(a) or (b) unless the Competent Authority (CA) has granted an EA for the activity. The Minister⁸ published the EIA Regulations comprising the EIA Regulations GN R982, and three Listing Notices namely GN R983 (Listing Notice 1), GN R984 (Listing Notice 2) and GN R985 (Listing Notice 3) in terms of	– Section 20 of the report discusses the proposed financial provision for the Proposed Project.	activities that may commence without having to obtain an EA in terms of the NEMA. As such, an application for EA in terms of NEMA 'Listed Activities' as contemplated in GN R983 – GN R985 of 2014, as amended, was submitted to the DMRE on 29 September 2023. An EIA phase has been undertaken where the impacts associated with the proposed activities have been determined. The proposed measures in which to mitigate and manage the impacts including the monitoring programme are also detailed as part of this process In addition, financial provision for the proposed Project will be made and will comply with the Financial Provision Regulations (GN R1147 of 2015, as amended).

⁴ GN R983 in GG 38282 of 4 December 2014 as amended by GN R327 in GG 40772 of 7 April 2017, GN 706 in GG 41766 of 13 July 2018 and GN 517 in GG 44701 of 11 June 2021.

⁵ GN R984 in GG 38282 of 4 December 2014, as amended by GN R325 in 40772 of 7 April 2017 and GN 517 in GG 44701 of 11 June 2021.

⁶ GN R985 in GG 38282 of 4 December 2014, as amended by GN R324 in 40772 of 7 April 2017, GN 706 in GG 41766 of 13 July 2018 and GN 517 in GG 44701 of 11 June 2021.

⁷ The *Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations* published in GN R1147 in GG 39425 of 20 November 2015 as amended by GN 1314 in GG 40371 of 26 October 2016; GN R452 in GG 41584 of 20 April 2018; GN 991 in GG 41921 of 21 September 2018; GN 24 in GG 42956 of 17 January 2020; GN 495 in GG 44698 of 11 June 2021.

⁸ Now the Minister of Environment, Forestry and Fisheries.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	sections 24(2) and 24D of the NEMA, as amended. The Regulations make provision for the regulation of the procedure and criteria as contemplated in chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for EA for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.		
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) ⁹ . List of waste management activities that have, or are likely to have, a detrimental effect on the	The NEM:WA commenced on 1 July 2009 and as a result of its commencement the relevant provisions in the Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA) in respect of waste management, were repealed. The Act sets out to reform the law regulating waste management and deals with waste management and control more comprehensively than was dealt with in the ECA. It also introduces new and distinct concepts never canvassed within the realm of waste management in South Africa, such as the concept of contaminated land	The Listed Activities which are potentially triggered under the GN R921 are provided in Table 6 of this report.	The proposed Project involves a list of activities which require a WML for Listed Activities as contemplated in the List of Waste Management Activities Regulations (GN R921 of 2013, as amended). The triggered waste management activities have been applied for as part of the application for EA submitted to the DMRE. As part of this phase an EIA is undertaken where the impacts associated with the

⁹ As amended by the National Environmental Management: Waste Amendment Act 26 of 2014. As stated above, the National Environmental Laws Amendment Act, 2022 (Act No 2 of 2022) was signed into law on 24 June 2022 and will come into operation on a date to be fixed and proclaimed by the President. Once the amendment act comes into operation residue stockpiles and residue deposits will be removed from NEMWA and regulated in terms of the provisions of NEMA. Residue stockpiles and residue deposits will therefore no longer be regarded as waste for which a waste management licence is required. Residue stockpiles and residue deposits will in future be authorized in terms of the NEMA under the EIA Listing Notices. In terms of the transitional provisions any approval granted, or waste management licence issued in relation to residue deposits and residue stockpiles remain valid until it lapse or replaced under the provisions of the NEMA.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
environment (GN 921 of 2013, as amended)¹⁰. National Waste Information Regulations, 2012 (GN R625 of 2012)¹¹. Regulations Regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015 (GN R632 of 2015, as amended)¹². Waste Classification and Management Regulations, 2013 (GN R634 of 2012)¹³. National Norms and Standards for the Assessment of Waste for	and extended producer responsibility. It also provides for more elaborate definitions to assist in the interpretation of the Act. In terms of section 19(1) of the NEM:WA, the Minister, published in GN R921, a list of waste management activities that have, or are likely to have a detrimental effect on the environment. Section 20 of the NEM:WA pertains to the consequences of listed waste management activities and states that no person may commence, undertake or conduct a waste management activity, except in accordance with the requirements or standards for that activity as determined by the Minister or in accordance with a waste management licence issued in respect of that activity, if a licence is required. In accordance with section 19(3), the Schedule to GN R.921 provides that a waste management licence is required for those activities listed in Category A and B thereof and compliance with the Norms and Standards is		proposed activities are determined. The proposed measures in which to mitigate and manage the impacts including the monitoring programme are also detailed as part of this process.

¹⁰ GN 921 in GG 37083 of 29 November 2013 as amended by GN 332 in GG 37604 of 2 May 2014; GN R633 in GG 39020 of 24 July 2015; and GN 1094 in GG 41175 of 11 October 2017.

¹¹ GN R625 in GG 35583 of 13 August 2012.

¹² GN R632 in GG 39020 of 24 July 2015 as amended by the Planning and Management of Residue Stockpiles and Residue Deposits Amendment Regulations, 2018 published under GN 990 in GG 41920 of 21 September 2018. Once the relevant sections in the National Environmental Laws Amendment Act, 2022 (Act No 2 of 2022) comes into effect, residue stockpiles and residue deposits will be excluded from NEMWA and will be regulated in terms of the provisions of NEMA. The Residue Regulations will remain operational and will be deemed to have been made under NEMA.

¹³ GN R634 in GG 36784 of 23 August 2012.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Landfill Disposal (R635 of 2012)¹⁴. National Norms and Standards for the Disposal of Waste to Landfill (R636 of 2012)¹⁵. National Norms and Standards for the Storage of Waste (GN 926 of 2013)¹⁶. National Norms and Standards for the Remediation of Contaminated Land and Soil Quality – GN 331 in Government Gazette No. 37603 dated 2 May 2014.	required for those activities listed in Category C thereof prior to the commencement, undertaking or conducting of same. In addition, GN R.921 differentiates between Category A, B, and Category C waste management activities. Category A waste management activities are those which require the conducting of a basic assessment process as stipulated in the EIA Regulations 2014, as amended, (GN R982) promulgated in terms of the NEMA as part of the waste management licence application and Category B waste management activities are those that require the undertaking of a Scoping and Environmental Impact Assessment process stipulated in the GN R.982 as part of the waste management licence application. Category C waste management activities do not require a waste management licence, however a person who wishes to commence, undertake or conduct a waste management activity listed under this category, must comply with, amongst others, the relevant National Norms and Standards for the Storage of Waste (GN R.926 of 29 November 2013) published in terms of the NEM:WA.		
National Environmental Management: Air Quality	The Act aims to regulate and protect the environment, by "providing reasonable measures for the prevention of air	The Air Quality baseline impact assessment for the Project area is summarised	An Air Quality Impact Assessment, guided by the NEM:AQA and its incorporated regulations was undertaken as part of the EIA

¹⁴ R635 in GG 36784 of 23 August 2012.

¹⁵ R636 in GG 36784 of 23 August 2012.

¹⁶ GN 926 in GG 37088 of 29 November 2013.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Act, 2004 (Act No. 39 of 2004) (NEM:AQA). Listed Activities and Associated Minimum Emission Standards Identified in terms of section 21 of the NEM:AQA (GN R893 of 2013, as amended)¹⁷. National Dust Control Regulations, 2013 (GN R827 of 2013)¹⁸. National Atmospheric Emission Reporting Regulations, 2015 (GN R283 of 2015)¹⁹. Atmospheric Dispersion Modelling Regulations, 2014 (GN R533 of 2014)²⁰. National Greenhouse Gas	pollution and ecological degradation, and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national Norms and Standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto". The Minister published Listed Activities and Associated Minimum Emission Standards Identified in terms of section 21 of the NEM:AQA in 2013. Part 3 of the Notice makes provision for a list of activities in the following categories which the Applicant must review to determine whether an application for an Air Emissions Licence is required: – Category 1: Combustion Installations; – Category 2: Petroleum Industry, the production of gaseous and liquid fuels as well as petrochemicals from crude oil, coal, gas or biomass; – Category 3: Carbonisation and Coal Gasification; – Category 4: Metallurgical Industry;	in Section 10.1.1 of this report.	phase to establish a clear baseline of current air quality in the proposed Projects' vicinity and quantify anticipated impacts from the proposed new activities and prescribe mitigation and management measures for the impacts that may be deemed significant.

¹⁷ GN R893 in GG 37054 of 22 November 2013, as amended by GN 551 in GG 38863 of 12 June 2015; GN 1207 in GG 42013 of 31 October 2018; GG 687 in GG 42472 of 22 May 2019; GN 421 in GG 43174 of 27 March 2020.

¹⁸ R827 in GG 36974 of 1 November 2013.

¹⁹ GN R283 in GG 38633 of 2 April 2015.

²⁰ GN R533 in GG 37804 of 11 July 2014.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Emission Reporting Regulations (GN R275 of 2017 as amended) ²¹ .	– Category 6: Organic Chemicals Industry; – Category 7: Inorganic Chemicals Industry; – Category 8: Thermal Treatment of Hazardous and General Waste; – Category 9: Pulp and Paper Manufacturing Activities, including By-Products Recovery; and – Category 10: Animal Matter Processing.		
National Environmental Management: Biodiversity Act, 2004 (Act No. 39 of 2004) (NEM:BA). Threatened or Protected Species Regulations, 2007 (GN R152 of 2007)²². Alien and Invasive Species Regulations (GN R1020 of 2020)²³. Alien and Invasive Species Lists, 2020 (GN 1003 of 2020)²⁴.	The Act aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. The Act allows for the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith. In terms of section 57 of the Act, no person may carry out any restricted activity involving any species which has been identified by the Minister as "critically endangered species", "endangered species", "vulnerable species" or	The Terrestrial Biodiversity and Wetland Aquatic impact assessment undertaken for the Project area is summarised in Section 10.1.11 of this report.	As part of this proposed Project, flora & fauna (Terrestrial Biodiversity Assessment) and wetlands and aquatic (Aquatic Assessment) have been undertaken to determine the current status of the environment and to determine any potential ecological sensitivity to be avoided and / or mitigated. Terrestrial Biodiversity and Aquatic Impact Assessments were conducted in terms of the requirements of the NEM:BA and its regulations. The findings of the assessments in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area detailed in this report.

²¹ GN R275 in GG 40762 of 3 April 2017 as amended by GN R994 in GG 43712 of 11 September 2020.

²² GN R152 in GG 29657 on 23 February 2007.

²³ GN R1020 in GG 43735 of 25 September 2020.

²⁴ GN 1003 in GG 43726 of 18 September 2020. Notice replaced the previous Alien and Invasive Species Lists (GN 864 in GG 40166 of 29 July 2016).

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	"protected species" without a permit. The Act defines "restricted activity" in relation to such identified species so as to include, but not limited to, "hunting, catching, capturing, killing, gathering, collecting, plucking, picking parts of, cutting, chopping off, uprooting, damaging, destroying, having in possession, exercising physical control over, moving or translocating". The Minister has made regulations in terms of section 97 of the NEM:BA with regards to Threatened and Protected Species which came into effect on 1 June 2007. Furthermore, the Minister published lists of critically endangered, endangered, vulnerable, and protected species in terms of section 56(1) of the NEM:BA.		A list of threatened species that may occur within and may be impacted by the proposed Project has been listed in Section 10.1.11. The management and control of Alien Invasive Plants (AIPs) will be governed by the NEM:BA during all the phases of the project. There are currently no applications submitted in terms of NEM:BA for the proposed Project.
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA).	The Act intends: – To provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; – For the establishment of a national register of all national, provincial and local protected areas; – For the management of those areas in accordance with national Norms and Standards; – For intergovernmental cooperation and public consultation in matters concerning protected areas; and	The findings of the Terrestrial Biodiversity impact assessment in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area detailed in Section 10.1 of this report.	Officially protected areas, either Provincially or Nationally that occur close to proposed Project could be impacted. A Terrestrial Biodiversity Impact Assessment was conducted in terms of the requirements of the NEM:BA and considered the provisions of NEMPAA to determine whether any protected areas are located within the proposed Project.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	– For matters in connection therewith. – Chapter 2 of the Act prescribes the different types of protected areas such as: – Special nature reserves, national parks, national reserves, and protected environments; – World Heritage Sites; – Marine Protected Areas; – Specially protected forest areas, forest nature reserves and forest wilderness areas- declared in terms of National Forest Act (Act No. 84 of 1998); and – Mountain Catchment Areas- declared in terms of Mountain Catchment Areas Act (Act No. 63 of 1970).		
National Water Act, 1998 (Act No. 36 of 1998) (NWA). Regulations on the use of water for mining and related activities aimed at the protection of water resources (GN R.704 of 1999)²⁵.	The national government, acting through the Minister of Water and Sanitation (previously the Minister of Water Affairs), is the public trustee of South Africa's water resources, and must ensure that water is protected, used, developed, conserved, managed, and controlled in a sustainable and equitable manner for the benefit of all persons (section 3(1)).	The water uses which may be triggered under Section 21 of the NWA in relation to the proposed Project are provided in Table 7 of the report.	The proposed Project triggers various water uses as defined by section 21 of the NWA and thus require licensing. A WULA and Integrated Water and Waste Management Plan (IWWMP) as per the requirements of GN R 267 of 2017 will be submitted to the Department of Water and Sanitation (DWS) for section 21 water uses triggered by the proposed Project. Groundwater and Surface Water Impact Assessments were conducted as part of the

²⁵ GN R.704 in GG 20119 of 4 June 1999.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Water Use Licence Application and Appeals Regulations, 2017 (GN R.267 of 2017)²⁶. Regulations regarding the safety of dams in terms of section 123(1) of the NWA (GN R139 of 2012)²⁷. General Authorisations: General Authorisation: 21(c) and (i) water use for the purpose of rehabilitating a wetland for conservation purposes (GN 1198 of 2009)²⁸.	Section 19 of the NWA places an obligation on landowners, persons in control of land, occupants of land and land users of land on which: Any activity or process is or was performed or undertaken; or Any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, to take all reasonable measures to prevent any such pollution from occurring, continuing, or recurring. In terms of the NWA, a person may only use water without a licence under certain circumstances. All other use, provided that such use qualifies as a use listed in section 21 of the Act, require a WUL. A person may only use water without a licence if such water use is permissible under Schedule 1 (generally domestic type use) if that water use constitutes a continuation of an existing lawful water use (water uses being undertaken prior to the commencement of the NWA, generally in terms of the Water Act of 1956), or if that water use is permissible in terms of a general authorisation issued under section 39 (general authorisations allow for the use of certain section		EIA phase to assess potential impacts of the proposed Project on groundwater and surface water resources. Mitigation and management measures to ensure that the potential impacts are managed are included in this report. A stormwater management system based on the principles of GN R.704 of 1999 has also been included in this report. All dirty / polluted water will be managed as per the requirements of GN R.704 of 1999. Clean water will be diverted away from the designated dirty areas as far as possible. No dirty / polluted water will be discharged into the environment.

²⁶ GN R267 in GG 40713 of 24 March 2017.

²⁷ GN R139 in GG 35062 of 24 February 2012.

²⁸ GN 1198 in GG 32805 of 18 December 2009.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
○ General Authorisation: 21(c) and (i) water uses (GN 509 of 2016)²⁹. ○ Revision of General Authorisation for the Taking and Storing of Water (GN 538 of 2016)³⁰. Revision of General Authorisation in terms of section 39 of the National Water Act 36 of 1998 (GN 665 of 2013)³¹.	21 uses provided that the criteria and thresholds described in the general authorisation is met). The Minister published Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals in GN R.267 of 2017. The Regulations serve to prescribe the procedure and requirements of Water Use Licence Applications (WULAs) as contemplated in Sections 41 of NWA, as well as an appeal against a decision made by a Responsible Authority in terms of Section 41(6) of the NWA. The Regulations provide the requirements for the WULA and state that consideration and decision for a WUL must be undertaken within a period of 300 days of submitting such application. A procedure for public participation must also be conducted as contemplated in section 41(4) of the NWA, as part of the WULA process.		
National Forest Act, 1998 (Act No. 84 of 1998) (NFA).	This Act makes provisions for the management and conservation of public forests. In terms of section 15(3) of the NFA four lists of protected trees belonging to a	The Terrestrial Biodiversity and Wetland Aquatic impact assessment	A Terrestrial Biodiversity Impact Assessment was conducted in terms of the requirements of the NEM:BA and considered the provisions

²⁹ GN 509 in GG 40229 of 26 August 2016.

³⁰ GN 538 in GG 40243 of 2 September 2016.

³¹ GN 665 in GG 36820 of 6 September 2013.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Regulations under the National Forests Act No. 84 of 1998 (GN R466 of 2009) ³² .	particular species under section 12(1)(d) of the Act have been published with the most recent list published on 13 September 2013. The effect of declaring these trees as protected is that in terms of section 15(1) of the NFA no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or forest product derived from a protected tree, except under a licence granted by the Minister to an applicant and subject to such period and conditions as may be stipulated.	undertaken for the Project area is summarised in Section 10.1 of this report. The findings of the assessment in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area detailed in this report.	of the NFA to determine whether any protected areas are located within the proposed Project.
Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) (CARA).	The Act intends to provide for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.	A list of threatened species that may occur within and may be impacted by the proposed Project has been listed in Section 10.1 of the report. The findings of these assessments in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area	A Soil and Agricultural-Ecosystem Impact Assessment was conducted to consider the provisions of CARA. Additionally, A Terrestrial Biodiversity Impact Assessment was conducted to identify areas which are of important ecological importance.

³² GN R466 in GG 32185 of 29 April 2009.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
		detailed in this report.	
National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA).	The NHRA established the South African Heritage Resources Agency (SAHRA) as well as provincial heritage resources agencies. In terms of the NHRA, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide, or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site. Section 38 of the NHRA states that any person who intends to undertake developments categorised in section 38 of the NHRA must at the very earliest stages of initiating such development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. By way of example, the developments referred to in section 38 of the NHRA include: The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 metres in length; The construction of a bridge or similar structure exceeding 50 metres in length; Any development or other activity which will change the character of a site –	The Heritage Impact assessment undertaken for the Project area is summarised in Section 10.1 of this report.	A Phased 1 Heritage Impact Assessment and Palaeontological Assessment were conducted for the proposed Project. The assessments were uploaded on the SAHRA site. A Heritage Resource Management process has been initiated with the SAHRA in accordance with Section 38 of NHRA.

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	○ Exceeding 5000 m² in extent; or ○ Involving three or more existing erven of subdivisions thereof; or ○ Involving three or more erven or divisions thereof which have been consolidated within the past five years; or ○ The costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority; ○ The rezoning of a site exceeding 10 000 m² in extent; or Any other category of development provided for in the regulations by SAHRA or the provincial heritage resources authority.		
Section 25 of the Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA). Noise Control Regulations (GN R154 of 1992)³³.	These Regulations set out rules relative to the control of noise as provided for in section 25 of the ECA. The Regulations, among other things: define powers of local authorities to control noise; define general prohibitions in relation with activities that produce noise; define and prohibit noise nuisance; and concern the use of noise measuring instruments.	The Noise Impact Assessment for the Project area is summarised in Section 10.1 of this report.	A Noise Impact Assessment, guided by the NEMA and its incorporated regulations together with GN R154 of 1992 was undertaken as part of the EIA phase to establish a clear baseline of current noise quality in the proposed Projects' vicinity and quantify anticipated impacts from the proposed new activities and prescribe

³³ GN R154 of January 1992.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
			mitigation and management measures for the impacts that may be deemed significant.
Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).	The Act makes provisions that address the health and safety of personnel working on the construction aspects of the proposed remediation. The Act addresses amongst others, the: – Safety requirements for the operation of machinery; – Protection of personnel against hazards to health and safety, arising out of or in connection with the activities of persons at work; – Establishment of an advisory council for occupational health and safety; and – Provision for matters connected therewith. The law states that any person undertaking activities at work or on any premises shall ensure as far as is reasonably practicable that nothing about the manner in which work is undertaken is unsafe or creates a risk to health when properly used.	The design elements of the Project are outlined in Section 5 of the Report.	The development responds to the OHSA by incorporating infrastructure and design elements that protect construction and operations personnel from occupational hazards. This includes the provision of ablution facilities, change houses, safety signage, access controls, and the design of workshops and fuel depots to mitigate exposure to fire, chemicals, or mechanical hazards. The OHSA requirements for employer duties, employee awareness, and consultation structures (such as safety committees) have been integrated into the project's operational framework to ensure a safe and compliant working environment.
Petroleum Products Act, 1977 (Act No. 120 of 1977). Draft Regulations Regarding Petroleum	Regulations regarding petroleum products specification and standards.		The development includes the establishment of a new fuel depot, which triggers compliance with the Petroleum Products Act and its associated specifications and standards (Draft GN R627 of 2021). The facility

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Products Specification and Standards (GN R627 of 2021) ³⁴ .			will be designed and operated according to these regulatory requirements to ensure safe handling, storage, and transfer of petroleum products. All storage tanks will comply with design specifications, safety distances, and environmental containment protocols to minimise the risk of fire, spills, and contamination.
Explosives Act, 1956 (Act No. 26 of 1956).	This Act makes provision for, amongst others, storage, transport and the use of explosives. Section 6 of the Act makes provision for storage of explosives in licensed premises and section 9 makes provision for use of blasting material without a permit. The Explosives Regulations GN R1604 (GG 3648 of 8 September 1972) provides safety distances from explosive storage areas.	The report references relevant safety zones and operating procedures in the Blasting Risk Assessment attached under Appendix IV.	Since blasting may be required for opencast mining and adit development, the Project must comply with the Explosives Act. Storage of explosives will only take place in licensed magazines in accordance with Section 6, while Section 9 provisions will govern the blasting operations. All blasting activities will adhere to the Explosives Regulations (GN R1604), particularly the safe distances from storage and blasting areas, ensuring protection for both workers and the public.
Hazardous Substances Act, 1973 (Act No. 15 of 1973) (HAS).	The Act aims to provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of	Section 12.7 of the report details the mitigation measures to be implemented to minimise	The Project will involve handling potentially hazardous substances, including diesel, oils, and chemicals used in the plant and workshops. These activities require

³⁴ GN R627 in GG 44363 of 30 March 2021.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	pressure thereby in certain circumstances, and for the control of certain electronic products; to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products; and to provide for matters connected therewith.	exposure to the environment.	compliance with the Hazardous Substances Act in terms of storage, use, and disposal. The infrastructure has been designed to minimise exposure and risk, with spill containment measures, proper labelling, Material Safety Data Sheet (MSDS) access, and secure storage. Waste generated will be classified and disposed of through licensed facilities, ensuring environmental and public health protection.
National Road Traffic Act, 1996 (Act No. 93 of 1996).	The National Road Traffic Act aims to provide for road traffic matters, which shall apply uniformly throughout the Republic and for matters connected therewith.	Section 10.1 summarises the Traffic Impact Assessment undertaken for the Project.	The proposed development includes new and upgraded access roads, haul roads, and vehicle yards, making compliance with the National Road Traffic Act essential. All road infrastructure will be constructed to conform with national road traffic standards, including signage, turning radii, and safety buffers. The operation of heavy vehicles transporting coal and supplies will adhere to road safety regulations to prevent accidents, manage traffic loads, and reduce community disturbance. The haulage and delivery of goods (including dangerous goods) will comply with vehicle licensing and transport safety standards.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Policies and Plans			
South African Mining Charter, 2018 ³⁵ .	The Mining Charter focuses on sustainable transformation of the mining industry. The Mining Charter seeks to achieve the following objectives: – Promote equitable access to the nation's mineral resources to all the people of South Africa; – Substantially and meaningfully expand opportunities for Historically Disadvantaged South Africans (HDSAs) to enter the mining and minerals industry and to benefit from the exploitation of the nation's mineral resources; – Utilise and expand the existing skills base for the empowerment of HDSAs and to serve the community; – Promote employment and advance the social and economic welfare of communities and major labour sending areas; – Encourage beneficiation of South Africa's mineral commodities; and Promote sustainable development and growth of the mining industry.	Section 10.2 of this report describes the socio-economic characteristics of the Project area. The report further highlights the potential socio-economic opportunities that the Project would bring into the area.	A Socio-Economic Impact Assessment has been undertaken as part of the EIA phase of the proposed Project. Management and mitigation measures have been developed and aligned to the Mining Charter. These mitigation measures have been included in the EMPr.
National Development Plan, 2011 (NDP) ³⁶ .	Development in South Africa is guided by the NDP, which presents a shared long-term strategic framework within		The proposed Project is in alignment with the NDP through its potential to create

³⁵ GN 1002 in GG 41934 of 27 September 2018.

³⁶ https://www.nationalplanningcommission.org.za/National_Development_Plan

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	which more detailed development planning can take place to advance the long-term goals adopted in the NDP. The Plan aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and the reduction of inequality. The NDP 2030 sets a target of creating approximately 11 million new jobs and achieving an annual average economic growth rate of 5.4 % by 2030.		employment and its plans to develop infrastructure.
Draft National Climate Change Adaptation Strategy (NCCAS), 2019³⁷.	On 6 May 2019, the Minister of Environmental Affairs published the NCCAS for public comment. According to the draft NCCAS, its purpose is to provide "... a common vision of climate change adaptation and climate resilience for [South Africa], and [outline] priority areas for achieving this vision." the document also purports to be "... South Africa's National Adaptation Plan and fulfils South Africa's commitment to its international obligations as outlined in the Paris Agreement under the United Nations Framework Convention on Climate Change." The NCCAS's vision draws on South Africa's National Climate Change Response Policy (NCCRP), the National Development Plan (NDP) (NPC 2011), the adaptation commitments included in its Nationally Determined	The Air Quality Impact Assessment for the Project area is summarised in Section 10.1 of this report.	An Air Quality Impact Assessment, guided by the NEM:AQA and its incorporated regulations was undertaken as part of the EIA phase to establish a clear baseline of current air quality in the proposed Projects' vicinity. The assessment also considered the provisions of the NCCAS and NCCRP. The assessment aimed to quantify anticipated impacts from the proposed new activities and prescribe mitigation and management measures for the impacts that may be deemed significant.

³⁷ GN 644 in GG 42446 of 6 May 2019.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	Contributions (NDC), sector adaptation plans, provincial adaptation plans and local government adaptation plans. The NCCAS functions are as follows: – Act as a common reference point for climate change adaptation efforts in South Africa in the short to medium term, providing guidance across all levels of government, sectors, and stakeholders affected by climate variability and change. – Provide a policy instrument which national climate change adaptation objectives for the country can be articulated to provide overarching guidance to all sectors of the economy. – Facilitate the degree to which development initiatives at different levels of government and business integrate and reflect critical climate change adaptation priorities, and thus inform resource allocation by the various stakeholders towards climate change resilience. – Guide stronger coherence and coordination on climate change adaptation activities between different institutions and levels of government. Support South Africa in meeting its international obligations by defining the country's vulnerabilities, plans to reduce such vulnerabilities and leverage opportunities,		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	outlining the required resources for such action, whilst demonstrating progress on climate change adaptation.		
National Climate Change Response White Paper (NCCRWP), 2011 ³⁸ .	The NCCRWP, published in 2011, prioritises both climate change mitigation and adaptation in moving towards a climate-resilient and lower-carbon economy and society. The overarching approach to adaptation, as identified in the NCCRWP, focuses on the development of adaptation responses that are flexible to changing conditions, that take local context and local knowledge into account and that are informed by rigorous research. The NCCRWP identifies a set of key adaptation related sectors including water, health, human settlements, agriculture and commercial forestry, biodiversity and ecosystems, and disaster risk reduction and management, and advocates the inclusion of climate change into plans for these sectors. Since the development of the NCCRWP, considerable progress has been made in developing adaptation policies, plans and strategies in various sectors and spheres of government, including the development of climate adaptation plans in local and provincial government.		

³⁸ Department of Environmental Affairs (DEA), 2011. 'National Climate Change Response White Paper' (NCCRWP). Pretoria: DEA. Accessed 22 November 2018 at: https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Tools, Standards and Guidelines			
Department of Forestry, Fisheries and the Environment (DFFE) Environmental Screening Tool.	The DFFE requires that their National Environmental Screening Tool be utilised prior to undertaking an application for any EA and that the report generated by the tool be submitted with the EA application. The tool is a geographically based web-enabled application which allows a proponent intending to submit an application for an EA to pre-screen their proposed site for any environmental sensitivities. Regulation 16(1)(b)(v) of the EIA Regulations, 2014 (as amended) requires a screening report to accompany an application for an EA.	The Listed Activities which are potentially triggered under the Listing Notices are provided in Table 6 of this report. The specialist studies are attached under Appendix IV.	The EIA process was undertaken in respect of the authorisation process of the proposed Project and is in compliance with the NEMA requirements read with the EIA Regulations of 2014, as amended. An EA application together with the Screening Tool Report was submitted to the DMRE on 04 September 2024. Specialist studies as noted in Section 10 and Section 12.1 were undertaken in terms of: – Appendix 6 of the EIA Regulations of 2014, as amended; or – GN 320 the procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of section 24(5)(a) and (h) and 44 of the NEMA, when applying for EA.
National Biodiversity Assessment	The National Biodiversity Assessment (NBA) 2018 is the primary tool for monitoring and reporting on the state of biodiversity in South Africa and informs policies, strategic objectives and activities for managing and conserving biodiversity more effectively. The NBA is especially	The findings of the assessments in the form of the impacts and the proposed mitigation measures undertaken for	Terrestrial and Aquatic Biodiversity Impact Assessments were conducted in terms of the requirements of the NEM:BA and its regulations. The assessments considered the

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Prioritisation Tools ³⁹ .	important for informing the National Biodiversity Strategy and Action Plan (NBSAP), the National Biodiversity Framework (NBF) and the National Protected Area Expansion Strategy (NPAES), the National Spatial Development Framework, the National Water and Sanitation Master Plan and the National Biodiversity Economy Strategy.	the Project area detailed in Section 12.7 of this report.	prioritisation tools of the NBA and provide spatial outputs of the NBA provisions. The findings of the assessments in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area detailed in this report.
Hazardous substances management standards: South African National Standard (SANS) 10089-1:2008 - Specifications for aboveground storage facilities for petroleum products ⁴⁰ . SANS 310: 2011 - Storage tank facilities for hazardous chemicals: Aboveground storage tank facilities for flammable, combustible	SANS 10089-1:2008 The SANS 10089-1:2008 specifies requirements for aboveground storage facilities used for storing petroleum products in South Africa. This standard outlines technical specifications and safety requirements to ensure the safe and efficient storage of petroleum products, including gasoline, diesel, and other fuels. The SANS 10089-1 covers various aspects of aboveground storage facilities, including design criteria, construction materials, tank installation, maintenance procedures, and safety measures. SANS 310:2011 The SANS 310:2011 sets out specifications for aboveground storage tank facilities intended for	The Guidelines were consulted when compiling the EMPr Part B of the report). In addition, these Guidelines will also be consulted when compiling the IWWMP which will be submitted as part of WULA for the proposed Project.	

³⁹ SANBI. (2019). National Biodiversity Assessment 2018: The status of South Africa's ecosystems and biodiversity. Synthesis Report. Pretoria: South African National Biodiversity Institute, an entity of the Department of Environment, Forestry and Fisheries.

⁴⁰ South African Bureau of Standards - SANS 10089-1: The petroleum industry Part 1: Storage and distribution of petroleum products in above-ground bulk installations, 2008.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
and non-flammable chemicals ⁴¹ .	hazardous chemicals, including flammable, combustible, and non-flammable substances, in South Africa. This standard establishes requirements for the design, construction, operation, and maintenance of storage tank facilities to ensure the safe handling and storage of hazardous chemicals. It covers various aspects such as tank design, material selection, installation procedures, containment systems, ventilation, fire protection, and emergency response measures.		
Waste management standards: SANS 10234:2019, Edition 2: Globally Harmonised System of Classification and Labelling of Chemicals (GHS) ⁴² .	SANS 10234:2008 South Africa has moved a step forward in regard to mandating that Globally Harmonised System (GHS) of Classification and Labelling of Chemicals, be implemented within the country. Standard SANS 10234:2019 (edition-2) was published through the South Africa Bureau of Standards on December 17, 2019. This Standard supersedes Standards: SANS 10265 edition-1 of 1999 and SANS 10234 edition-1.01 of 2008. This Standard is aligned with the 4th revision of the UN GHS Purple book and is cross referenced in the NEM:WA and National Health Act, 2003 (Act No. 61 of 2003).		The Guidelines were consulted when compiling the EMPr (Part B of the report). In addition, these Guidelines will also be consulted when compiling the IWWMP which will be submitted as part of WULA for the proposed Project.

⁴¹ South African Bureau of Standards - SANS 310: 1ED 2011: Storage Tank Facilities for Hazardous Chemicals - Aboveground Storage Tank Facilities for Flammable, Combustible And Non-Flammable Chemicals, 2011.

⁴² Standard SANS 10234:2019 (edition-2), South African Bureau of Standards

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	The National Committee for Standards for Dangerous Goods, including hazardous chemical substances and dangerous goods, is in charge of preparing this Standard. The Committee has decided to permanently remove the Supplement (List of Classification and Labelling of Chemicals in Accordance with GHS), to the SANS 10234:2008 (edition-1), since the Committee believes that the chemicals on this list are constantly changing. This Standard is also mandated by the South Africa Department of Environment Affairs and Department of Health. This Standard will be considered a minimum requirement to adhere to when the draft Regulation of Hazardous Substances Agents (2018) is published, which is projected for 2020, under the authority of the Department of Labour. The Standard provides guidelines for classifying chemicals based on their physical, health, and environmental hazards, as well as standardised labelling elements such as pictograms, signal words, hazard statements, and precautionary statements.		
Water standards: SANS 241-1:2015 Drinking water Part 1 – Microbiological, physical,	SANS 241-1:2015 The SANS 241-1:2015 is a critical standard governing the quality of drinking water in South Africa, addressing microbiological, physical, aesthetic, and chemical	The Guidelines were consulted when compiling the EMPr (Part B of the report). In addition, these Guidelines will also be consulted when compiling the IWWMP which will be submitted as part of WULA for the proposed Project.	

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
aesthetic and chemical determinants ⁴³ .	determinants. This standard provides comprehensive guidelines for ensuring the safety and suitability of drinking water for human consumption. It outlines specific requirements and limits for various parameters, including microbial contaminants, physical properties such as turbidity and colour, aesthetic factors like taste and odour, and chemical constituents such as heavy metals and organic pollutants.		
Air quality: National Ambient Air Quality Standards (NAAQS), 2009 ⁴⁴ . GN 486 dated 29 June 2012: National Ambient Air Quality Standard for Particulate Matter with Aerodynamic Diameter less than 2.5 Micron Metres (PM _{2.5}) ⁴⁵ .	NAAQS The NAAQS provide comprehensive guidelines and regulations to safeguard air quality across South Africa. These standards outline permissible concentrations of various air pollutants, including particulate matter, sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead, aimed at protecting public health and the environment. The NAAQS serves as a benchmark for assessing and monitoring air quality levels nationwide, guiding government agencies, industries, and other stakeholders in implementing measures to mitigate air pollution and minimise its adverse impacts. NAAQS – PM_{2.5} The National Ambient Air Quality Standard for Particulate		The Project activities have been set out to abide by the NEM: AQA and standards set out in the NAAQS. The Standards were consulted when compiling the Air Quality Impact Assessment and the EMPr (Section 10.1 and Part B of the report).

⁴³ South African Bureau of Standards - SANS 241-1:2015 Drinking water Part 1 – Microbiological, physical, aesthetic and chemical determinants, 2015.

⁴⁴ GN 1210 in GG 32816 of 24 December 2009.

⁴⁵ GN 486 in GG 35463 of 29 June 2012.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	Matter with Aerodynamic Diameter less than 2.5 Micron Metres (PM _{2.5}) establishes regulatory guidelines to control and monitor fine particulate pollution in the ambient air across South Africa. PM _{2.5} refers to tiny particles suspended in the air, which can penetrate deep into the lungs and pose significant health risks, including respiratory and cardiovascular problems. The standard sets permissible concentration limits for PM _{2.5} in ambient air, serving as a crucial tool for protecting public health and the environment.		
Noise standards: SANS 10103:2008 The measurement and rating of environmental noise with respect to annoyance and to speech communication ⁴⁶ .	SANS 10103:2008 outlines guidelines for the measurement and assessment of environmental noise concerning its potential to cause annoyance and disrupt speech communication. This standard provides a framework for objectively evaluating noise levels in various environments to ensure they meet acceptable thresholds for human comfort and communication.	The Standards were consulted when compiling the Noise Impact Assessment and the EMPr (Part 2 of this report).	
Integrated Environmental Management (IEM) guidelines: Integrated Environmental Management Information Series – Impact	The IEM guidelines serve as a comprehensive framework for managing environmental considerations across various sectors and activities. These guidelines emphasise the integration of environmental considerations into decision-making processes at all stages of planning, implementation, and monitoring. By adopting an	The S&EIA process for the proposed Project has been undertaken in accordance with the principles of IEM. A detailed impact assessment together with the recommended mitigation and management measures are provided in this report (Section 12.7 of the report). The Need and Desirability of the Project were considered and discussed following the guidelines provided by the DFFE (Section 7 of the report).	

⁴⁶ South African Bureau of Standards - •SANS 10103:2008 The measurement and rating of environmental noise with respect to annoyance and to speech communication, 2008.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Significance. Information Series 5, 2004⁴⁷. Integrated Environmental Management Information Series – Cumulative Effects Assessment. Information Series 7, 2004⁴⁸. Integrated Environmental Management Information Series – Criteria for Determining Alternatives in EIA. Information Series 11, 2004⁴⁹. Review in EIA, Integrated Environmental Management, Information Series 13, 2004⁵⁰. Public Participation guideline in terms of	integrated approach, IEM seeks to balance socio-economic development with environmental protection, ensuring that development activities are sustainable and minimise adverse environmental impacts. Key components of IEM include stakeholder engagement, Environmental Impact Assessment, environmental management plans, monitoring, and adaptive management strategies.	The Public Participation Process was facilitated as recommended in the Public Participation guidelines. The Exemption and Appeal guidelines were considered during the outset of the proposed Project to determine the necessary processes and applications that need to be followed (if required). Section 9.2 of the report outlines the public participation undertaken for the Project to date.	

⁴⁷ DEAT (2002) Impact Significance, Integrated Environmental Management, Information Series 5, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

⁴⁸ DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

⁴⁹ DEAT (2004) Criteria for determining Alternatives in EIA, Integrated Environmental Management, Information Series 11, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

⁵⁰ DEAT (2004) Review in Environmental Impact Assessment, Integrated Environmental Management, Information Series 13, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
NEMA EIA Regulations, 2017⁵¹. Guidelines on Need and Desirability, 2017⁵². Guideline on the Administration of Appeals, 2015⁵³.			
Water management guidelines: Department of Water Affairs and Forestry (DWAF)⁵⁴, Second Edition, 1998. Waste Management Series. Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste. DWAF, Second Edition, 1998. Waste Management	DWAF Waste Management Series The DWAF Waste Management Series represents a comprehensive set of guidelines aimed at promoting effective and sustainable waste management practices in South Africa. These series encompass various aspects of waste management, including waste minimisation, collection, treatment, disposal, and recycling. The series emphasise the importance of minimising environmental impacts, protecting public health, and promoting resource efficiency through the proper management of waste streams. Guidelines for the Utilisation and Disposal of Wastewater Sludge – Volume 1	Assessments conducted as part of the surface and groundwater specialist reports were undertaken in terms of the relevant Best Practice Guidelines (BPG's) of the DWS as outlined in the specialist reports attached as appendices to this report. Section 12.1 of the report provides a summary of the specialist studies undertaken for the Project.	

⁵¹ Department of Environmental Affairs (2017), Public Participation guideline in terms of NEMA EIA Regulations, Department of Environmental Affairs, Pretoria, South Africa.

⁵² DEA (2017), Guideline on Need and Desirability, Department of Environmental Affairs (DEA), Pretoria, South Africa.

⁵³ Department of Environmental Affairs (2015), Guidelines on the Administration of Appeals, Department of Environmental Affairs, Pretoria, South Africa.

⁵⁴ Now known as the Department of Water and Sanitation.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Series. Minimum Requirements for Waste Disposal by Landfill. DWAF, Second Edition, 1998. Waste Management Series. Minimum Requirements for Water Monitoring at Waste Management Facilities. Guidelines for the Utilisation and Disposal of Wastewater Sludge – Volume 1: Selection of Management Options; 2006. Guidelines for the Utilisation and Disposal of Wastewater Sludge - Volume 3: Requirements for the Onsite and Off-site Disposal of Sludge; 2006. Best Practice Guideline G1 – Storm Water Management; 2006.	The Guidelines for the Utilisation and Disposal of Wastewater Sludge – Volume 1: Selection of Management Options, published in 2006, offer comprehensive guidance on the sustainable management of wastewater sludge in South Africa. This volume focuses specifically on the selection of management options for wastewater sludge, considering various factors such as environmental impacts, public health considerations, and resource recovery opportunities. The guidelines promote environmentally sound practices, resource recovery, and the protection of public health while addressing the challenges associated with sludge management in South Africa. <i>Guidelines for the Utilisation and Disposal of Wastewater Sludge - Volume 3</i> The Guidelines for the Utilisation and Disposal of Wastewater Sludge - Volume 3: Requirements for the Onsite and Off-site Disposal of Sludge, published in 2006, provide detailed guidance on the safe and environmentally responsible disposal of wastewater sludge in South Africa. This volume outlines requirements and best practices for both onsite and off-site disposal methods, addressing considerations such as site selection, engineering design, operational procedures, monitoring, and regulatory compliance.		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Best Practice Guideline G2 – Water and Salt Balances; 2006. Best Practice Guideline G3 – Water Monitoring Systems; 2007. Best Practice Guideline G4 – Impact Prediction; 2008. Best Practice Guideline G5 – Water Management Aspects for Mine Closure; 2008. Best Practice Guideline H1 – Integrated Mine Water Management; 2008. Best Practice Guideline H2 – Pollution Prevention and Minimisation of Impacts; 2008. Best Practice Guideline H3 – Water Reuse and Reclamation; 2006. Best Practice Guideline H4 – Water Treatment; 2007.	Best Practice Guidelines G1 to G5 The Best Practice Guidelines G1 to G5 collectively offer a comprehensive framework for responsible water management in the mining industry of South Africa. Guideline G1 focuses on stormwater management, providing guidance on minimising the environmental impacts of stormwater runoff from mining operations. Guideline G2 addresses water and salt balances, offering strategies for managing water resources efficiently and minimising salt accumulation in mining environments. Guideline G3 focuses on water monitoring systems, outlining best practices for monitoring water quality and quantity to ensure compliance with regulatory standards and identify potential environmental risks. Guideline G4 covers impact prediction, providing methodologies for assessing the potential environmental impacts of mining activities on water resources. Finally, Guideline G5 addresses water management aspects for mine closure, emphasising the importance of planning and implementing measures to mitigate long-term environmental impacts and ensure the sustainable closure of mining operations. Best Practice Guidelines H1 to H4 The Best Practice Guidelines H1 to H4 collectively provide a comprehensive framework for sustainable water		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
External Guideline: Generic Water Use Authorisation Application Process, 2007. Internal Guideline: Generic Water Use Authorisation Application Process, 2007. Best Practice Guideline A2 – Water Management for Mine Residue Deposits; 2008. Best Practice Guideline A3 – Water Management in Hydrometallurgical Plants; 2007. Best Practice Guideline A4 – Pollution Control Dams; 2007. Best Practice Guideline A6 – Water Management for Underground Mines; 2008. Operational Guideline: Integrated Water and	management practices in the mining industry of South Africa. Guideline H1 focuses on integrated mine water management, emphasising the holistic management of water resources within mining operations to minimise environmental impacts and promote water conservation. Guideline H2 addresses pollution prevention and minimisation of impacts, providing strategies for mitigating pollution from mining activities and minimising adverse environmental effects. Guideline H3 focuses on water reuse and reclamation, offering guidance on safely and sustainably reusing water within mining operations to reduce freshwater consumption and minimise wastewater discharges. Guideline H4 covers water treatment, outlining best practices for treating water to meet regulatory standards and protect water quality. Together, these guidelines support environmentally responsible mining practices, promote water resource sustainability, and help safeguard water resources for current and future generations. External Guideline: Generic Water Use Authorisation Application Process, 2007 and the Internal Guideline: Generic Water Use Authorisation Application Process, 2007 The External Guideline: Generic Water Use Authorisation Application Process, 2007 and the Internal Guideline: Generic Water Use Authorisation Application Process,		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Waste Management Plan, 2010. Water Conservation and Water Demand Management Guideline for the Mining Sector in South Africa; DWA, 2011. Internal Guideline: Section 21(a) and (b) Water Use Authorisation Application Process (taking and/or storing water). Internal Guideline: Section 21(c) and (i) Water Use Authorisation Application Process (impeding or diverting the flow of water in a watercourse and /or altering the bed, banks, course or characteristics of a watercourse). Internal Guideline: Section 21(e), (f), (g), (h) and (j) Water Use Authorisation	2007 collectively provide comprehensive guidance on the application process for obtaining water use authorisations in South Africa. The External Guideline offers guidance to external stakeholders, including water users and applicants, outlining the requirements and procedures for submitting water use authorisation applications to regulatory authorities. In contrast, the Internal Guideline provides guidance to internal stakeholders within the DWS, detailing the processes and criteria for reviewing and processing water use authorisation applications. Both guidelines aim to ensure consistency, transparency, and efficiency in the water use authorisation process, facilitating compliance with water resource management regulations and promoting sustainable water use practices. Best Practice Guidelines A2 to A6 The Best Practice Guidelines A2 to A6 collectively offer comprehensive guidance for effective water management practices in various mining operations in South Africa. Guideline A2 focuses on water management for mine residue deposits, providing strategies for the safe and sustainable management of water within these facilities to minimise environmental impacts. Guideline A3 addresses water management in hydrometallurgical plants, offering best practices for managing water resources efficiently and minimising pollution risks associated with these		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Application Process (waste discharge related).	operations. Guideline A4 covers PCDs, outlining measures for constructing and maintaining dams to prevent pollution and protect water quality. Guideline A6 focuses on water management for underground mines, providing guidance on managing water inflows, dewatering operations, and minimising water-related risks in underground mining environments. Together, these guidelines promote environmentally responsible mining practices, support water resource sustainability, and help mitigate the potential impacts of mining activities on water resources and ecosystems. Operational Guideline: Integrated Water and Waste Management Plan, 2010 The Operational Guideline: Integrated Water and Waste Management Plan, 2010, serves as a comprehensive framework for the development and implementation of integrated water and waste management plans in South Africa. This guideline provides detailed guidance on the planning, design, and implementation of strategies to manage water resources and waste streams in an integrated manner. It emphasises the importance of considering the interconnections between water and waste management activities to optimise resource use, minimise environmental impacts, and promote sustainability. The guideline outlines steps for conducting assessments, setting objectives, identifying management		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	options, and monitoring progress towards achieving water and waste management goals. <i>Water Conservation and Water Demand Management Guideline for the Mining Sector in South Africa</i> The Water Conservation and Water Demand Management Guideline for the Mining Sector in South Africa, published by the DWS in 2011, provides a comprehensive framework for promoting efficient water use and conservation practices within the mining industry. This guideline outlines strategies and best practices for minimising water consumption, reducing water losses, and optimising water management processes throughout all stages of mining operations. It emphasises the importance of implementing water conservation measures to mitigate the impacts of water scarcity, ensure sustainable water use, and minimise environmental degradation. The guideline also addresses the integration of water demand management principles into mine planning, design, and operations to improve water efficiency and resilience to climate change. <i>Internal Guideline: Section 21(a) and (b) Water Use Authorisation Application Process</i> The Internal Guideline: Section 21(a) and (b) Water Use Authorisation Application Process provides detailed instructions and procedures for internal stakeholders		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	within the DWS to assess and process water use authorisation applications for taking and / or storing water. This guideline outlines the requirements, criteria, and documentation necessary for evaluating applications in accordance with Section 21(a) and (b). It sets out the steps for reviewing applications, including conducting technical assessments, evaluating environmental impacts, considering public comments, and issuing water use authorisations with appropriate conditions. Internal Guideline: Section 21(c) and (i) Water Use Authorisation Application Process The Internal Guideline: Section 21(c) and (i) Water Use Authorisation Application Process outlines the procedures and criteria for the DWS to assess and process water use authorisation applications related to impeding or diverting the flow of water in a watercourse and/or altering the bed, banks, course, or characteristics of a watercourse. This guideline provides detailed instructions for evaluating applications in accordance with Section 21(c) and (i), including technical assessments, environmental impact evaluations, public consultation processes, and issuing water use authorisations with appropriate conditions. Internal Guideline: Section 21(e), (f), (g), (h), and (j) Water Use Authorisation Application Process		

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	The Internal Guideline: Section 21(e), (f), (g), (h), and (j) Water Use Authorisation Application Process delineates the procedures and criteria for the DWS to evaluate and process water use authorisation applications pertaining to waste discharge activities. This guideline offers comprehensive instructions for assessing applications in accordance with Section 21(e), (f), (g), (h), and (j) of relevant water legislation, encompassing various aspects of waste discharge management. It includes detailed guidelines for conducting technical assessments, evaluating potential environmental impacts, engaging with stakeholders, and issuing water use authorisations with appropriate conditions.		
Mining and Biodiversity Guidelines ⁵⁵ .	Published in 2013, the Mining and Biodiversity Guidelines 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. From a business	The Terrestrial Biodiversity and Wetland Aquatic Impact Assessment undertaken for the Project area are summarised in Section 10.1 of this report. The findings of the assessment in the form of the impacts and the proposed mitigation	Based on the outputs of the Mining and Biodiversity Guidelines, the proposed Project largely falls outside of areas classified in terms of the guidelines. Some proposed elements however are associated with areas classified as being of 'high biodiversity importance'.

⁵⁵ Department of Environmental Affairs, Department of Mineral Resources, Chamber of Mines, South African Mining and Biodiversity Forum & South African National Biodiversity Institute. (2013). Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector. Pretoria, South Africa.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	perspective, the document explains the value for mining companies of adopting a risk-based approach to managing biodiversity. The early identification and assessment of mining impacts on biodiversity provides an opportunity to put in place environmental management plans and actions that reduce risks to biodiversity, people and business (Department of Environmental Affairs <i>et al.</i>, 2013). The purpose of the Mining and Biodiversity Guidelines was to identify and categorise biodiversity priority areas sensitive to the impacts of mining to support mainstreaming of biodiversity issues in decision-making in the mining sector. In order to do this, a composite raster layer was developed based on a large number of individual biodiversity spatial datasets held by South African National Botanical Institute (SANBI), distinguishing between 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. The guidelines therefore provide explicit direction in terms of where mining-related impacts are legally prohibited, where biodiversity priority areas may present high risks for mining projects, and where biodiversity may limit the potential for mining.	measures undertaken for the Project are detailed in Section 12.7 of this report.	

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
Guideline: National Freshwater Ecosystem Priority Areas (NFEPA) ⁵⁶ .	The Guideline for NFEPA serves as a comprehensive framework for identifying and prioritising areas of high ecological value and significance within freshwater ecosystems in South Africa. Developed to guide conservation efforts and management strategies, this guideline outlines methodologies and criteria for assessing the ecological importance of freshwater ecosystems based on various factors such as biodiversity, ecological processes, and ecosystem services. By identifying NFEPA's, decision-makers can prioritise conservation actions, allocate resources effectively, and implement targeted management interventions to safeguard the health and integrity of freshwater ecosystems.		An Aquatic Biodiversity Impact Assessment was conducted as part of the EIA phase. The findings of the assessment in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area detailed in Section 12.7 report.
South African Water Quality Guidelines Volume 7: Aquatic Ecosystems, dated 1996 ⁵⁷ .	The South African Water Quality Guidelines Volume 7: Aquatic Ecosystems, dated 1996, provides essential guidance for the management and protection of aquatic ecosystems. This volume outlines standards and criteria for assessing and monitoring the quality of water bodies, including rivers, lakes, wetlands, and estuaries, to ensure their ecological health and integrity. It covers various parameters such as physical, chemical, and biological		An Aquatic Biodiversity Impact Assessment was conducted as part of the EIA phase. The findings of the assessment in the form of the impacts and the proposed mitigation measures undertaken for the proposed Project area detailed in Section 12.7 of this report. This report considered the South African Water Quality Guidelines Volume 7: Aquatic Ecosystems guidelines.

⁵⁶ Nel, J.L., Driver, A., Strydom, N.A., Maherry, A.M., Peterson, C., Hill, L., Roux, D.J., Nienaber, S., van Deventer, H., Swartz, E.R. & Smith-Adao, L.B. (2011). Atlas of Freshwater Ecosystem Priority Areas in South Africa: Maps to support sustainable development of water resources. WRC Report No. TT 500/11. Water Research Commission, Pretoria, South Africa.

⁵⁷ DWAF (1996) South African Water Quality Guidelines. 2nd Edition, Volume 7: Aquatic Ecosystems. Department of Water Affairs and Forestry, Pretoria.

Applicable Legislation and Guidelines used to compile the Report	Description	Reference where applied in Report	How Does This Development Comply with and Respond to The Policy and Legislative Context
	characteristics, as well as specific pollutants that may affect aquatic ecosystems.		

7. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES⁵⁸

In accordance with item 3. (1)(f) in Appendix 3 of the EIA Regulations, 2014, the need for and desirability of the proposed Project must be motivated, as contemplated in the approved Final Scoping Report. The Department of Environmental Affairs (DEA) published a “Guideline on Need and Desirability” (Department of Environmental Affairs, 2017) which contains best practice guidelines for the consideration of the need and desirability of a development involving NEMA Listed Activities.

Need and desirability is based on the principle of sustainability, set out in the Constitution and in NEMA, and provided for in various policies and plans. The guideline sets out a list of questions which should be addressed when considering need and desirability of a proposed development based on Section 24 of the Constitution which calls for the securing of “ecological sustainable development and use of natural resources” and the promotion of “justifiable economic and social development”.

In addition to the above, the proposed Project is aligned with the objectives of the MPRDA:

- To promote economic growth and mineral development in South Africa;
- To promote employment and advance the social and economic welfare of all South Africans;
- To ensure that the nation’s mineral resources are developed in an orderly and ecologically sustainable manner while promoting justifiable social and economic development; and
- To ensure that holders of MRs contribute towards the socio-economic development of the area in which they are operating.

A discussion on the socio-economic and environmental need and desirability considerations is provided below.

7.1. ECONOMIC AND SOCIAL CONSIDERATIONS

The presence of the Umgala mining projects in the study area is generally seen to be positive due to the economic and employment benefits that the mining project will provide. While mining’s contribution to national gross domestic product (GDP) has dropped significantly in the past few decades, it is still seen as a major potential driver of economic development and previously disadvantaged persons’ empowerment. Coal mining is the only mining activity in eMadlangeni Local Municipality (LM) and, while most of the Amajuba District’s mines closed in the late 1990s, the recovery of coal prices now makes it viable to re-open them. The presence at Utrecht of the R34 that links regional roads to the coal export terminus at Richards Bay is a very positive driver for the redevelopment of coal mining in the area.

eMadlangeni’s approximately 37,000 people in 2022 contributed by contrast only 7%, so economic development in eMadlangeni is seen as the biggest development need (Urban Econ, 2023). While the town of Utrecht’s dramatic natural setting at the foothills of the Balelesberg is seen as having a big

⁵⁸ Required as per the EIA Regulations Appendix 3 (3) (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 development footprint within the approved site as contemplated in the accepted scoping report.

potential for attracting tourism, the Covid pandemic and other factors have conspired to severely limit the realization of this potential. Agriculture is now the biggest contributor to local economic performance in terms of GVA, but its employment potential is very limited because this area is suitable mostly for stock grazing (very low labour requirement), not cropping.

Given the nature and scale of the Project - the creation of employment opportunities, the contribution to the local, provincial, and national GDP, the stimulation of new business activity, and the raising of income levels – it is likely to result in medium to very high positive socio-economic impacts. It contributes to improving the economic performance of eMadlangeni Local Municipality and economic standing of the many communities living around the proposed mining project area.

Heritage resources are present in the Mining Right area and the Applicant has taken pains to locate/design all surface infrastructure to avoid impacting identified Heritage resources within the Umgala footprint.

7.2. ENVIRONMENTAL CONSIDERATIONS

The Mining Right area falls within the Grassland Biome and more specifically, the Income Sandy Grassland (Endangered) and the Northern KwaZulu-Natal Moist Grassland (Vulnerable), their conservation status established in a national ecosystems assessment (Bathusi Environmental, 2024).

Despite the degraded nature of the environment around the Umgala portion of the mining right – due to past mining and even agricultural activities there – some species of conservation importance have been identified there, and there are numerous water bodies and wetlands. A number of these wetlands are, however, artifices resulting from past mining activities and topography alterations, and some of them will be re-developed as mining pollution control dams in the new project.

The Menar Group – of which the Applicant is a subsidiary - now developing the project has a strong track record in sustainable mining and is ensuring thorough planning and design of the coal mining project to minimize negative environmental impacts, notably concerning its surface spatial footprint, water management and control of acid mine drainage (refer to the Acid Mine Drainage Management Plan attached to Appendix IV).

The economically depressed nature of the area may be a constraint to nature-based tourism, in spite of the presence in the area of several proclaimed nature reserves. Revenues accruing to local and regional authorities from the mining project may enable the development or upgrade of tourism infrastructure. Biodiversity offset projects linked to mining environmental approval will be designed to directly benefit local biodiversity resources, so the mining project may have an overall positive environmental outcome if all mitigation and compensation actions are implemented.

Considering the above, the need and desirability of an application must be addressed separately and in detail answering inter alia the questions as indicated in Table 11 below.

Table 11: Need and desirability considerations

Securing Ecological Sustainable Development and Use of Natural Resources		
1.1	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area? How were the following ecological integrity considerations taken into account? 1.1.1 Threatened Ecosystems, 1.1.2 Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure, 1.1.3 Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs"), 1.1.4 Conservation targets, 1.1.5 Ecological drivers of the ecosystem, 1.1.6 Environmental Management Framework, 1.1.7 Spatial Development Framework, and 1.1.8 Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.).	The following specialist studies have been compiled to inform this report from an ecological perspective: - Terrestrial Biodiversity Assessment - Wetland and Aquatic Biodiversity Impact Assessment, and - Hydropedology Impact Assessment which links to the ecological drivers of these ecosystems. The ecological integrity of the site has been adequately assessed, and the outcome of these assessments have been incorporated into this report.
1.2	How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where could these negative impacts not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Refer to the ecological information in Section 10.1 and the impact assessment and mitigation measures in Section 12.7 of this report.
1.3	How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Refer to ecological information in Section 10, and the impact assessment and mitigation measures in Section 12 and Section 13 of this report.

1.4	What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?	General waste, hazardous waste and litter will be generated during the life of the mine, and these should be kept in designated areas and disposed of to a licensed landfill facility. Other wastes that may cause soil contamination, are from the use of vehicles and loaders during the mining process, which may lead to hydrocarbon spills. Regulations for soil clean-up and management have been prescribed within the EMPr.
1.5	How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Heritage sites identified within the Project area were avoided by revising the original site layout plan and maintaining a 50m bufferzone. Refer to Sections 10 to 13 of this report.
1.6	How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?	Since coal seams are usually associated with wetland related terrain, as most coal seams are the result of peat and other organic carbon accumulations over the years, this will always be the areas where coal is found and may be characterised by sensitive features such as wetlands, pans and grasslands. In an attempt to avoid the sensitive areas, the infrastructure layout was developed to avoid certain areas of high sensitivity. Where these areas could not be avoided, mitigation measures were provided to minimise the impacts. As a final and last resort, offsetting will be explored and executed as per the requirements of the biodiversity impact assessment.
1.7	How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts? 1.7.1. Does the proposed development exacerbate the increased dependency	Several specialist studies were undertaken as part of this Project. The impacts on resources are outlined in Section 12.7 of this report.

	on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialized growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life). 1.7.2. Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?) 1.7.3. Do the proposed location, type and scale of development promote a reduced dependency on resources	
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)? 1.8.2 What is the level of risk associated with the limits of current knowledge? 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?	Specialist studies across various themes and fields have been undertaken for this Project. Through undertaking these studies there is now an understanding of the receiving environmental and the potential risks associated with this project. Each report has listed possible assumptions, limitations and gaps in the study. These limitations have been included under Section 18.
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? 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	Refer to the impacts and proposed mitigation measures described in Section 12.7.

	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.)?	Refer to the impact assessment and mitigation measures in Section 12.7 of this report.
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 environmental risk assessment for all environmental features has been assessed and has been included under Section 12.7 of 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?	Since the approval of the original EMP in 2009, there have been several layout changes to consider environmental features, such as avoiding graves and maintaining a buffer zone and also minimizing the extent of disturbance to delineated wetlands. In addition, Knights Hill formed part of the original Project, but has been removed from the Project. Alternatives are further discussed in Section 8 of this report.
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 13 of this report. Specialist studies have been undertaken and the findings of these reports have been included in this draft EIAr.
"Promoting justifiable economic and social development"		
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations? 2.1.1 The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area, 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.), 2.1.3 Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and 2.1.4 Municipal Economic Development Strategy ("LED Strategy").	eMadlangeni's current IDP (aligned with Amajuba District) prioritises basic-service backlogs, jobs via agriculture, tourism and (legacy) coal value chains, SMME support, and safer, better-maintained municipal infrastructure. It aligns upward to the Amajuba District Growth & Development Plan ("Vision 2030/2035"). Mine infrastructure aimed at aligning with District SDF, Air Quality & Environmental Management Frameworks. District SDF flags consolidation of nodes, protection of high-value environmental assets (wetlands, biodiversity), and investment into priority corridors and service backlogs. This supports mines that rehabilitate historical impacts and share infrastructure. In support of this, the Applicant has decided to exclude Knights Hill from this application, subsequently reducing the

		overall mine footprint for the current Project. Utrecht and eMadlangeni have historical and cultural sites tied to the district's tourism narrative. As a result, a heritage impact assessment was undertaken and grave sites avoided in the final layout plan for Umgala. In terms of the LED Strategy, job creation via primary sectors (agri/forestry), tourism-led nodal development, SMME/supplier development, skills pipelines for youth, and leveraging legacy mining value chains where feasible are supported, provided that compliance and rehabilitation improve net outcomes.
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? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs 2.2.2. Implementation of Social and Labour Plan (SLP)	Refer to the comment made above. The implementation of the SLP will further contribute to local economic development. Prioritising local recruitment reduces unemployment in Utrecht, where historic unemployment rates have been high (~38%). Training and apprenticeships (engineering, safety, admin, artisanal trades) not only serve the mine but also create a skilled workforce that can benefit other sectors after mine closure. Wages earned locally circulate through shops, transport, housing rentals, and services, boosting the small-town economy. These are some examples of the positive impacts associated with the implementation of the mine and SLP. Further socio-economic impacts are provided in Section 12.7 of this report.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	Refer to comments made above. All aspects and comments received from I&APs during the Scoping process were reasonably addressed and incorporated into the final Scoping Report submitted to the DMRE and have been provided within this draft EIAr for further review. Local economic growth and work opportunities will be main benefits from the Project if approved and may continue to address some of the physical, psychological, development,

		cultural and social needs. Refer to the proposed public participation process in Section 9 and Appendix IV of this report.
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 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, 2.5.2. reduce the need for transport of people and goods, 2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport), 2.5.4. compliment other uses in the area, 2.5.5. be in line with the planning for the area, 2.5.6. for urban related development, make use of under-utilised land available with the urban edge, 2.5.7. optimise the use of existing resources and infrastructure, 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), 2.5.9. discourage "urban sprawl" and contribute to compaction/densification, 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, 2.5.11. encourage environmentally sustainable land development practices and processes	The preferred alternative has been assessed within this report. As the Project includes an area with an existing right, no other site alternatives were assessed. As noted above, several infrastructure layouts have been considered during the course of the design phase (since 2022). The final and preferred layout were designed to avoid sensitive heritage sites and also resulted in the exclusion of the Knights Hill portion of the Project. Refer to Section 8, details of alternatives considered, in 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.), 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), 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 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?	
2.6	How were 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)? 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? 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?	Specialist reports were undertaken during the EIA Phase, and have been included under this draft EIAr to inform the impact assessment process for the Project. Environmental impacts and mitigation measures have been identified in Section 12 of this report.
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? 2.7.2. Positive impacts. What measures were taken to enhance positive impacts?	Refer to the impact assessment and mitigation measures in Section 12.7 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 socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural	Refer to the impact assessment and mitigation measures in Section 12.7 of this report.

	resources, etc.)?	
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 and mitigation measures in Section 12.7 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?	This draft EIAr explored the existing socio-economic conditions of the application area (refer to Section 10) and has assessed the possible socio-economic impacts (both positive and negative) under Sections 12. The EAP has ensured that past I&APs have been included in the PPP. This ensured that any impacted I&APs would have the opportunity to register their comments during both the past 30-day comment period for draft Scoping Report and this submission of the Draft EIAr for comment. Furthermore, by following the legislative Public Participation process, new I&APs would also have an opportunity to raise concerns about the project or better guide the project on how to achieve the best practicable environmental option. The appointed specialists assessed the impacts across the respective themes and recommend mitigation techniques to achieve the same objective. Refer to the impact assessment and mitigation measures in Section 12 of this report. The mine will be in line with the regulatory requirements and provide financial provision to ensure that the mitigation measures proposed can be carried out.
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 a Scoping, EIA and Public Participation Process, the EAP and Applicant ensures that equitable access will be considered. Refer to the impact assessment and mitigation measures in Sections 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 and mitigation measures in Sections 12 of this report. The draft EIAr specifies timeframes within which mitigation measures must be implemented.

2.13	What measures were taken to: 2.13.1. ensure the participation of all interested and affected parties, 2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, 2.13.3. ensure participation by vulnerable and disadvantaged persons, 2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means, 2.13.5. ensure openness and transparency, and access to information in terms of the process, 2.13.6. ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and 2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein will be promoted?	Refer to Section 9 of this report, which describes the public participation process that both has been undertaken during the Scoping Phase, and which will take place during the EIA phase of the Project.
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 9 of this report, describing the public participation process that that has been undertaken for the scoping phase and what will be undertaken during the EIA Phase under this application for the Project. The Applicant developed a Social Labour Plan, which further addresses this aspect.
2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	The Mining Right holder will have an Environmental Policy and a Health and Safety Policy in place. This, when implemented at the extended opencast mine will regulate activities on the coal mining area. All workers and contractors will need to abide to the policies and framework as specified.
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,	Refer to the findings of the Social Impact Assessment in Section 12.7 of the report.

	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), 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 (i.e. equitable distribution of costs and benefits), and 2.16.5. the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).	
2.17	What measures were taken to ensure: 2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and 2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	The applicant is in the process of applying for the following aspects across different legislation requirements: – A Part 2 Amendment application in terms of Section 31 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) to update the existing Environmental Authorisation/EMPr to make provision for the upgrading and new adit complex at Umgala – Application for a WML for the Umgala Discard Facility in terms of the identified Waste Management Activities outlined in the WML Regulations (2013) published under the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA), including the reprocessing of existing dumps at both Umgala and Zimbutu; and – Application for a Water Use License (WUL) from the Department of Water and Sanitation (DWS) for water uses triggered in terms of Section 21 of the National Water Act, 1998 (Act No. 36 of 1998 (NWA);
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 9 of this EIAR, describing the public participation process to be implemented for the Project, as well Section 10.
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 12 of this report.
2.20	What measures were taken to ensure that the costs of remedying pollution,	A Closure report has been compiled during the EIA Phase and has been

	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?	included in this draft EIA and EMPr (refer to Appendix IV).
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 8 where the proposed alternative is discussed.
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 Sections 13 of this report

8. MOTIVATION FOR THE PREFERRED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE INCLUDING A FULL DESCRIPTION OF THE PROCESS TO REACH THE PROPOSED DEVELOPMENT FOOTPRINT WITHIN THE APPROVED SITE

8.1. DETAILS OF THE FOOTPRINT ALTERNATIVES CONSIDERED

According to the DEA "Guideline on Need and Desirability and Guidelines on Assessment of Alternatives and Impacts," (2017) feasible and reasonable alternatives must be identified for a development as required by the NEMA EIA Regulations and are also applicable to the Scoping and EIA Process. Each alternative is to be accompanied by a description and comparative assessment of the advantages and disadvantages that such development and activities will pose on the environment and socio-economy. Alternatives form a vital part of the initial assessment process through the consideration of modifications to prevent and/or mitigate environmental impacts associated with a particular development. Alternatives are to be amended when the development scope of work is amended. It is vital that original as well as amended alternative identification, investigation, and assessment together with the generation and consideration of modifications and changes to the development and activities are documented.

Although an array of alternatives could be investigated for each project, such alternatives will not necessarily be applicable to each project and/or project phase. However, alternatives should be considered to maximise efficient and sustainable resource utilisation and minimise any negative impacts on the bio-physical and socio-economic environments.

Alternative should be considered with respect to:

- The property on which or location where it is proposed to undertake the activity
- The type of activity to be undertaken
- The design or layout of the activity
- The technology to be used in the activity
- The operational aspects of the activity, and
- The option of not implementing the activity.

For the purposes of this Project, rigorous Feasibility Studies were undertaken by the engineering and Project team, and following on from the above, the alternatives identified as applicable to assess in this S&EIR process are as follows:

- Property/Location Alternatives
- Design/Layout Alternatives
- Operational Alternatives
- "No-Go" Alternative (this is a mandatory option)

Based on the contextual information presented above, and described in detail below, there is no

evidence to suggest that other alternatives should be investigated for the Project.

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

Site options in mining are fundamentally dictated by:

- The spatial distribution of mineral resources, and the economic viability of exploitation of those resources, in this case, coal;
- The legal context concerning the allocation and acquisition of rights to prospect for and develop mineral resources.

Welgedacht has been granted a mineral right to exploit the coal resources contained in the mining concession area as shown in Figure . As mentioned previously in this report, Umgala was previously mined with some existing surface infrastructure. This has largely dictated the location and design of the current Project, designed specifically to minimize the surface footprint of the Project. The old Umgala Colliery infrastructure area was established, well before legislation such as the National Water Act (No. 36 of 1998) was promulgated. This led to the following decisions regarding the location and layout of the Project:

- All coal washing/ processing will take place on the footprint of the old Umgala plant (new plant to be built on old footprint), and all discard will be disposed of at an expanded dump to be constructed on the footprint of the old Umgala Discard Dump adjacent to the plant.
- Heritage features and avoidance thereof influenced the layout changes.
- Coal from a new adit to undertake underground mining of viably exploitable coal seams on the eastern portion of the Umgala section will be transported by truck for processing at the Umgala plant, so that surface infrastructure in the vicinity of the adit is minimized.
- Open-cast or surface mining is proposed only of the minimal areas required for development of the Umgala adits to access underground workings.
- Old discard existing at Umgala and also contained in the Zimbutu Discard Dump 5 km south of Umgala plant will be reclaimed and transported from Zimbutu by truck for processing at the Umgala Plant. This will have the additional environmental benefit of removing material that has the potential for acid leachate generation from a location close to watercourses and residential areas, enabling a far simpler and sustainable closure process for that now disused colliery.
- Mining and associated activities at Knights Hill were removed from this Project after Scoping Phase based on additional reviews or additional specialist input required for this site.
- A RAPS system has also been introduced and shown in the finalised layout.

8.1.2. *Preferred site and layouts*

As noted in the Introduction and Project Description section of this report (Section 1 and Section 4), different site layouts were considered during the feasibility phase of the Project. The original and

approved layout as per the EMPR (2009) serves as the first option considered for the Project, but was eliminated due to additional activities and infrastructure required to optimize the Project-related activities.

Upon commencement of the IEA process, an initial overall site layout map was prepared and included in the Scoping Phase. This included mining and related activities at Knights Hill (presented in Figure 11 below). After the consultation process in the Scoping Phase and additional feasibility studies undertaken by the Application, activities at Knights Hill were removed from this Project and application. The overall Project layout was subsequently updated and the final and preferred site layout map is presented in Figure 12.

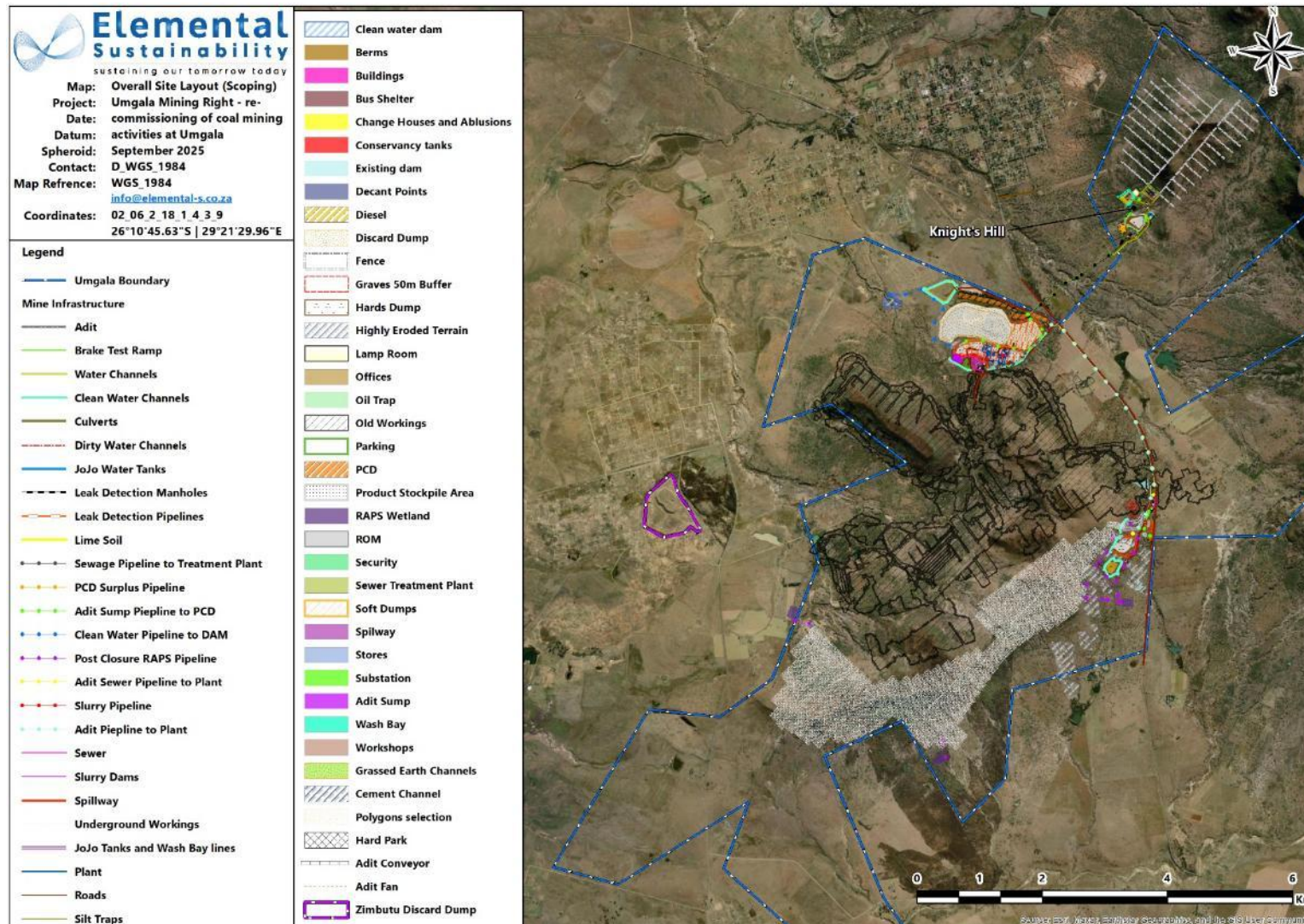


Figure 11: Overall Site Layout (original during Scoping Phase)

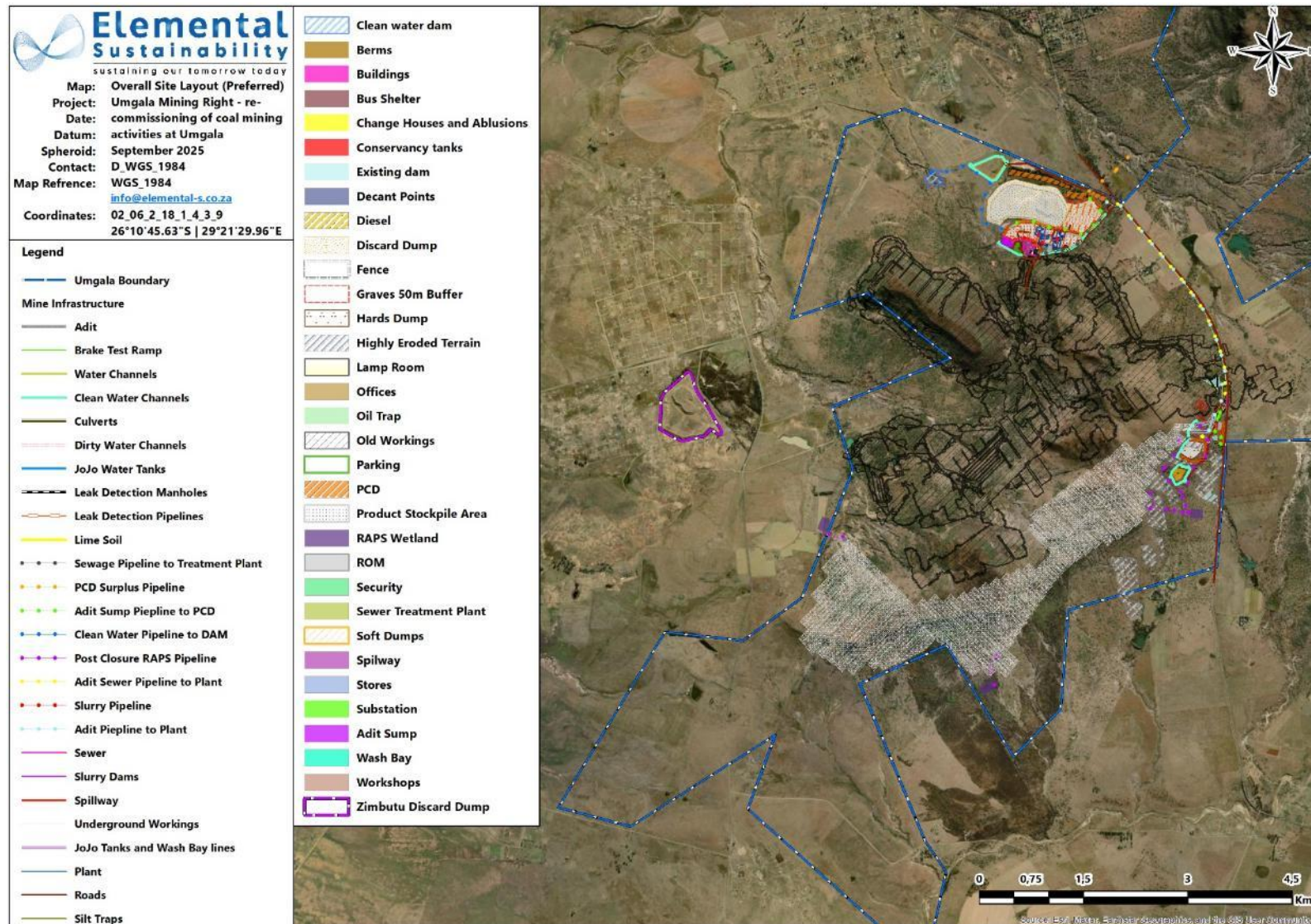


Figure 12: Overall Site Layout Map (preferred)

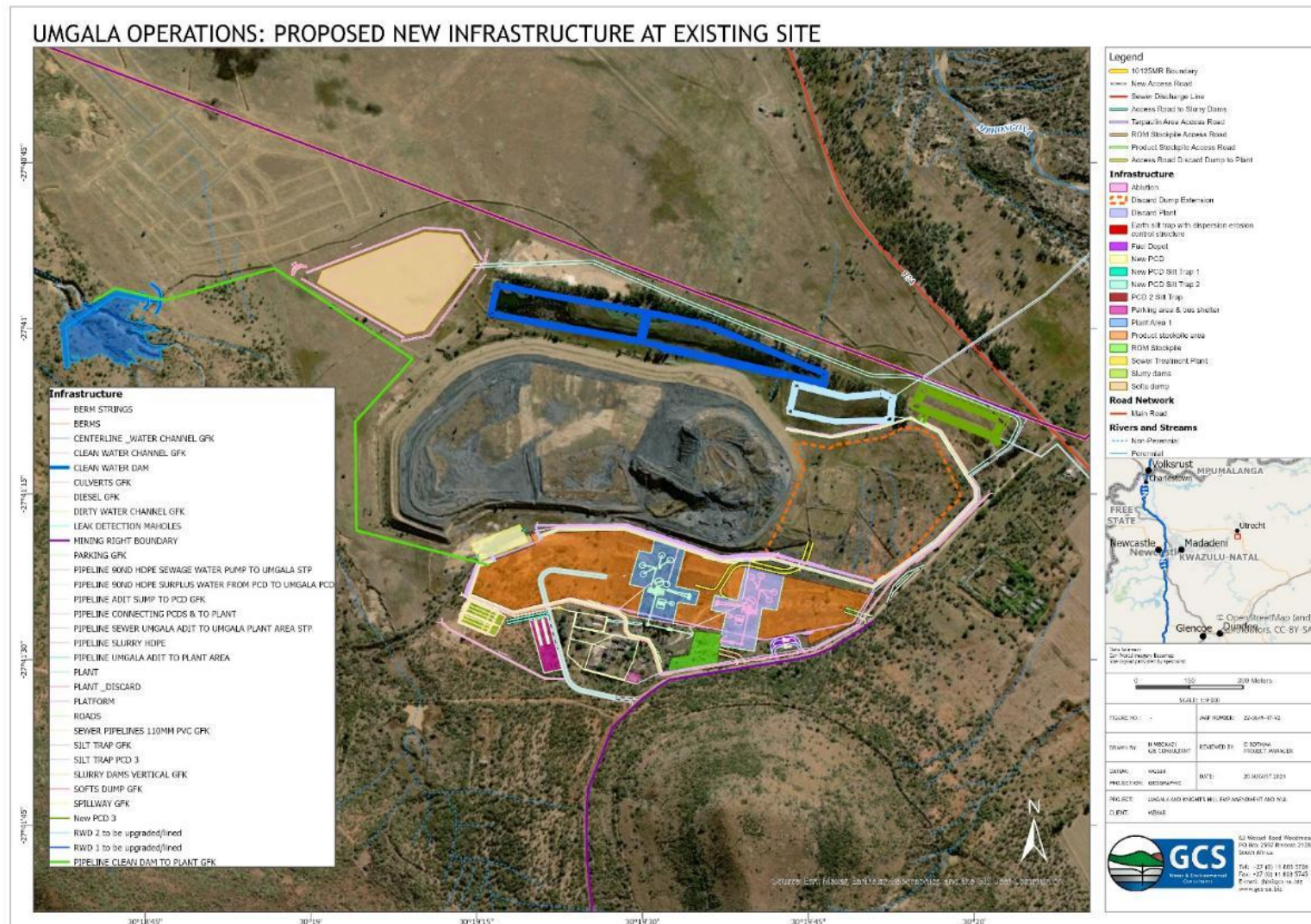


Figure 13: Project infrastructure at Umgala 1 – Northern Section

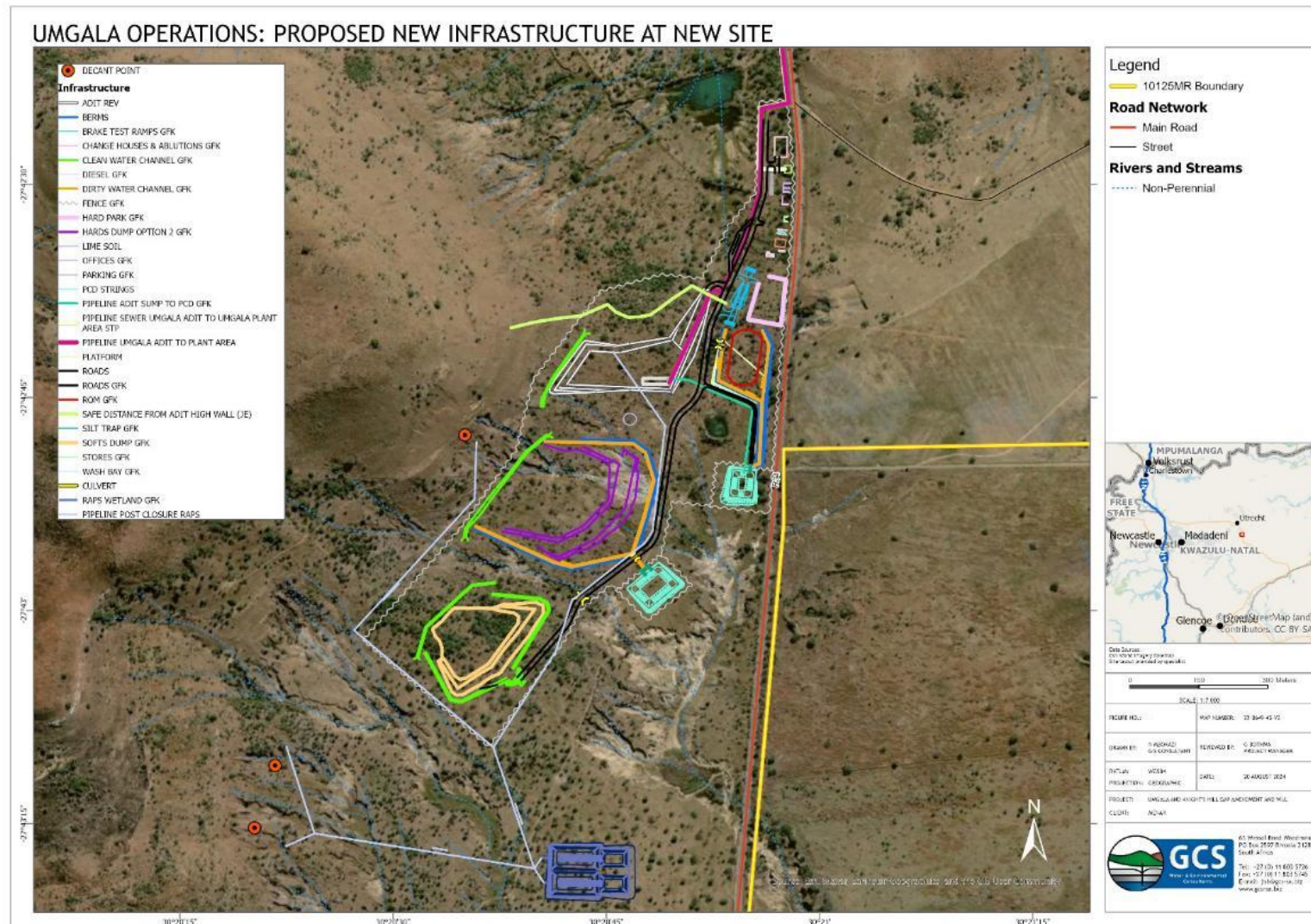


Figure 14: Project Infrastructure at Umgala 2 – Southern Section

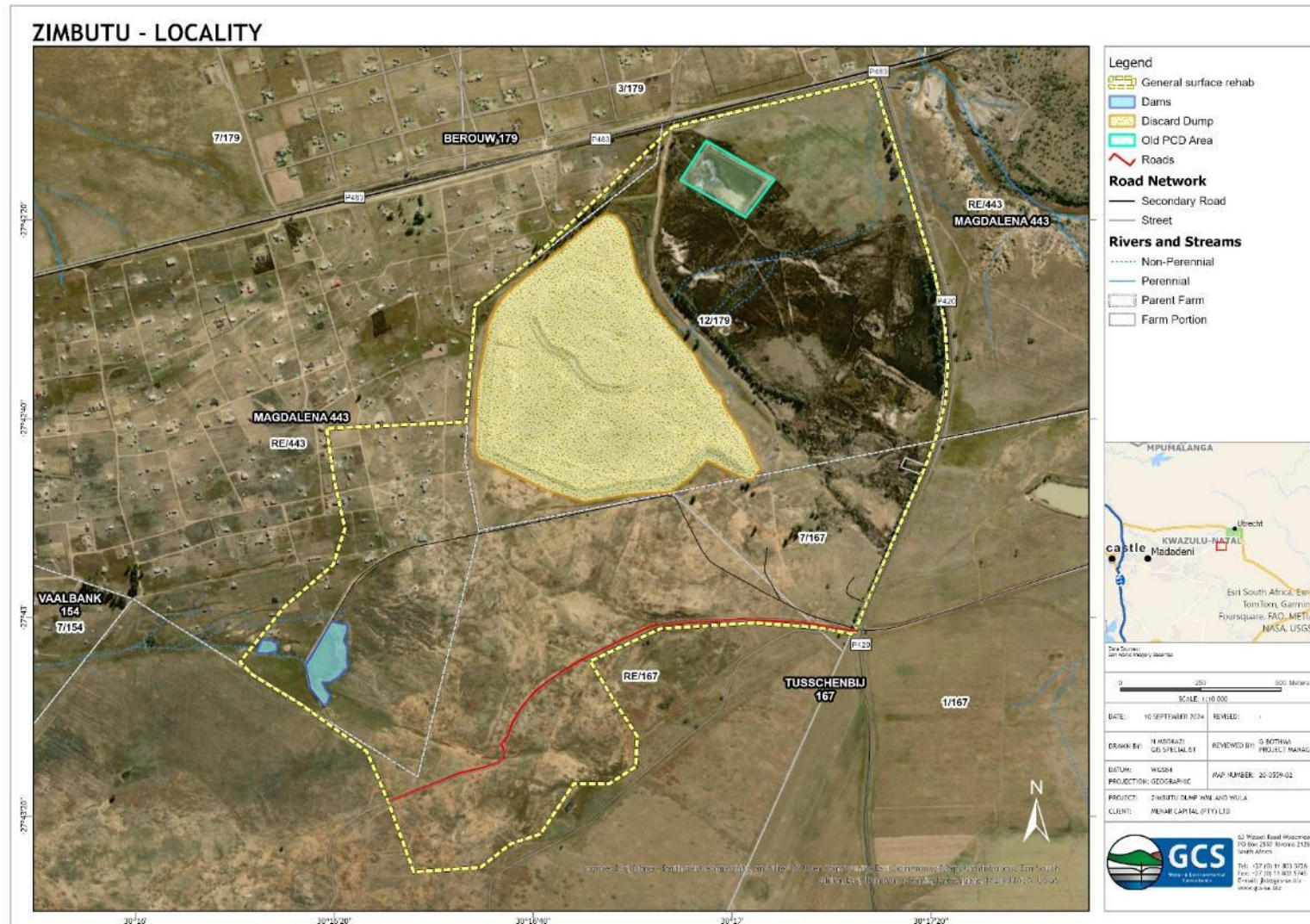


Figure 15: Existing Zimbutu Discard Dump – material will be trucked to Umgala Plant

Considerations in the layout of selected aspects of the infrastructure included the following:

- Placement of the haul roads in relation to nearby sensitive habitat types and adequate buffering to prevent the spread of impacts notably related to coal dust and its polluting constituents
- Avoiding heritage sites and maintaining a 50m buffer around these site
- Utilizing existing roads for transport of material from Zimbutu Dump to the Umgala Plant. A section of access road will be upgraded to facilitate the hauling of material from Zimbutu.
- Excluding activities associated with Knights Hill from this Project and IEA application process

8.1.3. Operational and technology alternatives

Coal mining is generally considered a comparatively straightforward extraction process due to the relatively soft nature of the coal seams. The mining process is less complex than that of many other mineral resources, as it does not require chemical beneficiation for mineral recovery. Instead, coal is subjected primarily to mechanical processing, such as crushing and washing, to achieve the desired aggregate sizes for market specifications.

The geological characteristics of the coal-bearing formations largely determine the applicable mining methods, which are limited to either opencast (surface) mining or underground mining. Within the Project area, certain coal seams are exposed at or near the surface (daylighting), making them amenable to opencast extraction. However, these seams dip and extend into deeper geological settings where opencast mining is no longer economically or technically viable, necessitating consideration of underground mining methods.

The following are preferred in terms of operational aspects of the Project:

- Opencast or surface mining is proposed only of the minimal areas required for development of the Umgala adit portals to access underground workings.
- Underground mining technology has been designed to minimize the potential for caving.
- Drill and blast, followed by extraction by continuous miners (diesel powered, driverless excavation machines), loading onto carts for transport to the ROM stockpile at the adit portal, from which the ore will be transferred to truck or pipeline for conveyance to the washing plant.
- Zimbutu Discard Dump reclamation will comprise shovelling directly onto trucks – only temporary stockpile area will be necessary to facilitate loading.
- Where dewatering is anticipated in the underground mine, water will be pumped to surface for storage followed by transfer and reticulation to various points of demand (no potentially dirty water will be discharged to the environment).
- Later on in mining, water will be pumped via decant points from the underground works to evaporation ponds and artificial wetlands for purification before discharge to the environment. A RAPS system has also been included within the proposed layout going forward.

As outlined above, the options are limited, and opencast mining has been minimised to only essential support areas for underground mining. Other options have been ruled out during vigorous feasibility studies undertaken by the engineering team.

8.1.4. “No-Go” alternative

The “no-go” option means the Umgala Project would not be implemented. Should the Umgala Project not go ahead, the recommissioned operations at Umgala Mine, the development of the new adit and underground mines, and the reclamation of current discard at Umgala and the Zimbutu Discard Dump will not materialise.

The “no-go” option would result in significant economic loss for Welgedacht Exploration Company and its parent company, the surrounding communities and the local and district municipalities. At provincial and national levels, lost tax revenue will be the principal outcome, with failure to make gains in employment levels an additional political cost. Given the massive sub-regional and district economic impact of the closure of the Arcelor Mittal steel mill at Newcastle, 30 km away, failure to develop this mining project represents a major economic setback to Northern KwaZulu-Natal, with potentially dire social consequences. Unemployment levels in the region before the steel mill closure were alarmingly high; the closure of the steel mill combined with failure to optimise other economic development potential could have catastrophic socio-economic consequences.

On the other hand, the ‘no-go’ option will be a positive outcome for the local environment, protected species and protected environments. The Umgala-Knights Hill mining right partially overlaps the Utrecht Town Park Private Nature Reserve (N.395, 2002, PGKZN 6133). The Knights Hill adit and surface infrastructure lies entirely within it, and the underground mining section underlies the sensitive footslopes of the Balelesberg in the reserve. However, it is important to note that the Knight’s Hill development have been excluded from this application.

As a result, a “no-go” option for the Knights Hill operations have been identified as the preferred option and has been removed from this application, with only Umgala mining/reclamation and related operations and Zimbutu Dump reclamation to proceed as part of this application.

8.2. CONCLUDING STATEMENT OF PREFERRED ALTERNATIVES

Based on the results of scientific studies done and socio-economic considerations, the following concluding remarks are made regarding the preferred alternative:

- The project has gone through many design iterations to arrive at the location, layout and technology options designed to minimize its environmental footprint and to manage all deleterious environmental impacts
- Knights Hill operations have been excluded from this application

- No one globally has feasibly solved the problem of acid mine drainage from coal mining, but Welgedacht's underground dewatering and treatment strategy (construction of artificial wetlands) is designed to minimise the long-term environmental impacts.

Through implementation and execution of a terrestrial biodiversity monitoring programme, the anticipated and actual impacts of the mining activity within the terrestrial environment can be monitored. Collated information data and results will contribute towards a responsive management approach to minimise the impact footprint and associated sphere of influence.

9. DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED⁵⁹

9.1. APPROACH AND METHODOLOGY

The public participation approach adopted for this proposed Project is in line with the processes contemplated in Chapter 6 (regulation 39 to 44) of the EIA Regulations, 2014. A phased approach for the PPP activities has been adopted as aligned with requirements of NEMA, namely:

- Application Phase
- Announcement Phase
- Scoping Phase
- EIA Phase
- Decision Phase

Table 12 notes the PPP Phases, objectives for each interaction with Interested and Affected Parties (I&APs), key activities undertaken and outputs.

⁵⁹ Required as per the EIA Regulations Appendix 3 (3) (1) (h) (ii) details of the public participation process undertaken in terms of regulation 41 of the regulations, including copies of the supporting documents and inputs.

Table 12: Public Consultation Phases, Objectives, Key Activities and Outputs

Phases	Objectives	Key Activities	Key Outputs
Application Phase	To conduct a screening process for identifying the triggered Listed Activities	To submit the required Environmental Authorisation (EA) Application	Submission and acceptance of the EA application by the Department of Mineral Resources and Energy (DMRE)
Announcement Phase	Announcement Phase	To inform Interested and Affected Parties (I&APs) of the proposed project and EA process	– Distribution of Background Information Document (BID) – Placement of site notices – Newspaper advertisements
Scoping Phase	Scoping Phase	To identify potential environmental and social issues and obtain input from I&APs	– Convene public meetings – Circulate Draft Scoping Report (DSR) for comment – Register and engage with I&APs
Environmental Impact Assessment Phase	EIA Phase	To assess and evaluate potential impacts and determine mitigation measures	– Circulate Draft EIA Report and Environmental Management Programme (EMPr) – Host public meetings – Collect public comments
Decision-making Phase	Decision-making Phase	To inform stakeholders of the Competent Authority's decision and appeal process	– Notify I&APs of the EA decision. – Provide access to decision documents – Outline appeal procedures

9.2. PUBLIC PARTICIPATION ACTIVITIES

The public participation process for the re-commissioning of the Welgedacht mining operations will involve a series of planned activities to engage with the public and I&APs. These activities will ensure that the public is informed, involved, and have the opportunity to express their views on the Project. A range of communication channels will be used to disseminate information about the Project, ensuring transparency and fostering an environment where community concerns can be addressed. Throughout the process, the Project team will maintain open lines of communication, ensuring that all stakeholders are kept up to date and have the chance to provide feedback.

9.2.1. Application Phase

The application phase focused on the initial steps of engaging with the community and key stakeholders to inform them of the Project's proposed activities and associated infrastructure. This phase involved the compilation of the necessary documentation for the Project application, which included environmental assessments and detailed Project descriptions. Key stakeholders were identified, and early engagement were initiated to ensure that they are fully informed about the Project's potential impacts and benefits.

9.2.2. Landowner Engagement / Consent

Landowner engagement is a critical component of the public participation process, particularly for landowners directly affected by the proposed operations. The Project team engaged with these landowners to inform them of the planned activities. It is vital to secure the consent of landowners where applicable, ensuring that they are fully aware of the Project and any potential impacts on their land.

9.2.3. Announcement Phase

The primary objectives of this phase were threefold. First, it focused on disseminating detailed and pertinent information regarding the Welgedacht Project to both the general public and I&APs. This included providing comprehensive details about the planned re-commissioning of Umgala operations. Second, this phase aimed to encourage members of the public to formally register as I&APs, which facilitated their engagement and participation in the ongoing decision-making process. Finally, the announcement phase offered registered I&APs the opportunity to provide feedback on the draft Scoping Report, ensuring that their concerns and suggestions are incorporated into the Project's planning and development. This phase played a critical role in promoting transparency, accountability, and meaningful community involvement throughout the life of the project.

9.2.3.1. Announcement Phase Public Participation Activities

Table 13 provides details of the public participation activities undertaken during the Announcement Phase.

Table 13: Public Participation Activities Undertaken During the Announcement Phase

Activity	Details
Identification of stakeholders	A comprehensive stakeholder database was created for the Welgedacht re-commissioning Project, which includes a diverse range of Interested and Affected Parties (I&APs). This includes individuals and groups with direct or indirect interests in the Project, such as local communities, landowners, government authorities, environmental groups, and other stakeholders. The database also incorporates individuals impacted by activities related to the mining rights, the planned infrastructure, and the reprocessing of the existing material at Umgala as well as the Zimbutu Discard Dump. Special consideration was given to both those within and surrounding the Project areas, especially those residing near the access roads, new infrastructure, and water use areas.
Distribution of announcement letter and Background Information Document (BID)	An official announcement letter was distributed to all identified stakeholders, informing them of the re-commissioning activities. The letter includes information on the scope of the project, including activities such as the construction of a new processing plant, discard dump extension, security offices, and pipelines, along with updates on the existing infrastructure. A BID was also provided, detailing key project aspects, timelines, environmental considerations, and potential impacts on local communities, water resources, and infrastructure.
Placement of site notices.	Site notices were placed within the Project operational areas, as well as adjacent to areas affected by the planned activities, such as the new access roads and discard disposal facilities. These notices inform the local community and those who may not have received direct communication about the project. The notices provide details about the mining re-commissioning activities, new infrastructure like the fuel depot and stormwater management systems, as well as the timeline for the Project.
Placement of newspaper advertisements.	Newspaper advertisements were published in a local newspaper. The advertisements serve to inform a broader public audience about the planned activities, particularly those related to the extension of the discard disposal facility and the reclamation of the Zimbutu Discard Dump.

9.2.4. Scoping Phase

The objectives of public participation during the Scoping Phase are multifaceted. Primarily, it aimed to furnish I&APs with ample and easily accessible information presented in an unbiased manner. This empowered them to articulate comments, express concerns, and offer suggestions aimed at optimising the proposed Project outcomes. Furthermore, I&APs were given the platform to contribute to the formulation of specialists' terms of reference (ToR) for the required studies, ensuring their perspectives are integrated into the investigative process. Additionally, they were provided with the opportunity to impart valuable local and traditional knowledge, enriching the EIA) with insights

essential for comprehensive understanding and assessment.

9.2.4.1. *Scoping Phase Public Participation Activities*

Table 13 provides details of the public participation activities undertaken during the Scoping Phase.

Table 14: Public Participation Activities Undertaken During the Scoping Phase

Activity	Details
Announcement of the Project and Scoping Phase	Notifications were sent on 3 and 9 September as well as 3 October 2024.
Scoping consultation meetings.	The following consultation meetings were held: 17 September 2024 10:00 - A focus group meeting with the relevant officials of the eMadlangeni Local Municipality was held at the municipal offices in Utrecht. 17 September 2024 12:00 - A focus group meeting was held at the Municipal Chamber with eMadlangeni officials, the Deputy Mayor and Ward Councillors as well as representatives of KwaZul-Natal's Department of Environmental Affairs (EDTEA). 18 September 2024 10:00 - focus group meeting with representatives of the local Agricultural Union, KwaNalu and landowners was held at the Utrecht Town Hall.
Availability of the Draft Scoping Report.	The DSR was available for public comment for 30 days for public review from 4 September until 4 October 2024 (30 days). The DSR was available for review at the Utrecht Library and electronically via the GCS Website.
The DMRE acceptance of the Final Scoping Report.	10 January 2025

9.2.5. *Environmental Impact Assessment Phase*

All comments and concerns received during the Draft EIA review period will be documented and addressed in the Final EIA Report. This report will be submitted to the Department of Mineral Resources and Energy (DMRE) for consideration and decision-making. Following submission, the Final EIA Report will be made available to registered I&APs for their information. All registered I&APs will be informed of the report's submission and availability via e-mail or SMS.

This Draft Environmental Impact Assessment Report (Part 1) and the Environmental Management Programme will be subjected to a public participation process, whereby I&APs will be given 30 days from **27 February 2026 to 30 March 2026** to review and comment. All comments and responses will be included in the final EIAr and EMPr to be submitted to the DMRE for a decision.

The public participation process during the EIA Phase serves two key objectives:

- To ensure that all concerns raised by I&APs have been adequately considered throughout the specialist studies and overall EIA process, allowing stakeholders to verify that their input has been incorporated.
- To provide stakeholders with an opportunity to review the EIA findings, including the assessment of potential impacts and proposed mitigation measures, thereby fostering a more inclusive and transparent evaluation of the Project's environmental and social implications.

9.2.6. Decision-making Phase

The DMRE's decision regarding the EA application will be made available on the GCS website for review. All registered I&APs will be notified of the DMRE's decision and the associated appeal process via e-mail and SMS.

In accordance with the National Appeal Regulations, 2014 (GN R993 of 8 December 2014, as amended), promulgated under the National Environmental Management Act (NEMA), any person wishing to appeal the decision must submit their appeal to the designated appeal administrator. A copy of the appeal must also be provided to the applicant (if the appellant is an I&AP), all registered I&APs, and any relevant organs of state with an interest in the matter. This must be done within 20 days from the date on which the notification of the decision was issued to registered I&APs.

The DMRE will make the final determination on the IEA application for the Project. All registered I&APs will be notified of the outcome and the appeal process, including relevant deadlines, via email, SMSs, and a newspaper advertisement.

9.3. SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES⁶⁰

All comments received during the Scoping Phase were captured in a Comments and Responses Report (CRR). The CRR was appended to the Final Scoping Report as a full record of issues raised, including responses on how the issues were considered during the process. The CRR is also attached as Appendix III to this draft EIAr. The CRR will be kept updated with comments received as the process unfolds and any additional comments received during the EIA Phase will be included. A summary of the CCR will be included in this Section in the final EIAr.

⁶⁰ Required as per the EIA Regulations Appendix 3 (3) (1) (h) (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.

10. THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE DEVELOPMENT FOOTPRINT ALTERNATIVES⁶¹

A summary of the baseline environment for the Project area is provided in the sections below, extracted from available information and relevant specialist studies undertaken for this report. The purpose of understanding environmental baseline conditions relates to the potential of the Project to impact on the existing environment and the potential for existing environmental aspects to influence the proposed Project in terms of design, location, technology and layout.

Reference is made to Umgala 1 and Umgala 2 in this Chapter. Umgala 1 refers to the northern infrastructure and activities associated with the Project and includes, among others, the new Plant. Umgala 2 refers to the southern infrastructure and activities associated with the Project and includes, among others, the adit (see Figure 16).

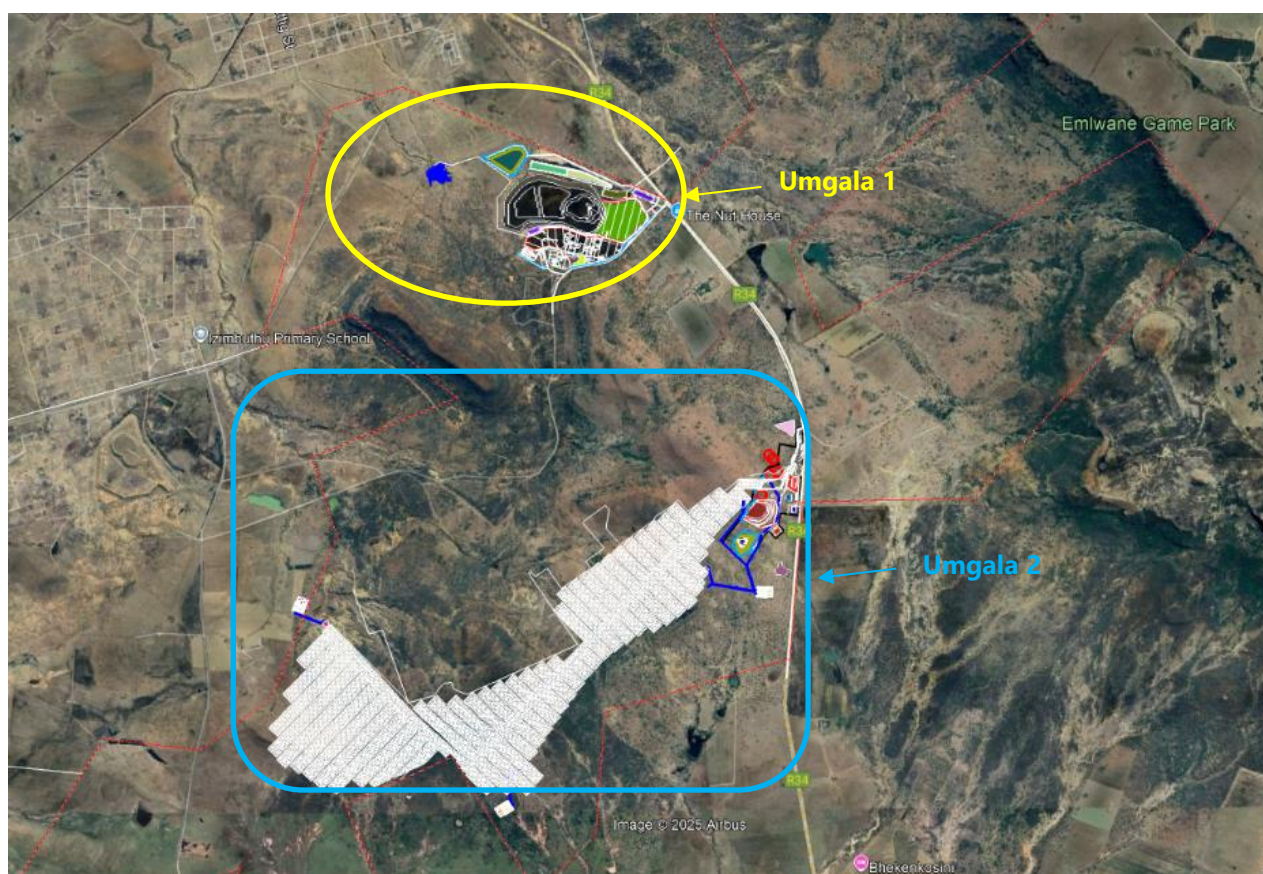


Figure 16: Umgala 1 and Umgala 2

⁶¹ Required as per the EIA Regulations Appendix 3 (3) (1) (h) (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

10.1. BIOPHYSICAL ENVIRONMENT

10.1.1. Climate

A Climate Change Impact Assessment (CCIA) was undertaken by Rayten Engineering in August 2025. The information in this section is extracted from the CCIA report, with the full report attached as Appendix IV to this EIAr and EMPr.

Climate, amongst other factors, influences all other environmental processes, from weather patterns, evaporation, surface runoff, storm peak flows, soil-water processes, biological and ecological processes.

The varied nature of the topography within the study area results in varied local weather conditions. The Project area is situated in the upland bioclimatic zone of the northern KZN region and forms part of the regional sub-tropical climatic zone of southern Africa. The climate is characterised as temperate, with summer rainfall. Evaporation exceeds rainfall and the predominant winds blow south-easterly, albeit the strongest winds blow from the north-west.

KwaZulu-Natal experiences increased temperatures in the summer months (January to March and October to December), with decreased temperatures in the winter months (May to August). Furthermore, most rainfall occurs in mid-summer, however, winter months are not completely dry, with some rainfall occurring in June (the driest month of the year) (Figure 17).

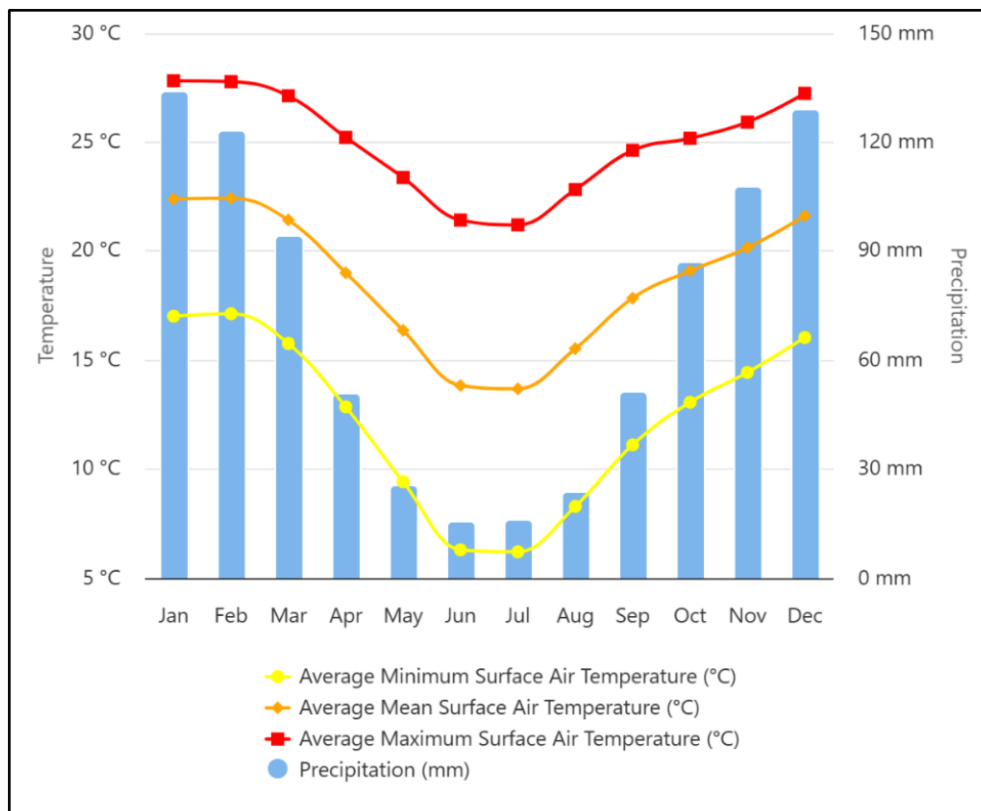


Figure 17: Observed Seasonal Cycle in Average Minimum, Mean and Maximum Surface Air Temperature, and Precipitation for Kwazulu-Natal from 1991 - 2020 (The World Bank, 2024)

10.1.1.1. Temperature

Kwazulu-Natal has experienced higher average temperatures over recent decades as seen in Figure 18. Climate models predict that average temperatures for Kwazulu-Natal will continue to rise in the future, for all shared socioeconomic pathways (SSPs), besides SSP1-2.6 for which temperatures are predicted to stabilize in the future (Figure 19). SSPs are various climate change scenarios of anticipated global socioeconomic changes up to the year 2100 defined by the IPCC 6th Assessment Report on climate change in 2021. They are used to derive different greenhouse gas emission scenarios under various climate policies (IPCC, 2021).

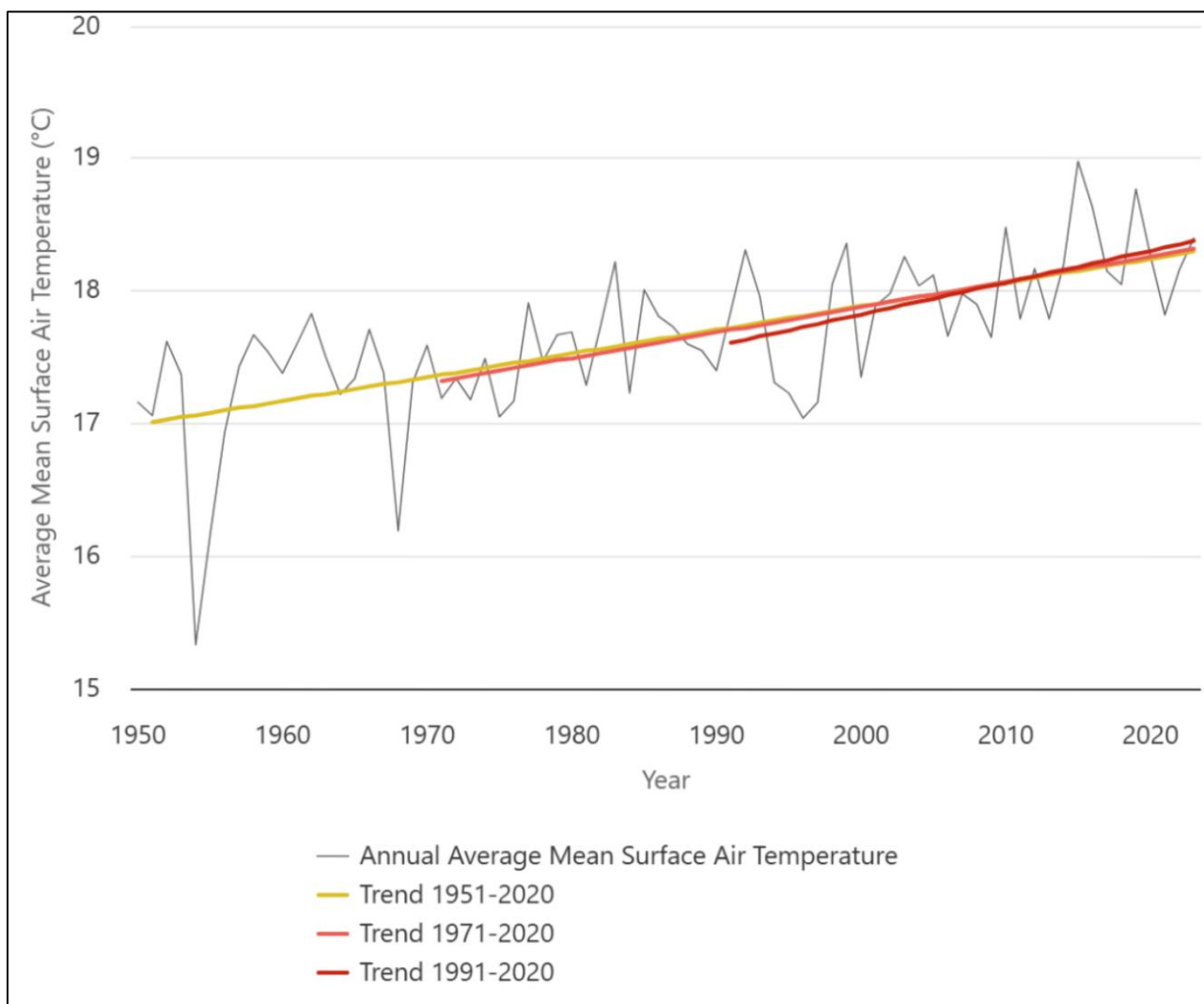


Figure 18: Observed Annual Average Mean Surface Air Temperature for Kwazulu-Natal between 1950 and 2023 (The World Bank, 2024)

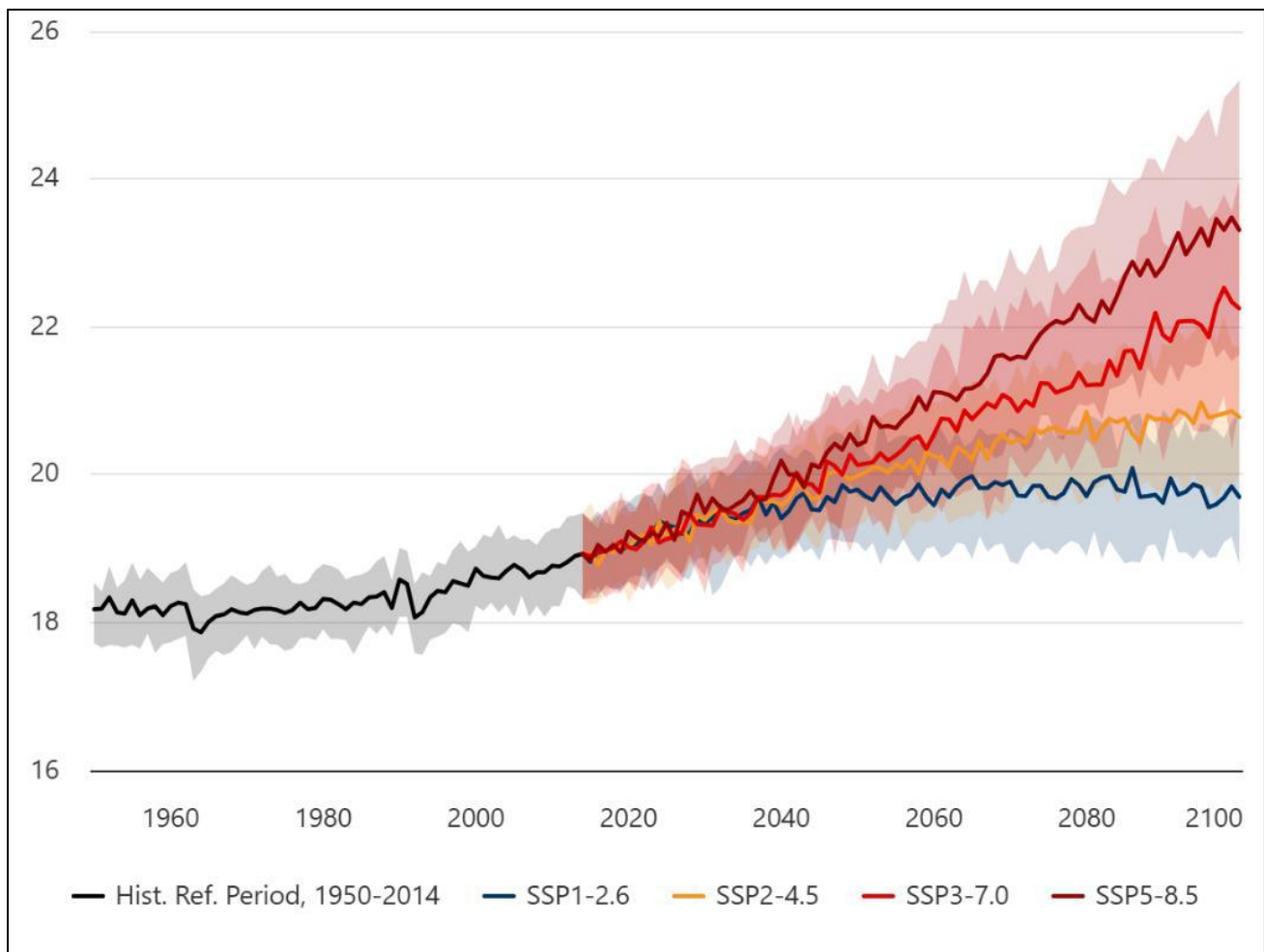


Figure 19: Projected Mean Temperature Kwazulu-Natal, South Africa (Reference Period 1995-2014) (The World Bank, 2024)

10.1.1.2. Rainfall

The Water Management Area (WMA) has relatively high rainfall as compared to the rest of the country. The rainfall is uniformly spread across the WMA with the majority of the rainfall occurring in summer with between 800 mm – 1500 mm per annum. Higher rainfall is experienced along the western part of the WMA on the Windward side of the Drakensberg Mountains, while the lower end of the rainfall band is experienced in rain-shadow pockets. 80% of the rainfall is experienced as summer thunderstorms. Occasionally, the area will experience snow on the high lying areas.

The quaternary catchment falls within the B4B rainfall zone. Five stations (Table 15) were identified in the vicinity of the site and their rainfall records were obtained from the Daily Rainfall Extraction Utility (Kunz, 2004) and the Department of Water Affairs Hydrological Services – Surface Water website.

The MAP for the quaternary catchments is estimated to range between 730 mm – 801 mm. The metadata for the stations considered for the regional rainfall analysis is provided in Table 15. The metadata is sourced from the Daily Rainfall Extraction Utility the Department of Water Affairs Hydrological Services – Surface Water website.

Table 15: Rainfall station metadata (DWS, 2025)

Station Name	Station ID	Reliability (%)	Record Length (yr.)	Years	MAP (mm)	Altitude (mamsl)	Distance from site (km)
Utrecht (mun)	0371579 W	67.6	1920 - 2000	80	737	1203	5.8
Waaihoek	0371706 W	61.5	1920 - 2000	80	713	1355	12.3
Utrecht @ Zimbutu Mine	V3E003	100	1971 - 1979	8	424	1394	0
Utrecht	V3E004	100	1979 - 1997	18	707	1225	5.5
Zaaihoek @ Zaaihoek Dam	V3E005	100	1988 - 2020	32	800	1694	39.4

10.1.1.3. Evaporation

The mean annual A class pan evaporation depth at station V3E004 is 1 928 mm. The study area falls within the 21A evaporation zone (Midgley et al.,1994). The average A-Pan evaporation rates for the station are presented and plotted against rainfall recorded at station V3E004 in Figure 20.

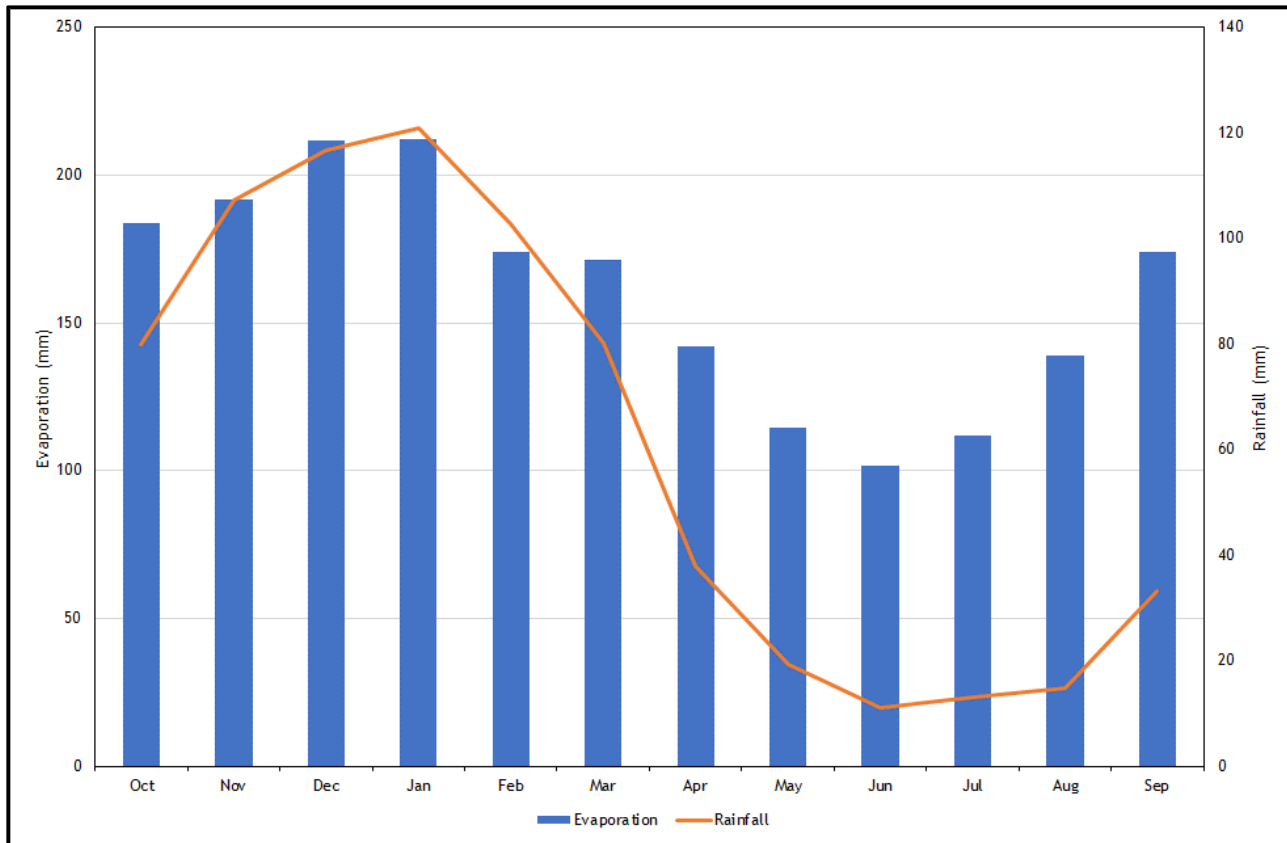
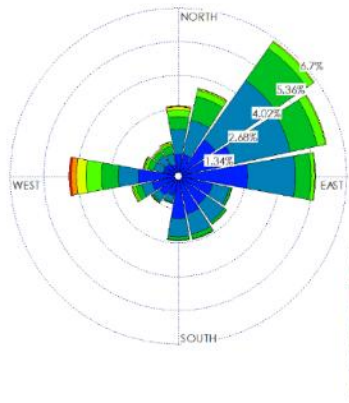


Figure 20: Monthly evaporation plotted against rainfall

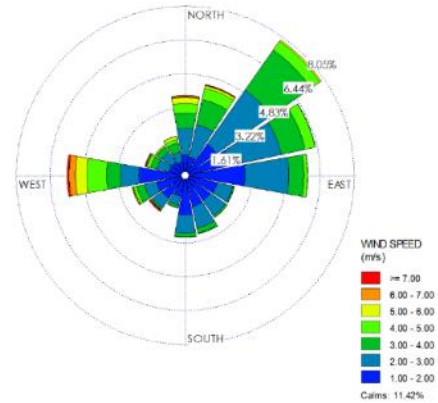
10.1.1.4. Wind

Wind roses of from hourly wind field data recorded in Vryheid, generated to reflect the period, seasonal, and diurnal wind fields are presented in Figure 21, Figure 22 and Figure 23) respectively. A wind rose is a graphic tool to give a concise view of how wind speed and direction are distributed at a specific location. The colours reflect the wind speed and the size of the 'petal' the occurrences of wind from a specific direction.

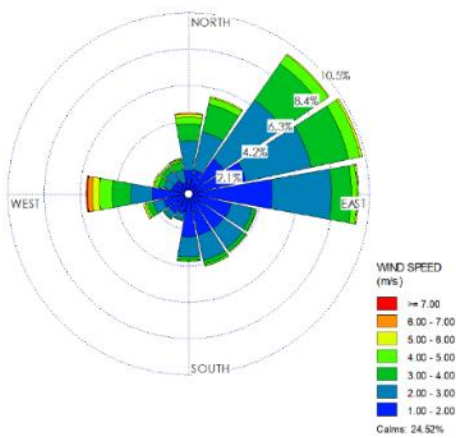
The wind field is generally characterised by airflow from both the westerly as well as north-easterly and easterly sectors. The strongest winds are from the west. Calm conditions with wind speeds below 1 m/s occurred 14.9% of the reporting period, with 14.3% calms during the day and 32.9% during the night. From February to May there is a distinct increase in wind from a westerly direction. The strongest winds occur in the month of July.



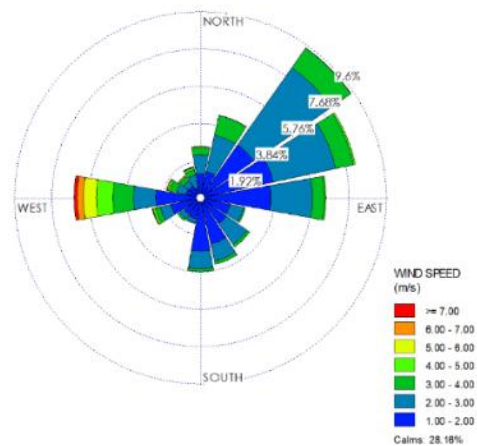
Period average, Jan-2017 to Jul-2020



2018

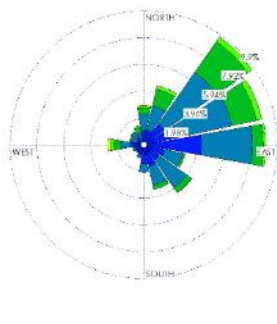


2019

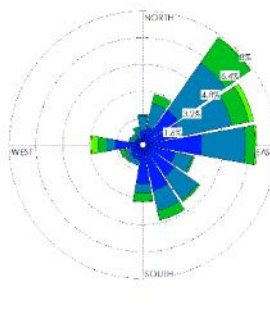


Jan-2020 to Jul-2020

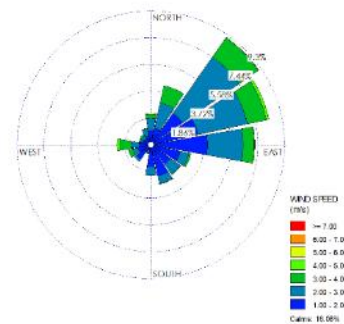
Figure 21: Period average wind roses for Vryheid



January



February



March

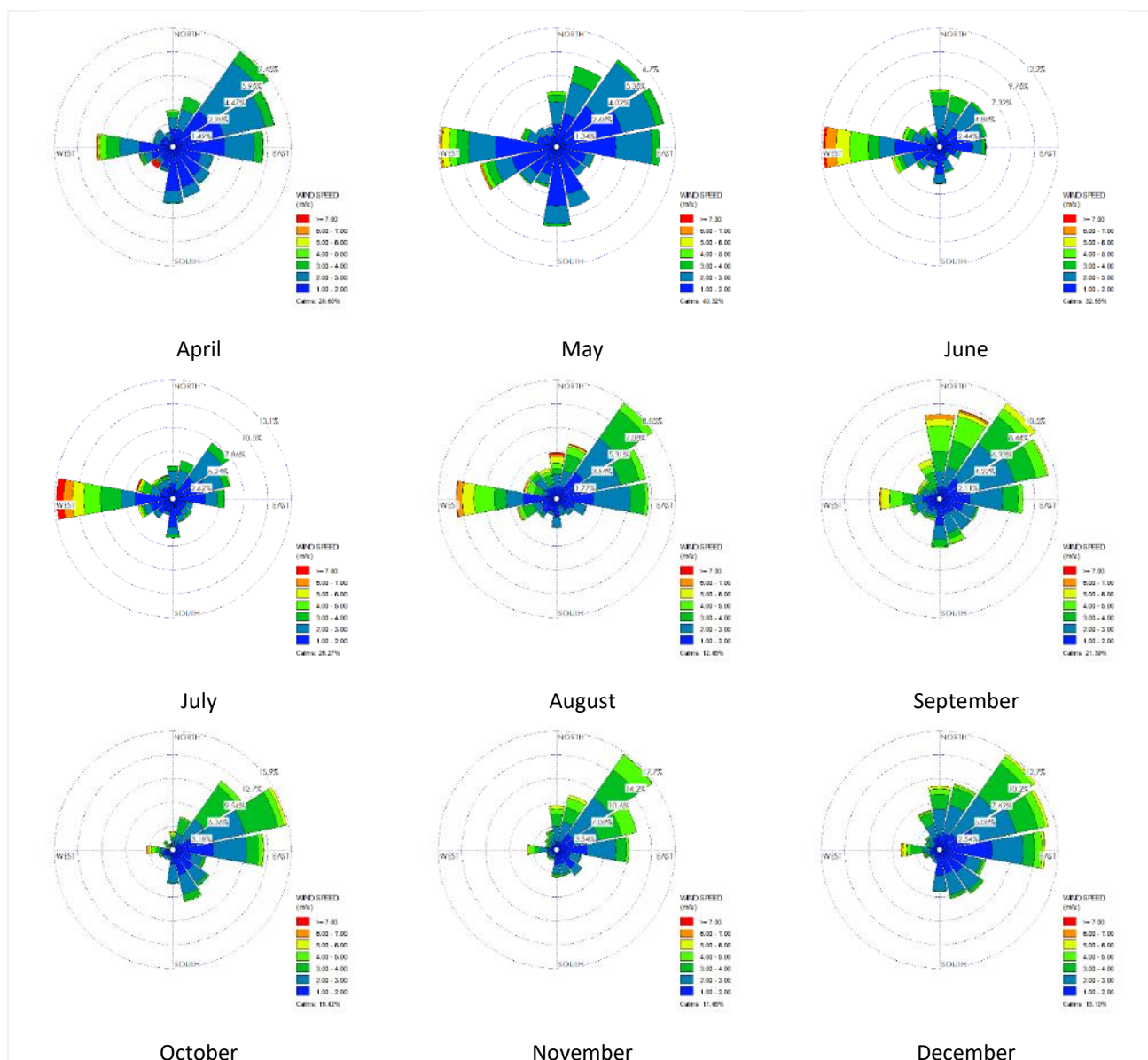


Figure 22: Monthly wind roses for Vryheid

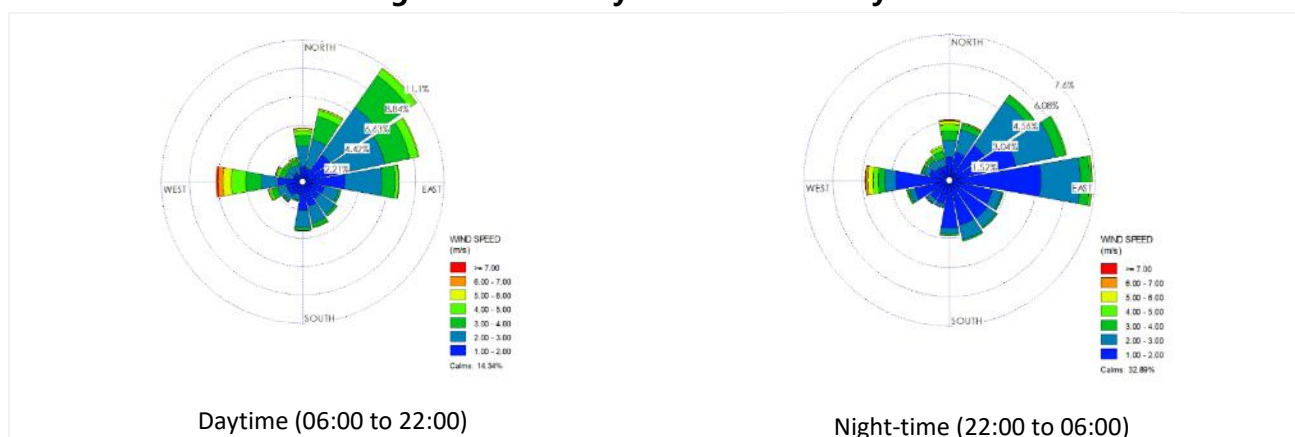


Figure 23: Day and night-time wind roses for Vryheid

10.1.1.5. Greenhouse gasses in South Africa

South Africa's 9th National GHG Inventory Report was recently published by the DFFE in February 2025, as noted in Government Gazette No. 52067, and covers the period from 2000 to 2022. The report documents the country's GHG emissions for 2022 and provides a historical overview of trends from 2000. According to the 9th National GHG Inventory Report, the energy sector remains the largest emitter, responsible for 78–86% of total national emissions in 2022. (DFFE, 2025). Within the energy sector, energy industries account for 60% and transport accounts for 14% of emissions. Emissions from solid fuels and oil and natural gas activities are minor contributors (~0.6% and 0.03%, respectively).

South Africa's primary energy consumption is ranked 17th in the world. This energy intensity is high primarily due to the large scale, energy-intensive primary minerals beneficiation industries and mining industries (DFFE, 2021). Additionally, the energy sector is heavily reliant on fossil fuels to generate electricity.

Between 2000 and 2022, energy sector emissions declined by 2.5% overall. However, emissions from electricity production rose by 11.5%, correlating with an 8.7% increase in power generation over the same period (DFFE, 2025)

Industrial Processes and Product Use (IPPU) emissions constituted 6.4% of total emissions in 2022. Overall, IPPU emissions fell by 6.7% since 2000, largely because of declines in the metals production (-39%) and chemicals industries (-31%). In 2022, waste contributed 4–4.8% of national emissions. The majority of waste sector emissions were attributed to wastewater treatment and discharge (44.7%) and solid waste disposal (41.5%), with smaller contributions from biological treatment of solid waste (12.2%) and incineration and open burning of waste (1.6%). Since 2000, waste emissions have risen by 44.1% (DFFE, 2025).

Agriculture in 2022 accounted for 11-12% of South Africa's emissions, while agriculture sector emissions have decreased by 9.1% since 2000. Emissions from enteric fermentation showed the largest decrease (14%) over the period, mainly due to lower emissions from non-dairy cattle, likely linked to a decline in livestock numbers since 2000.

10.1.2. Air Quality

An Atmospheric Impact Report was compiled by Soundscape in April 2024. The information in this section is extracted from the Atmospheric Impact Report, with the full report attached as Appendix IV to this EIAr and EMPr.

10.1.2.1. Ambient Air Quality

In the absence of any other data for the Project area, pollutant concentrations at the Eskom-Majuba and Eskom-Ezamokuhle stations were studied. The data sets were carefully analysed, and erroneous or out-of-range values removed. Data availability is summarised in Table 16. In 2020, no data was

collected, and in 2021 and 2023 data availability is poor, generally less than 30% across all pollutants. The year 2022 had the best data availability of the past 5 years (Soundscape, 2024).

Table 16: Ambient air quality data availability

AQMS	Pollutant	Data availability (%)					
		2020	2021	2022	2023	2024 to date (13-Apr)	Overall
Eskom - Majuba	CO	0%	0%	0%	0%	0%	0%
	NO _x	0%	18%	71%	28%	37%	30%
	PM _{2.5}	0%	27%	47%	21%	37%	25%
	PM ₁₀	0%	0%	56%	25%	0%	19%
	SO ₂	0%	21%	65%	26%	54%	30%
Eskom-Ezamokuhle	CO	0%	3%	59%	8%	0%	17%
	NO _x	0%	26%	76%	1%	83%	30%
	NO ₂	0%	27%	74%	1%	84%	29%
	PM _{2.5}	0%	16%	68%	2%	0%	20%
	PM ₁₀	0%	28%	82%	34%	0%	33%
	SO ₂	0%	27%	77%	33%	66%	36%

For comparison with NAAQS, long-term average, and 99th percentiles of 1-hour and 24-hour average pollutant concentrations at Eskom-Majuba and Eskom-Ezamokuhle were calculated. Since the distribution of hourly concentrations typically follows a positively skewed normal distribution, the median value was also calculated.

In a positively skewed distribution, the mean (or average) is higher than the median. This indicates that there are several much higher values increasing the values, while most of the data clusters at lower values. Using both the mean and median values, provides a more complete understanding of the data's distribution. The median can be a better measure of "typical" value in such distributions because it is less influenced by outliers and extreme values. PM₁₀, PM_{2.5}, and SO₂ concentrations in exceedance of NAAQS are indicated in the Amersfoort area, about 90 km north-northwest of the Project.

Table 17: Average ambient pollutant concentrations applied in dispersion simulations

	Exposure period	Unit	CO	NO ₂	PM _{2.5}	PM ₁₀	SO ₂
NAAQS	1-year	µg/m ₃	n/a	40	20	40	50

	24-hour	µg/m ₃	n/a	n/a	40	75	125
	1-hour	µg/m ₃	30 000	200	n/a	n/a	350
Eskom-Majuba	Median	µg/m ₃	n/d	n/d	15	34	4.56
	Long-term average	µg/m ₃	n/d	n/d	24.8	49.6	23.4
	24-hour 99th percentile	µg/m ₃	n/a	n/d	78.2	168	257
	1-hour 99th percentile	µg/m ₃	n/d	n/d	n/a	n/a	405
Eskom-Ezamokuhle	Median	µg/m ₃	96.3	5.25	9	21	11.1
	Long-term average	µg/m ₃	447	8.06	21.2	44.6	24
	24-hour 99th percentile	µg/m ₃	n/a	n/a	108	162	153
	1-hour 99th percentile	µg/m ₃	2 610	41	n/a	n/a	142

Notes:

n/d no data

n/a not applicable

highlight exceeds NAAQS

10.1.2.2. Air Emission Sources

Emissions from the Project are expected to originate from both point and fugitive sources, with similar sources anticipated during both construction and operational phases. Emission sources identified and quantified during the operational phase include:

- Loading and unloading of coal
- Conveyor belt transfer points
- Crushing and screening operations
- Haulage on unpaved roads
- Windblown dust from stockpiles and waste/ discard dumps
- Diesel exhaust from mobile mining equipment and generators

Dust entrainment from unpaved roads and windblown dust were identified as the primary contributors to particulate matter (PM) emissions, followed by materials handling and transfer operations.

10.1.2.3. Dispersion modelling results

Dispersion simulation results are provided in the Air Quality Impact Assessment attached in Appendix IV. The modelling results are summarised as follows:

- No exceedance of NAAQS for CO, PM_{2.5}, or SO₂ are expected at sensitive receptors, neither incrementally nor cumulatively.
- Simulations indicate exceedance of criteria for NO₂, PM₁₀, PM_{2.5}, and dustfall at sensitive receptors.

- NO₂ concentrations reduce can be reduced to levels below the 1-hour NAAQS by ensuring diesel mobile mining equipment and generators are fitted with appropriate controls such as catalytic converters to meet international emission limits for such equipment.
- To achieve the necessary reduction in PM₁₀ emissions and ensure compliance with the 24-hour NNAAQS at sensitive receptors, significant efforts must be made (Level 3 mitigation). This will involve the implementation of well-coordinated, effective, and tailored mitigation measures specific to each emission source.
- Such measures will also reduce dustfall rates to levels within the limit for residential areas.
- The non-carcinogenic health impact screening indicates no exceedances of criteria.
- Increased life-time cancer risk, conservatively estimated, is shown to be moderate to low.

The assessment of potential impacts associated with the Project and proposed mitigation measures are presented in Section 12.7 of this report.

10.1.3. Noise

The section below includes information extracted from the noise impact assessment, conducted by Soundscape in 2024. The full report is attached as Appendix IV.

A baseline environmental noise survey was conducted as part of the assessment to establish existing rating levels within the study area. Figure 24 illustrates the noise survey locations utilised for the study. This survey was critical in providing a reference point against which potential noise impacts from the proposed mining operations could be measured. The results revealed that ambient noise levels in the area are predominantly influenced by vehicular traffic, particularly along the R34 and various surrounding local roads. During periods of reduced traffic flow—typically at night—the soundscape is notably shaped by natural sources such as insects, birds, and frogs, which in some instances contributed to night-time noise levels that exceeded those recorded during the day.

The average noise levels measured were found to be 50.2 dBA during daytime hours and 48.3 dBA during night-time hours. These values reflect typical rural or semi-rural acoustic environments and were adopted as the desired rating levels for the impact assessment. By using these baseline levels as the benchmark, the study aimed to ensure that noise generated by the proposed Project does not significantly alter the existing acoustic character of the area or result in increased nuisance to nearby receptors.

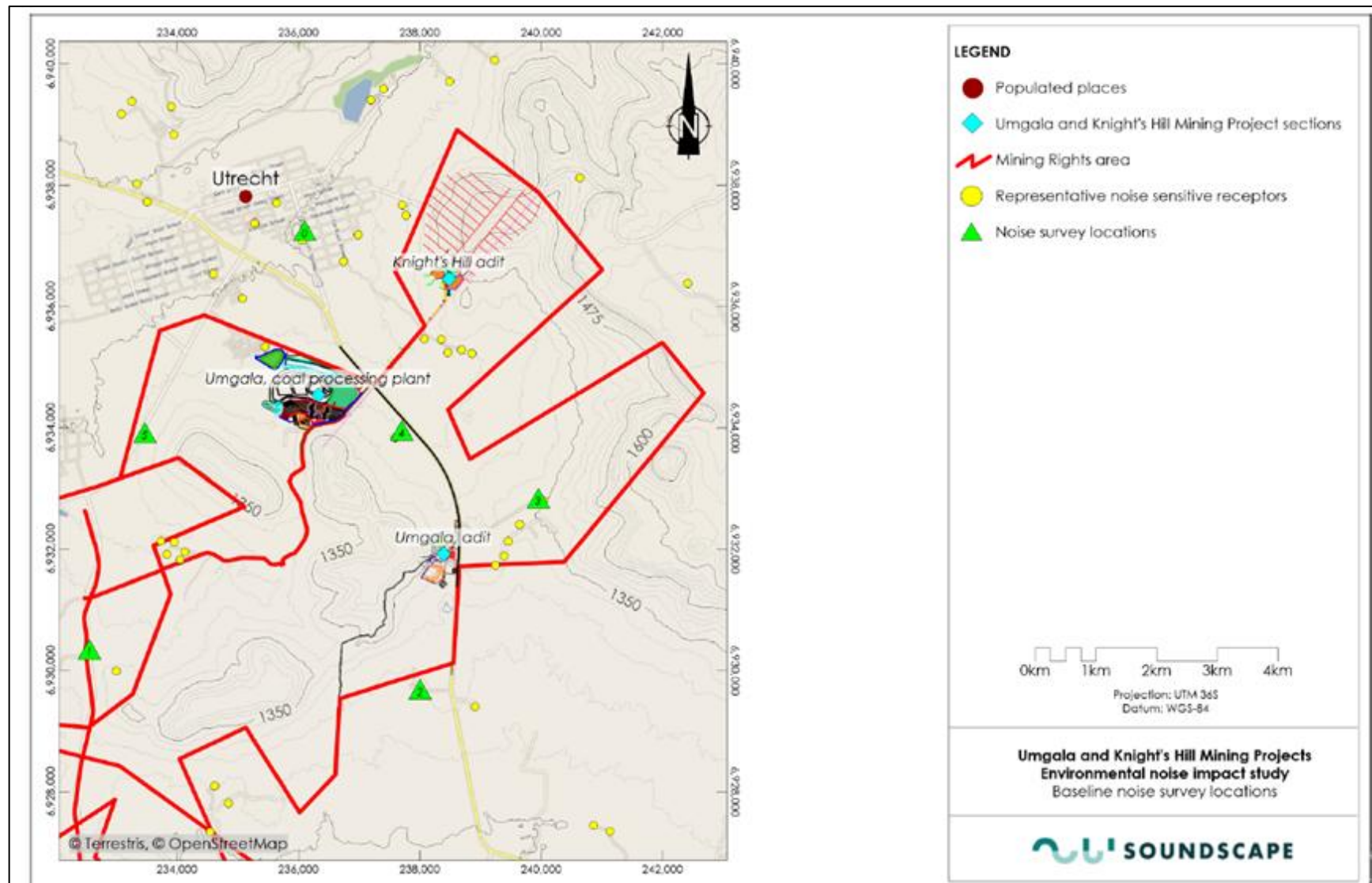


Figure 24: Baseline Noise Survey Locations

An assessment of the potential noise impacts and proposed mitigation measures are provided in Section 12.7 of this report.

10.1.4. Geology

Geophysical investigations and underground mapping of the area have demarcated a multitude of northwest, and southeast trending dyke intrusions. The presence of the thick dolerite sills which cap certain areas and the associated thick dolerite boulder layers at surface make the interpretation of ground magnetic surveys very difficult. The true magnitude of the major dyke features has been mapped from the underground geological studies, and projected to surface. Additional geophysics was undertaken in 1999 to delineate the extension to the dolerite dykes outside of the underground mining area. As there are old workings adjacent to the Anthracite block the dykes are well known. There is one dyke on the northwest side with a throw of 35 meters which separates of 300 000 run-of-mine tons which is opencastable and requires underground mining. The northwest side is higher by 40m than the southeast side. The Alfred seam is thinner on the sub outcrop on the south side (2.6 m) than the coal under the hill (4.5 m). The Gus Seam is also thinner on the south side and is not of an economic thickness. Both the seams may be accessed by new adits on the south side.

In summary, the geology according to the landtype data for the Project area is mainly dolerite, with small areas of sandstone of the Vryheid Formation, Eccca Group (Eco Assist, 2023). The regional geology of the Project area is presented in Figure 25 below.

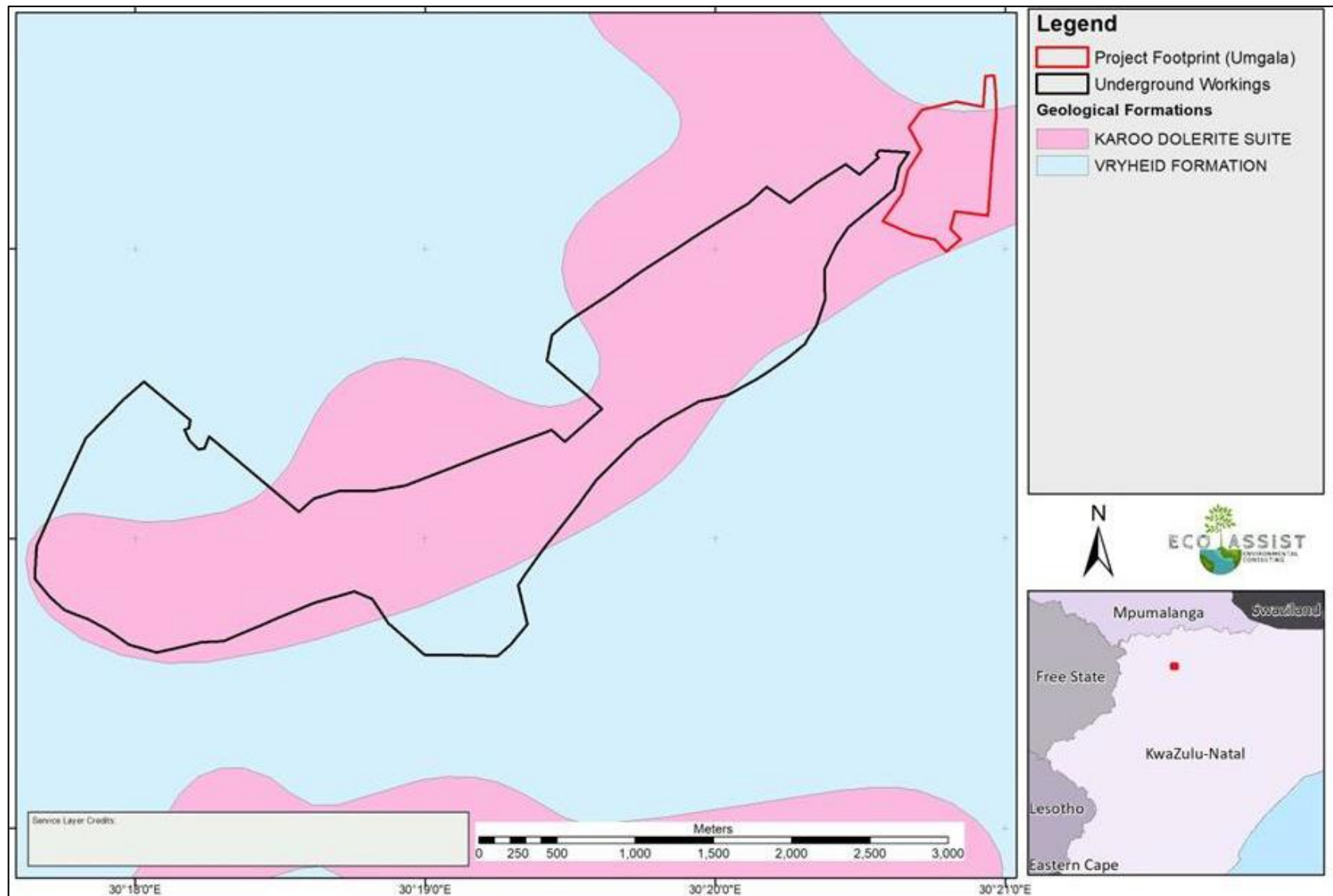


Figure 25: Regional geology for the Project area (Eco Assist, 2023)

10.1.5. Topography and Drainage

The topography of the Water Management Area (WMA) spans elevations from sea level to approximately 3,000 metres above mean sea level (mamsl) and comprises three distinct topographical zones. The Umgala mining area, along with its associated infrastructure, is situated at the base of Zimbutu Mountain, to the west of the Balelesberg mountain range, which trends in a northwest–southeast direction. This area is characterised by a series of stepped terrace slopes and a broad, gently sloping valley shaped by the Dorpspruit and Sandspruit streams, which delineate the natural hydrological boundaries of the project site. The terrain promotes surface water drainage along ephemeral drainage lines, with runoff from the proposed adit area flowing in a south-easterly direction into the lower Sandspruit basin.

10.1.6. Soil, Land Use and Capability

The information provided in this section was extracted from the Soil, Land Use and Land Capability Assessment undertaken by GCS in 2023. The full report is attached as Appendix IV.

10.1.6.1. Soil

In order to determine the baseline conditions of soil and land use capability in the Project area, a field survey was conducted by traversing the site both by vehicle and on foot. Soil profiling was undertaken using a hand auger to a depth of 1.5 m or until the first restricting layer was encountered.

Soil observations were geo-referenced using a GPS device. Soils were classified to the family level in accordance with Soil Classification: A Natural and Anthropogenic System for South Africa (Soil Classification Working Group, 2018). Existing landscape features, such as exposed trenches, were also used to supplement soil type and depth verification.

Soil samples were collected to analyse the following parameters:

- Soil fertility, including:
 - pH (KCl)
 - Calcium (Ca)
 - Magnesium (Mg)
 - Sodium (Na)
 - Potassium (K)
 - Phosphorus (P)
 - Exchangeable acidity
- Macro-nutrient ratios
- Soil carbon content (C)

Land type data, derived from 1:250 000 scale maps (Land Type Survey Staff, 1972–2006), was used to determine general soil patterns, terrain types, and associated climatic conditions across the Project area.

The underground workings footprint is predominantly within Land Type Ea34, covering crest and midslope positions. Soils are mainly Shortlands and Hutton forms, with slopes ranging from 2% to 15%, and clay content between 15% and 45%. The mining infrastructure footprint also falls within Land Type Dc41. Soil depths are classified as shallow to moderate, generally ranging between 0 mm and 600 mm (refer to Figure 26).

Terrain analysis was conducted using ArcGIS Spatial Analyst tools to generate a Digital Elevation Model (DEM) (refer to Figure 27). The elevation within the Umgala area ranges from 1,270 to 1,440 masl. The area is characterised by generally steep slopes, with the majority of the terrain exceeding 7% gradient.

In land capability modelling, terrain is a critical factor influencing both plant physiological requirements and site sensitivity/accessibility (Department of Agriculture, Forestry and Fisheries, 2017). The terrain modelling focused on two key aspects:

- Plant physiological suitability
- Terrain sensitivity

The terrain capability assessment indicated predominantly low ratings in the Project area.

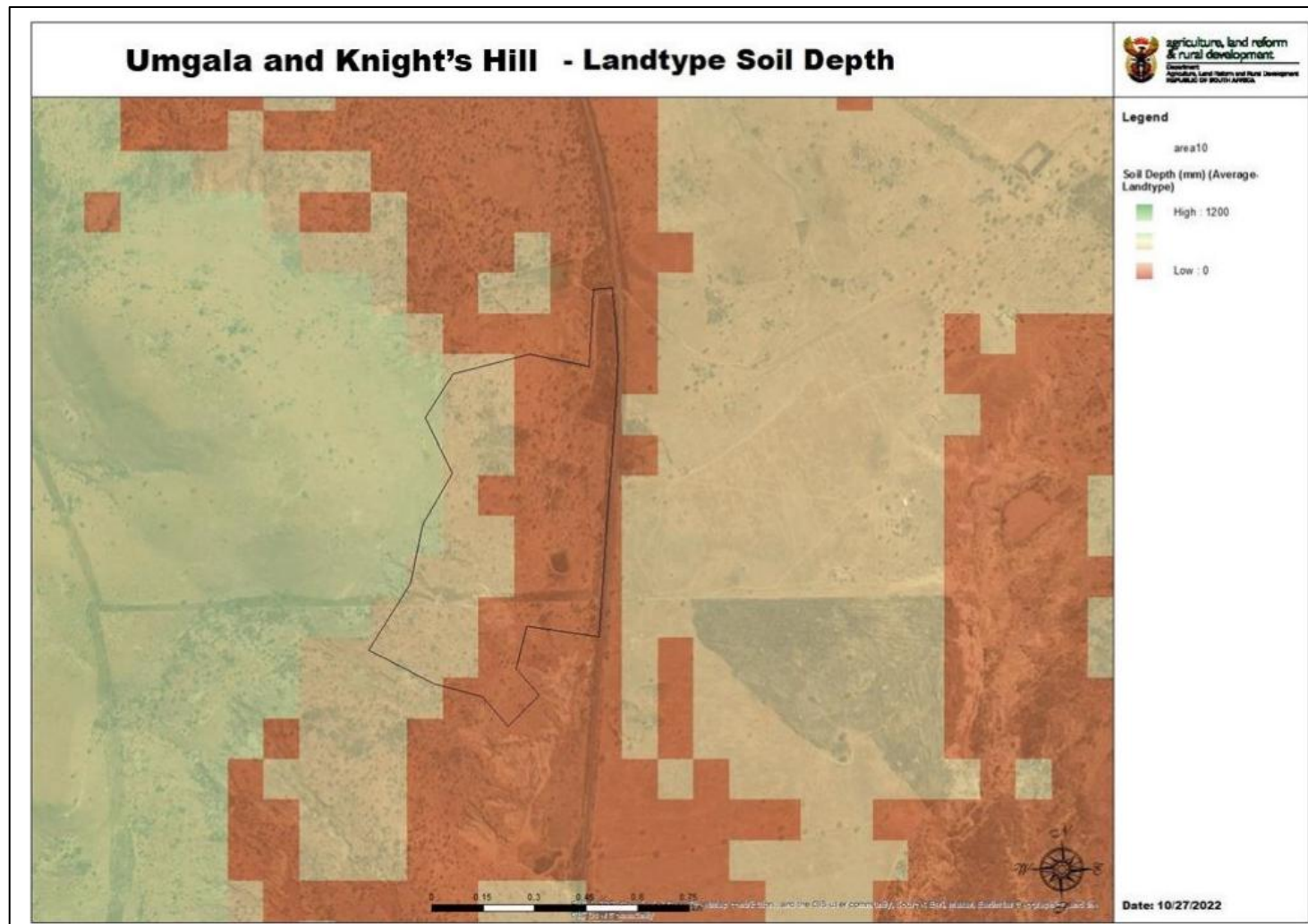


Figure 26: Land type soil depths within the Umgala Project area

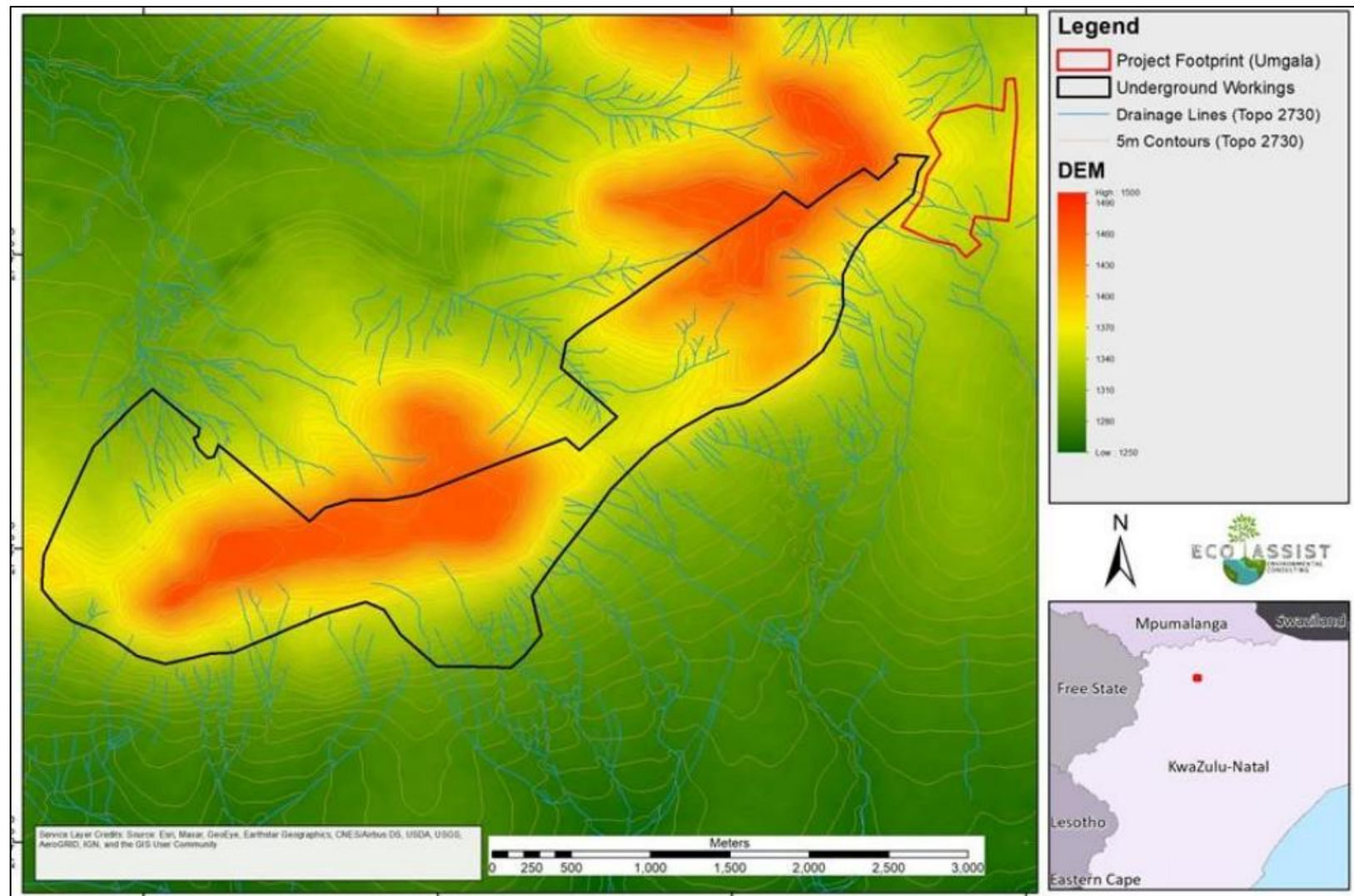


Figure 27: The Digital Elevation Model for the Project area

10.1.6.2. Land Capability

Soil capability refers to the inherent characteristics of the soil and their overall contribution to plant production (Department of Agriculture, Forestry and Fisheries, 2017). For the current assessment, three key databases were utilised in the soil capability modelling:

- Land Type Data: Based on data by Beukes, this was modelled and rasterised using the original land type database along with a 90 m SRTM Digital Elevation Model (DEM). Soil attributes were linked to fixed boundary zones, focusing more on attribute-level data rather than spatial variability.
- Land Type Soil Attribute Database: Provided by the Agricultural Research Council (ARC), this includes comprehensive soil property information.
- Soil Fertility Data: Sourced from the Department of Agriculture, Forestry and Fisheries (DAFF).

The modelling process was guided by three main considerations:

- Plant available water,
- Soil sensitivity, and
- Soil fertility.

Based on this modelling, soil capability across the Umgala Project was classified as low to low-moderate. The Umgala underground portion was rated moderate to high; however, its mountainous terrain presents significant challenges for economically viable agriculture.

Land capability refers to the most intensive, sustainable use of land for rainfed agriculture, determined by the combined influence of climate, soil, and terrain characteristics (DAFF, 2017). It serves as a foundational input layer for identifying and protecting high-value agricultural land, with the aim of preserving such areas for long-term agricultural production and national food security.

The land capability data layer used in this assessment is a continuous national dataset that includes all areas, regardless of existing transformation (e.g., built-up areas, water bodies, or mining operations).

According to the land capability evaluation, the Project area is predominantly rated as low to low-moderate in capability (refer Figure 28). These ratings are the result of an integrated assessment of climate, soil, and terrain factors.

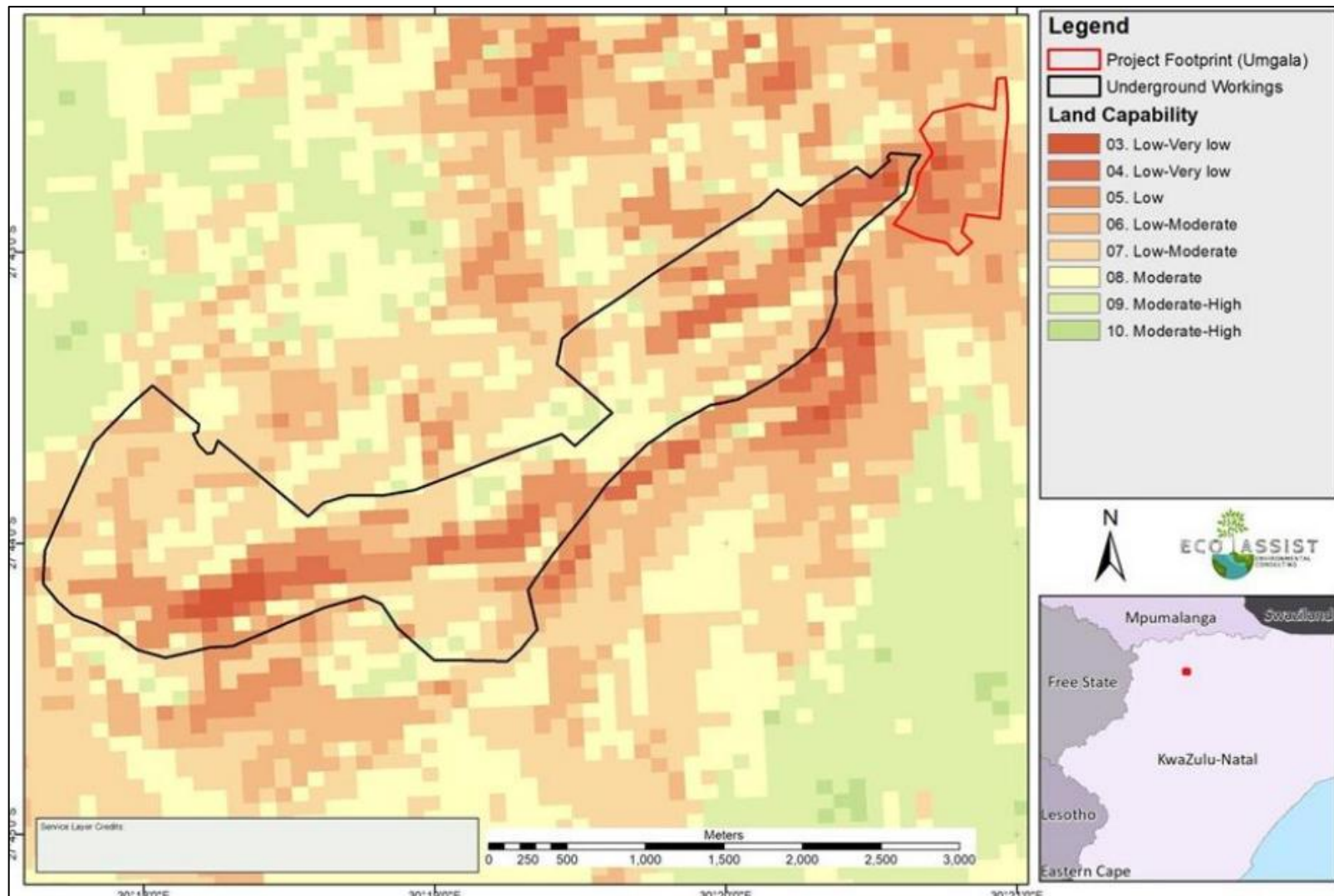


Figure 28: Land capabilities within the Umgala Project Area

10.1.6.3. Summary

A detailed soil survey was conducted at the Project site from 7th to 9th September 2022 using a hand-held auger and GPS for data logging. The soils were classified to the family level according to the "Soil Classification: A Natural and Anthropogenic System for South Africa" (Soil Classification Working Group, 2018). The soil forms identified are as follows:

- Main soil forms: Mispah, Glenrosa, Tubatse, Katspruit, and Longlands.
- The underground workings area (264 ha) is mainly Glenrosa/Mispah soils, with smaller sections of Tubatse (88.45 ha) on shallower slopes and severe erosion in some areas (77.96 ha).
- The mining infrastructure area (9.37 ha) has severe erosion, with Tubatse soils (36.36 ha) dominating, small areas of Longlands (1.66 ha), and a wet area classified as Katspruit (0.82 ha).

Agricultural potential is influenced by soil, terrain, and climate factors, with land capability classes reflecting the most intensive, long-term use of land under rainfed conditions. The land capability is determined by physical landscape features, while land potential is derived by combining land capability with regional climate capability. The guidelines outlined in *The Farming Handbook* (Smith, 2006) were used for classification.

The land capability for the Project areas is shown in Figure 28, with the soil forms linked to land capabilities. Key findings include:

- Glenrosa and Mispah soils are classified as non-arable (class VI to VIII), dominating the underground workings.
- Tubatse soils:
 - Deeper than 600mm and with slopes >7% are classified as class IV (light cultivation or grazing).
 - Shallower than 600mm with slopes >7% are non-arable (class VI).
 - Deeper than 600mm with slopes <7% are classified as class III, suitable for moderate cultivation.
- Longlands soils have poor nutrient retention, classified as class IV (light cultivation or grazing).
- Katspruit soils are wetland soils, classified as class V.

The underground section is dominated by non-arable land (class VI to VIII), with small, isolated areas of potential arable land that face high erosion risk. The mining infrastructure area is mostly class IV (light cultivation), but erosion risk also restricts agricultural use.

An assessment of the potential impacts and proposed mitigation measures are provided in Section 12.7 of this report.

10.1.7. Wetland

The information provided in this section was extracted from the Wetland Assessment undertaken by CEET in 2024. The full report is attached under Appendix IV.

10.1.7.1. Strategic Water Areas

Strategic Water Source Areas (SWSAs) are critical ecological infrastructure assets that provide water to approximately 60% of South Africa's population, over 90% of urban water users, 67% of the national economy, and 70% of irrigated agriculture (Nel et al., 2017; Le Maitre et al., 2018). Ecological infrastructure refers to naturally functioning ecosystems—such as wetlands, rivers, riparian zones, and SWSAs—that offer essential services including water supply, water purification, flood regulation, and drought resilience, thereby supporting climate change adaptation and enhancing the performance of built infrastructure like dams.

According to the Strategic Water Source Areas Layer (2017) spatial dataset, the Umgala Project does not intersect directly with any SWSAs. However, the nearest SWSA, the Enkangala Grasslands, lies approximately 3 km from the Umgala 1 and 2 site buffer zone (refer to Figure 29).

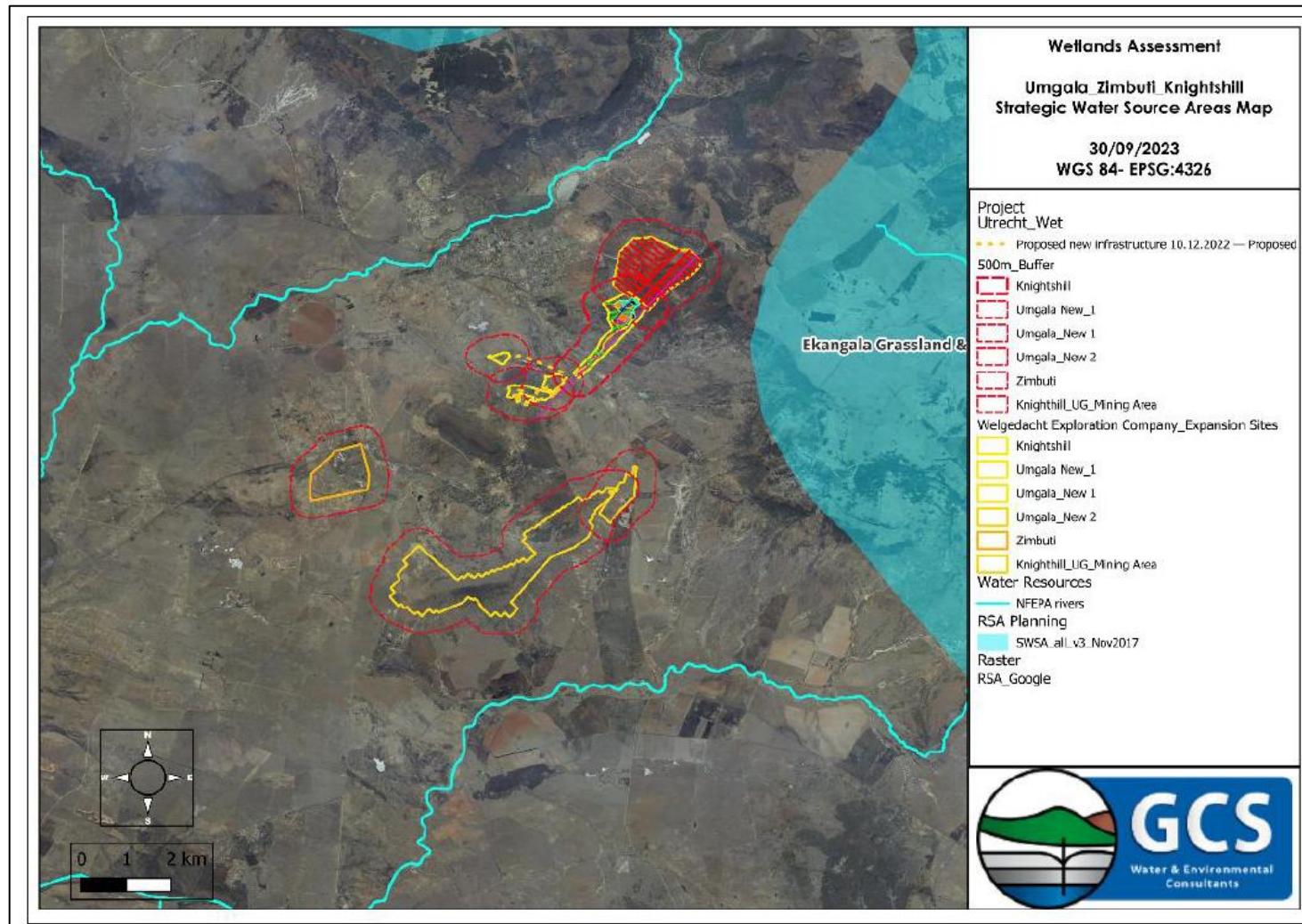


Figure 29: Strategic Water Source Area for the Project Area

10.1.7.2. National Freshwater Ecosystem Priority Areas Wetlands

National Freshwater Ecosystem Priority Areas (NFEPA) map products identify Freshwater Ecosystem Priority Areas (FEPAs), which are strategic spatial priorities critical to preserving rivers, wetlands, and estuaries. These ecosystems play a vital role in supporting water quantity and quality, enhancing resilience to floods and droughts, and complementing built infrastructure. FEPAs are integral to a sustainable water resource strategy and must be maintained in an A or B ecological condition. Wetlands in lower condition categories should be rehabilitated to the best possible ecological state.

For the Umgala Project site, the conservation significance was evaluated using NFEPA GIS layers. No NFEPA rivers are located within 500 m of either development. However, several NFEPA wetlands are situated in close proximity to Umgala 1 and 2, with some as near as 32 m from proposed infrastructure (see Figure 30 and Figure 31). These include artificial systems created by historical mining activities that nonetheless provide valuable ecological services.

Any interaction with NFEPA wetland systems necessitates the implementation of strict, sensitive mitigation measures during both construction and operational phases to avoid long-term impacts. These measures should be formally incorporated into the Environmental Management Programme (EMPr), especially where access or activities may influence identified NFEPA systems.

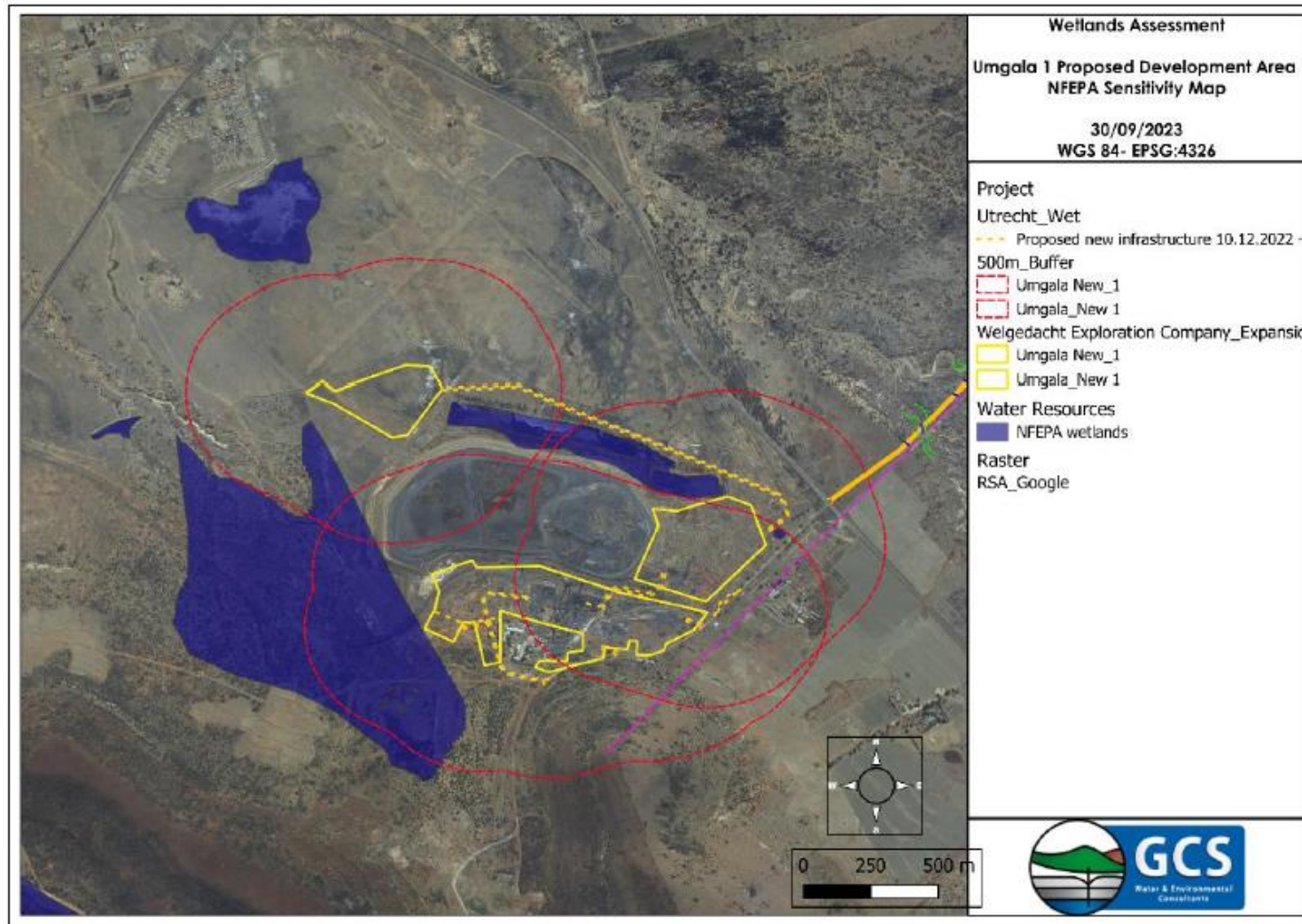


Figure 30: Location of NFEPA wetlands related to proposed development area of Umgala 1

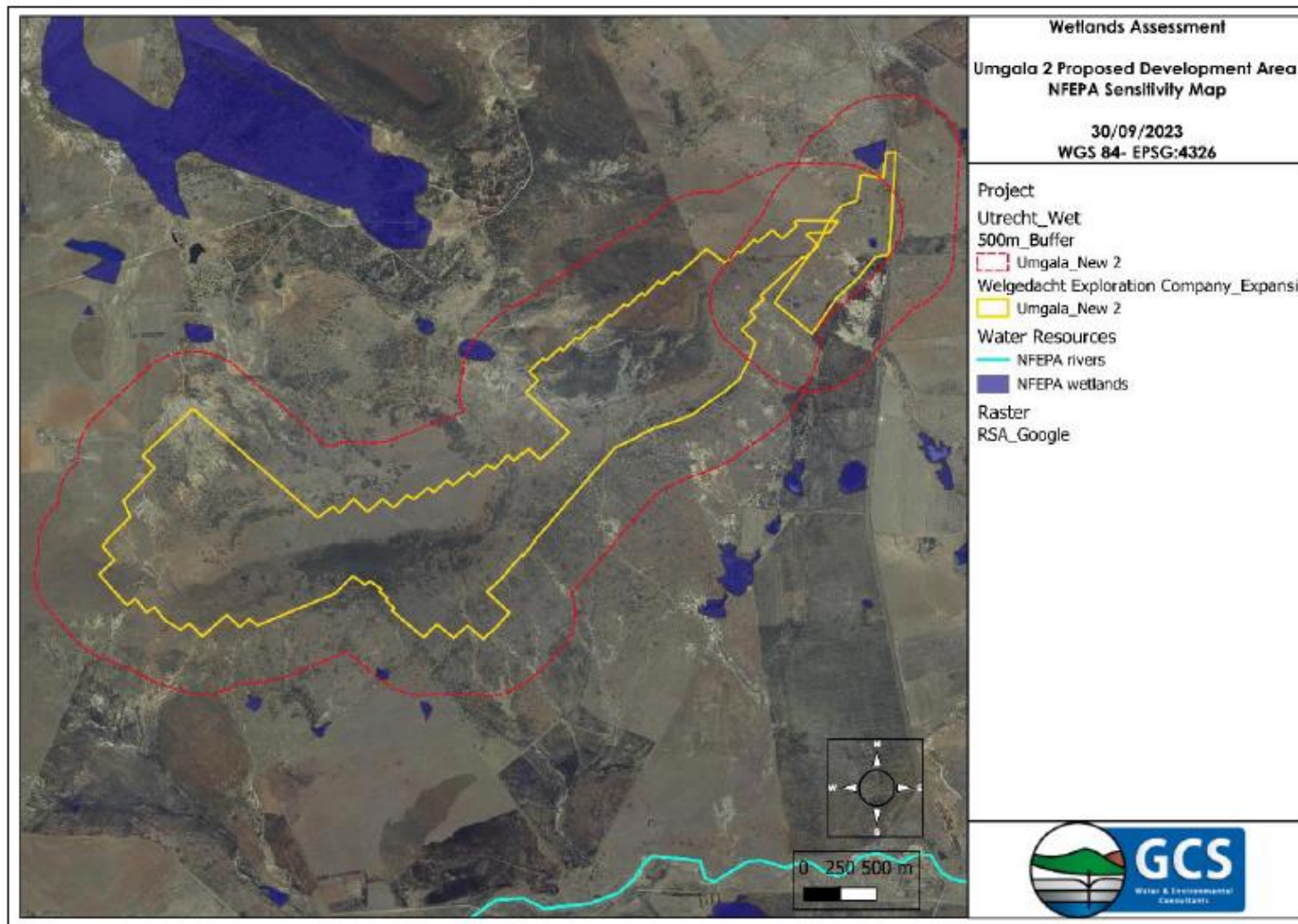


Figure 31: Location of NFEPA wetlands and rivers within and around proposed development area of Umgala

10.1.7.3. Catchments

The proposed infrastructure associated with the Umgala Project are all located within the Thukela WMA (Figure 32). Specifically, Umgala is situated within the V32B and V32C quaternary catchments (Figure 33).

The sub-quaternary reach associated with Umgala 1 is the Dorpspruit River (V32A-2398). This river reach has a Present Ecological State (PES) classification of D (Largely Modified), with an Ecological Importance (EI) rating of High and an Ecological Sensitivity (ES) rating of Very High. In contrast, Umgala 2 is associated with the Tiyna River (V32C-2526), which holds a PES classification of C (Moderately Modified), with both EI and ES ratings classified as High.

These findings highlight the shared ecological context of the project areas within the Thukela WMA, with the Dorpspruit River representing a key ecological feature for both Umgala and Knights Hill, and all Project sites associated with watercourses of high ecological importance and sensitivity.

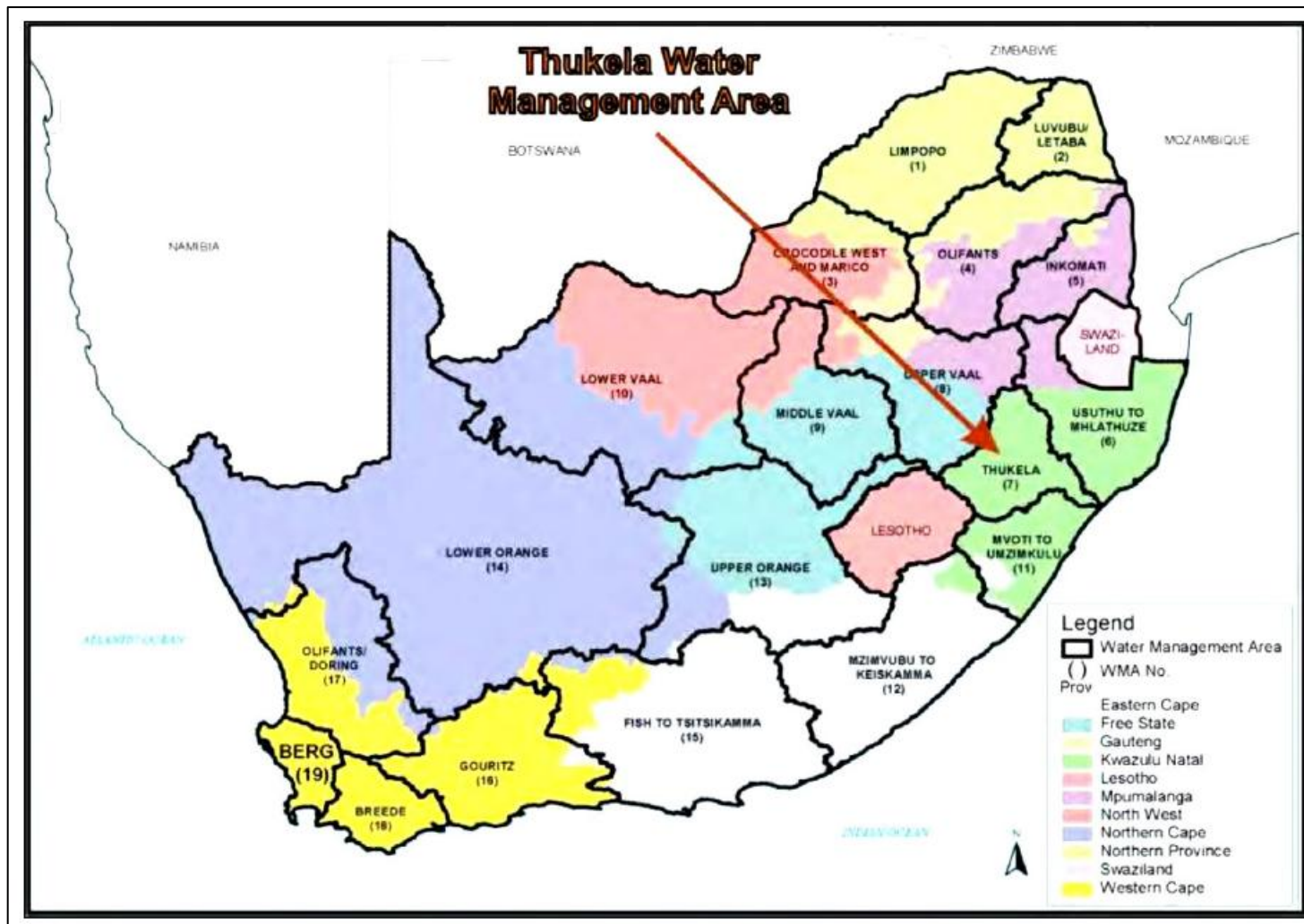


Figure 32: Water Management Area associated with the Project Area

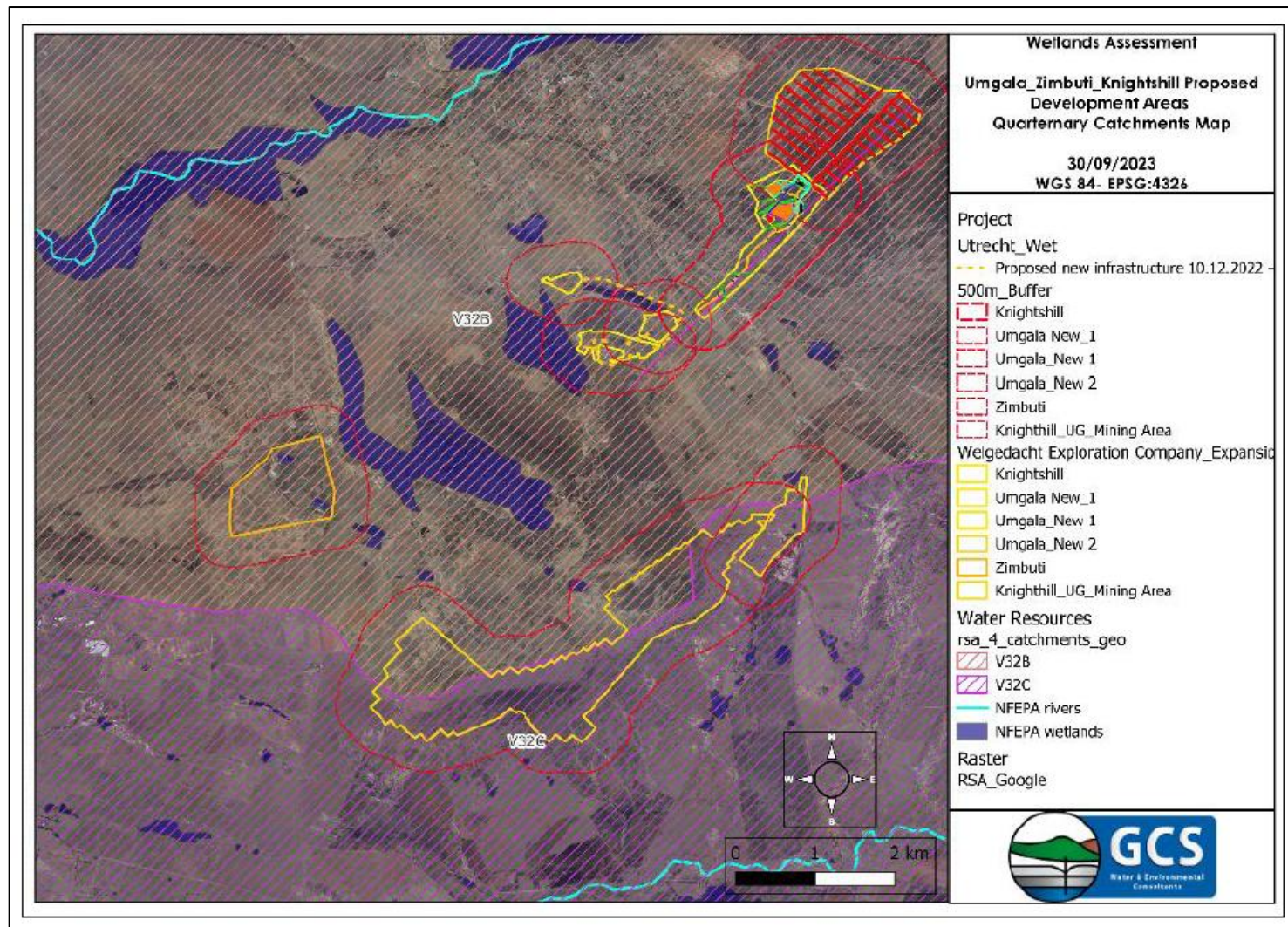


Figure 33: Catchments within the Project Area

10.1.7.4. Wetland Delineation and Classification

The field assessment incorporated key indicators outlined in the national wetland delineation guidelines to determine the presence and extent of wetlands. While not all indicators were applied at every site, their usage was clearly specified in the results. The indicators considered include:

- Terrain Unit Indicator: Used to evaluate the wetland's position in the landscape. Wetlands typically occur in valley bottoms, where water accumulation is prolonged.
- Soil Form Indicator: Identifies specific soil forms linked to frequent saturation, as defined by the Soil Classification Working Group (1991).
- Soil Wetness Indicator: Assesses redoximorphic features such as mottling and gleying, which are signs of long-term water saturation. Soil samples were analysed using the Munsell Colour Chart to determine hue, value, and chroma.
- Vegetation Indicator: Evaluates the presence and distribution of hydrophytic plant species that signify varying moisture regimes.

Extensive fieldwork was conducted, with areas thoroughly traversed and soil auger samples collected as needed. Sampling points were logged using a Garmin GPSMAP 64 device. Soil was collected at two depths (0–10 cm and 40–50 cm), and each sample was assessed for colour and redoximorphic features. In areas with significant landscape transformation, vegetation of ecological relevance was noted. Where plant species could not be readily identified, leaf and bark samples were collected for further analysis using botanical identification keys.

As indicated in Table 18 there are a significant number of wetlands within the 500 m buffer of the surface infrastructure areas. These have been delineated using GoogleEarthTM imagery, NFEPA shapefiles, NWM5 and field verification. Subsequent to the site visits undertaken the number of wetlands has been finalized at 13 systems as classified below and depicted in Figure 34 and Figure 35. The wetlands at each site were delineated and classified into the following HGM units.

Table 18: Classification of Delineated Wetlands

Name	Type	Size (Ha)
Umg_W1	Dam/Depression_ Artificial	10.09
Umg_W2	Seepage	7.57
Umg_W3	CVB	10.81
Umg_W4	CVB	32.2
Umg_W5	Dam/Depression_ Artificial	0.1
Umg_W6	CVB	13
Umg_W7	Seepage	2.76
Umg_W8	Seepage	9.46
Umg_W9	CVB	31.1
Umg_W10	Dam/Depression_ Artificial	4.73
Umg_W11	Depression	0.59
Umg_W12	CVB	15.82
Umg_W13	Depression	1.64

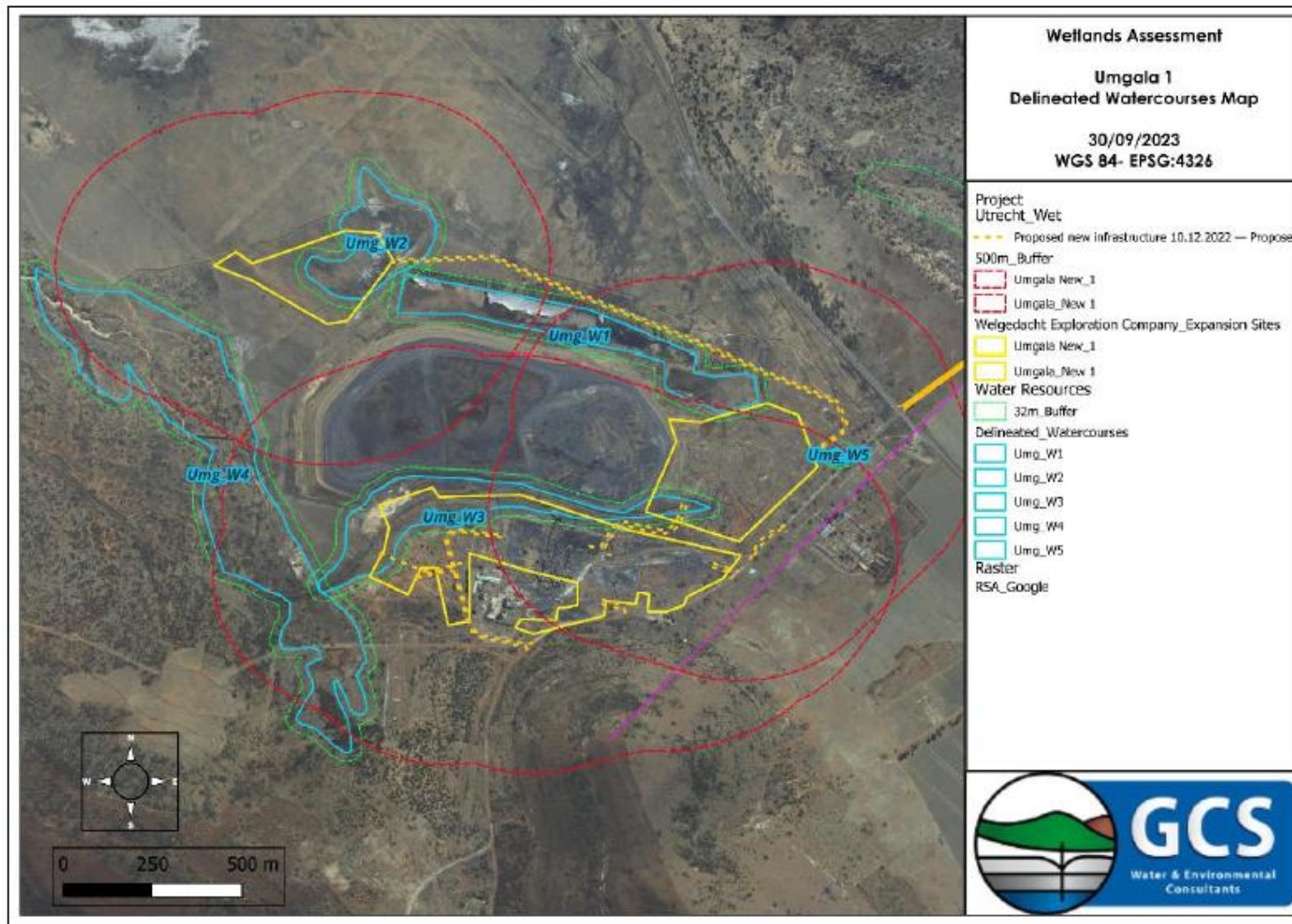


Figure 34: Wetlands Delineated within and around the proposed infrastructure upgrade Umgala 1 Area

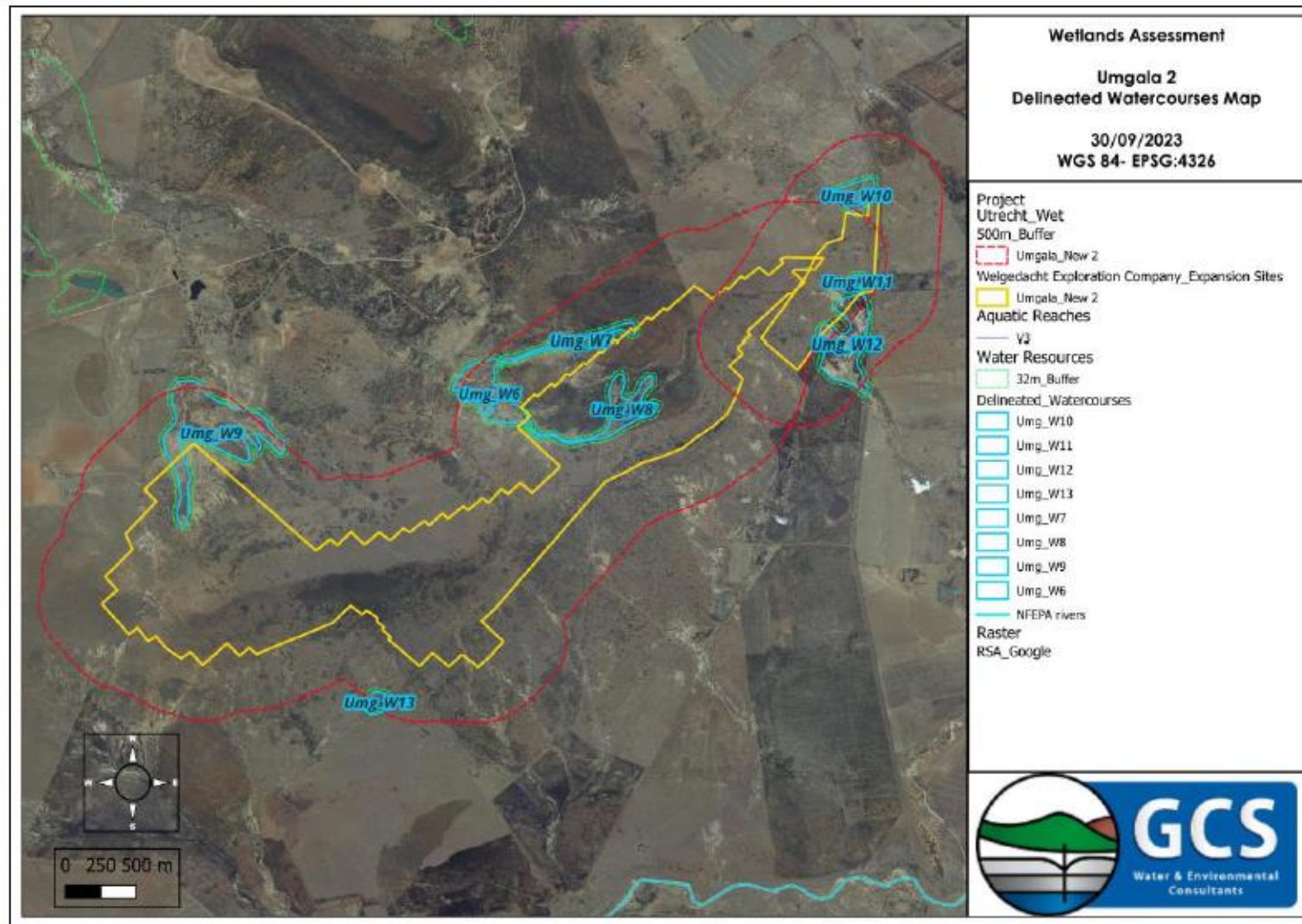


Figure 35: Wetlands Delineated within and around the proposed infrastructure and mining area expansion Umgala 2 Area

10.1.7.5. Present Ecological Status (PES) and Ecological Importance and Significance (EIS) of delineated wetlands

The following assessments were undertaken for each wetland and catchment related thereto, Present Ecological State, Ecological Importance and Sensitivity and Ecosystem Services. The loss and complete transformation of wetland habitats is expected in open cast and in some instances underground mining activities. The table below includes the sizes of each wetland assessed and the resultant loss/impact area related thereto. The loss of the wetland area up to 22.55 ha is anticipated and cannot be mitigated or avoided in the current design of the proposed mining area upgrade and expansion. The ecosystem services provided by the wetlands are shown in Table 19, exhibiting generally low scores. The PES and EIS of the delineated wetlands for Umgala 1 and Umgala 2 are illustrated in Figure 36 and Figure 37 respectively.

Table 19: Present Ecological State and Ecological Importance and Significance of delineated wetlands

Name	Type	Size (Ha)	Hydrology	Geomorphology	Water Quality	Vegetation	Overall Score	Summary Score
Umg_W1	Dam/Depression_Artificial	10.09	D	D	B	C	C/D	B- High
Umg_W2	Seepage	7.57	C	D	B/C	C/D	C	C- Moderate
Umg_W3	CVB	10.81	B	C/D	D	E	D	D- Low/Marginal
Umg_W4	CVB	32.2	B	C/D	D	D	C/D	D- Low/Marginal
Umg_W5	Dam/Depression_Artificial	0.1	D	C/D	D	D	D	C- Moderate
Umg_W6	CVB	13	D	B/C	C	C	C	B- High
Umg_W7	Seepage	2.76	D	D	C	C	C	B- High
Umg_W8	Seepage	9.46	D	D/E	C	C	C/D	B- High
Umg_W9	CVB	31.1	C	C/D	C	C	C	A- Very High
Umg_W10	Dam/Depression_Artificial	4.73	D	C/D	C	B/C	C	B- High
Umg_W11	Depression	0.59	C	C/D	C	B/C	C	B- High
Umg_W12	CVB	15.82	C	D/E	D	E	D	C- Moderate
Umg_W13	Depression	1.64	C	D/E	C	B/C	C	C- Moderate

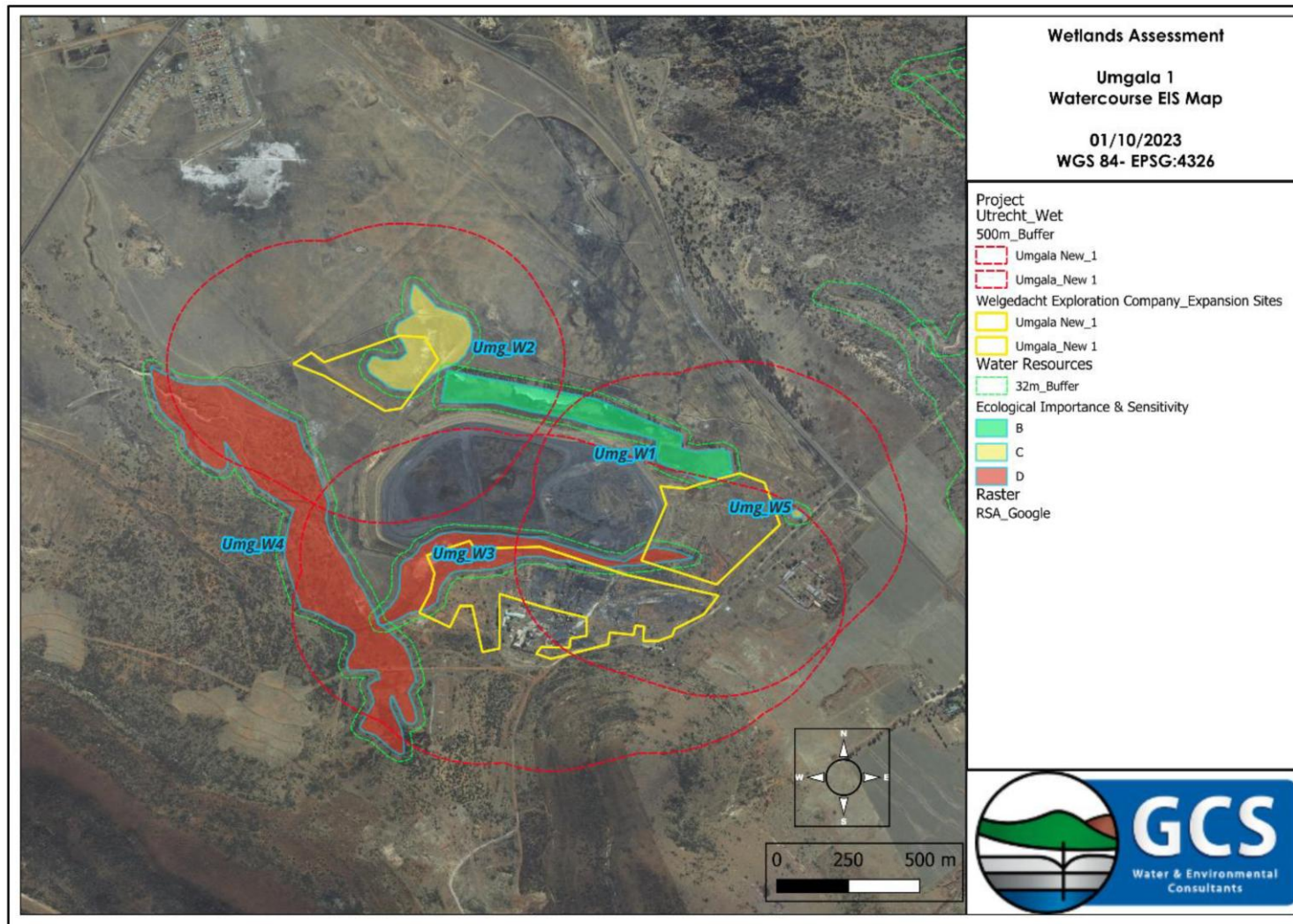


Figure 36: Ecological Importance and Sensitivity of Delineated Watercourses in Umgala 1

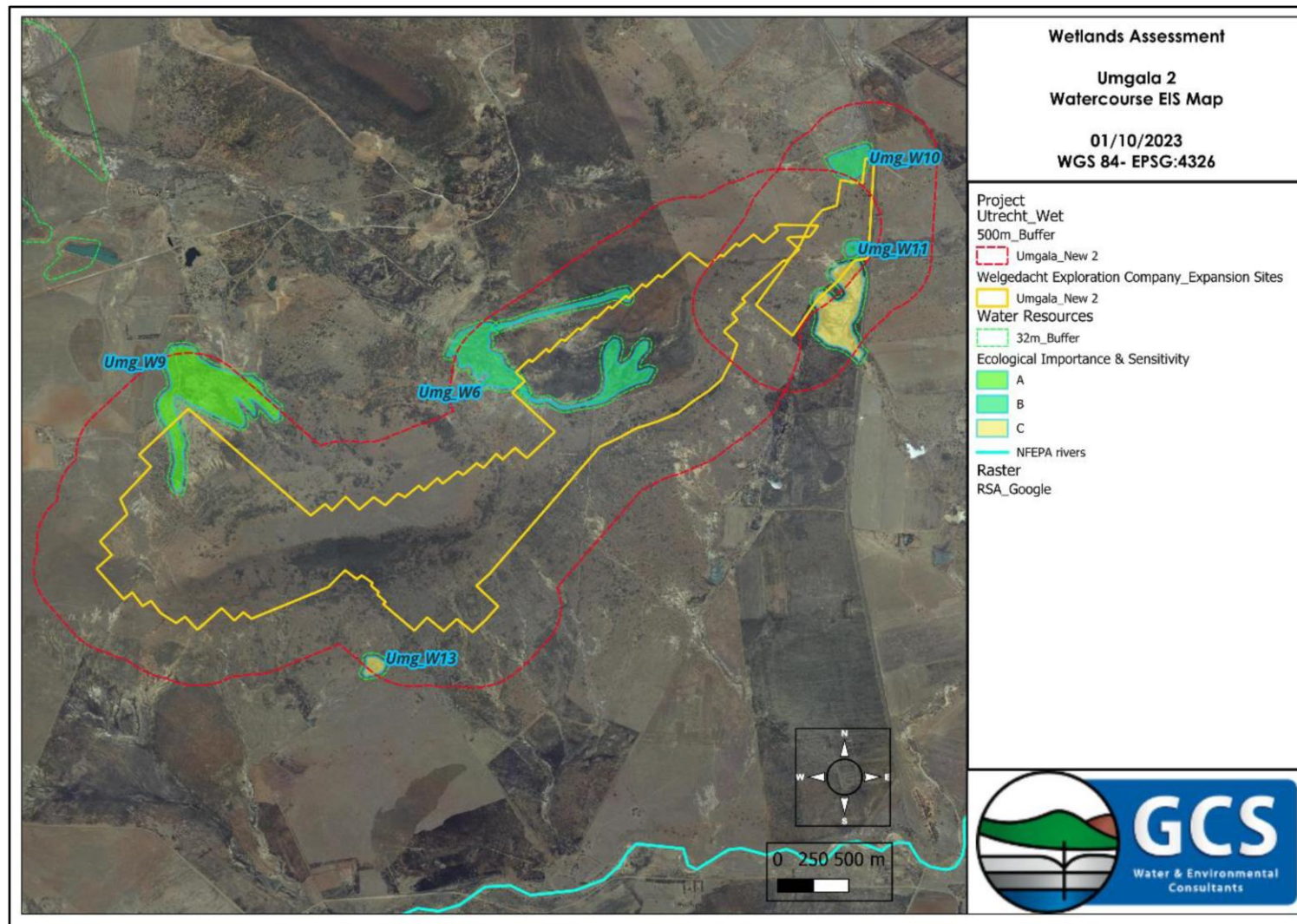


Figure 37: Ecological Importance and Sensitivity of Delineated Watercourses in Umgala 2

10.1.7.6. Conclusion

The Umgala Project areas are located near several NFEPA-classified wetlands, with 13 wetland systems confirmed within the 500 m buffer zone following site visits and verification using Google Earth™, NFEPA shapefiles, NWM5, and fieldwork. Of these, several wetlands fall within 32 m of the Umgala 1 infrastructure footprint. Umgala 2 is associated with four NFEPA wetlands located outside the immediate footprint but within the 500 m buffer.

Hydrologically, Umgala 1 is linked to the Dorpspruit River (V32A-2398), with a PES classification of D (Largely Modified) and Ecological Importance (EI) and Ecological Sensitivity (ES) ratings of High and Very High, respectively. Umgala 2 is associated with the Tiyna River (V32C-2526), with a PES of C (Moderately Modified) and both EI and ES rated as High.

Wetland assessments included evaluations of PES, Ecological Importance and Sensitivity, and Ecosystem Services. Up to 22.55 ha of wetland habitat loss is anticipated, primarily due to opencast and, to a lesser extent, underground mining. The ecosystem services provided by these wetlands are generally rated low, with limited options for avoidance or mitigation under the current Project design. Refer to Section 12.7 of this report for an assessment of impacts and proposed mitigation measures.

10.1.8. Aquatic

The River Guy Proprietary Limited conducted the Baseline Aquatic Assessment for the Project. The information provided in this section was extracted from the aforesaid report which is attached under Appendix IV.

10.1.8.1 Present Ecological State

The assessment was undertaken on the 20th of September 2023, which is representative of a low flow assessment, as rain has not yet occurred. The location of assessed site is presented in Figure 38.

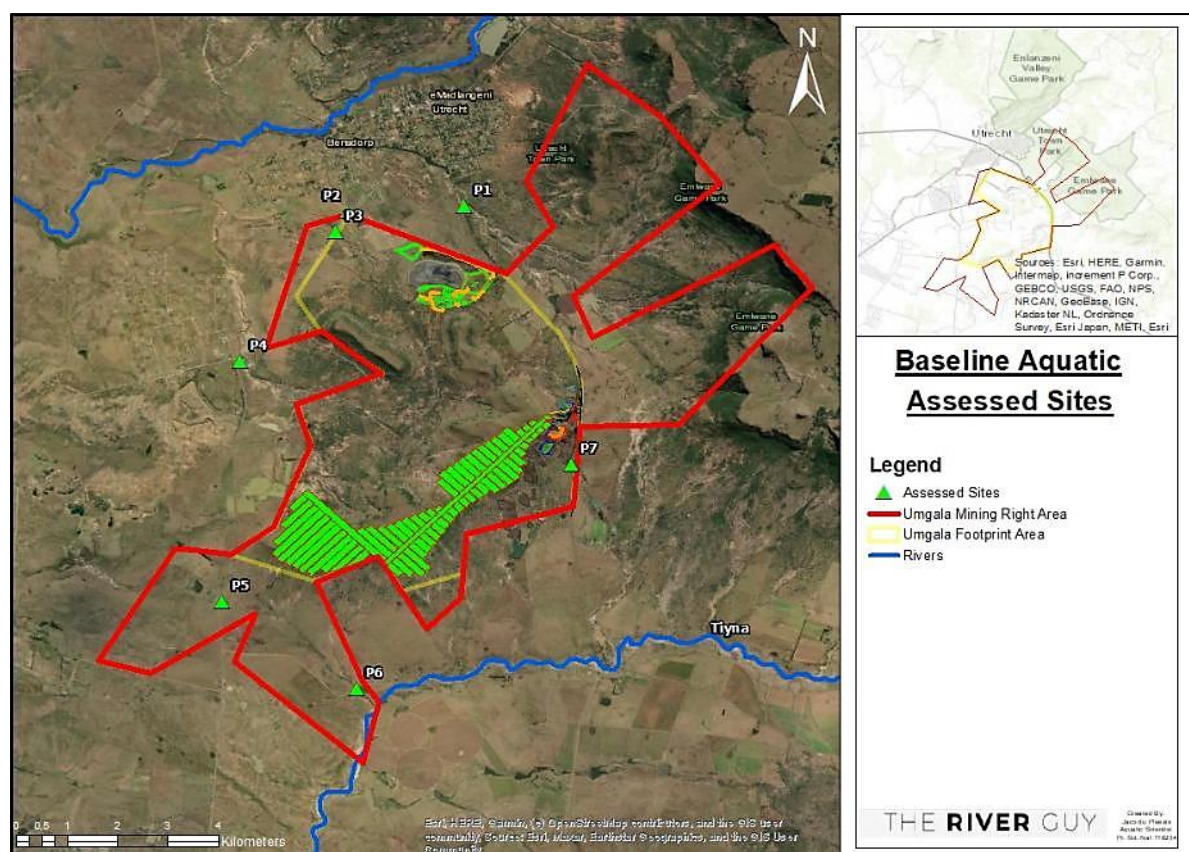


Figure 38: Location of assessed sites (the River Guy, 2023)

The Assessed Sites P1-P4 are situated within the Dorpspruit Sub Quaternary Reach (SQR) V32A-03298, which is a Stream order one (1) river. The present ecological state of the Dorpspruit River SQR based on the Department of Water and Sanitations historical data (DWS, 2012) is rated Largely Modified (Category D) with a High ecological importance and a very high ecological sensitivity. Historic recorded impacts upon the reach includes: Alien invasive plants, Acid Mine Drainage, the town of Utrecht, instream weirs, waste water treatment facilities and abstraction for irrigation purposes. A detailed summary of the Sub Quaternary Reach (SQR) is displayed in Table 20.

The Assessed Site P5 is situated in the Buffels Sub Quaternary Reach V32C-02533, which is a stream order 4 river with a length of 20.46 km, rated Largely Natural (Category B) with a high ecological importance and sensitivity. Historic impacts associated with the SQR include cultivation, water abstraction for rural and semi-urban areas, roads and an established gauging weir (Table 21).

The Assessed Sites P6 and P7 are located in the Tinya Sub Quaternary Reach V32C-02526 (DWAF, 2012), which is a stream order 1 river classed Moderately Modified (Category C), with a high ecological importance and sensitivity. Historic impacts that have been recorded within the SQR include instream weirs, old agricultural lands, over grazing, erosion and small areas of sand mining (Table 22).

Table 20: General summary for the Dorpspruit Sub Quaternary Reach V32A-03298 (DWAF, 2012) (Assessed sites P1,2,3,4)

Present Ecological State		Ecological Importance				Ecological Sensitivity	
Largely Modified		High				Very High	
Instream Habitat Continuity Modifications	Moderate	Fish species /SQ	9	Invertebrate taxa / SQ	58	Fish physico-chemical sensitivity description	Very High
Riparian/Wetland zone continuity modifications	Large	Fish average confidence	2.11	Invertebrate average confidence	2.72	Fish no-flow sensitivity description	Very High
Potential instream habitat modifications	Small	Fish representativity per secondary class	High	Invertebrate representativity per secondary class	Very High	Invertebrate physico-chemical sensitivity description	Very High
Riparian-wetland zone modifications	Large	Fish rarity per second class	High	Invertebrate rarity per second class	Very High	Invertebrate velocity sensitivity	Very High
Potential flow modifications	Moderate	Habitat diversity class	Moderate	Ecological importance riparian-wetland instream vertebrates	High	Riparian-wetland instream vertebrates (excluding fish) intolerance water level/ flow changes description	High
Potential physico-chemical modification activities	Large	Riparian-wetland natural vegetation rating based on % natural vegetation in 500m	Very High	Habitat Size Class	Low	Stream size sensitivity to modified flow/water level changes description	High
		Riparian-wetland natural vegetation importance based on expert rating	Not Assessed	Instream Migration Link Class	High	Riparian-wetland vegetation intolerance to water level changes	Not Assessed

Present Ecological State	Ecological Importance				Ecological Sensitivity
Largely Modified	High				Very High
	Riparian-Wetland Zone Migration Link	Moderate	Riparian -Wetland Zone habitat integrity class	Moderate	
	Instream Habitat integrity Class	Very High			

Table 21: General summary for the Buffels Sub Quaternary Reach V32C-02533 (DWAF, 2012) (Assessed Site P5)

Present Ecological State		Ecological Importance				Ecological Sensitivity	
Largely Natural		High				High	
Instream Habitat Continuity Modifications	Small	Fish species /SQ	9	Invertebrate taxa / SQ	61	Fish physico-chemical sensitivity description	High
Riparian/Wetland zone continuity modifications	Small	Fish average confidence	3.44	Invertebrate average confidence	3.26	Fish no-flow sensitivity description	High
Potential instream habitat modifications	Small	Fish representativity per secondary class	High	Invertebrate representativity per secondary class	Very High	Invertebrate physico-chemical sensitivity description	Very High
Riparian-wetland zone modifications	Small	Fish rarity per second class	High	Invertebrate rarity per second class	High	Invertebrate velocity sensitivity	Very High
Potential flow modifications	Moderate	Habitat diversity class	Very Low	Ecological importance riparian-wetland instream vertebrates	Not Assessed	Riparian-wetland instream vertebrates (excluding fish) intolerance water level/ flow changes description	Not Assessed

Present Ecological State		Ecological Importance				Ecological Sensitivity	
Largely Natural		High				High	
Potential physico-chemical modification activities	Moderate	Riparian-wetland natural vegetation rating based on % natural vegetation in 500m	High	Habitat Size Class	Low	Stream size sensitivity to modified flow/water level changes description	Low
		Riparian-wetland natural vegetation importance based on expert rating	Very High	Instream Migration Link Class	Very High	Riparian-wetland vegetation intolerance to water level changes	High
		Riparian-Wetland Zone Migration Link	Very High	Riparian -Wetland Zone habitat integrity class	Very High		
		Instream Habitat integrity Class	Very High				

Table 22: General summary for the Tinya Sub Quaternary Reach V32C-02526 (DWAF, 2012) (Assessed Sites P6 and P7)

Present Ecological State		Ecological Importance				Ecological Sensitivity	
Moderately Modified		High				High	
Instream Habitat Continuity Modifications	Small	Fish species /SQ	9	Invertebrate taxa / SQ	61	Fish physico-chemical sensitivity description	High
Riparian/Wetland zone continuity modifications	Moderate	Fish average confidence	3.22	Invertebrate average confidence	2.84	Fish no-flow sensitivity description	High
Potential instream habitat modifications	Large	Fish representativity per secondary class	High	Invertebrate representativity per secondary class	High	Invertebrate physico-chemical sensitivity description	Very High

Present Ecological State		Ecological Importance				Ecological Sensitivity	
Moderately Modified		High				High	
Riparian-wetland zone modifications	Moderate	Fish rarity per second class	High	Invertebrate rarity per second class	Very High	Invertebrate velocity sensitivity	Very High
Potential flow modifications	Small	Habitat diversity class	Moderate	Ecological importance riparian-wetland instream vertebrates	Not Assessed	Riparian-wetland instream vertebrates (excluding fish) intolerance water level/ flow changes description	Not Assessed
Potential physico-chemical modification activities	Small	Riparian-wetland natural vegetation rating based on % natural vegetation in 500m	High	Habitat Size Class	Low	Stream size sensitivity to modified flow/water level changes description	Low
		Riparian-wetland natural vegetation importance based on expert rating	High	Instream Migration Link Class	Very High	Riparian-wetland vegetation intolerance to water level changes	High
		Riparian-Wetland Zone Migration Link	High	Riparian -Wetland Zone habitat integrity class	High		
		Instream Habitat integrity Class	Moderate				

10.1.8.2. Fish species

Nine (9) fish species are expected to occur within the Dorpspruit, Buffels and Tinya Rivers. Two species of conservation concern are expected to occur within the systems, however based on the frequency of occurrence as determined by The Department of Water and Sanitation (2012) their likelihood is deemed to be low to moderate.

Labeo rubromaculatus (Tugela Labeo) rated Vulnerable by the IUCN (2023), is isolated to the Tugela System, KwaZulu-Natal. This species prefers deep pools but is known to occur within rapids. It feeds on algae, diatoms, and detritus. Shoals are known to migrate upstream in spring and summer for breeding purposes. The major threat to this species is due to habitat transformation (changes in the natural flow regime/ barriers) (IUCN, 2023).

Oreochromis mossambicus (Mozambique Tilapia), this species is not directly impacted by anthropogenic activities being a hardy species. The most significant contributor to the sensitivity listing of vulnerable by the IUCN is due to the introduction of the alien *Oreochromis niloticus* (Nile Tilapia) which has contributed to the hybridization and competition of *Oreochromis mossambicus*.

10.1.8.3. Intermediate habitat

The vegetation type associated with the Umgala mining area is the Northern KwaZulu-Natal Moist Grassland (GS4) rated Vulnerable (VU), and the Income Sandy Grassland rated Vulnerable (VU) (Mucina and Rutherford). The northern KwaZulu-Natal Moist Grassland vegetation type is isolated to the northern and northwestern regions of KwaZulu-Natal, forming a discontinuous rim around the upper Thukela Basin. The Income Sandy Grassland vegetation type is restricted to the KwaZulu-Natal province occurring within the Newcastle, Vryheid, Dundee and surrounding areas.

A Strategic Water Source Area (SWSA) refers to an area that supplies a disproportionate amount of mean annual runoff to downstream economies and urban centres and are regarded as vital to the economy. Any negative impacts to water quality within a SWSA can have a disproportionately large negative effect on the functioning of downstream ecosystems and the overall sustainability of growth and development in the regions they support. The identification of SWSA is essential to ensure that appropriate management measures of these areas are implemented and any potential negative impacts from a proposed development are adequately mitigated. The northern sections of the Umgala Mining right area is located downstream of the Phongola Drakensberg Strategic Water Source Area.

10.1.8.4. Water quality

A single exceedance was observed at the time of sampling at assessment point P5 namely pH, slightly lower measurements compared to the Target Water Quality Guidelines as set out by the Department of Water and Sanitation was observed. However, pH measurements are known to fluctuate during the diurnal cycle. There is potential of anthropogenic impacts in the form of runoff or seepage being present within the area however, this may only be confirmed with chemical analysis.

No further measurements observed are of concern at the remaining assessment points falling within the recommended guidelines as set out for aquatic ecosystems (DWAF, 1996). And are not deemed to be limiting factors at the time of sampling.

10.1.8.5. Aquatic Macroinvertebrate

The SASS5 methodology was specifically designed for characterising impairment of biotic integrity, and thus can be used to assess the 'state of a river' with regards to unseen pollutants and long-term change (Davies & Day, 1998). Due to the fragmented observation of water (pools) and stagnant nature associated with the assessment points at the time of sampling no sampling could be undertaken. It is recommended that a follow up high flow assessment be conducted to accurately determine the biotic sensitivity associated with the systems.

10.1.8.6. Conclusion

The Present Ecological Status (PES) for the Dorpspruit, Buffels and Tinya River scored in the high ranges due to two expected fish species of conservation concern. The Ecological Importance and Sensitivity (EIS) fall in the high and very high ranges and has functionality in respect of moderating water quality and supporting fish species and aquatic macroinvertebrates, as well as sustaining a well-defined riparian area.

Based on the overall sensitivity and the Phongola Drakensberg strategic water management area situated upstream, the potential of impact and reduction of basic functioning of the reach is highly likely. High impacts prior are associated with the construction and operation of the proposed mining if proposed mitigations are not strictly adhered to. Likely impacts upon the reach include loss of basic functioning, increased turbidity, and sedimentation of the river downstream and potential water quality impacts in the form of Acid Mine Drainage.

10.1.9. Hydrology

A Hydrological Assessment was undertaken for the Project by GCS in 2024. The information provided in this section is extracted from the report. The full report is attached under Appendix IV.

The objectives of the hydrological study were to evaluate the hydrological functions of the Project area and determine its ecological water requirements (EWR). A site walkover assessment was conducted to verify the presence and alignment of drainage lines and rivers within the area. As part of the study, a conceptual hydrological cycle was developed for the sub-catchment associated with the Project area, outlining the key hydrological components that may be affected by the proposed activities. Furthermore, peak flow return periods for the 1:10, 1:50, and 1:100-year flood events were calculated to inform conceptual flood line modelling, with the aim of delineating potential exclusion zones. This modelling exercise will be undertaken using a HEC-RAS model, supported by publicly available 30 m Digital Terrain Model (DTM) data from the Advanced Land Observing Satellite (ALOS) dataset. The findings and outcomes of these assessments were consolidated into a detailed

hydrological report, which included the identification and analysis of potential hydrological risks associated with the proposed development.

The baseline hydrology review comprised the following key activities:

- Hydro-meteorological Data Collection and Analysis: Historical rainfall, evaporation, and temperature data were collected and analysed to understand the prevailing climatic and hydrological conditions.
- Catchment Delineation and Drainage Characteristics: Catchment boundaries were delineated, and the drainage patterns within the Project area were characterised.
- Determination of Hydraulic and Geometric Parameters: Key hydrological and geometric parameters of the catchment were established to support hydrological modelling.

10.1.9.1. Sub-catchments/Hydrological Response Units

The site is characterised by four (4) Hydrological Response Units (HRUs), which define the natural drainage patterns and hydrogeological flow boundaries, based on a 1:1 000 stream count and 30 m Digital Terrain Model (DTM) data (refer to Figure 39). These HRUs align well with both desktop-delineated and field-verified drainage lines within the Project area. Site-specific drainage flows from the proposed Umgala adit, RoM stockpile, PCDs, and hard stockpile predominantly discharge southward via an ephemeral drainage line, while runoff from the Umgala office complex, soft stockpile, and soil stockpile drains northward through another ephemeral drainage line. There are no perennial watercourses on site; however, the Tiyna River (approximately 2 km south) and the Dorpspruit River (approximately 2.5 km north) are the principal rivers bounding the Project area.

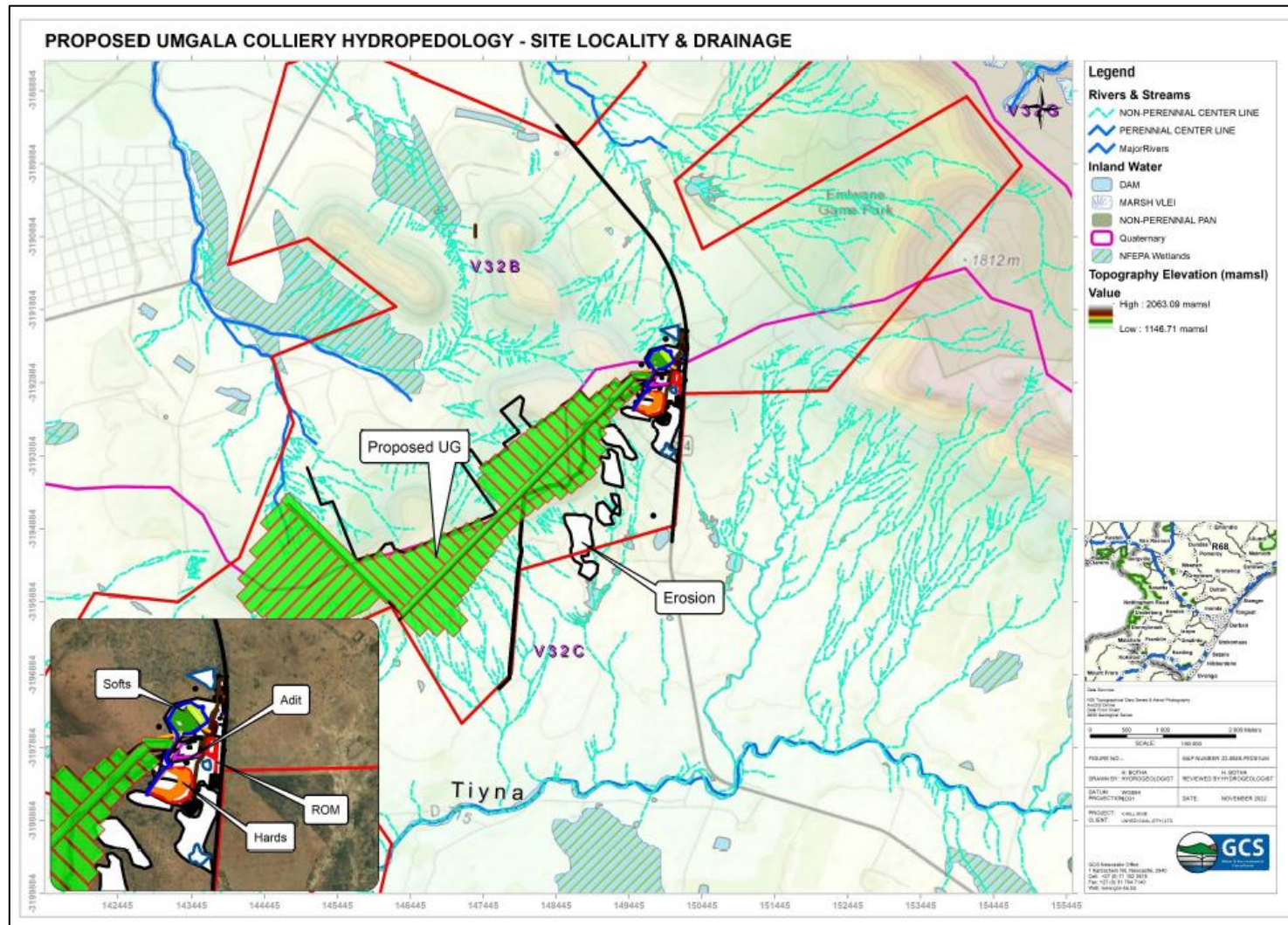


Figure 39: Umgala Site Locality and Drainage (GCS, 2024)

10.1.9.2. *Regional Context: Water Management Area*

The Pongola-Mtamvuna WMA, located primarily within KwaZulu-Natal, is characterised by several major river systems draining from the Drakensberg escarpment toward the Indian Ocean. Key rivers within the WMA include the Mhlathuze, Mkuze, Mfolozi, Thukela, Mvoti, Mgeni, Mkomazi, uMzimkulu, and Mtamvuna (Department of Water and Sanitation, 2022).

Topographically, the WMA spans elevations from sea level to approximately 3,000 metres above mean sea level (mamsl). The area receives comparatively high annual rainfall, ranging between 800 mm and 1,500 mm, predominantly during summer months in the form of thunderstorms. Higher rainfall occurs on the windward slopes of the Drakensberg, while lower rainfall levels are observed in sheltered rain-shadow areas. The region is also subject to seasonal snowfall in higher elevations, periodic droughts, and occasional flood events. Rainfall variability in the area is influenced by the El Niño–Southern Oscillation (ENSO), with El Niño conditions typically resulting in below-average rainfall and La Niña conditions contributing to above-average rainfall patterns summer (Reason, Allan, Lindesay, & Ansell, 2000).

10.1.9.3. *Buffalo River Sub-Catchment*

The Umgala Project site falls within the Thukela River basin in the Buffalo River sub-catchment of the of the Pongola-Mtamvuna WMA. The Buffalo River is the main northern tributary of the Thukela River and flows in a south-easterly direction from the eastern escarpment to its confluence with the Thukela River. There are two major dams in the Buffalo River sub-catchment, these being Ntshingwayo Dam (previously known as Chelmsford), with a full supply capacity of 199 million m³, and Zaaihoek Dam, with a full supply capacity of 193 million m³.

10.1.9.4. *Reserve*

The Reserve is the quantity and quality of water required to satisfy the basic human needs by securing a basic water supply and to protect the aquatic ecosystem in order to secure ecologically sustainable development and use of relevant water resources (Department of Water and Sanitation, 2017).

The Reserve for the Thukela catchments has been determined and gazetted (Department of Water and Sanitation, 2022). A summary of the ecological water requirements for the quaternary catchments (as a percentage of natural MAR) is indicated in Table 23.

Table 23: Reserve determination and ecological categorisation (Department of Water and

Sanitation, 2022)

Quaternary Catchments	Water Resource	Mean Annual Runoff (million m ³ /a)	EWR as % of natural mean annual runoff
V32B, V32C, V32D, V32E, V32F	Middle Buffalo River	695.05	19.01

10.1.9.5. Water quality

Water quality impacts for the quaternary catchments will be assessed using the reserve quality limits as per the determined and gazetted limits for the Thukela catchment. The Buffalo River is the most significant surface water resource in quaternary catchments V32b and V32B. The River Ecological Specification (Eco Specs) relating to physiochemical data of the Buffalo River were used to compare instream quality data monitored at Umgala by GCS for the period between January 2010 – July 2022 and instream water quality measured by DWS between July 1982 and April 2018.

The results were obtained for the concentrations of heavy metals (such as Mn, Fe), salinity and nutrients in the water samples collected from different sources (see Figure 40).

These were compared with the resource quality objectives (RQO) for the middle Buffalo River (Table 24). Sulphate concentrations in the samples monitored by GCS and DWS ranged from 59.2 mg/l (DWS, middle Buffalo R) – 12 450 mg/l (in the Umgala RWD). Only two monitoring points were below the RQO limit. There was a noticeable increase in the concentrations of heavy metals in the GCS-sampled points emanating from the old Umgala Colliery but note the substantial drop in TDS in the Mpongosa stream, a short distance below the RWD that drains into it. And by the time the Buffalo River itself is reached, heavy metal/pollutant concentrations are within the target concentrations. In other words, pollutants are diluted in the streams downstream of the mining area. The Buffalo River, by contrast, demonstrates high levels of organic pollution, starting with extremely high levels of *E. coli* in the reaches proximal to the urban and peri-urban settlements of Madadeni (DWS 102760 and 188835) and elevated ortho-phosphate levels at several sampling points. This may be a product of organic break-down or of agricultural chemicals (fertiliser) used in the alluvial lands along the river.

Table 24: Umgala Mine Instream Water Quality Assessment

Variable	Unit	DRQO_EWR13: Buffalo	GCSS2	Weir7B	RWD	RWD Seepage	Mpongosa	DWS 189205	DWS 102760	DWS 188825	DWS 188835	DWS188842
Chloride (Cl)	mg/l	≤90	63	11.4	253.4	42.2	19		31.1			
Total Dissolved Solids (TDS)	mg/l	≤450	4709	3110	17090	2965	495		364.8			
Fluoride (F)	mg/l	≤1	1.5	0.4	11.1	0.4	0.4		0.7			
Sodium (Na)	mg/l	<58	292	304	1468	2374	59.5		47.8			
Nitrate (NO ₃)	mg/l	≤10	2.2	0.17	2.8	0.06	1.6		5.3	5.4	3.9	5.4
pH		6.5 – 9.5	8.0 – 8.2	8.1 – 8.3	7.7 – 8.7	3.6 – 6.8	8.1 – 8.4	6.9 – 7.7	7.2 - 8.3	6.8 - 8.0	6.7 - 8.9	6.6 - 7.9
Ortho- phosphate (PO ₄ ³⁻)	mg/l	≤0.1						1.1	0.4	1.49	1.0	1.8
Sulphate (SO ₄ ²⁻)	mg/l	≤180	3386	4384	12450	2374	59.2		76.5			
Total Alkalinity (CaCO ₃)	mg/l	≤0.105	316	305	534	30	326		116.9			
Arsenic (As)	mg/l	≤0.05	NOT MONITORED									
Escherichia coli	CFU/ 100ml	≤130							76500		20400	15580
Cadium (Cd)	mg/l	≤0.1	NOT MONITORED									

Variable	Unit	DRQO_EWR13: Buffalo	GCSS2	Weir7B	RWD	RWD Seepage	Mpongosa	DWS 189205	DWS 102760	DWS 188825	DWS 188835	DWS188842
Aluminium (Al)	mg/l	≤0.15	0.6	0.02	0.6	3.5	3.9					
Iron (Fe)	mg/l	≤0.2	0.8	0.05	0.6	3.5	3.9					
Manganese (Mn)	mg/l	≤0.0095	0.5	0.02	1.6	74.5	1.7					
Lead (Pb)	mg/l	≤0.0073	NOT MONITORED									
Copper (Cu)	mg/l	≤0.07	NOT MONITORED									
Nickel (Ni)	mg/l	≤0.0725	NOT MONITORED									

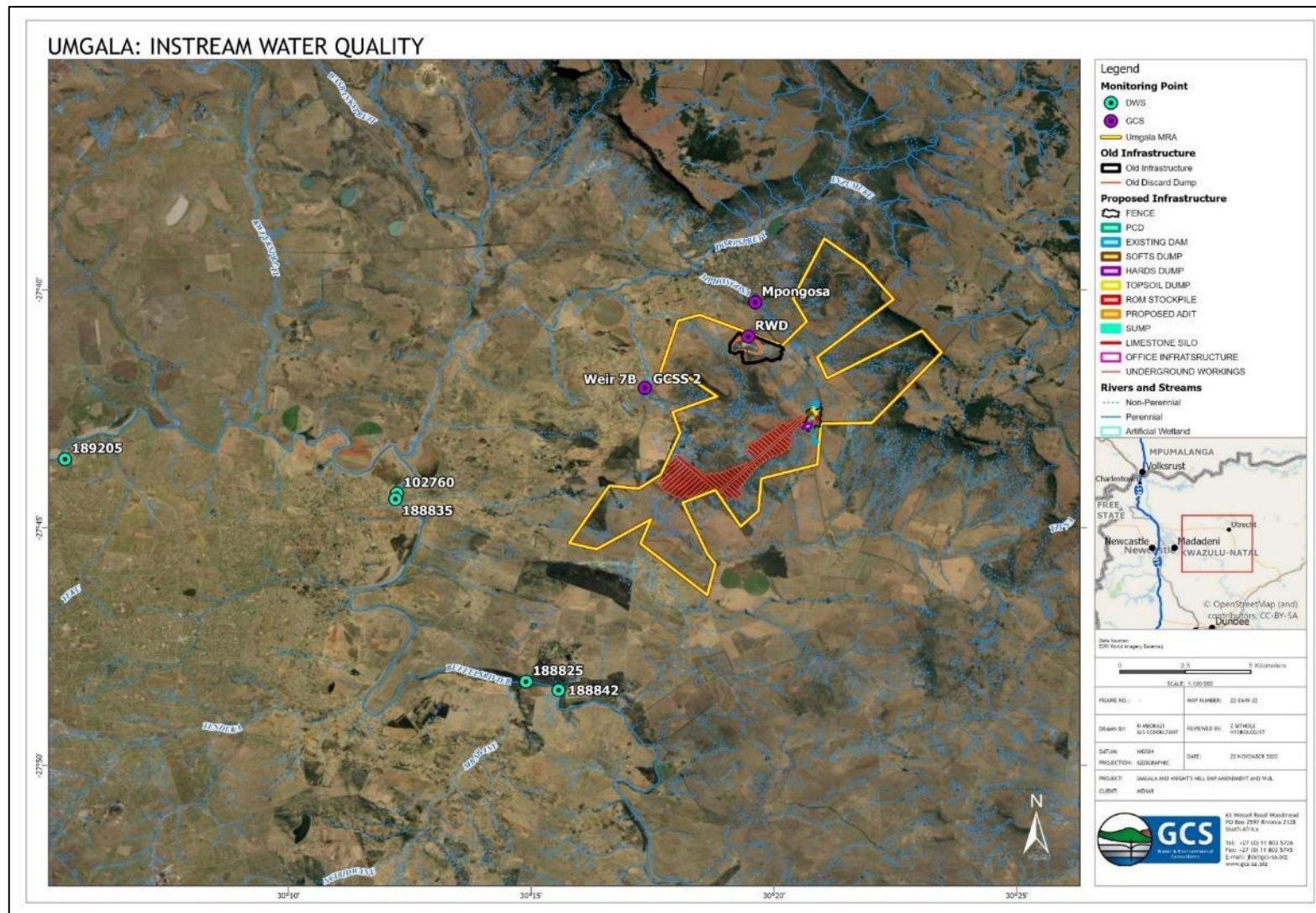


Figure 40: Umgala Instream Water Quality Monitoring Points (DWS and GCS)

10.1.9.6. Floodline Assessment

The following information described below was applicable to the Project site.

The floodline assessment evaluates the potential risks of flooding to infrastructure and the protection of natural water resources. The placement of infrastructure near natural watercourses is governed by legislation to meet minimum requirements (Government Gazette, 1998).

10.1.9.6.1. Model Assumptions and Results

The development of the floodlines was based on several key assumptions, which include:

- The topographic data provided was deemed accurate and extensive enough to support conceptual hydraulic modelling at an appropriate level of detail.
- The Manning's 'n' values used in the model were considered suitable for the flooding events modelled, effectively representing all channels and floodplains in the study area.
- No abstractions or discharges into the stream sections were considered during the modelling process.

10.1.9.6.2. Model Results – Umgala

The 1:50-year and 1:100-year flood lines are illustrated in Figure 41 and Figure 42. Based on the modelling results, no flood encroachment is indicated on the surface infrastructure. It is recommended that the stormwater management plan for the site be designed to divert floodwater away from the adit/shaft areas to prevent potential flooding impacts on these structures.

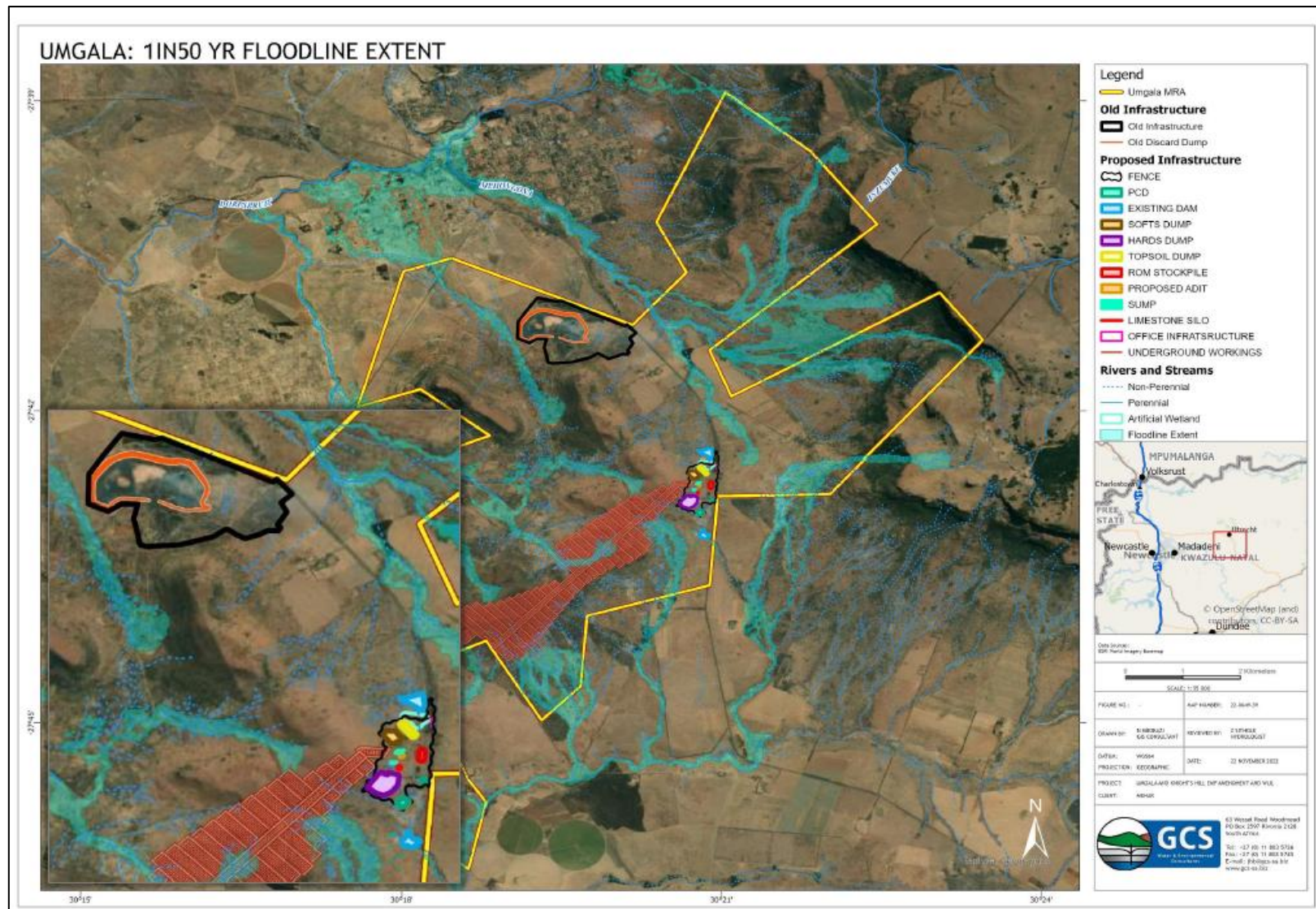


Figure 41: Umgala in 50 Year Floodline Extent

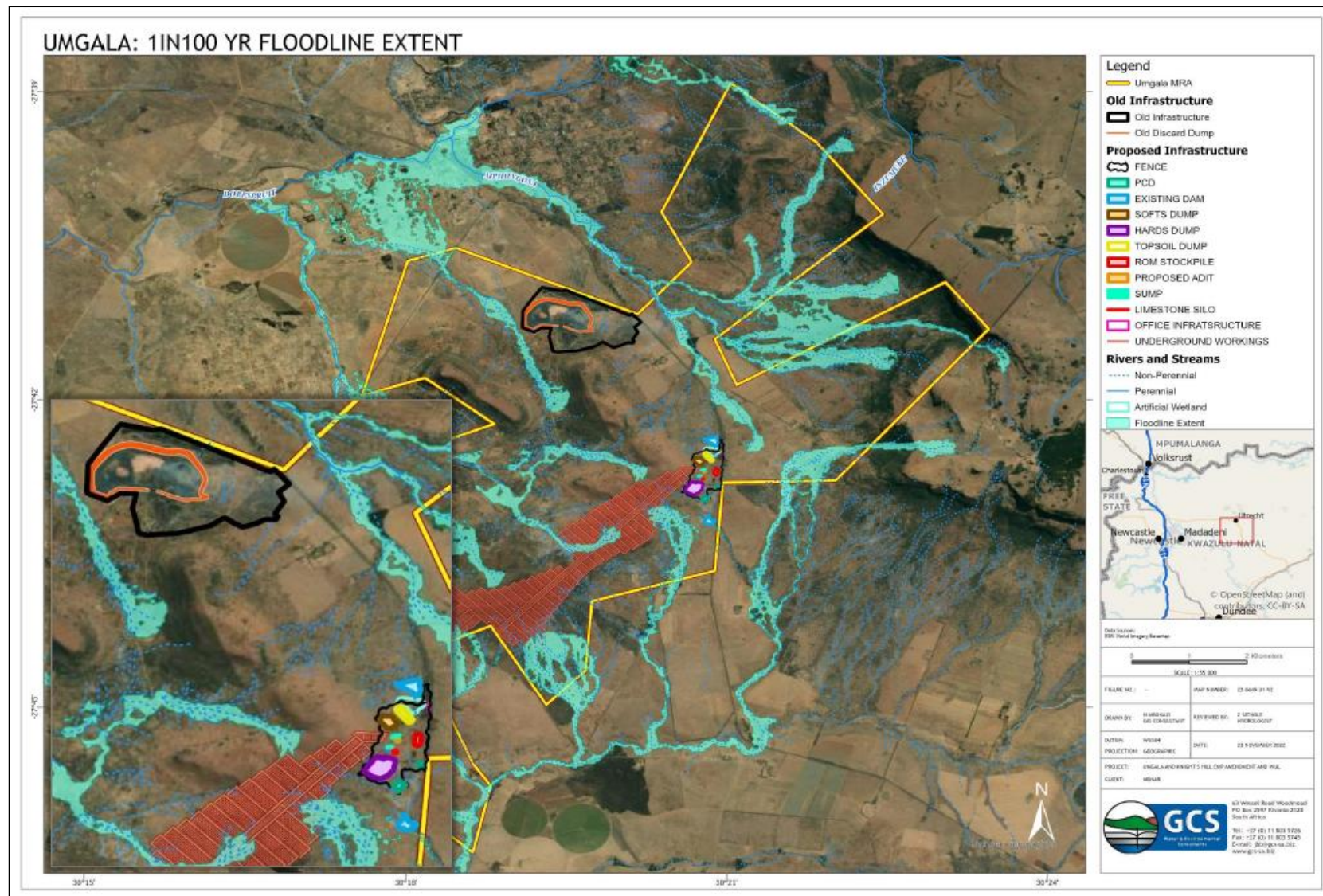


Figure 42: Umgala in 100 Year Floodline Extent

10.1.9.7. Conclusion

The Umgala Project site is located within Quaternary Catchment V32B of the Pongola WMA (DWS, 2016), with similar MAP of approximately 731.7 mm/a. The natural runoff at Umgala was recorded at 50.1 mm/a (7% of MAP). The site experience significant evaporation rates of 1,928 mm/a.

The hydrological dynamics are influenced by their location south of the Dorpspruit River, upstream of its confluence with the Wasbankspruit, which eventually joins the Buffels River and flows into the Thukela River. The site is prone to droughts and occasional flood events, with potential variability linked to the El Niño–Southern Oscillation (ENSO). The drainage of both sites is characterised by ephemeral streams, with four HRUs, based on topographical data and detailed stream counting.

Flood risk assessments indicate no flood encroachment on the surface infrastructure. However, it is recommended that the stormwater management plans be designed to divert floodwater from the adit/shaft areas, with a review of the flood risk once detailed topographic surveys are completed.

An assessment of the potential impacts and proposed mitigation measures are presented in Section 12.7 of this report.

10.1.10. Geohydrology

A geohydrological assessment was undertaken by GCS in 2024. The information provided in this section is extracted from the report, which is attached under Appendix IV.

The study aimed to assess groundwater quantity, quality, and impacts at the Umgala Project areas by reviewing existing reports and monitoring data, conducting site visits, and applying models to understand groundwater flow and potential risks during the Project's operational and closure phases.

10.1.10.1. Hydrological overview

Hydrometeorological data for the study area were obtained from various sources including the South African Water Resources Study WR2012 database (Bailey & Pitman, 2015), South African Atlas of Agrohydrology, and Climatology (Schulze, 1997), and the Daily Rainfall Data Extraction Utility (Lynch, 2004). Moreover, sources such as the Köppen Climate Classification (Kottek, et al., 2006), World Climate Data CMIP6 V2.1 (Eyring, 2016), and Meteoblue (Meteoblue, 2022) were used to refine hydrological data.

These sources provided means of determining the Mean Annual Precipitation (MAP), Mean Annual Runoff (MAR), and Mean Annual Evaporation (MAE) of the study site as well as the design rainfall data. Data was applied to the site water balance calculations, runoff peak flow estimates for flood line modelling and stormwater runoff peak flow estimates for stormwater system sizing (where applicable to this study).

10.1.10.2. Field Investigations

Extensive groundwater investigations have been conducted at Umgala, encompassing both historical and recent hydrocensus campaigns. These include the following:

- Historical Surveys:
 - GCS conducted field hydrocensus campaigns in 1999, 2002, 2018, and 2020.
 - Additional data from the GRIP (2016) and NGA (2018) databases confirmed the presence of multiple boreholes within the study area.
 - In total, 11 boreholes were identified:
 - 4 are actively used for domestic and livestock watering.
 - 1 is dedicated to groundwater monitoring.
 - 1 is not equipped.
 - The remaining boreholes were either blocked or no longer in use.
 - Several springs were also recorded during the 2002 field campaign.
 - In 2020, 8 boreholes were sampled to determine the site's hydrochemical characteristics.
- Recent Survey:
 - A follow-up hydrocensus was conducted by GCS in September 2022, identifying an additional 3 boreholes, all of which were sampled to further validate the site's hydrochemistry.
 - Photographic documentation of all identified boreholes is included in the comprehensive Geohydrology Study.

10.1.10.3. Geophysical Investigations

The geophysical investigation aimed to identify likely dolerite contact zones or lineaments that may intersect/underlie the study area. These are known preferential flow paths for groundwater movement. The findings are briefly summarised as follows:

- 2020 Geophysical Investigation:
 - Twelve (12) Magnetic (Mag) profiles were completed. Mag readings were taken at 5 m intervals. The Mag traverses varied from approximately 505 m to 1 460 m lengths.
 - Based on the geophysical investigation undertaken, and the geophysical method applied, the following was determined:
 - Evidence of dolerite dykes or contact zones was identified at the Proposed Umgala Softs Dump, Adit and Opencast section (based on the 2020 mine layout). This suggests preferential flow path structures in these areas.
 - No evidence of dolerite dykes or contact zones could be identified at the Umgala Discard Dump. Hence, the area is likely void of these preferential flow path structures. Groundwater movement is therefore expected to be via the bulk aquifer rock, in connected fractures or intergranular sedimentary occurrences.
- The data was also used to determine future monitoring borehole drilling positions (Table 25)

Table 25: Proposed monitoring borehole drilling positions

Drilling Position	Latitude (WGS84)	Longitude (WGS84)	Depth (m)
980	-27.713938	30.348354	40
92	-27.710807	30.348494	40
169	-27.710405	30.346645	40

- 2022 Geophysical Investigation:
 - Four (4) Magnetic (Mag) profiles were completed. Mag readings were taken at 5 m intervals. The Mag traverses varied from approximately 275 m to 485 m lengths.
 - Based on the geophysical investigation undertaken, and the geophysical method applied, the following was determined:
 - Evidence of dolerite dykes or contact zones were identified at the around the Proposed Adit, Softs Dump and Topsoil Dump. This suggests preferential flow path structures in these areas.
 - No evidence of dolerite dykes or contact zones could be identified at the Proposed Hards Dump, Proposed Limestone Silo and Proposed PCD's. Hence, the area is likely to void of these preferential flow path structures. Groundwater movement is therefore expected to be via the bulk aquifer rock, in connected fractures or intergranular sedimentary occurrences.

Refer to Section 12.7 for an assessment of the potential impacts and proposed mitigation measures.

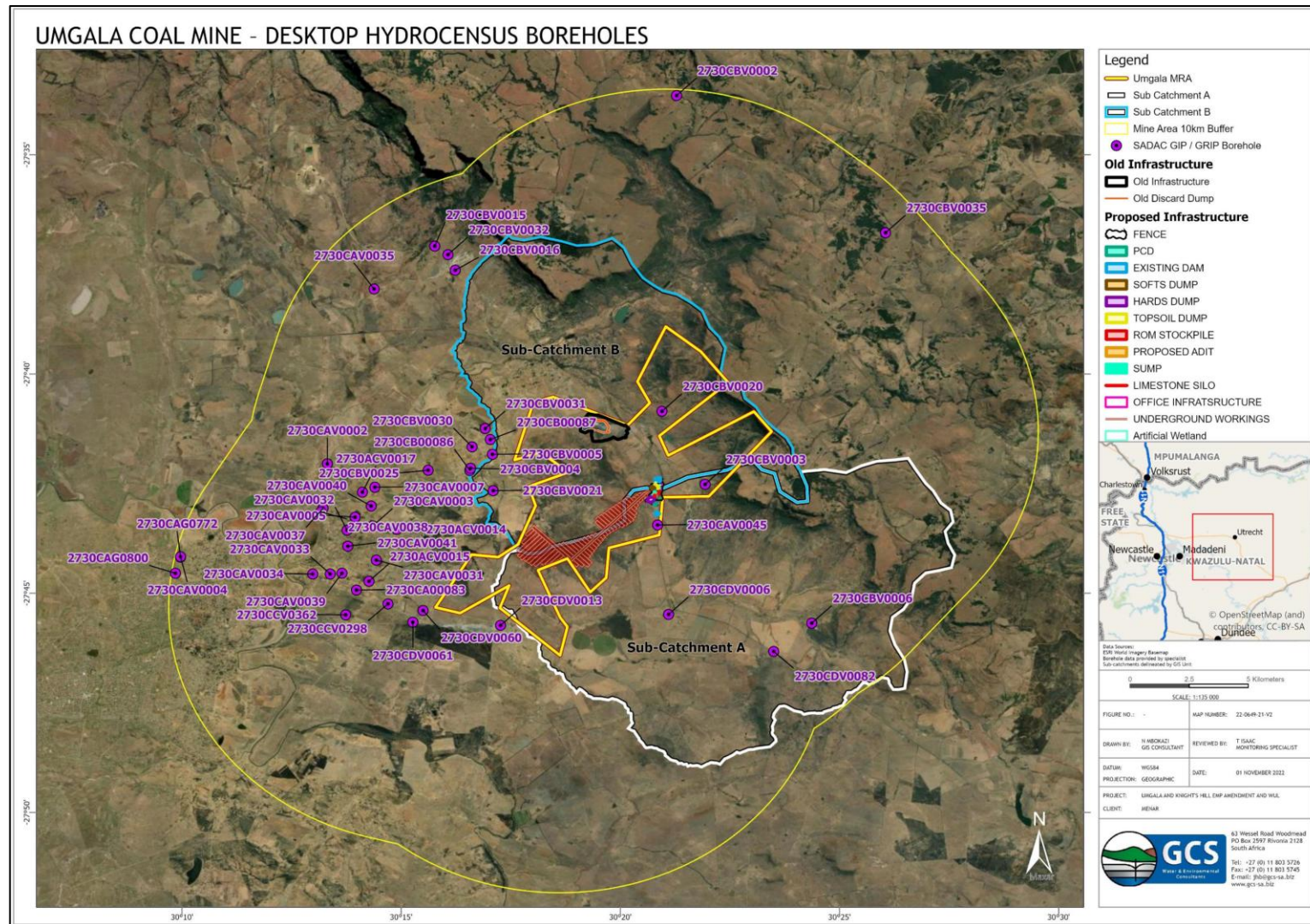


Figure 43: Desktop hydrocensus boreholes in the project area

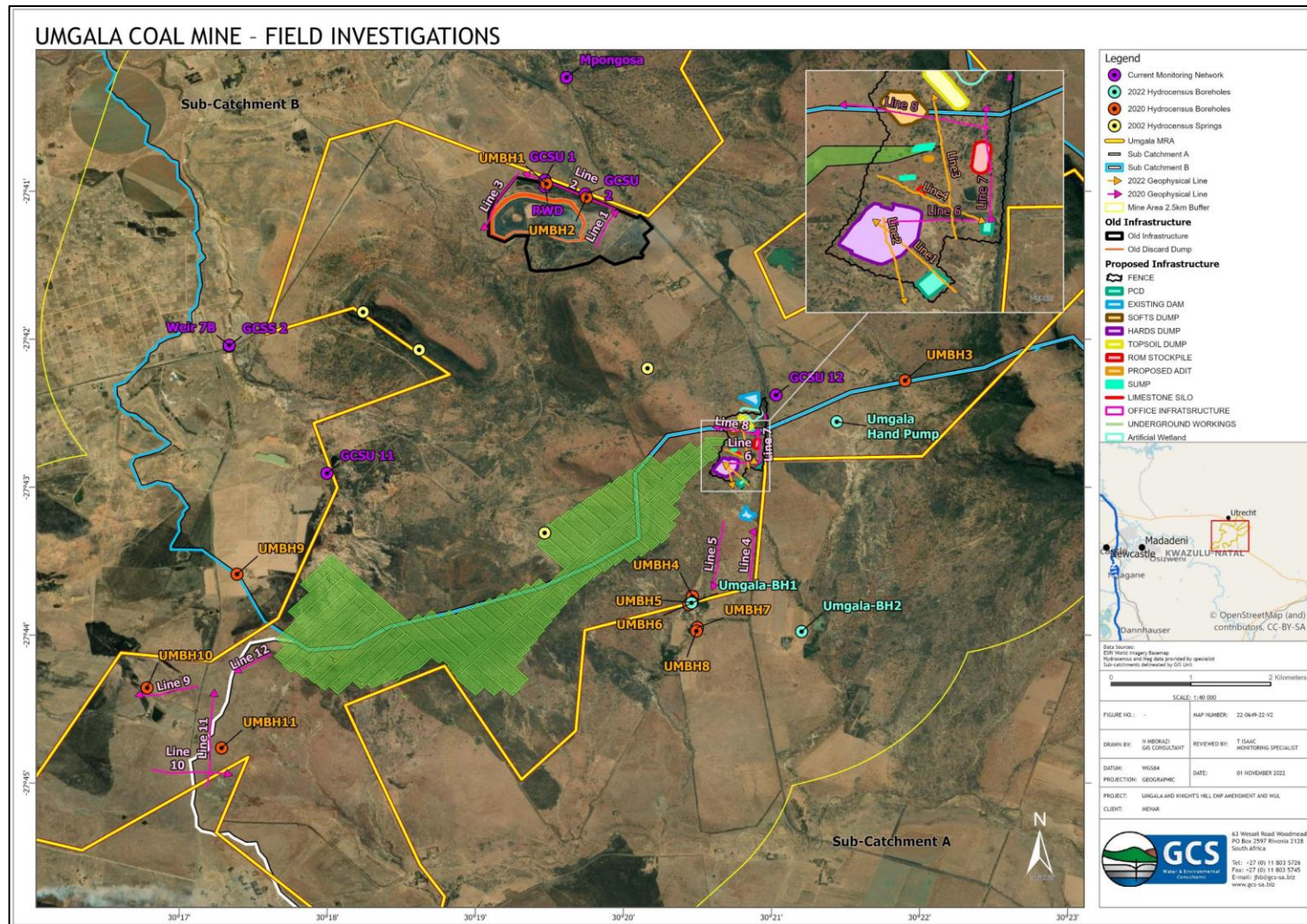


Figure 44: Field investigations in the project area

10.1.11. Biodiversity

The information provided in this section was extracted from the biodiversity impact assessment undertaken by Bathusi Environmental Consultants (BECs) in 2025. The full report is attached as Appendix IV. It should be noted that "Study Site 1" or "Site 1" referred to in this section and the terrestrial biodiversity report, refers to Umgala 2 as referred to in Section 10 (i.e. the southern section of Umgala associated with the Project). Subsequently, "Study Site 2" or "Site 2" refers to Umgala 1 (northern section of Umgala).

10.1.11.1. Data collection and seasonality

The site and surrounding area were investigated by means of a randomised (non-timed) meander surveys during 29th November to 4th December 2020 (BEC), 7th to 10th November 2022 (BEC), as well as 10th to 14th May 2025 (Cossypha).

Site inspections were generally conducted the austral summer season, which is considered optimal for the collection of detailed biological information.

10.1.11.2. Terrestrial Biodiversity Theme

10.1.11.2.1. KZN Systematic Biodiversity Conservation Plan (KZNSCP, 2012)

According to the KZN BSP (2016) (refer to Figure 45) the northern corner of Site 1 and a small section in the northern part of Site 2 falls within an area classified as CBA: Optimal. It is evident from the former KZN Terrestrial Systematic Conservation Plan spatial coverage (EKZNW, 2011) that the CBA status assigned to these areas is vegetation driven due to potential presence of Glencoe Moist Grassland and Income Sandy Grassland ecological types. However, results of the assessment found that, for Site 2, the habitat is not particularly representative of the Northern KwaZulu-Natal Moist Grassland. Furthermore, considering the level of anthropogenic transformation (mining activities) and loss of integrity, the possibility exists that the conservation status of these parts should in reality be lower than indicated.

Other species driving the classification include the plant species *Kniphofia galpinii*, the *Mollusca: Cochlitoma simplex*; and *Spirostreptida: Doratogonus minor*. According to the Amajuba District

Municipality Biodiversity Sector Plan (EKZNW, 2014) extractive industry (mining) is generally not permitted within PAs and CBAs.



Figure 45: Critical Biodiversity Areas in the study area and surrounds according to the KZN Biodiversity Sector Plan (2016)

10.1.11.2.2. National Threatened Ecosystems

The *National Environmental Management Biodiversity Act (Act 10 of 2004)* (NEMBA) provides for listing of threatened or protected ecosystems, in one of four categories, namely Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or protected. The list of nationally threatened terrestrial ecosystems in South Africa was gazetted in December 2011 (*NEMBA: National List of ecosystems that are threatened and in need of protection, G34809, GN 1002*), with the aim of reducing the rate of ecosystem and species extinction by preventing further degradation and loss of structure, function and composition.

A review of the revised Red List of Ecosystems (RLE) for the terrestrial realm for South Africa (Original extent, SANBI 2021), indicates that the regional ecology comprises the Northern KwaZulu-Natal Moist Grassland¹¹ (Gs4) (VU) and the Income Sandy Grassland¹² (Gs7) (EN) (refer to Figure 46).

Figure 47 illustrates the loss of habitat according to the Red List of Ecosystems (RLE) for terrestrial realm for South Africa (Remnants, SANBI 2021), indicating that significant losses of habitat has been registered on a local and regional scale.

Income Sandy Grasslands:

The Income Sandy Grassland comprises an original extent of approximately 4,654 km², of which only 49 % remains untransformed. It is spatially situated in a triangle between Newcastle, Vryheid and Dundee and another larger portion in the Wasbank area in northern KwaZulu-Natal. It comprises very flat, extensive areas with generally shallow, poorly drained, sandy soils where low, tussock-dominated sourveld is supported in the form of a mosaic with wooded grasslands (with *Vachellia sieberiana* var. *woodii*) and on well-drained sites with the trees *V. karroo*, *V. nilotica*, *Senegalia caffra* and *Diospyros lycioides*. *V. sieberiana* var. *woodii* often form sparse woodlands on disturbed sites. The grass species *Aristida congesta*, *Cynodon dactylon* and *Microchloa caffra* commonly occur on shallow soils.

This ecosystem has experienced a loss in natural habitat of approximately 350 km² in the recent past; these declines have been primarily driven by agriculture and croplands, covering approximately 899 km², as well as old fields that cover 945 km² of the ecosystem. Urban development impacted approximately 400 km² of the ecosystem. Additionally, erosion is a serious problem in this ecosystem (Mucina et al. 2006).

Northern KZN Moist Grasslands

This unit cover an approximate area of 7,441 km², of which only 57 % remains untransformed. It comprises the northern and northwestern regions of the KwaZulu-Natal Province, where it forms a discontinuous rim around the upper Thukela Basin, situated almost entirely within the catchment of the Thukela River. It lies between the drier KwaZulu-Natal Highland Thornveld and the moist upland vegetation of mainly Low Escarpment Moist Grassland to the north and Drakensberg Foothill Moist Grassland to the west. The most extensive areas are in the vicinity of Winterton, Bergville, Fort Mistake, Dannhauser, Dundee, north of Ladysmith and west of Newcastle. At higher altitudes this unit is usually surrounded by Low Escarpment Moist Grassland in the north and Drakensberg Foothill Moist Grassland in the west and south. At lower altitudes KwaZulu-Natal Highland Thornveld and Thukela Thornveld usually occur to the east. It is recognised as hilly and rolling landscapes that support tall tussock grassland usually dominated by *Themeda triandra* and *Hyparrhenia hirta*. Open *Vachellia sieberiana* var. *woodii* savannoid woodlands encroach up the valleys, usually on disturbed (strongly eroded) sites. This ecosystem is threatened by a broad range of pressures. Agriculture is a key pressure on this ecosystem type with 1323 km² of the ecosystem consisting of croplands and a further 1,034 km² of old fields. Dam construction represents a secondary pressure, with 131 km² of the ecosystem transformed by artificial water bodies, while plantations cover 217 km² of this unit. Additionally, the ecosystem is degraded due to alien invasions by *Acacia dealbata*, *Rubus*, *Eucalyptus* and *Populus*, as well as affected by bush encroachment and erosion (Mucina et al. 2006)

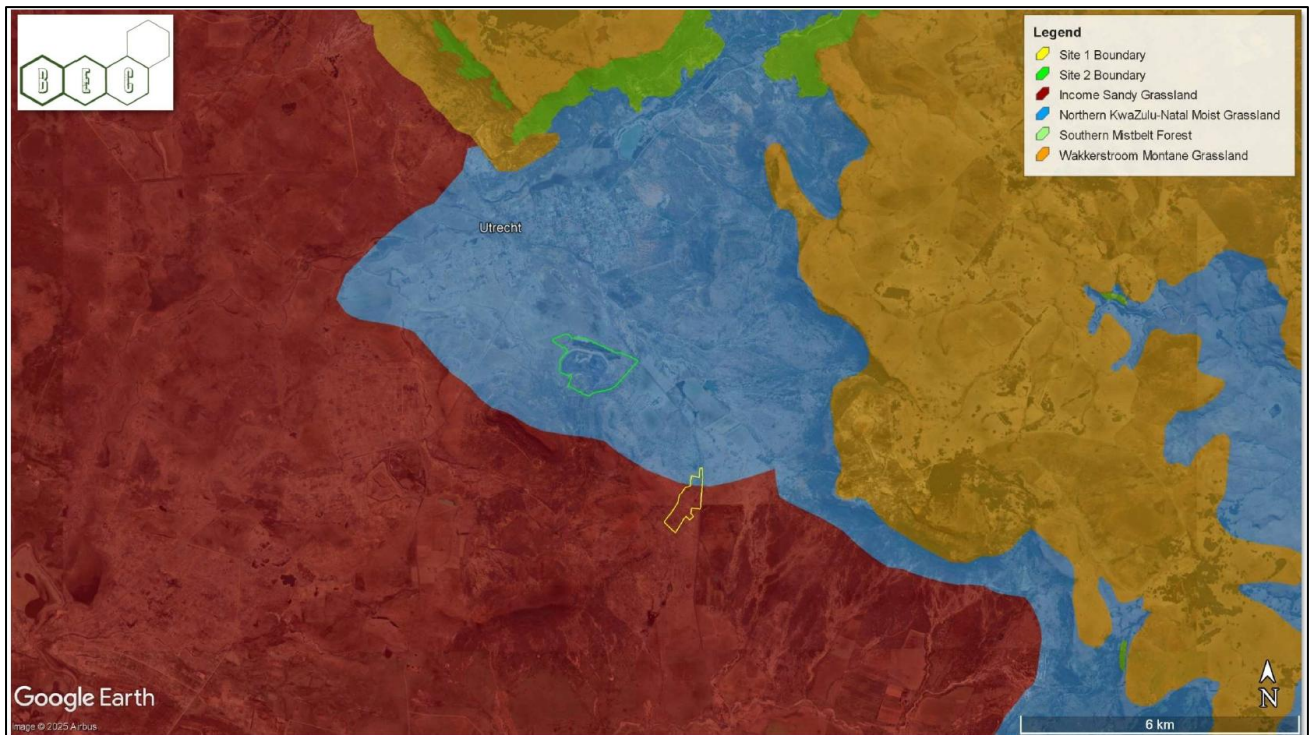


Figure 46: Spatial placement of the study area in relation to the original extent of Vegmap ecosystems (Vegmap, SANBI 2021)



Figure 47: Spatial placement of the study areas in relation to the remaining extent of Vegmap ecosystems (SANBI, RLE 2021)

10.1.11.2.3. Site Ecological Importance of the Terrestrial Biodiversity Theme

The “Site Ecological Importance” (SEI) (refer Table 26) pertaining to the Terrestrial Biodiversity Theme is derived through the analysis as prescribed by the “Guidelines for the implementation Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa” (SANBI, 2022) (refer Appendix 5, specifically in relation to the proposed project areas, i.e., Site 1 and Site 2. Broad-scale habitat types, as determined from the botanical assessments are used to assess the SEI according to the Terrestrial Biodiversity Theme criteria, illustrated in Figure 48 (Site 1) and Figure 49 (Site 2).

Table 26: SEI of broadscale habitat types according to the terrestrial biodiversity theme

Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
Artificial Impoundments	Low - although range restricted, the nature is artificial and does not exhibit any specific conservation importance on a local or regional scale.	Low - habitat is artificial, although providing some ecological functionality, i.e., farm dams. Occurring as embedded and isolated, small parts of landscape.	High - habitat is likely to attain present status within relative short period.	Very Low
	Biodiversity Importance (BI) = Low			
<i>Digitaria eriantha</i> deteriorated grassland plains	Medium - because of some deterioration and species changes, a moderate correlation to the Vulnerable regional ecological type is noted. Also, minor wet areas noted that contribute to habitat diversity.	Medium - habitat is somewhat deteriorated because of persistent grazing, some species changes are noted. Moderate to high connectivity on a local scale.	Medium - habitat is likely to recover relatively slow, but because of existing impacts, are not likely to attain a pristine status that correlates entirely to regional types	Medium
	Biodiversity Importance (BI) = Medium			
Erosion gulleys	Low - although somewhat range restricted, the occurrence of this specific habitat types across the landscape is noted. Not particularly representative of the regional ecological types.	Low - habitat is severely disturbed with low levels of ecological functionality. Occurring as embedded, although comparatively extensive parts of landscape.	Very High - habitat is likely to attain present status within relative short period, <5 years. However, the progressive nature of deterioration (erosion) will prevent recovery to original status.	Very Low
	Biodiversity Importance (BI) = Low			
Stands of exotics	Very Low - severely altered because of the infestation by exotic trees	Low - habitat is artificial, although providing some ecological functionality. Occurring as embedded and isolated, small parts of landscape.	Very High - habitat is likely to attain present status within relative short period, <5 years. However, the nature of exotic species dominance will prevent recovery to original status.	Very Low
	Biodiversity Importance (BI) = Very Low			
Transformed areas (mining, infrastructures, roads, quarries)	Very Low - no natural habitat remaining.	Very Low - habitat is entirely transformed, with no apparent ecological functionality.	Very High - habitat is likely to attain present status within relative short period, <5 years. The nature of transformed habitat will prevent recovery to original status.	Very Low
	Biodiversity Importance (BI) = Very Low			

Table 1: SEI of broad-scale habitat types according to the Terrestrial Biodiversity Theme				
Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
<i>Vachellia karoo</i> deteriorated closed woodland	Medium - despite some deterioration, a high incidence of 'natural' species and moderate correlation to the Vulnerable ecological type. Also, somewhat restricted on a regional scale as it correlates to mountainous areas. Also, moderate correlation to CBA habitat types.	High - Natural woodland with moderate to low deterioration levels, high connectivity on a local and landscape level, particularly with other high sensitivity areas.	Medium - impacts will likely result in slow recovery to original status, i.e., 10-15 years and also considering significant input and mitigation	Medium
	Biodiversity Importance (BI) = Medium			
<i>Vachellia sieberiana</i> sparse woodland plains	High - moderate to low deterioration levels are noted, with a moderate correlation to the Vulnerable and Endangered ecological types. Also, moderate correlation to CBA habitat types.	High - Natural woodland with moderate to low deterioration levels, high connectivity on a local and landscape level, particularly with other high sensitivity areas.	Medium - impacts will likely result in slow recovery to original status, i.e., 10-15 years and considering significant input and mitigation	High (Site 1)
	Biodiversity Importance (BI) = High			Low (Site 2) adjusted downward to allow for high level of deterioration and isolation

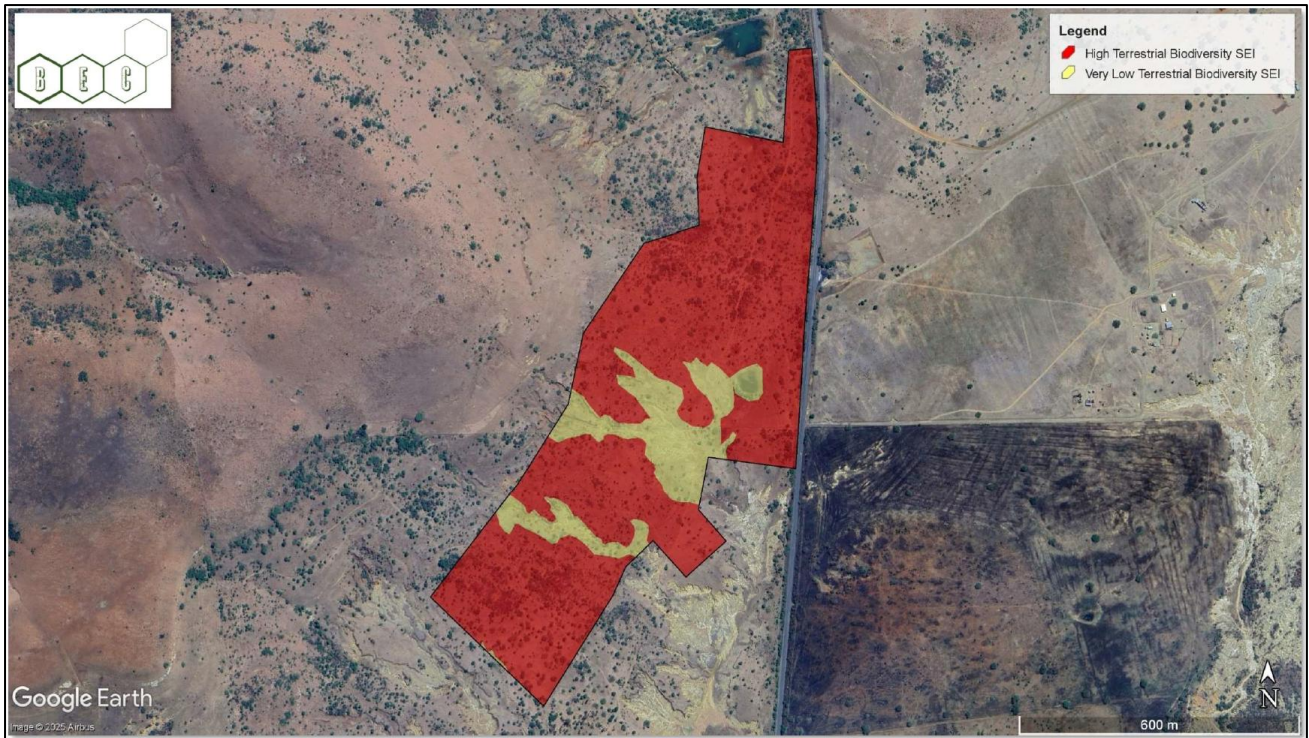


Figure 48: Site Ecological Importance sensitivities according to the Terrestrial Biodiversity Theme for Site 1



Figure 49: Site Ecological Importance sensitivities according to the Terrestrial Biodiversity Theme for Site 2

10.1.11.2.4. Protected areas

According to the South African Protected Areas Database (SAPAD 2024 Quarter 4; DFFE, 2024a), the South African Conservation Areas Database (SACAD 2024 Quarter 4; DFFE, 2024b), and Protected Areas in KwaZulu- Natal (managed by Ezemvelo KZN Wildlife), a few formally protected areas occur in and around the study area (refer to Figure 53). The proximity of these declared conservation areas are significant considerations in the suitability of the areas for, particularly, mining development and activities.

Private nature reserves account for approximately 37.8 % of the eMadlangeni LM, while 4.2 % represent community conservation areas and 5.2 % is ‘stewardship areas’ (eMadlangeni Municipality Draft IDP, 2020). Formal Protected Areas that are spatially situated in proximity to the study area include the following:

- Vryheid Mountain Nature Reserve (44km east)
- Pongola Bush Nature Reserve (42km northeast)
- Chelmsford Nature Reserve (47km southwest); and
- Paardeplaats Nature Reserve (47km northeast).

These areas are unlikely to be affected by the proposed development as it is situated significant distance from the proposed activity.

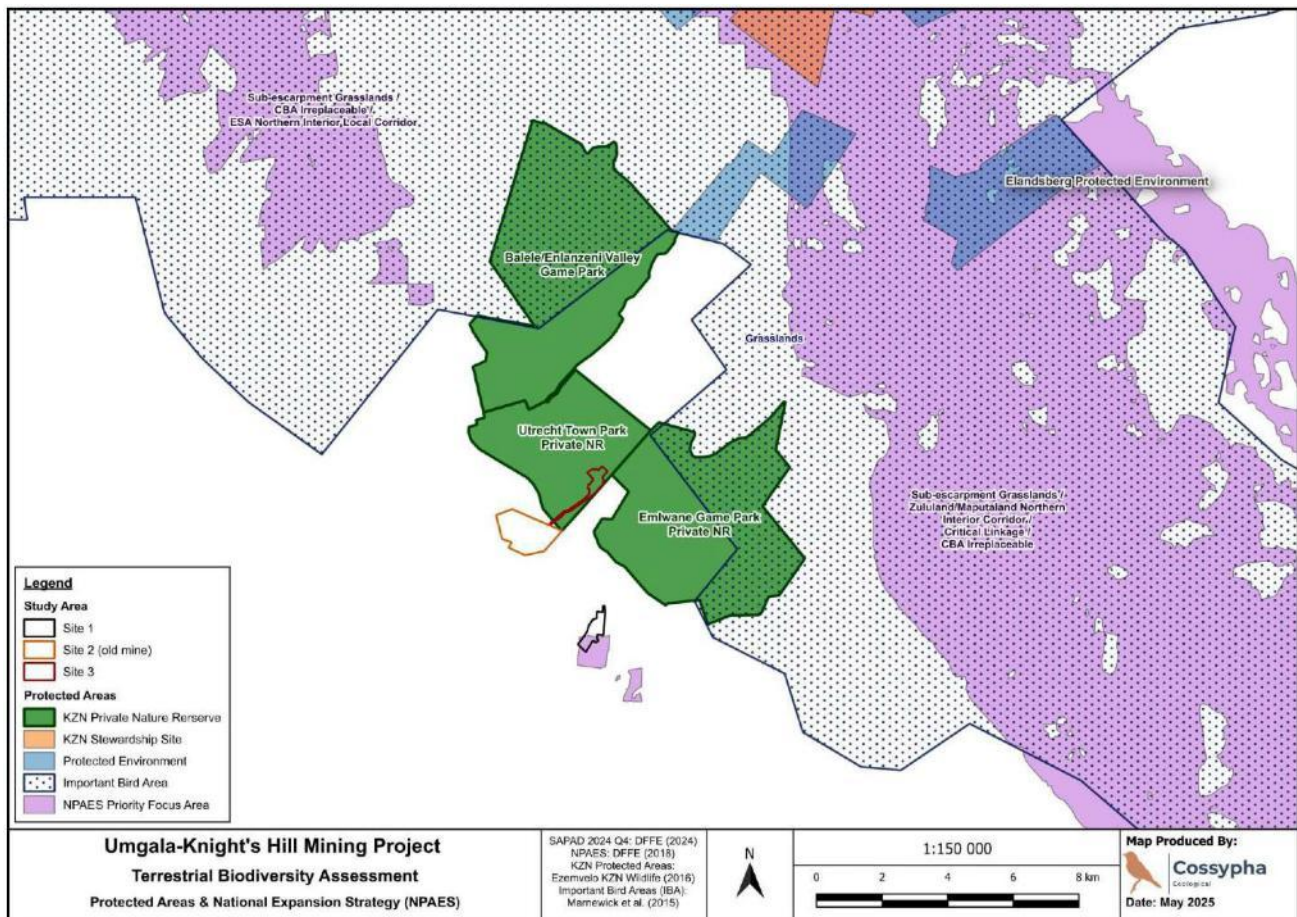


Figure 50: The study area in relation to National and KZN Protected Areas and National Protected Area Expansion Strategy (NPAES)

10.1.11.2.5. KZN Biodiversity Sector Plan

Systematic biodiversity planning is a scientific method for identifying geographic areas of biodiversity importance. It involves the mapping of biodiversity features such as ecosystems, species, and spatial components of ecological processes (such as corridors), as well as mapping a range of information related to these biodiversity features and their ecological condition. The results aim to set quantitative targets for biodiversity features and develop maps that show spatial biodiversity priorities. The configuration of priority areas is designed to meet biodiversity targets in the smallest area possible and to avoid conflict with other land and water resource uses where possible (Skowno et al., 2019). A Provincial Conservation Plan aims to build on national plans at the provincial level. It is intended to be used by all who are involved in land-use and development planning, most particularly those specialists who need a comprehensive source of biodiversity information. EKZNW developed the KwaZulu-Natal Systematic Conservation Plan (KZNSCP; Jewitt, 2011), which was subsequently replaced by the KwaZulu-Natal Biodiversity Sector Plan (KZN BSP) to guide the long-term conservation of biodiversity in the province (Escott et al., 2016). The Plan includes a GIS layer that lists land areas containing high biodiversity using irreplaceability measures. An irreplaceability measure quantifies the contribution of a particular site to achieve representation biodiversity targets (Ferrier et al., 2000).

According to the KZN BSP (2016), the northern corner of Site 1 and a small section in the northern part of Site 2 falls within an area classified as CBA: Optimal (see Figure 51). It is evident from the former KZN Terrestrial Systematic Conservation Plan spatial coverage (EKZNW, 2011) that the CBA status assigned to these areas is vegetation driven due to potential presence of Glencoe Moist Grassland and Income Sandy Grassland. Other species driving the classification include Plant: *Kniphofia galpinii*; Mollusca: *Cochlitoma simplex*; and *Spirostreptida*: *Doratogonus minor*.

10.1.11.3. Plant species theme

10.1.11.3.1 Habitat types

It should be noted that habitat types described in this report are based on species composition, physiognomic attributes and ecosystem attributes that include topography, edaphic conditions and moisture gradients. The following broad-scale habitat types were recognised from the study areas (refer to Figure 51 and Figure 52):

- Artificial Impoundments;
- *Digitaria eriantha* deteriorated grassland plains;
- Erosion gulleys;
- Stands of exotics;
- Transformed areas (mining, infrastructures, roads, quarries);
- *Vachellia karoo* deteriorated closed woodland; and
Vachellia sieberiana sparse woodland plains

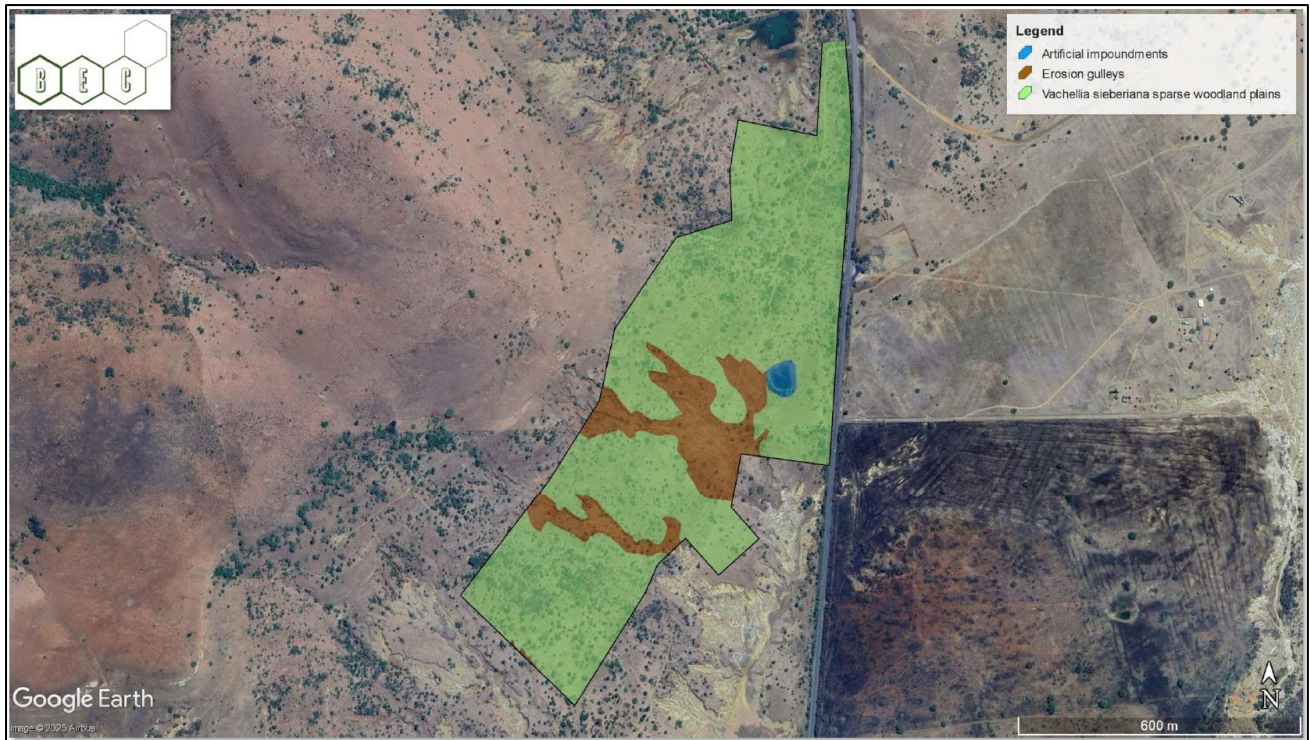


Figure 51: Broad-scale habitat types of Site 1 (Umgala 2 – Southern Section)

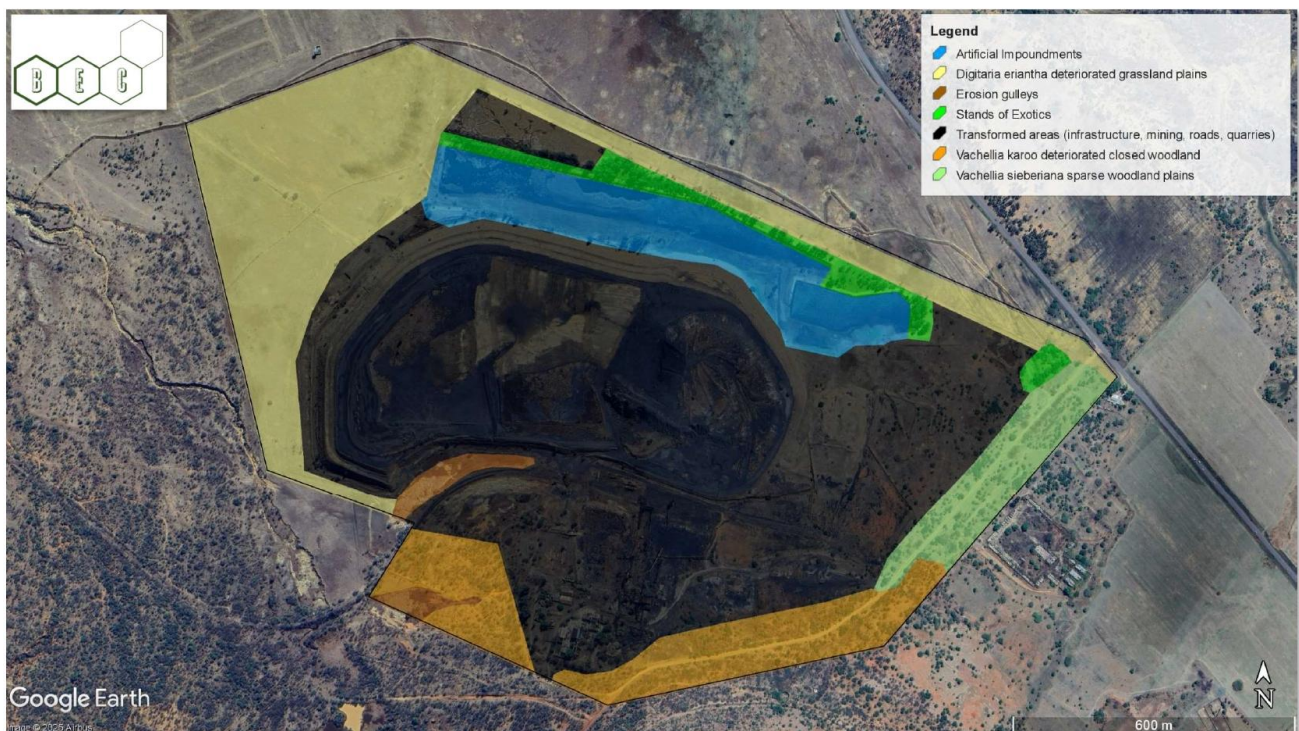


Figure 52: Broad-scale habitat types of Site 2 (Umgala 1 – Northern Section)

10.1.11.3.2. Site ecological importance of the plant species theme

The "Site Ecological Importance" (SEI) (refer Table 27) pertaining to the Plant Species Theme is derived through the analysis as prescribed by the "Guidelines for the implementation Terrestrial Fauna and

Terrestrial Flora Species Protocols for environmental impact assessments in South Africa" (SANBI, 2022) (refer Appendix 5, specifically in relation to the proposed project (including the project footprint and project related activities).

Table 27: SEI of the broad scale habitat types according to the Plant Species Theme

Table 7: SEI of the broad-scale habitat types according to the Plant Species Theme				
Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
Artificial Impoundments	Low - No plant SCC recorded or highly likely to occur, poor species diversity. Low conservation potential. Embedded in threatened ecological types.	Low - Although artificial it is larger than 1ha and represents a wetland type with some integrity and functionality, i.e., farm dams.	Medium - Because of artificial nature habitat is likely to attain present status within relative short period.	Low
	Biodiversity Importance (BI) = Low			
<i>Digitaria eriantha</i> deteriorated grassland plains	Medium - Ecosystems or habitats with medium to high species richness. Although no confirmed or highly likely populations of SCC, the presence of provincially protected species cannot be discounted. Moderate conservation potential. Represents a VU ecological type.	Medium - Habitat exhibit some disturbances from intensive grazing practices and are representative of vegetation communities in secondary successional stages with some degree of connectivity with other ecological systems. Moderate ecological integrity.	High - Habitat that can recover relatively quickly ($\approx$ 5-10 years) to restore > 70% of the original species composition and functionality of the receptor functionality, although with considerable input and effort as it exhibits moderate correlation to regional type.	Low
	Biodiversity Importance (BI) = Medium			
Erosion gulleys	Low - Ecosystems or habitats with low species richness and no confirmed or highly likely populations of SCC and/or range-restricted species. Limited conservation potential.	High - Although habitat is disturbed, it does exhibit ecological connectivity and functionality. Poor species diversity but does contribute to regional habitat diversity.	High - Although habitat is already degraded it represents a natural occurrence on a regional scale, also comprising extensive portions on a local and regional scale. Likely to attain present status within relative short period, <5 years. However, the progressive nature of deterioration (erosion) will prevent recovery to original (grassland) status.	Low
	Biodiversity Importance (BI) = Medium			
Stands of exotics	Very Low - Areas with little or no conservation potential and species poor. Habitat not likely to support SCC or regionally protected plants.	Very Low - Areas with poor connectivity and functionality on a local and regional scale. A modified type.	Very High - Artificial habitat type.	Very Low
	Biodiversity Importance (BI) = Very Low			

Table 7: SEI of the broad-scale habitat types according to the Plant Species Theme				
Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
Transformed areas (mining, infrastructures, roads, quarries)	Very Low - no natural habitat remaining. Habitat will not support and plant taxa or community of SCC species.	Very Low - Habitat is entirely transformed and degraded and does not contribute to local or regional functionality.	Very High - Artificial habitat type.	Very Low
	Biodiversity Importance (BI) = Very Low			
<i>Vachellia karoo</i> deteriorated closed woodland	Medium - Habitat with medium species richness. Although no confirmed or highly likely populations of SCC, the presence of provincially protected and range-restricted species cannot be discounted.	Medium - Habitat with moderate level of disturbance and moderately representative of natural habitat, although with moderate to high connectivity and high ecological functionality.	High - Habitat that can recover relatively quickly ($\approx$ 5-10 years) to restore > 70% of the original species composition and functionality of the receptor functionality.	Low
	Biodiversity Importance (BI) = Medium			
<i>Vachellia sieberiana</i> sparse woodland plains	High - Ecosystems or habitats with moderate to high species richness. Although no confirmed SSC, the highly likely presence of provincially protected and/or range-restricted species is noted. Moderate to high conservation importance.	High - >20 ha of Endangered ecological type. High connectivity and functionality, despite some evidence of minor disturbance.	High - Habitat that can recover relatively quickly ($\approx$ 5-10 years) to restore > 70% of the original species composition and functionality of the receptor functionality.	Medium (Site 1)
	Biodiversity Importance (BI) = High			Low (Site 2 adjusted downwards to allow for higher deterioration)

The SEI for the habitat types of the study area according to the Plant Species Theme are illustrated in Figure 53 and Figure 54.

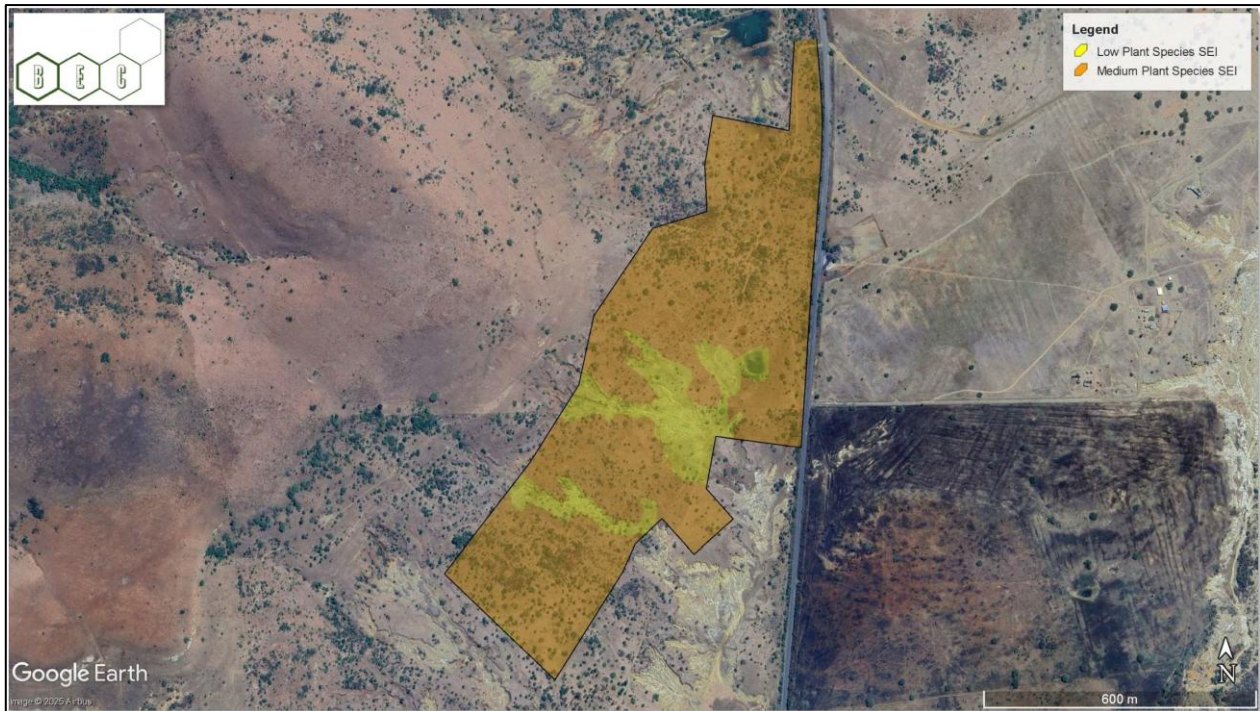


Figure 53: Site Ecological Importance sensitivities according to the Plant Species Theme for Site 1 (Umgala 2 - Southern Section)



Figure 54: Site Ecological Importance sensitivities according to the Plant Species Theme for Site 2 (Umgala 1 – Northern Section)

10.1.11.4. Animal species theme

10.1.11.4.1. Mammals

According to the presence of suitable habitat and the extant (or known) distribution ranges of mammal taxa in the study area (sensu MammalMap), the expected mammal richness on the study sites and immediate surroundings is approximately 63 species, of which only 49 species have so far been documented for the QDG squares sympatric and adjacent to the study sites. Therefore, 14 of the observed species are “new” records for the study area, which implies a comparatively poor understanding and documentation of the mammal richness on the study sites, given the higher number of species that could be anticipated.

Approximately 48 species (76 % of the expected richness) have a high probability to be present on the study sites and surroundings, of which 28 of these species (58 % of species with a high probability of occurrence) were confirmed during the surveys (refer Table 9), which include five (5) rodents, seven (7) bovid antelopes, (1) one equid (zebra), one (1) canid (jackals), two (2) herpestids (mongoose), one (1) leporid (hares and rabbits), one (1) orycteropid (aardvark), two (2) suids (pigs), two (2) hyaenids (hyaenas and aardwolf), three (3) felids (cats), one (1) mustelid (otters) and two (2) viverrids (civet) (refer to Figure 55).

Two of the confirmed species are threatened (c. Mountain Reedbuck *Redunca f. fulvorufula* - endangered and Leopard *Panthera pardus* – vulnerable), while three of the confirmed species (c. Serval *Leptailurus serval* and Brown Hyaena *Parahyaena brunnea*) are near threatened (sensu Child et al., 2016). In addition, ten (10) of the expected species have a moderate probability of occurrence (16 %), while six (6) of the expected species have a low probability of occurrence (10 %). The latter species (species with low probabilities of occurrence) either share distribution ranges peripheral to the study site or ecological information on their life histories and taxonomy are scant, thereby rendering their presence on the site as uncertain or questionable, even though suitable habitat is present.

Those taxa with the highest number of records for the area (dominant taxa - sensu MammalMap) within the study area include the Chacma Baboon (*Papio ursinus* – 291 records), Natal Multimammate Mouse (*Mastomys natalensis* – 54 records), Tete Veld Mouse (*Aethomys ineptus* – 26 records), Single-striped Grass Mouse (*Lemniscomys rosalia* – 21 records and the Greater Red Musk Shrew (*Crocidura flavescens* – 15 records).

The wider study area provides habitat for four threatened and four near threatened mammal species (refer Figure 42). Five of these species exhibit a high probability of occurrence, of which four species were positively confirmed during the surveys. The following threatened and near threatened species have been confirmed on the study sites or have a high probability of occurrence:

- Serval (*Leptailurus serval*)
- Cape Clawless Otter (*Aonyx capensis*)
- Brown Hyaena (*Parahyaena brunnea*)
- Leopard (*Panthera pardus*)
- Mountain Reedbuck (*Redunca f. fulvorufula*)

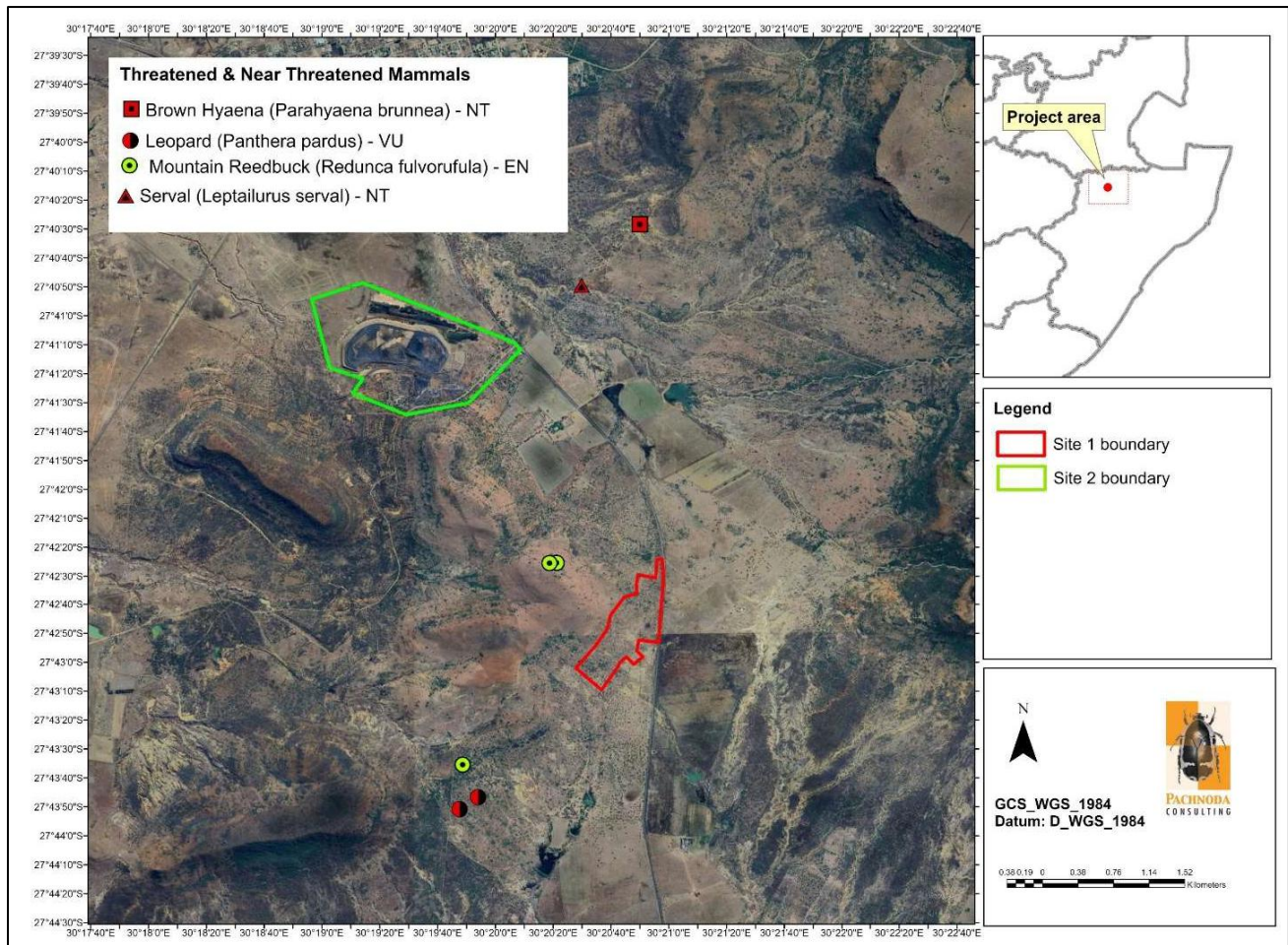


Figure 55: Satellite imagery illustrating the confirmed observations of threatened and near threatened

10.1.11.4.2. Amphibians

The amphibian richness on the study sites is considered low, with 14 frog species expected to occur. Only 10 of these are regarded to be resident (high probability of occurrence) on the study sites, of which five species were confirmed during the surveys (refer Figure 43). The various impoundments provide breeding habitat for obligate or "true" aquatic frog species such as Delalande's River Frog (*Amietia delalandii*) and also offers ephemeral foraging and breeding habitat for many widespread species such as Guttural Toad (*Sclerophrys gutturalis*), Common Caco (*Cacosternum boettgeri*), Natal Sand Frog (*Tomopterna natalensis*) and Bubbling Kassina (*Kassina senegalensis*). No frog species of conservation concern is expected to be present on the study sites.

10.1.11.4.3. Reptiles

The reptile composition on the study sites is poorly known with only 26 species currently known from 2730CB and the adjacent mapping units, of which 22 species have a high probability of occurrence. However, it is expected that the reptile richness is underestimated for the study sites (and surrounds) and could be much higher when compared to the extant richness sensu ReptileMap. The predicted richness may well be double the known richness given the topographic complexity and mountain

grassland adjacent to Site 1. reptile species of conservation concern is expected to be present on the study sites.

10.1.11.4.4. Invertebrates

An invertebrate survey with the aim of finding species of conservation concern was conducted by Peter Hawkes and his team (Afribugs) during March 2025. The following information was taken from the findings of Afribugs (all images and text are the copyright of Afribugs) as described in the reports by Cossypha (2025):

The invertebrate survey of necessity focussed on SCC rather than overall invertebrate diversity, which would be impractical to assess without a large multi-specialist team to cover all taxonomic groups and would take years to complete. It should be borne in mind that while the survey team searched for all of the target species highlighted by the screening tool and EKZNW, the potential presence of other SCC and possible undescribed species were also considered. Recognition of such non-target species—and especially undescribed species—is strongly influenced by the breadth of experience of the members of the survey team. It is therefore highly probable that additional undescribed species in taxonomic groups with which the team members are less familiar were also present but were not recognised as being of significance. The additional SCC found during the survey should thus be taken as a minimum indication of the significance of the habitats surveyed, rather than as a comprehensive assessment.

The main target species of the survey, *Clonia lalandei* (which was predicted as potentially present by the screening tool), was not observed on any of the sites surveyed, however, one SCC predicted by the EKZNW database was found, and three other non-predicted species of high significance were found. The four SCC identified were:

1. *Cochlitoma simplex* (phylum Mollusca, class Gastropoda), the Thukela Agate Snail

A large land snail belonging to the family Achatinidae. According to Herbert and Kilburn (2004) this species is endemic to the Thukela Basin, ranging from Kranskop and Mooi River northwards to Ladysmith and the Nqutu area; its distribution covers roughly 10 % of the area of KwaZulu-Natal. It inhabits riverine thicket, and bushveld as well as more open grassy savanna and during the dry season hides in the bases of grass tussocks and under fallen aloes. It is apparently patchily distributed but may be locally common where conditions are favourable. The species has not yet been assessed against IUCN Red List criteria, but it is likely that should such an assessment be undertaken, the species would be classified as Vulnerable. A single empty shell was found on the nearby Umgala-Knight's Hill north of site2, but as mollusc activity was generally very low during the surveys, this may not be an accurate indication of low density in the study area.

2. *Doratogonus praealtus* (phylum Arthropoda, subphylum Myriapoda, class Diplopoda)

The High-altitude Black Millipede, currently listed on the IUCN Red List (Rudolf et al. 2021) as Vulnerable (VU). Although conditions appeared favourable for sampling of millipedes throughout the

field survey as significant rainfall had occurred just prior to this, and more rain occurred on several occasions during the survey, it was fairly late in the season and millipede activity appeared generally low. Despite this, one specimen of *Doratogonus praealtus* was found on Site 1, and the locations of six were recorded on a hill north of Site 2 (additional specimens were seen by various member of the ecological survey team, but waypoint data was not collected in all cases). *D. praealtus* is more widely distributed than *Cochlitoma simplex*, with records from high-lying grassland and forest habitats in northern KwaZulu-Natal, Swaziland and Mpumalanga, ranging from around Vryheid in the south to near Ohrigstad in the north.

3. *Peringueyella zulu* (phylum Arthropoda, subphylum Hexapoda, Class Insecta), the Zulu Ambush Katydid

This species is currently listed by the IUCN Red List (Bazelet & Naskrecki 2014b) as Critically Endangered, Possibly Extinct (CR PE) not having been recorded since its original collection in 1922. Six specimens of this species (four females and two males) were found on Site 1, two by sweep-netting and four by visual searching, in areas with medium-long grass and scattered trees. No specimens of this species were recorded at the other site surveyed despite similar search efforts and methods, which suggests a very localised and/or patchy distribution. *P. zulu* was originally collected at the Nagana Research Station in the Umfolozi Nature Reserve and (probably) near Ntambanana in the Lower Umfolozi District, about 40 km inland from Richards Bay; both localities are probably approximately 200-300 masl; the rediscovery of the species at approximately 1,300 masl is therefore somewhat surprising.

4. *Conocephalus (Megalotheca)* sp. nov. (phylum Arthropoda, subphylum Hexapoda, Class Insecta)

This undescribed species is a katydid of the family Tettigoniidae, subfamily Conocephalinae; four specimens were found, one male and one female each at Sites 1 and from a hilly north of Site 2. It had been thought that a related species, *Conocephalus (Megalotheca) zlobini*, which is listed as VU on the IUCN Red List and the only South African species of the subgenus known from KwaZulu-Natal (the other three all being found only in the Western Cape), might be present in the area. However, although the type locality of *C. zlobini* (Cathedral Peak in the Drakensberg) is only about 180 km from Utrecht and it has also been recorded from the Free State, this species was not found during the Umgala-Knight's Hill surveys. Although of only moderate size and very cryptic in terms of both body form and colour, *Megalotheca* are readily collected by sweep-netting, a widely used entomological sampling technique that is a standard method for orthopteran surveys.

According to the Animal Species Protocol (DEFF 2020) undescribed species should be assessed as “High Sensitivity”, although this was amended (DFFE 2023) to indicate that “in the case of hyperdiverse and/or taxonomically poorly resolved invertebrate groups the designation of an undescribed species as “High Significance” should be at the discretion of the specialist, provided that sound, reasoned arguments are included”. In this case, although *Conocephalus* is a large genus, with 168 species and 15 subspecies recognised globally (Cigliano et al. 2025), the taxonomy of the group

is reasonably well-resolved, especially in the case of the subgenus *Megalotheca*, which has only nine recognised species and was recently revised (Gorachov 2009).

In addition, the conservation status of the four known South African *Megalotheca* species has recently (2014) been assessed, with two being classified as LC, one as VU and one as EN on the IUCN Red List. The distributions of the SA members of the genus have therefore been studied in some detail within the past decade and the fact that the undescribed species found on the sites has remained undiscovered to date strongly suggests that it has a limited distribution, even though it was found on one of the Sites as well as another site a few km north of Utrecht and thus may be locally fairly abundant. There is thus no justification at this stage for not treating this species as of high significance. It should be noted that all four of the species discussed above are flightless and hence have low dispersal abilities and are particularly sensitive to impacts of habitat destruction. The locations of the specimens found during the surveys of the three Umgala-Knights Hill sites are illustrated in Figure 56.

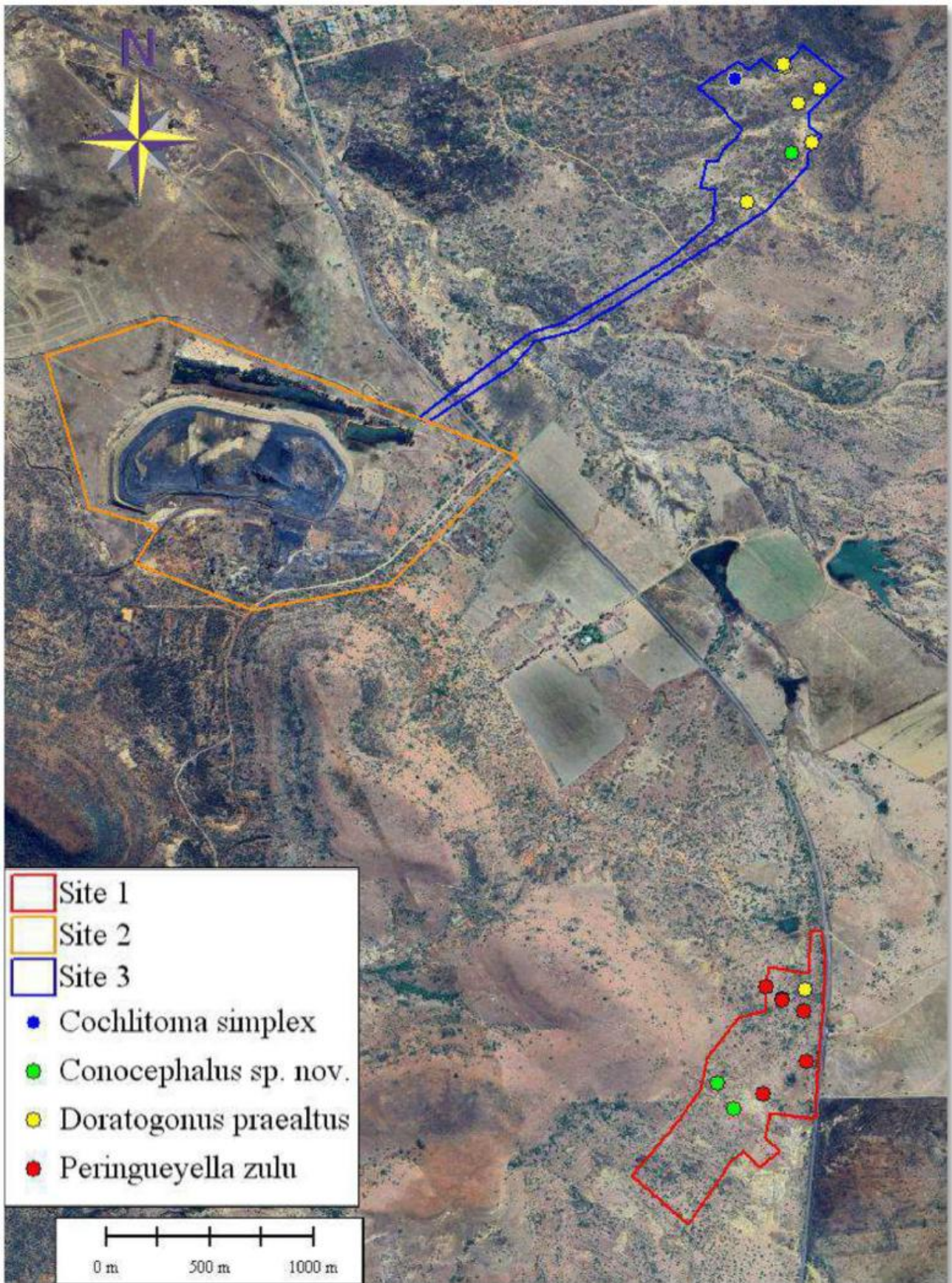


Figure 56: Locations of invertebrate SCC found during surveys of the sites in March 2025 by the Afribugs team (Cossypha, 2025)

10.1.11.5. Site Ecological Importance of the Plant Species Theme

The SEI for the habitat types of the study area according to the Animal Species Theme are summarized in Tables 18 & 19 (Site 1) and Tables 20 & 21 (Site 2). The combined bird, mammal and invertebrate SEI are illustrated in Figure 53 (Site 1) and Figure 54 (Site 2).

Table 28: SEI of the broadscale habitat types according to the bird and mammal habitat for Site 1 (Umgala 2 – Southern Section)

Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
Artificial Impoundments	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	High – ensure habitat connectivity and are important avian flyways and mammal dispersal corridors.	Low - Habitat that is unlikely to recover fully after a long period. > 15 years required to restore ≈less than 50% of the original species composition and functionality	High
	Biodiversity Importance (BI) = Medium			
<i>V. sieberiana</i> woodland	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	High - Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types. Good habitat connectivity. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.	Medium - Habitat that will recover slowly (≈more than 10 years) to restore > 70% of the original species composition and functionality of the receptor functionality	Medium
	Biodiversity Importance (BI) = Medium			
Erosion gulleys	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	High – ensure habitat connectivity and are potential avian flyways and mammal dispersal corridors.	High – habitat degraded.	Low
	Biodiversity Importance (BI) = Medium			
Transformed areas	Very Low - Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat	Very Low - Habitat is entirely transformed and degraded and does not contribute to local or regional functionality.	Very High - habitat transformed	Very Low
	Biodiversity Importance (BI) = Very Low			

Table 29: SEI of the broad-scale habitat types according to the invertebrate Habitat for Site 1 (Umgala 2 – Southern Section)

Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
<i>V. sieberiana</i> woodland – with tall and medium grassy layer	Very High – Ecosystems or habitats that provide suitable habitat for SCC. Confirmed occurrence of CR species that have a global Extent of Occurrence (EOO) of < 10 km ²	High - Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types. Good habitat connectivity. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.	Low - Species that have a low likelihood of remaining at a site when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed	Very High
	Biodiversity Importance (BI) = Very High			
Erosion gulleys with scattered tall to medium grassland	Very High – Ecosystems or habitats that provide suitable habitat for SCC. Confirmed occurrence of CR species that have a global Extent of Occurrence (EOO) of < 10 km ²	High - Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types. Good habitat connectivity. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.	Low - Species that have a low likelihood of remaining at a site when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed	Very High
	Biodiversity Importance (BI) = Very High			

Table 30: SEI of the broadscale habitat types according to the Bird and Mammal Habitat for Site 2 (Umgala 1 – Northern Section)

Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
Artificial Impoundments	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	Medium - Habitat that occurs at disturbances of medium intensity and are representative of vegetation communities in secondary successional stages with some degree of connectivity with other ecological systems	Medium - Habitat that will recover slowly (≈more than 10 years) to restore > 70% of the original species composition and functionality of the receptor functionality	Medium
	Biodiversity Importance (BI) = Medium			
<i>V. sieberiana</i> woodland and closed <i>V. karoo</i> woodland	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	Medium - Habitat that occurs at disturbances of medium intensity and are representative of vegetation communities in secondary successional stages with some degree of	High - Habitat that can recover relatively quickly (≈ 5-10 years) to restore > 70% of the original species composition and functionality of the	Low

Table 31: SEI of the broadscale habitat types according to the invertebrate Habitat for Site 2 (Umgala 1 – Northern Section)

Habitat	Criteria			Site Ecological Importance (SEI)
	Conservation Importance (CI)	Functional Integrity (FI)	Receptor Resilience (RR)	
<i>V. sieberiana</i> woodland and closed <i>V. karoo</i> woodland	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	Medium - Habitat that occurs at disturbances of medium intensity and are representative of vegetation communities in secondary successional stages with some degree of connectivity with other ecological systems	Medium - Habitat that will recover slowly (≈more than 10 years) to restore > 70% of the original species composition and functionality of the receptor functionality.	Medium
	Biodiversity Importance (BI) = Medium			
<i>Digitaria</i> deteriorated grassland	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	Medium - Habitat that occurs at disturbances of medium intensity and are representative of vegetation communities in secondary successional stages with some degree of connectivity with other ecological systems	High - Habitat that can recover relatively quickly (≈ 5-10 years) to restore > 70% of the original species composition and functionality of the receptor functionality.	Low
	Biodiversity Importance (BI) = Medium			
Erosion gulleys	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	High – ensure habitat connectivity and are potential avian flyways and mammal dispersal corridors.	High – habitat degraded.	Low
	Biodiversity Importance (BI) = Medium			
Alien tree stands	Very Low - Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat	Low - Habitat is modified and provide limited habitat for avifauna	Very High - habitat transformed	Very Low
	Biodiversity Importance (BI) = Very Low			
Transformed areas	Very Low - Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat	Very Low - Habitat is entirely transformed and degraded and does not contribute to local or regional functionality.	Very High - habitat transformed	Very Low
	Biodiversity Importance (BI) = Very Low			

		connectivity with other ecological systems	receptor functionality.	
	Biodiversity Importance (BI) = Medium			
<i>Digitaria</i> deteriorated grassland	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	Medium - Habitat that occurs at disturbances of medium intensity and are representative of vegetation communities in secondary successional stages with some degree of connectivity with other ecological systems	High - Habitat that can recover relatively quickly (≈ 5-10 years) to restore > 70% of the original species composition and functionality of the receptor functionality.	Low
	Biodiversity Importance (BI) = Medium			
Erosion gulleys	Medium – habitat with moderate species richness and no confirmed of highly likely populations SCC or range restricted species	High – ensure habitat connectivity and are potential avian flyways and mammal dispersal corridors.	High – habitat degraded.	Low
	Biodiversity Importance (BI) = Medium			
Alien tree stands	Very Low - Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat	Low - Habitat is modified and provide limited habitat for avifauna	Very High - habitat transformed	Very Low
	Biodiversity Importance (BI) = Very Low			
Transformed areas	Very Low - Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat	Very Low - Habitat is entirely transformed and degraded and does not contribute to local or regional functionality.	Very High - habitat transformed	Very Low
	Biodiversity Importance (BI) = Very Low			

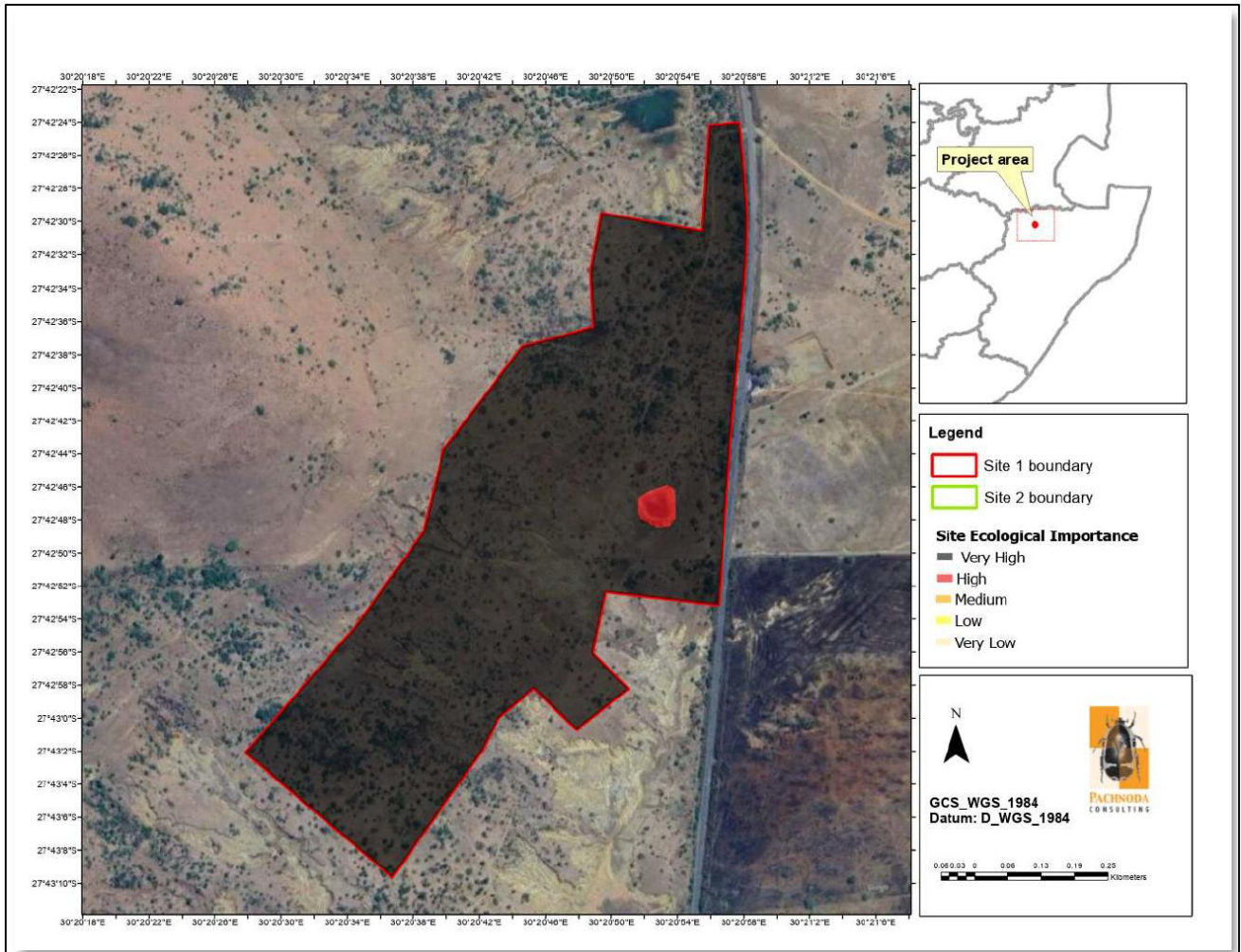


Figure 57: Site Ecological Importance sensitivities according to the Animal Species Theme for Site 1 (Umgala 2 – Southern Section)

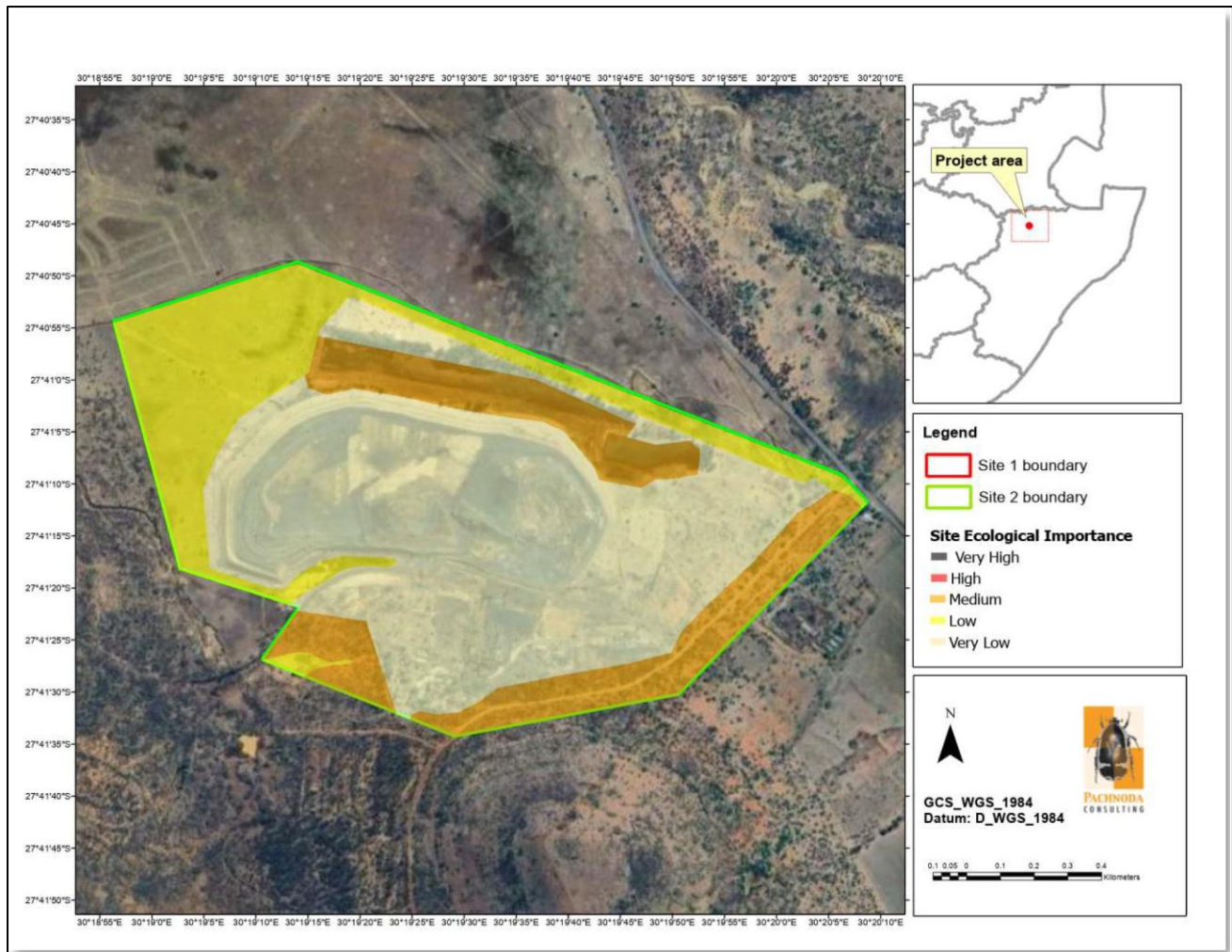


Figure 58: Site Ecological Importance sensitivities according to the Animal Species Theme for Site 2 (Umgala 1 – Northern Section)

10.1.11.6. Conclusion

This report concludes that the faunal assemblages on Site 1 (Umgala 2 – Southern Section) regarding the different habitat units are spatially autocorrected with a high overlap of similar taxa and similar functional groups occurring in these habitat types, thereby emphasising an intact "functionality". Therefore, large parts of Site 1 represent an exceedingly healthy and natural habitat, expressing intact ecological processes and functionalities, the occurrence of nearby threatened mammal and bird taxa and as well as the occurrence of threatened and undescribed invertebrate species.

It is predicted that unmitigated mining activities and mining operations at Site 1 will have negative impacts on the mammal, invertebrate and bird constituents and communities (notably species of conservation concern) on habitat with high and very high perceived ecological sensitivities and with high ecological connectivity, with the potential to disrupt the natural movement/dispersal of fauna along natural dispersal corridors and also along adjacent untransformed habitat with high topographical complexity. In addition, mining related activities will also result in the loss of habitat occupied by threatened invertebrate species, including one critically endangered katydid species. The

comprehensive implementation of the suggested mitigation approach is expected to result in amelioration of the anticipated impacts to an acceptable level, although still considered unavoidably on a local scale. In addition, habitat of very high SEI should be avoided.

The results of this study and the study of Cossypha (2025) showed that Site 1 has important biodiversity features. Should the project be approved for Site 1, detailed surveys will be necessary to determine the extent of the local population of *Peringueyella zulu* to allow the significance of potential impacts on this species to be fully evaluated. Development of Site 1 should not be allowed at present, since this is the only locality where an extant population of a critically endangered species, *Peringueyella zulu*, is known to exist, meaning a biodiversity offset potentially not at this stage feasible. Should development be allowed, impacts on Site 1 would need to be compensated for by a like-for-like offset that includes sufficient protection of this species habitat, including other SCC confirmed in the project area, to compensate for the loss of individuals and habitat within Site 1 and in adjacent areas likely to be impacted by habitat loss, dust and light pollution. Since Site 1 is largely surrounded by protected areas, impacts owing to pollution of this nature on possible populations of *P. zulu* within these reserves could be highly significant, so detection of the presence of *P. zulu* in the Balele/Enlanzeni Valley Game Park and/or Emlwane Game Park Private Nature Reserve would not be sufficient to suggest that the species would be adequately protected outside study areas. Sufficient viable populations of *P. zulu* outside of the study area which is not currently threatened by other developments should rather be sourced to effective the downgrading of the IUCN threat classification of this species before the implementation of offsetting any residual impacts. Should sufficient additional populations not be found, the confirmed presence of *P. zulu* would remain a fatal flaw (Hawkes as in Cossypha, 2025).

Similarly, the extent of the distribution and conservation status of the undescribed species of *Conocephalus* would need to be evaluated to determine the significance of potential impacts of this project on the species.

Mining-related activities on Site 2 would be supported as the area is primarily transformed by past/current mining activities, although such development on Site 1 is not supported.

Refer to an assessment of the potential impacts as well as proposed mitigation measures provided in Section 12.7 of this report.

10.1.12. Visual

A visual impact assessment was undertaken by Elemental Sustainability in 2025. The information provided in this section was extracted from the report. The full report is attached under Appendix IV.

The Project and its associated activities fall within the Category 5 development, with a **high** visual impact expected as indicated in Table 32. This translates to the proposed infrastructure potentially

having a significant effect and a noticeable change on the quality and scenic appearance of the immediate environment.

Table 32: Visual Impact Criteria

Visual impact criteria	
Very high visual impact expected:	Potentially significant effect on wilderness quality or scenic resources; Fundamental change in the visual character of the area; Establishes a major precedent for development in the area.
High visual impact expected:	Potential intrusion on protected landscapes or scenic resources; Noticeable change in visual character of the area; Establishes a new precedent for development in the area.
Moderate visual impact expected:	Potentially some effect on protected landscapes or scenic resources; Some change in the visual character of the area; Introduces new development or adds to existing development in the area
Minimal visual impact expected	Potentially low level of intrusion on landscapes or scenic resources; Limited change in the visual character of the area; Lowkey development, similar in nature to existing development
Little or no visual impact expected:	Potentially little influence on scenic resources or visual character of the area; Generally compatible with existing development in the area; Possible scope for enhancement of the area.

10.1.12.1. Landscape Scenic Quality

The scenic quality of the landscape is based on its value as a visual resource. The visual resource value of the study site is rated as **Moderate**, which is defined by a common landscape that exhibits some positive character, but which has evidence of alteration / degradation / erosion of features resulting in areas of more mixed character. The site is potentially sensitive to change in general, and change may be detrimental if inappropriately dealt with, but change may not require special or particular attention to detail.

10.1.12.2. Landscape Sensitivity

The landscape sensitivity to change criteria, indicates a landscape of **Low** sensitivity, which refers to a "Landscape of lower scenic quality, with few distinctive elements or valued characteristics and considered tolerant of a large degree of change e.g., out with any designated areas or within a degraded landscape". This is mostly attributed to the large transformation and severe degradation of the surrounding area.

10.1.12.3. Sense of Place

The concept of "sense of place" refers to the unique character, identity, and emotional or cultural attachment people develop toward a specific environment, often influenced by its visual, ecological, social, and historical qualities.

Within the context of the Project, the study area already reflects a moderately transformed sense of place, largely shaped by more than a century of mining activity in combination with agricultural land

use and rural settlement. The surrounding landscape includes cultivated fields, rural homesteads, schools, and historic settlement features, as well as existing and backfilled mining infrastructure such as discard dumps, sealed adit, and haul roads. This has resulted in a transitional character that no longer reflects a pristine rural setting, but rather a mixed-use, resource-driven landscape defined by its coal mining legacy.

Several components associated with the re-opening of the Umgala Colliery, including the new adit, processing plant (to be established on the footprint of the former plant), extension of the discard dump, pollution control dams (PCDs), pipelines, and haulage routes, will integrate with existing disturbed areas and former mining footprints. These facilities, together with the planned reclamation of the nearby Zimbutu Discard Dump, will contribute to the consolidation of the site as an operational mining complex.

The visual and functional impact of this combined infrastructure will reinforce the industrial-mining identity of the area. However, given the already altered condition of the landscape, this change is expected to be incremental rather than transformative. The most perceptible shifts in sense of place will likely be experienced by:

- Residents and farmsteads located in close proximity to the project footprint, especially where direct views toward new surface infrastructure occur;
- Road users along the R34 and P308, who may notice increased movement of vehicles, dust emissions, and visual alterations associated with the discard dump and haulage activity;
- Educational and recreational receptors, including nearby schools and Balele Game Park, where the contrast between rural/community settings and mining operations may be more strongly perceived.

Despite these localised effects, the broader regional sense of place, already defined by the coexistence of agriculture, rural settlement, and historic mining activity, is unlikely to be substantially altered. With the phased construction of new and refurbished infrastructure, the identity of the area will continue to reflect its long-standing role as a coal mining and agricultural landscape.

10.1.12.4. Visual Analysis

Several Viewpoints (VP) were identified Table 33, however, not all are sensitive receptors that will be negatively impacted. Reference points of the sensitive receptors (Viewpoints) are indicated in Figure 61. A total of 20 viewpoints (VPs) were identified within a 5 km radius of the proposed project footprint to evaluate the potential visual exposure and impact on surrounding receptors. These viewpoints were selected based on their proximity to the project site, elevation, and their representativeness of specific land use types and receptor categories.

The identified viewpoints include a range of receptor types, such as:

- Residents of surrounding rural farmsteads, smallholdings, and the town of Utrecht.

- Learners and staff at nearby schools, including Odoland Primary School, Emxhakeni Primary School, Izimbuthu Primary School, and Emalahleni Combined School.
- Road users, particularly those travelling along the R34 and P308 regional roads.
- Recreational and tourism receptors, including visitors to the Balele Recreation Resort and Game Park.

These receptor groups were considered based on their frequency of visual exposure, duration of occupancy, and sensitivity to changes in the visual landscape. Several of these receptors were assigned a **High** sensitivity rating (Table 34) due to their potential to experience direct and extended views of the proposed mining activities.

To provide a spatially representative assessment, the viewpoints were grouped by distance as follows:

- **Within 1 km of the project site** – VP4, VP7, VP8, VP10, VP11, VP15, and VP16: These represent the most sensitive and exposed receptors, with relatively direct views toward the proposed Umgala adit, processing plant, discard dump, and associated infrastructure.
- **Between 1 and 2 km** – VP1, VP3, VP9, VP12, and VP18: These receptors experience moderate visual exposure and include schools, residential clusters, and roadside viewpoints where visibility may vary depending on vegetation and local relief.
- **Between 2 and 5 km** – VP2, VP5, VP6, VP13, VP14, VP17, VP19, and VP20: These receptors are at a greater distance and therefore generally subject to lower visual exposure, although elevated rural homesteads and open landscapes with sparse vegetation may still allow for extended views of the site.

Not all viewpoints are expected to experience significant visual impacts. However, the sensitive receptors within 1 km, and those with unobstructed line-of-sight to key infrastructure (e.g., processing plant, discard dump, and haul roads), warrant careful consideration in the visual impact assessment process. The selection of these viewpoints ensures comprehensive spatial coverage and provides a realistic representation of how the proposed project may influence the visual character and landscape perception of the surrounding area.

Table 33: Viewpoints selected for representing the surrounding area

Viewpoint Number	Specific Receptor	Coordinates (In Decimal Degrees)
VP1	R34 Road Users	27°44'30.25"S; 30°20'58.14"E
VP2	Residential Farm	27°47'27.18"S; 30°21'4.22"E
VP3	Odoland Primary School	27°46'35.99"S; 30°17'2.07"E
VP4	Roads Users and Rural Residents	27°45'24.46"S; 30°17'8.35"E
VP5	Islamic College Newcastle	27°47'17.09"S; 30°15'39.70"E
VP6	Emxhakeni Primary School and Rural Residents	27°46'4.09"S; 30°13'42.72"E

Viewpoint Number	Specific Receptor	Coordinates (In Decimal Degrees)
VP7	Izimbuthu Primary School and Residents	27°42'1.53"S; 30°17'13.48"E
VP8	Residents of Utrecht	27°40'13.24"S; 30°18'40.58"E
VP9	Residents of Utrecht	27°39'46.17"S; 30°19'32.02"E
VP10	R34 Road Users	27°40'45.37"S; 30°19'46.89"E
VP11	Residents of Utrecht	27°40'12.64"S; 30°17'44.09"
VP12	P308 Road Users	27°38'57.80"S; 30°19'58.59"E
VP13	Residential Farm	27°41'38.10"S; 30°20'18.80"E
VP14	Residential Farm	27°42'14.66"S; 30°21'48.28"E
VP15	Residential Farm	27°44'1.81"S; 30°21'5.12"E
VP16	Residential Farm	27°46'34.02"S; 30°18'54.39"E
VP17	Rural Residents	27°44'42.54"S; 30°13'54.13"E
VP18	Balele Recreation Resort & Game Park	27°38'33.84"S; 30°20'16.25"E
VP19	Game Park Road Users / Tourists	27°41'11.25"S; 30°22'46.50"E
VP20	Emalahleni Combined School and Residents	27°38'56.02"S; 30°18'12.03"E

Table 34: Categorisation of Sensitive Receptors for the area

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

10.1.12.5. Visual Exposure and Viewing Distance

The visual impact of an object in the landscape diminishes at an exponential rate as the distance between the observer and the object increases (Hull and Bishop, 1988). For the Umgala operations, a 5 km Zone of Influence (ZOI) was determined to assess the visibility of proposed infrastructure. The resulting viewshed map (Figure 65) indicates that visibility of surface infrastructure diminishes with distance, although receptors located on higher-lying ridges and open slopes retain a degree of exposure.

The Digital Elevation Model (DEM) (Figure 62) and elevation profiles (Figure 59 and Figure 60) indicate that the project area is set within a stepped terraced valley at the base of Zimbutu Mountain, west of the Balelesberg range. Surface elevations range between 1,175 mamsl and 1,418 mamsl, with drainage

defined by the Dorpspruit and Sandspruit streams. The terrain gently slopes south-eastward, which contributes to visibility of infrastructure from receptors located in these directions, while the Balelesberg ridges provide intermittent topographic screening from the east.

The slope elevation map (Figure 63) also shows a moderately variable terrain with terraced valley floors (low slope zones in green) and steeper slopes around Zimbutu Mountain and the Balelesberg ridges (high slope zones in red). These elevated ridges provide partial natural screening but also create elevated vantage points with higher degrees of visual exposure. The slope aspect map (Figure 64) indicates that receptors located on east- and southeast-facing slopes are more exposed to the project footprint due to direct orientation toward the Umgala mining area. Conversely, receptors situated on opposing slopes are subject to reduced visibility due to terrain shielding. The viewshed map (Figure 65) highlights three categories of visual exposure:

- **High visibility (red zones):** Areas with clear, unobstructed views of the proposed infrastructure. These zones occur mainly to the south and southeast of the project site, including receptors such as VP1, VP15, VP16, and VP19.
- **Moderate visibility (yellow zones):** Areas with intermittent visibility influenced by elevation and slope orientation. These zones include VP3, VP9, VP11, VP12, VP18, and VP20.
- **Low visibility (green zones):** Areas unlikely to have direct views of the site, primarily in the west, northwest, and southwest sectors. Receptors such as VP5, VP6, and VP17 fall into this category.

Overall, the central valley terrain provides moderate visual absorption capacity, but receptors on elevated ridges and along major roads (R34 and P308) retain clear lines of sight. The visibility footprint of the infrastructure is categorised as **Low**, covering less than 25% of the 5 km ZOI (Table 35).

Table 35: Viewshed Evaluation Criteria

High	>50% of Zone of Influence (ZOI) is visible
Moderate	25% - 50% of Zone of Influence (ZOI) is visible
Low	>25% of Zone of Influence (ZOI) is visible

The assessment of viewing distance is based on the proximity of receptors to the proposed infrastructure footprint, including the adit, processing plant, discard dump, and associated facilities. This approach reflects the actual areas of disturbance that will generate visual impacts (Table 36):

- **Within 0–2 km (High exposure):** VP1, VP8, VP9, VP10, VP11, VP13, VP14, and VP15 represent the closest receptors to the proposed infrastructure. These include residents, farmsteads, and road users located in direct line-of-sight to surface facilities. Due to their close proximity and orientation, these receptors are expected to experience the highest levels of visual exposure.

- **Between 2 and 5 km (Moderate to low exposure):** All other viewpoints — VP2, VP3, VP4, VP5, VP6, VP7, VP12, VP16, VP17, VP18, VP19, and VP20 — are situated at greater distances from the proposed infrastructure. While distance reduces the intensity of visual impacts, some elevated receptors (e.g., VP19 and VP20) may still experience panoramic or intermittent views, particularly under clear atmospheric conditions or where vegetation cover is sparse.

Table 36: Sensitive viewing distance from the activities.

	Viewing distance sensitivity	Viewpoints
High	Viewing distance that is between 0 - 2 km of the proposed activities	VP1, VP8, VP9, VP10, VP11, VP13, VP14, VP15
Moderate	Viewing distance that is between 2 - 5 km of the proposed activities	VP2, VP3, VP4, VP5, VP6, VP7, VP12, VP16, VP17, VP18, VP19, VP20
Low	Viewing distance that is 5 km -10 km of the proposed activities	N/A

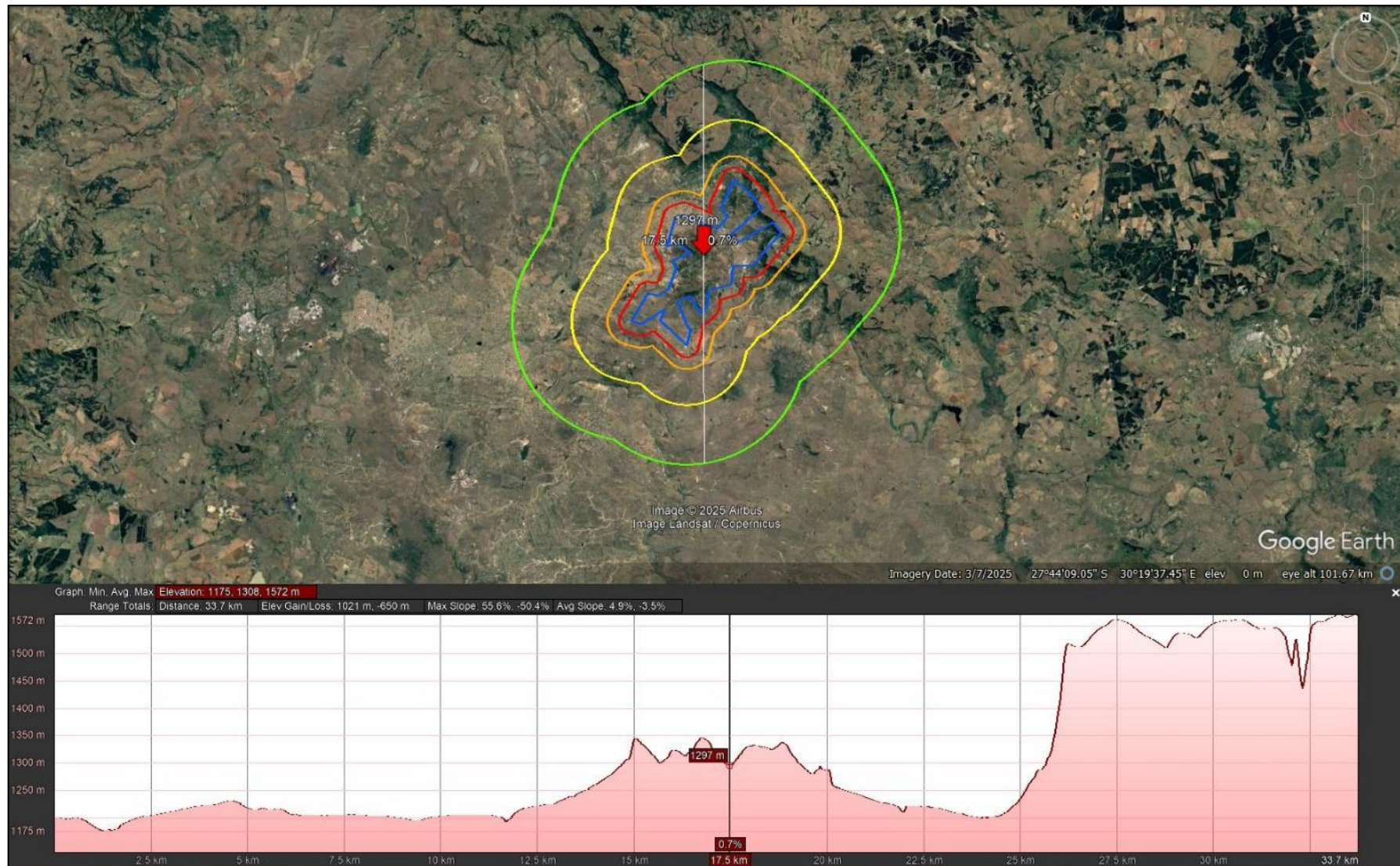


Figure 59: Elevation profile from the southern boundary to the northern boundary of the 10 km surrounding landscape (Google Earth 2025)

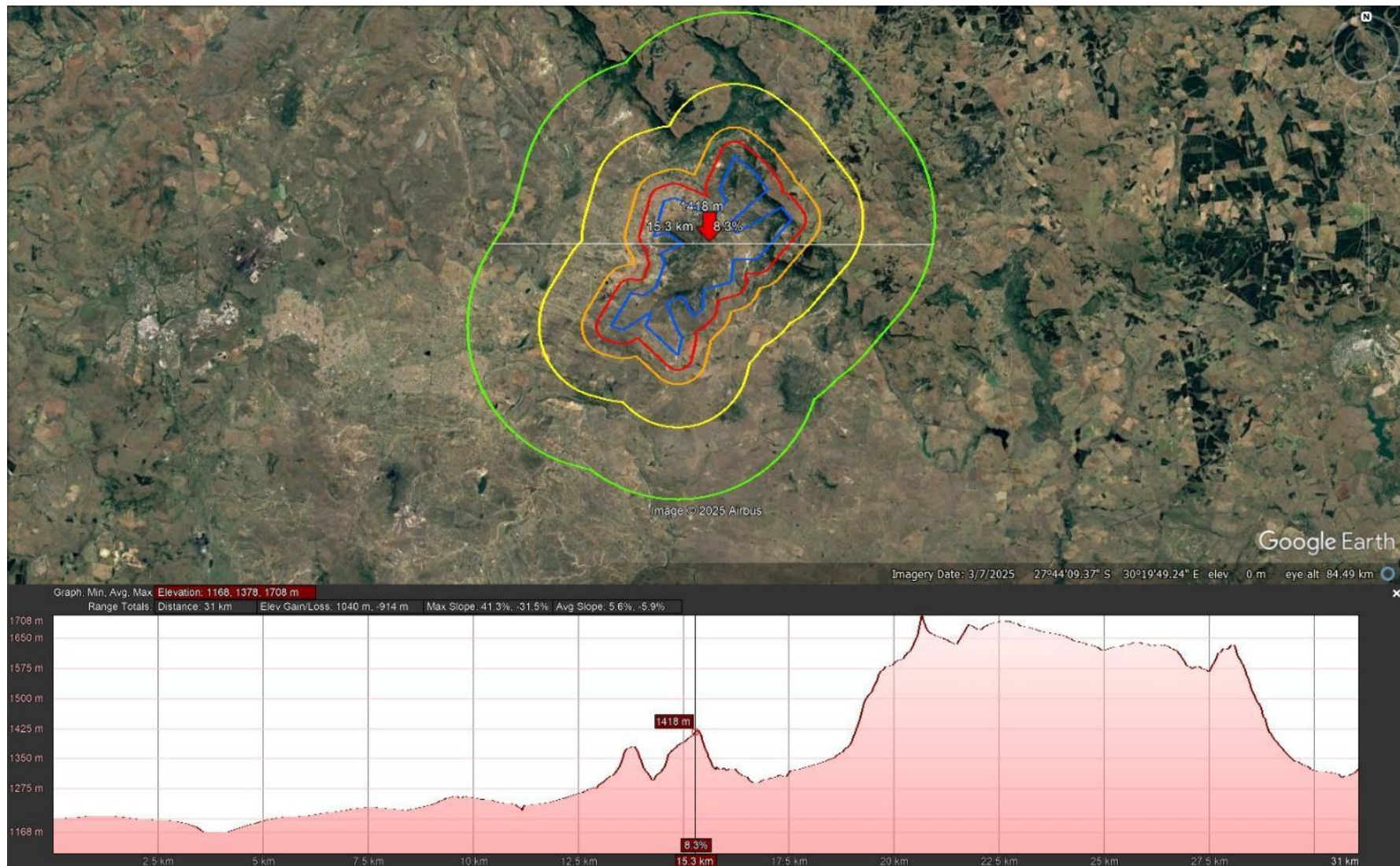


Figure 60: Elevation profile from the western boundary to the eastern boundary of the 10 km surrounding landscape (Google Earth 2025)

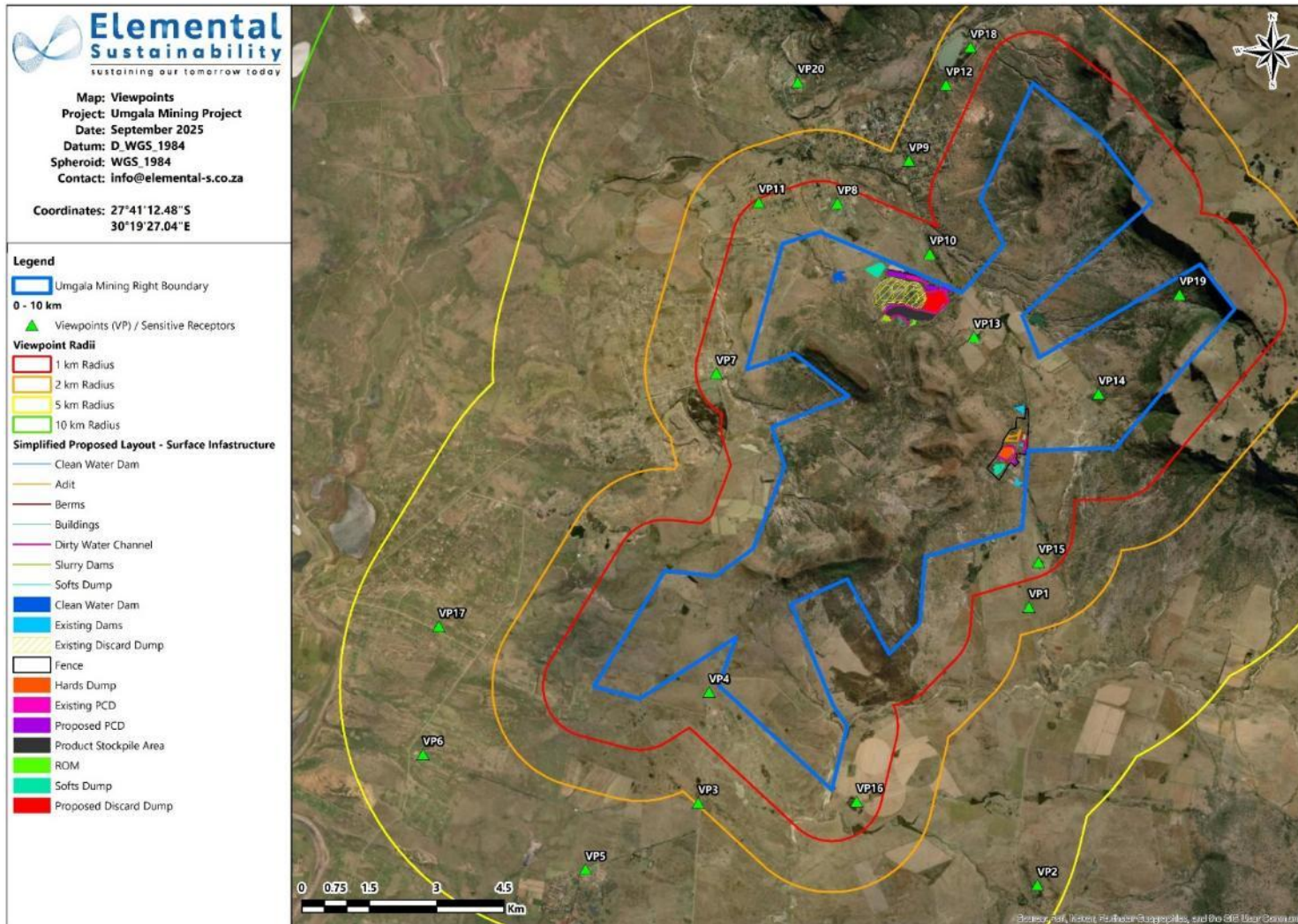


Figure 61: Surrounding Land Users and Sensitive Receptors (Viewpoints)

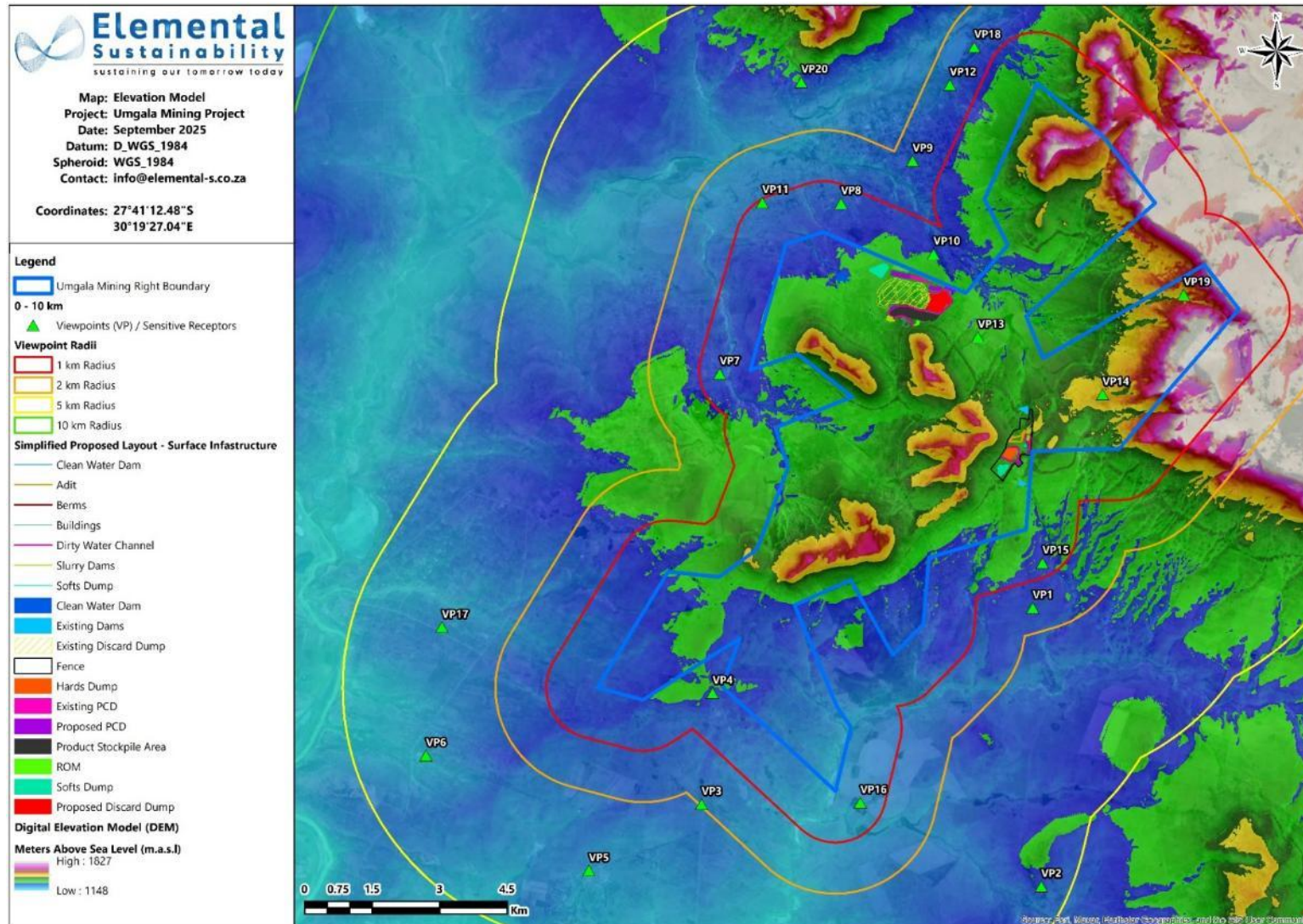


Figure 62: Digital Elevation Model (DEM) of the terrain in the 10 km surrounding area

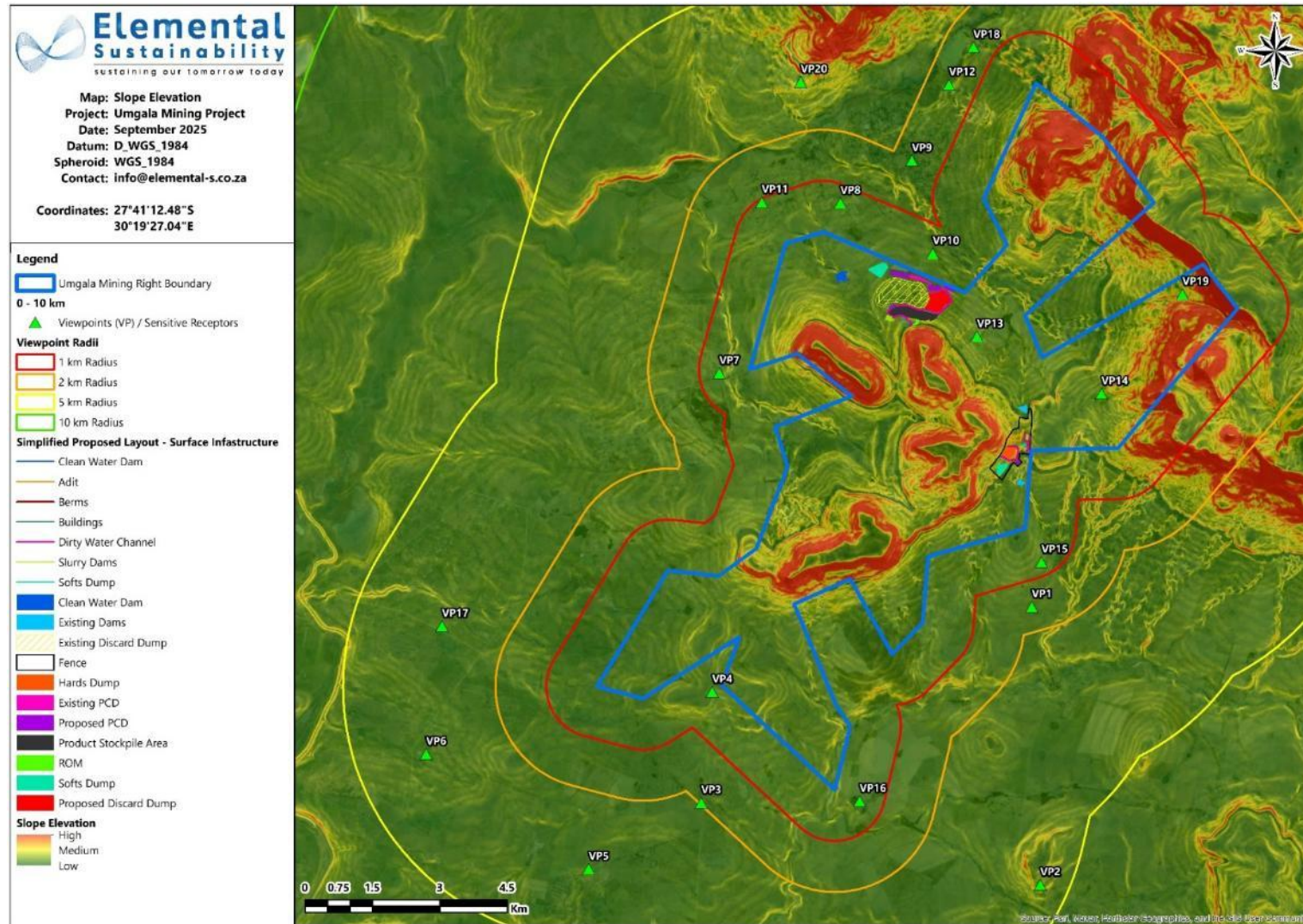


Figure 63: Slope elevation and steepness of the terrain in the 10 km surrounding area

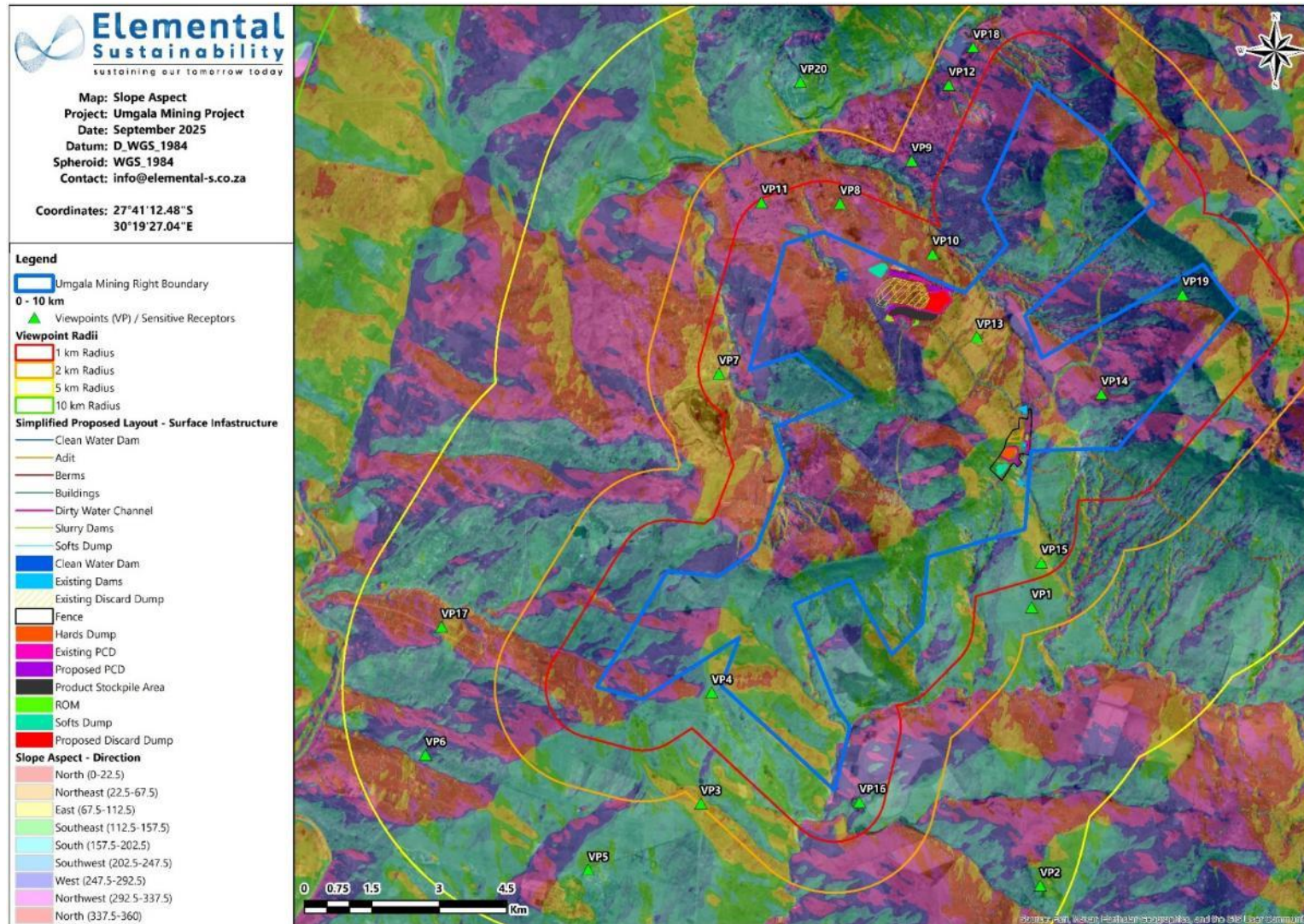


Figure 64: Slope Aspect direction of the terrain in a 10 km surrounding area

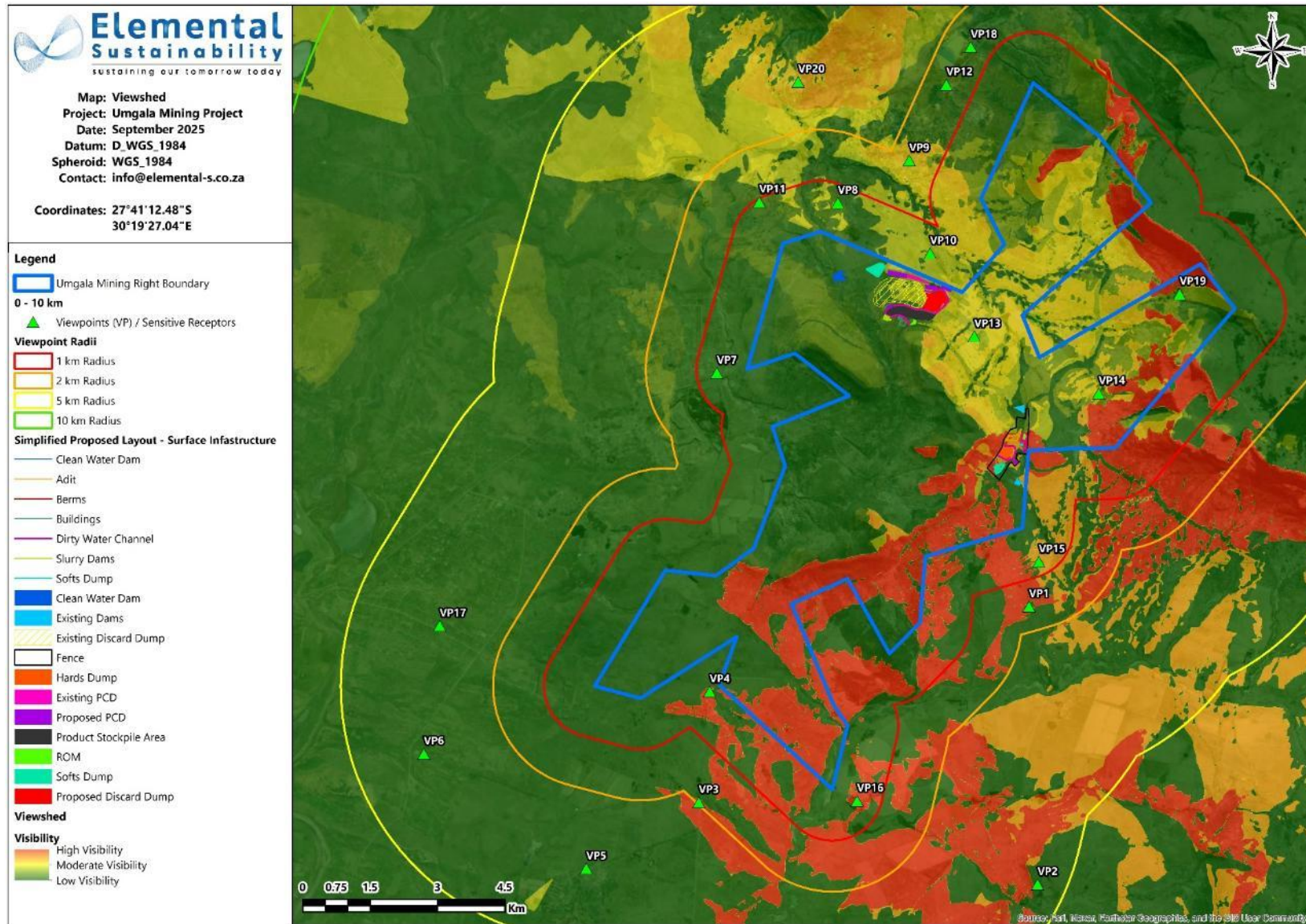


Figure 65: Viewshed Model of the 10 km surrounding area

10.1.12.6. Combined Visibility Analysis

The visibility of proposed infrastructure within the Umgala Mining Project area is shaped by the interplay of terrain, elevation, slope orientation, vegetation cover, and distance from receptors. By integrating the Digital Elevation Model (DEM), slope elevation and aspect analyses, vegetation mapping, and the viewshed model, a comprehensive understanding of the extent and character of visual exposure has been developed.

The DEM and slope elevation maps indicate that the project site lies within a stepped terraced valley at the base of Zimbutu Mountain, with elevations ranging between 1,175 and 1,418 mamsl. The terrain generally slopes southeastward, directing visibility toward receptors located in this direction. Elevated ridges associated with Zimbutu Mountain and the Balelesberg range provide partial containment, but also create elevated vantage points where receptors (e.g., VP19 and VP20) retain wide-ranging visibility of the site. Within the valley floor, receptors closer than 2 km (e.g., VP1, VP8, VP10, VP13, VP14, VP15) are subject to direct line-of-sight exposure due to limited terrain shielding. Overall, the model confirms that visibility is concentrated within 2 km of the infrastructure footprint, diminishing significantly beyond this distance due to slope shielding, distance attenuation, and atmospheric haze.

The combined analysis indicates that visual exposure is highest for receptors within 2 km of the infrastructure footprint, where terrain, vegetation, and land use provide little to no natural screening. Beyond this distance, exposure decreases rapidly, with visibility becoming more intermittent and landscape-dependent. Elevated ridges and open grasslands maintain some longer-range exposure, but the overall regional visual footprint is contained within 5 km, aligning with the disturbed, mixed-use character of the broader landscape.

The assessment of impacts associated with the visual impact assessment is presented in Section 12.7.

10.1.13. Traffic

The information provided in this section is extracted from the Traffic Impact Assessment undertaken by Emaan in 2025. The full report is attached as Appendix IV.

The existing traffic volumes on the surrounding road network immediately surrounding the site were obtained from classified traffic counts undertaken by Emaan Traffic Engineers at the following intersections on Monday, 4 August 2025:

- Count 1: R34 / Umgala Access Road
- Count 2: R34 / Zimbutu Access Road
- Count 3: R34 / Van Rooyen Street
- Count 4: R34 / Voor Street
- Count 5: P420 / Zimbutu Road

The traffic counts were undertaken from 00:00 to 18:00 during a typical weekday, recording all movements by vehicle type. An analysis of the traffic counts revealed that the Weekday AM peak hour on this road network occurred from 06:30 to 7:30 and the Weekday PM peak hour occurred from 16:00 to 17:00.



Figure 66: Traffic count locations (Emaan, 2025)

Table 37 below provides a summary of existing traffic analysis.

Table 37: Traffic analysis (Emaan, 2025)

No	Intersection	Existing level of service	Upgrade needed
1	R34 / Umgala Mine Access	Acceptable	No
2	R34 / Umgala Plant Access	Acceptable	No
3	R34 / Van Rooyen Street	Acceptable	No
4	R34 / Voor Street	Acceptable	No
5	P240 / Zimbutu Dump Access	Acceptable	No

The following conclusions are drawn from the Traffic Impact Assessment:

- Existing traffic analysis at key intersections surrounding the site indicates that all intersections currently operate at acceptable levels of service.

- The 5-year background traffic analysis shows that all intersections are expected to continue operating at acceptable levels of service.
- The background traffic with construction traffic analysis confirms that all intersections will operate acceptably during the construction phase.
- For the 2030 planning year (5-year horizon), background traffic volumes were factored at a compound annual growth rate of 2.5% and combined with operational phase traffic. The analysis indicates that no intersection upgrades will be required to accommodate the projected traffic volumes.
- During the construction phase, the mines will generate 87 employee trips, 24 truck trips, and a total of 159 ECU trips.
- During the operational phase, the mines will generate 62 employee trips in both the AM and PM peak periods, as well as 50 truck trips per hour, including during the AM and PM peak periods.
- No critical adverse road safety conditions are anticipated.

Refer to the assessment of potential impacts and proposed mitigation measures presented in Section 12.7 of the report.

10.1.14. Acid Mine Drainage

10.1.14.1. Historic and Proposed Waste Disposal Activities

According to the existing EMP, the existing infrastructure at Umgala was to be utilised, however, it has been confirmed that much of it will be decommissioned, and new infrastructure will be built. The following infrastructure is proposed for Umgala:

- Adit
- Various overburden dumps
- Haul Roads
- RoM Stockpile Area
- Product Stockpile Area
- Two Pollution Control Dams (lined, the capacity of 3 000 m³ and 8 000 m³)
- Ericson Dam
- New Processing Plant
- Discard Dump extension
- Site and Security Offices
- Stormwater Trenches
- Fuel Storage
- Sewage management systems

The abundance of mineral waste that is normally generated at an underground coal mine relates to the establishment of portals and tunnels to gain access to the coal seam (i.e. the opencast and adit). Moreover, mineral waste is also generated as a result of ROM processing. No ROM processing will be

conducted at the facility and it is expected that minimal waste will emanate from the underground mining operations.

Material that will be present in the underground working cavities will consist of the roof and floor sandstones, shales and dolerite (likely some carbonaceous rock in contact with the coal seam) and coal pillars, which are required to be barred down from above the mined horizon making the working environment safe and will not be waste generated from the mined seam.

Material excavated during the small opencast operation in preparation for the underground access adit will be placed on three stockpiles, softs, hards and soils. There may be some sulphide-bearing minerals contained in these facilities (i.e. remnants of the mining process) but it will not be to the extent as is expected for a discard or slurry dump.

ROM will be kept on-site long enough to ensure haulage to a preferred supplier for processing. ROM will be a combination of floor and roof sandstone, shale and coal. The footprint of the ROM pad will be maintained as small as possible.

No disposal facilities will therefore be required as part of the project and will significantly reduce the facility's footprint and prevent associated environmental impacts.

It should be noted that the Umgala operations will be conventional drill and blast, bord-and-pillar mining. Hence, there will be limited (if any) overburden generation as the underground mine will generally expand along the coal seam, maintaining the hanging wall and footwall rock to support mine expansion.

10.1.14.2. Likelihood of AMD at Umgala

Based on the available mine plan, only coal (ROM), softs, hards and topsoils will be kept at Umgala. No coal discard or slurry wastes will be kept on site. However, there may still be some AD/SD associated with the hanging wall, footwall and mine pillars within the mining void during and after mining, as well as ND from the softs and hard dumps which may contain sulphide-rich minerals.

Based on available static geochemical data, acid drainage (AD) and neutral drainage (ND) is likely to be associated with:

- Exposed rock in the mined out / partially mined out underground workings (i.e. a rock that is exposed to both oxygen and inflowing groundwater).
 - This is typically expected for shallow mine workings < 30 mbgl where oxygen ingress and rainfall infiltration will likely be high; and
 - Underground footwall / hanging wall rock (i.e. thin layer of rock either shale, mudstone or sandstone in contact with the coal) in unflooded or partly flooded mine workings; and
 - Areas where mine workings daylight or decants (i.e. these mine water will be exposed to access oxygen and may become acidic).

- Drainage from coal discard and slurry -**however not kept on-site**; and
- Drainage from coal products and the coal seams that are / will be mined.

The ratio of Neutralisation Potential (NP) to the Acid Potential (AP) of samples tested, indicated that in both open (presence of oxygen) and closed (absence of oxygen) systems acidic leachate is likely to form in the exposed coal seams. The floor and roof rocks may present limited buffer capacity for acid formation

AMD is highly likely to occur if:

1. There is sufficient oxidation of sulphide-rich material in the coal seam or exposed rock (O₂ component);
2. There is contact between the exposed oxidised rock and rainwater / oxygenated groundwater (H₂O component); and
3. There is sufficient oxidised iron(III) (Fe³⁺) which can react to form secondary minerals such as iron hydroxide (Fe(OH)₃), producing an acid.

Eliminating one of the above-mentioned components is highly likely to reduce and limit AMD potential. Oxygen usually enters the mine where mine workings are not flooded or via excessive rainfall recharge/inflows. Therefore, it is anticipated that shallow areas where the overburden is <30m are more susceptible to higher rainfall ingress, oxygen ingress and AD/SD.

SD will be more likely to occur where sulphate concentration dominates the water quality after closure (i.e. for old flooded workings). The probability of AD and NMD is high at the Umgala Colliery, as this is the typical drainage associated with neighbouring mines. Furthermore, rock samples from exposed coal seams, pillars and some of the hanging wall sandstone/shales are prone to acid generating. This is based on information gathered at Umgala and other mines operated by Welgedacht Exploration Company in the project area – mining similar lithologies.

10.2. SOCIO-ECONOMIC ENVIRONMENT

The information provided in this section is extracted from the Social Impact Assessment that was conducted by Urban-Econ Development Economists in 2023. The full report is attached as Appendix IV.

10.2.1. Spatial Analysis

Emadlangeni Local Municipality is predominantly rural; urban settlements account for a smaller portion of the municipality while the majority of the municipality is covered by rural settlements⁶². Rural settlements are found in pockets across the municipality, while concentrations of these occur on the north-eastern and western regions of the municipality. Although the municipality has a larger rural population, the settlement pattern is one of low density. Figure 67 illustrates the settlement patterns of the affected communities in relation to the mining area.

⁶² Emadlangeni Local Municipality Spatial Development Framework (2019/2020)



Figure 67: Affected Communities Locations in Proximity to the Umgala Mine (Urban-Econ, 2023)

10.2.2. Settlement Densities

The ELM settlement patterns are characterised as predominantly low-density rural settlements which sparsely cover the municipality, with average density of below one dwelling unit per hectare. There are, however, pockets where settlements occur in relatively higher densities, namely, in the central region (Utrecht), the western region (Vaalbank/ Berouw), the southern region (Kingsley) and the northern region (Groenvlei).

10.2.3. Nodes and Corridors

The mine and the identified affected communities are located along two major transport and development corridor, namely:

- The R34 is a primary/ major movement corridor within the municipality. It links to the N11 on the western portion, connecting Emadlangeni with Newcastle and Volksrust. The R34 also connects Emadlangeni with Vryheid in a south-eastern direction via the R33; and
- The P483 road links Emadlangeni with Osizweni and Madadeni. The P483 is also a Mixed Activity Corridor linking Emadlangeni to Osizweni, Madadeni and western parts of Newcastle.

Utrecht is identified as a primary node in the municipality's Spatial Development Framework (SDF). It is the administrative centre of Emadlangeni. Utrecht is located centrally within the municipality and is accessed via the R34. The town is identified as the agricultural hub of Amajuba District.

10.2.4. Economic Profile of Emadlangeni Local Municipality

Data on the economic structure and sectoral contribution are not collected at a sub-municipal level in South Africa for non-metropolitan municipalities and, as such, it is not possible to determine the structure of the economy of the Area of Impact (AOI). The following sub-sections first provide a snapshot of the South African economy and thereafter focuses on the economic structure and profile of the municipality.

10.2.5. Snapshot of the South African Economy

In the second quarter of 2022 the South African economy Real Gross Domestic Product (GDP) (measured by production) decreased by 0.7% after growth in two consecutive quarters. The first quarter of 2022 recorded an increase of 1.7% coinciding with the easing of COVID-19 lockdown restrictions. All industries recorded an increase in economic activity supported by an increase in exports and household spending, most significantly manufacturing, trade and mining. The floods that took place in April 2022 in KZN and load shedding contributed to the decline, weakening an already fragile national economy that had just recovered to pre-pandemic levels⁶³.

10.2.5.1. Sectoral review

The manufacturing sector continues to occupy a significant share of the South African economy. Seven industries recorded negative growth between the first quarter of 2022 and the second quarter of 2022. The sectors performance towards the growth in GDP in the second quarter are outlined below⁶⁴.

10.2.5.2. Primary Sector

Agriculture experienced a 7,7% decline and lost 0,2 of a percentage point from GDP growth. The decrease in the output of animal products was the main cause of the increase. The mining and quarrying sector experienced a 3,5% decline and a -0.2-percentage point decline in GDP growth. Production declines were observed for diamonds, manganese ore, gold, and coal.

10.2.5.3. Secondary Sector

The manufacturing sector had a 5,9% decline and lowered GDP growth by 0,7%.

10.2.5.4. Tertiary Sector

The trade, catering, and lodging sector experienced a 1,5% decline and lowered GDP growth by -0.2%. Retail and wholesale commerce were reported to have had a decline in economic activity, while the transport, storage, and communication sector saw a gain of 2,4%. Communication, transportation

⁶³ StatsSA (2022) Statistical Publication: *Gross Domestic Product Second Quarter 2022*.

⁶⁴ StatsSA (2022) Statistical Publication: *Gross domestic product, Second quarter 2022*

support services, and land transportation were all stated to have increased economic activity.

10.2.6. Overview of the Kwa-Zulu Natal Economy

KZN plays a significant role in South Africa's economy. KZN is the third smallest province in terms of land size in the country, however, the second largest contributor to the country's economy out of nine provinces. The province contributes 16% to the national GDP after Gauteng's share of 34%. As illustrated in Figure 68 below. KZN has the highest export propensity and the highest level of industrialisation in the country, the economic structure in KwaZulu-Natal is based on a large manufacturing sector in which growth is driven by the paper and paper products industry, ferroalloys (such as aluminium) and other chemicals. Further significant sub-sectors include motor vehicles and component manufacture, printing and publishing, food and beverage production, non-electrical machinery, iron and steel, wood furniture, textiles, and clothing.

This province offers a highly competitive advantage in capital-intensive manufacturing, transport, storage, and communications, as well as finance and business services. It is also well positioned in agriculture, forestry and fishing, agricultural resource-intensive manufacturing and in the tourism and accommodation sectors. The main cities and towns in KZN are Durban, Ulundi, Eshowe, Newcastle, Richards Bay with significant contribution to the KZN economy in their respective rights.

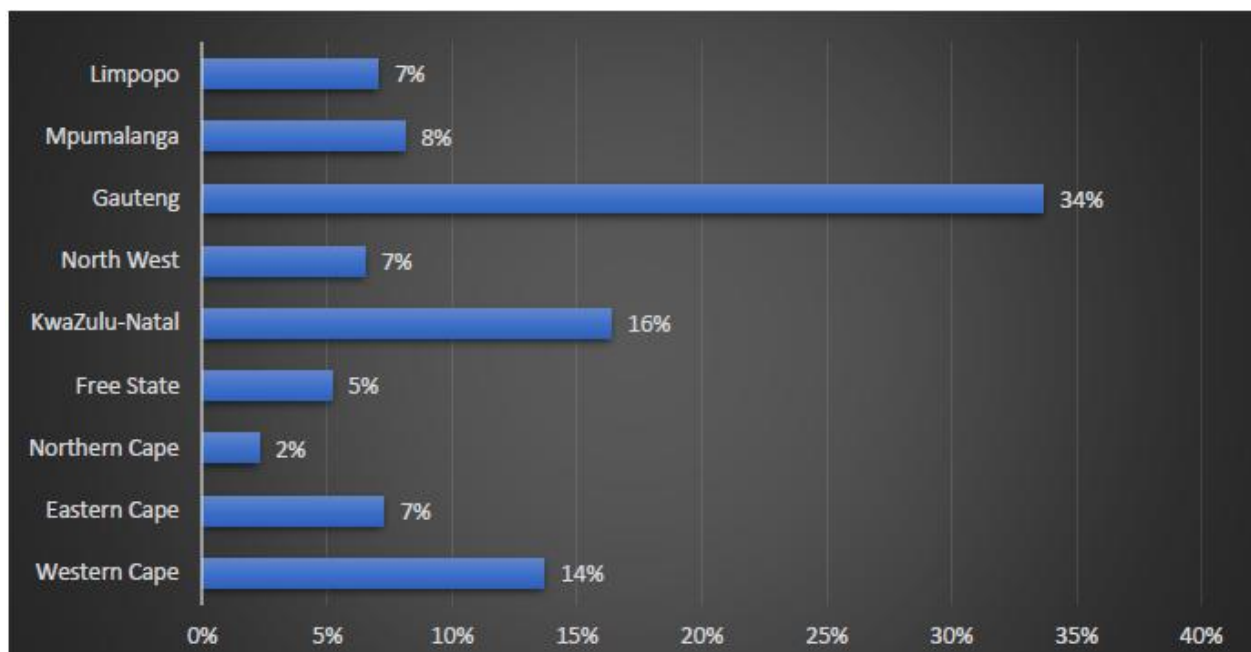


Figure 68: Kwa-Zulu Natal Gross Value Add (GVA) Contribution to the National Economy 2021 (Urban-Econ, 2023)

10.2.7. Emadlangeni Local Municipality Economic Size and Growth

GVA can be used to provide an oversight of the ELM economy in terms of the structural composition of the economy as well as the growth rate of production. ELM is one of the three local municipalities of the Amajuba District Municipality. Amajuba district municipality is the 5th highest performing district in KZN compared to other districts. The highest performing local municipality in terms GVA in

Amajuba District is Newcastle, followed by Dannhauser. The ELM local economy is the largest economy in King Cetshwayo District with a GVA contribution of 70% as shown in Figure 69 below.

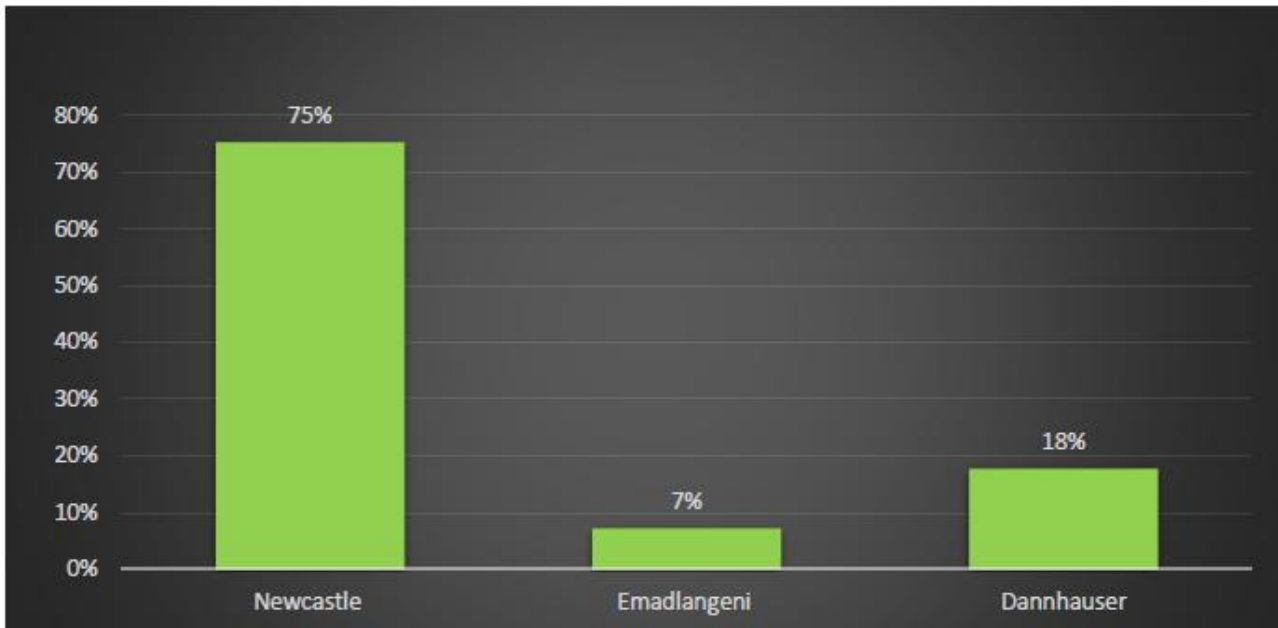


Figure 69: Emadlangeni Economic Contribution to the Regional Economy in 2021 (Urban-Econ, 2023)

The re-opening of Umgala mine will improve that economic performance of Emadlangeni to the District and the province. The ELM is dependent on the tertiary and primary sector as illustrated in the Figure 70 below.

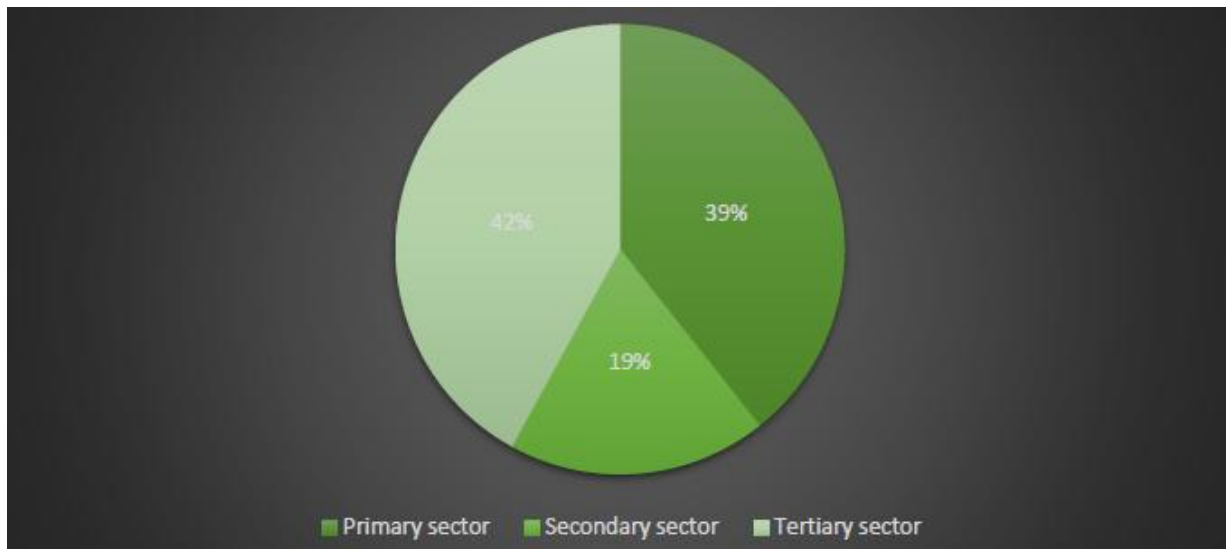


Figure 70: Sector Gross Value Add Contribution in Emadlangeni (Urban-Econ, 2023)

Limited mining occurs while sectors making a notable contribution to the economy of the area include trade, finance and government services and other main economic sectors include tourism and manufacturing. Agriculture is the most important economic sector with excellent potential, although,

the agricultural sector has declined over the years, it remains the mainstay of the municipality's economy.

Mining within Emadlangeni mainly comprises of coal. A number of the of the mines within Amajuba District closed in the late 90s due to the international fall in coal prices however, some of these mines have reopened. The municipality is strategically linked to the Richards Bay Coal terminal via the R34 where high grade coal from the municipal area is shipped to international markets. There is also a need to revive mining sector within Emadlangeni and a strong focus on manufacturing. These will create job opportunities which will act as pull factors⁶⁵.

10.2.8. Population of Emadlangeni Local Municipality

The population of Emadlangeni has steadily increased over the years. Figure 71 illustrates the population growth in ELM over the period 2011-2021. It indicates the total population of ELM increased from 34 442 in the year 2011 up to 36 752 in 2021. This represents a population growth rate of 1.0% pa over the 10 years. This is slightly lower than the national population growth rate which is 1.2 %pa.

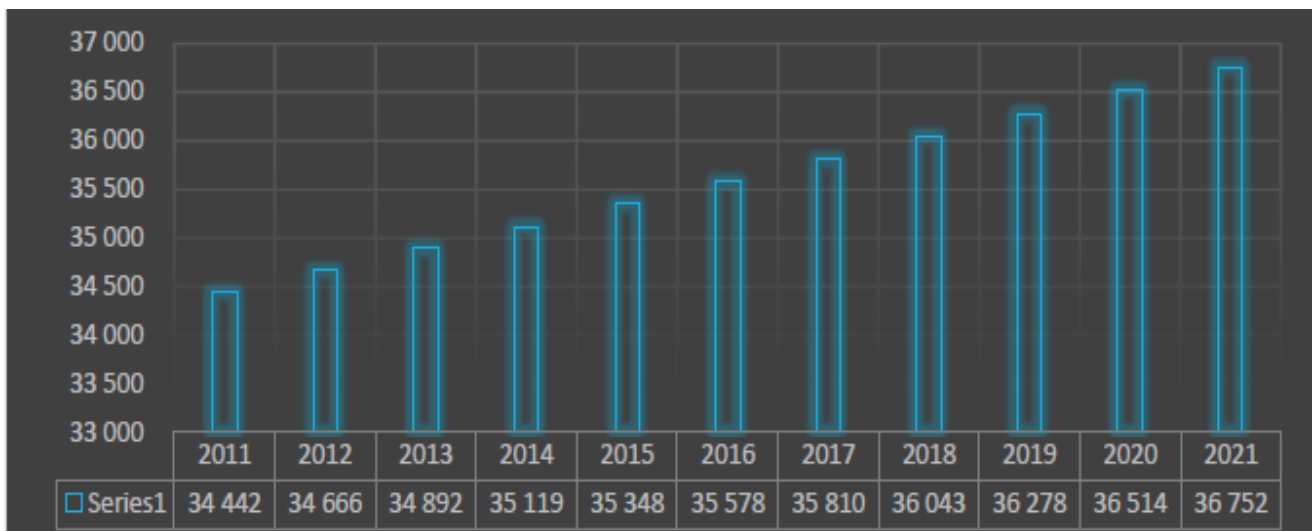


Figure 71: Emadlageni Population Growth over 10 Years (Urban-Econ, 2023)

ELM has also experienced the phenomenon of outmigration of young people. This could be attributed to young people leaving the municipal area in search for job opportunities in other areas of high economic activity compared to the Emadlangeni area. The lack of tertiary institutions within the municipality could be the contributing factor in this. The outmigration of young people presents several socio-economic consequences: The loss of the economic active portion of the population has certain consequences for the municipality. Economic productivity and the future growth of the area is likely to be affected, it is unclear if these young people will return to the area.

10.2.9. Households

⁶⁵ Emadlangeni Local Economic Development (LED) Strategy: 2016/17

Household density of Emadlangeni has also seen a steady increase over the past 10 years. There was a total of 6 813 households in 2011, this number grew up to 6 887 in the year 2021 (as illustrated in Figure 72). This indicates that as the number of households increase so does the average number of households. This could be a result of in-migration into the area due to job transfers or a new dwelling for the household⁶⁶.

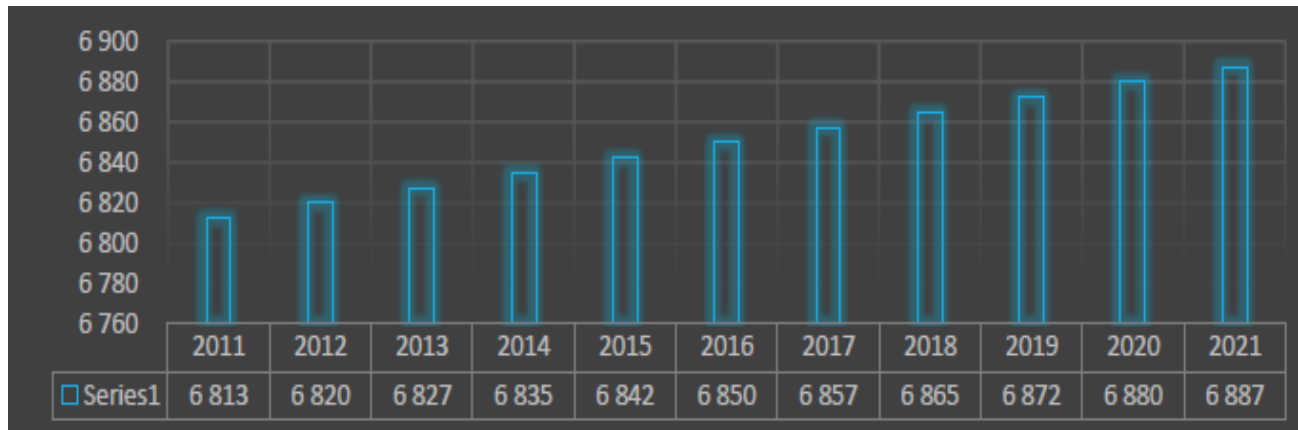


Figure 72: Emadlangeni Household Density (Urban-Econ, 2023)

10.2.10 Age Group

Figure 73 indicates that majority of the population comprise children under the age of 14 years. The high number of youth/ young adults leaving the area are in the potentially economically active portion of the population. They leave behind the elderly for better economic opportunities outside the local municipality. Another contributing factor is the limited educational facilities in the municipality. The relatively low level of youth (15 to 30 years of age) may be attributed to the lack of tertiary educational facilities in the sub-region.

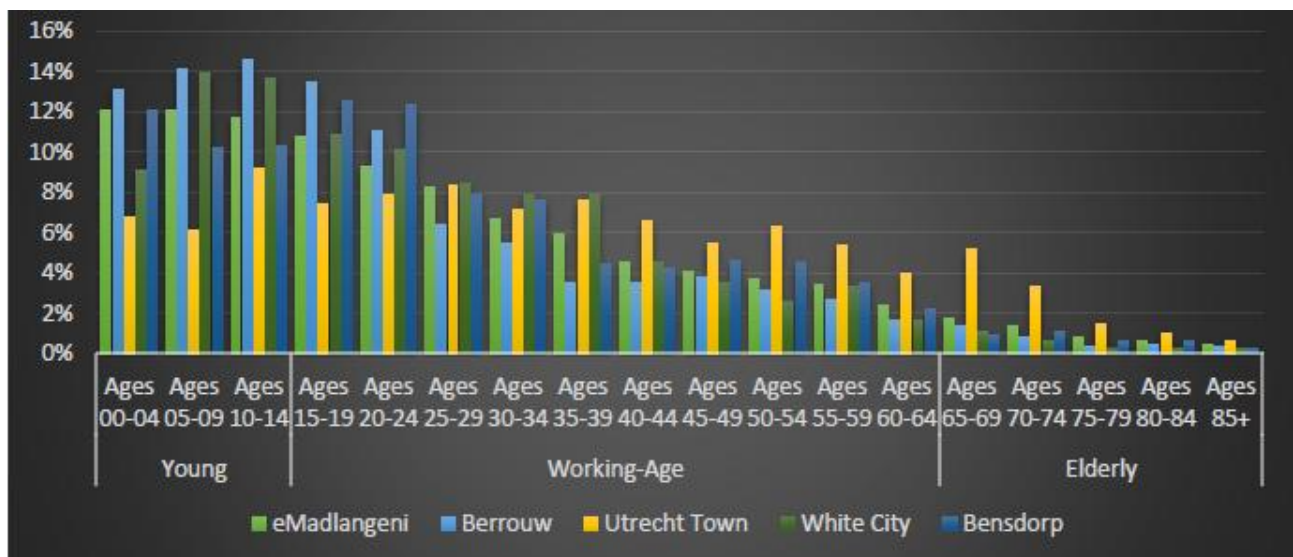


Figure 73: Affected Communities Population Age Groups (Urban-Econ, 2023)

⁶⁶ Emadlangeni Local Municipality Final Integrated Development Plan (IDP) 2020/21

10.2.11. Education

The highest education level achieved by the majority of the population is some secondary education accounting for 28% of the population. Followed by 23% of the population with some primary education and only 19% of the population completed managed to reach grade 12. About 14% of the population had no schooling by 2011 in Emadlangeni. White City community has the highest population that reached the grade 12 level compared to other communities.

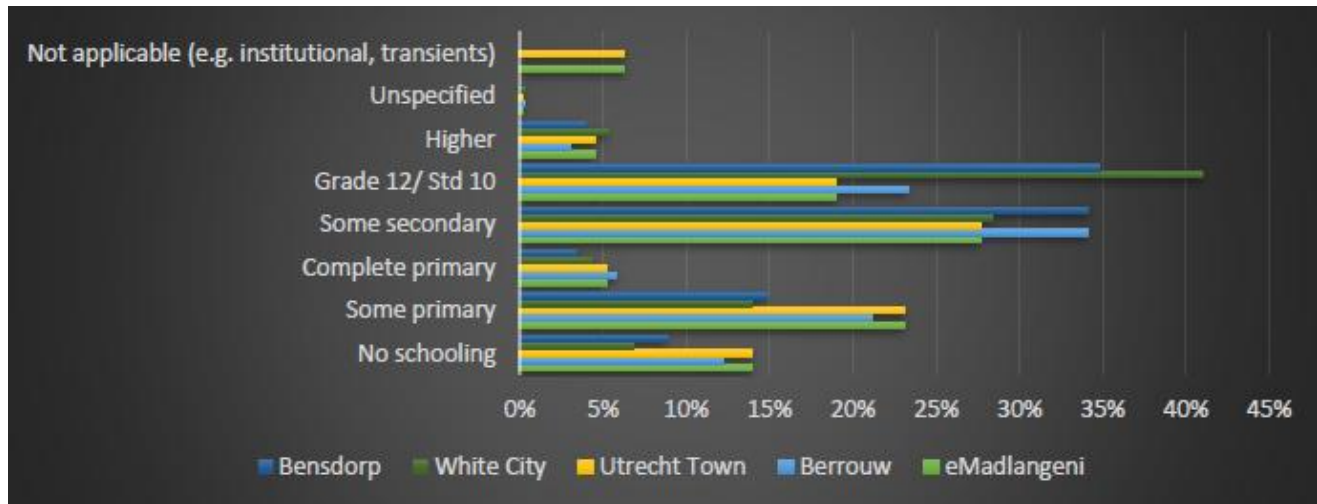


Figure 74: Area of Influence - Highest Education Level (Urban-Econ , 2023)

10.2.12. Employment

Figure 75 illustrates that almost 50% of the population at Emadlangeni LM was not economically active in the year 2011. Bensdorp has the highest number of people who are not economically active at 64%, followed by Utrecht town with 47% and White City at 45%. Only 27% of the population was employed, while 16% were unemployed.

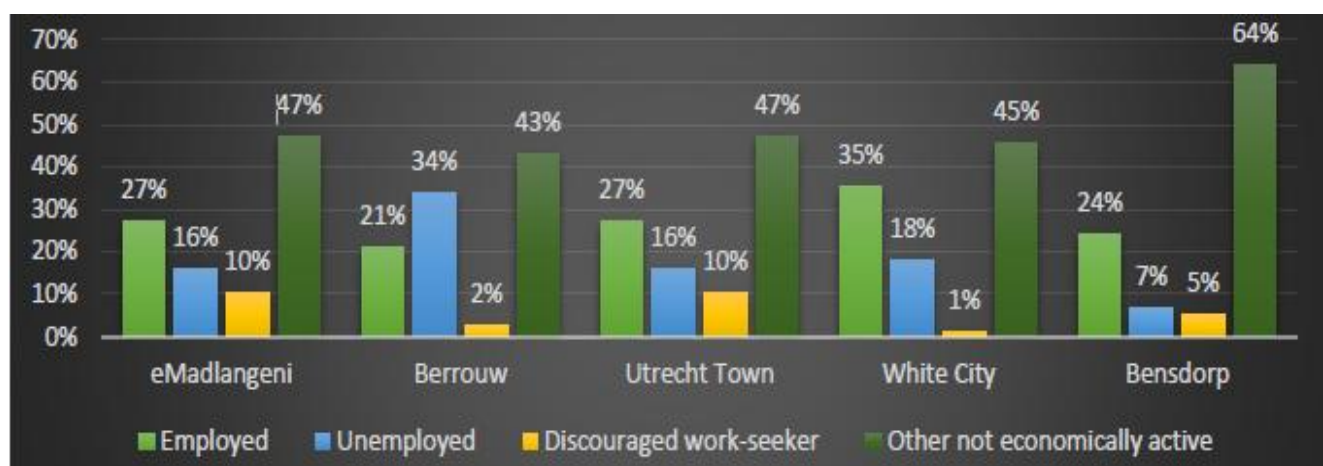


Figure 75: Affected Communities Employment Status (Urban-Econ, 2023)

Of those employed, the majority were employed in the community, social and personal services and wholesale and retail trade (as shown in Figure 76 below). There is little to no mining activity taking

place in the municipality as indicated in the graph below.

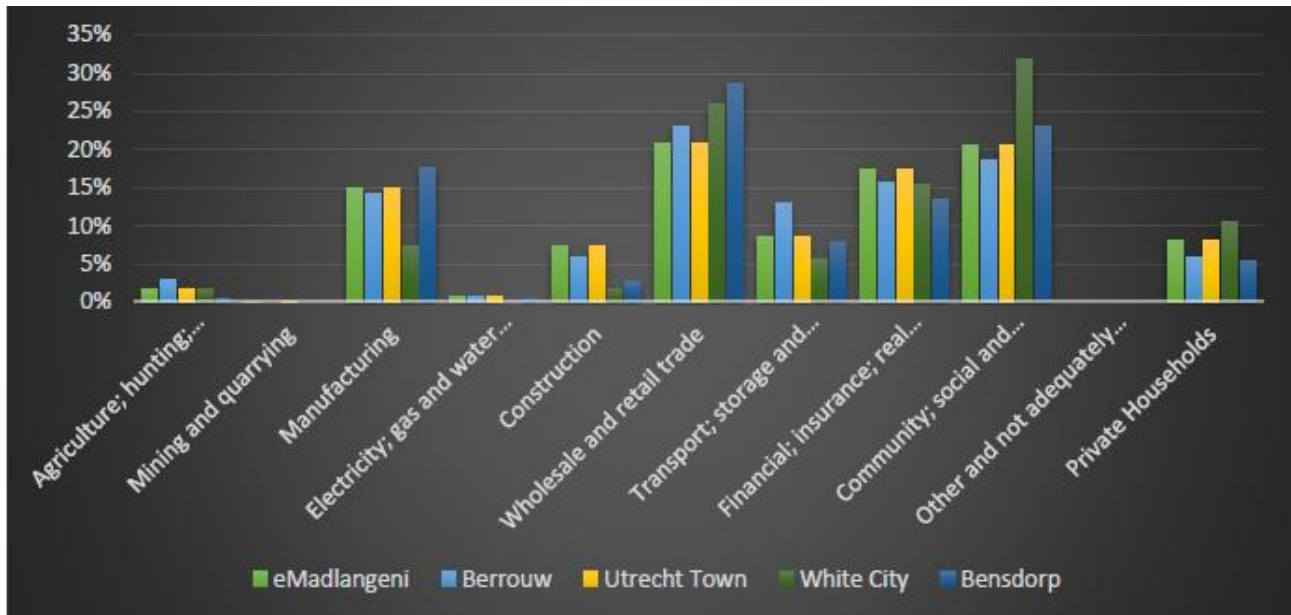


Figure 76: Employment by Industry in the Emadlageni Local Municipality (ELM) (Urban-Econ, 2023)

10.2.13. Gender

ELM gender distribution has more males than females, males accounting for 51% of the population and females with 49%. Utrecht town has an equal distribution of gender in the municipality. The rest of the affected areas has more females than males as illustrated in Figure 77.

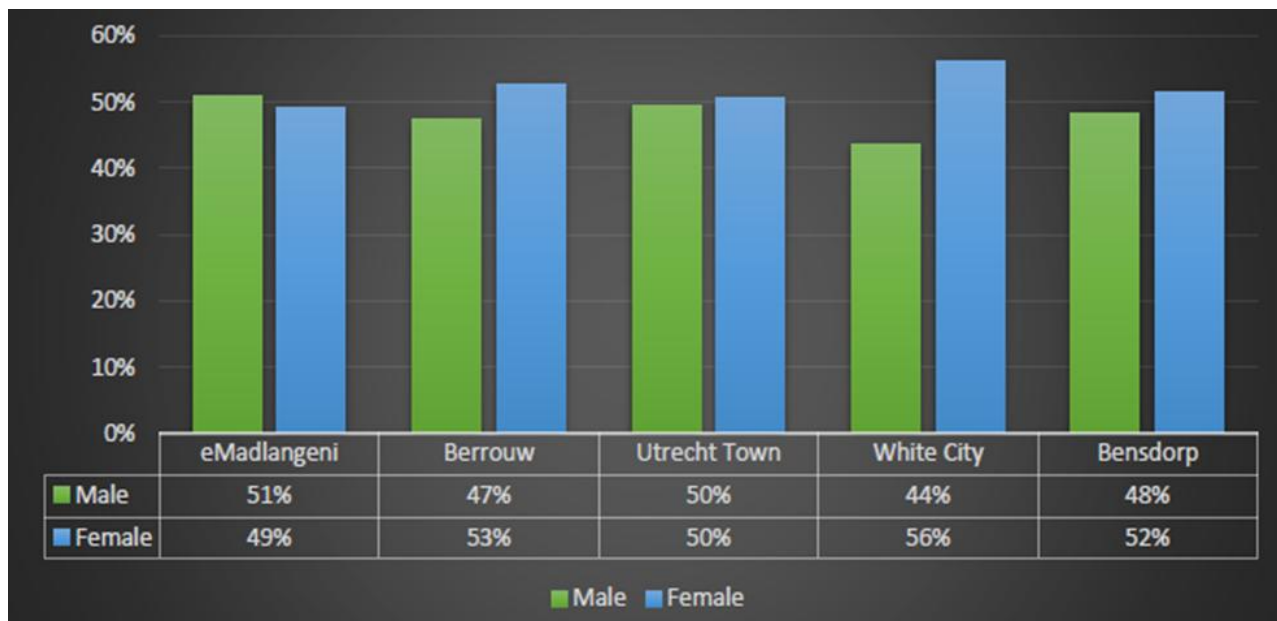


Figure 77: Emadlageni Gender Distribution (Urban-Econ, 2023)

10.2.14. Race

Majority of the population is black population group followed by 6% of white group and only 1% of coloured population as shown in Figure 78.

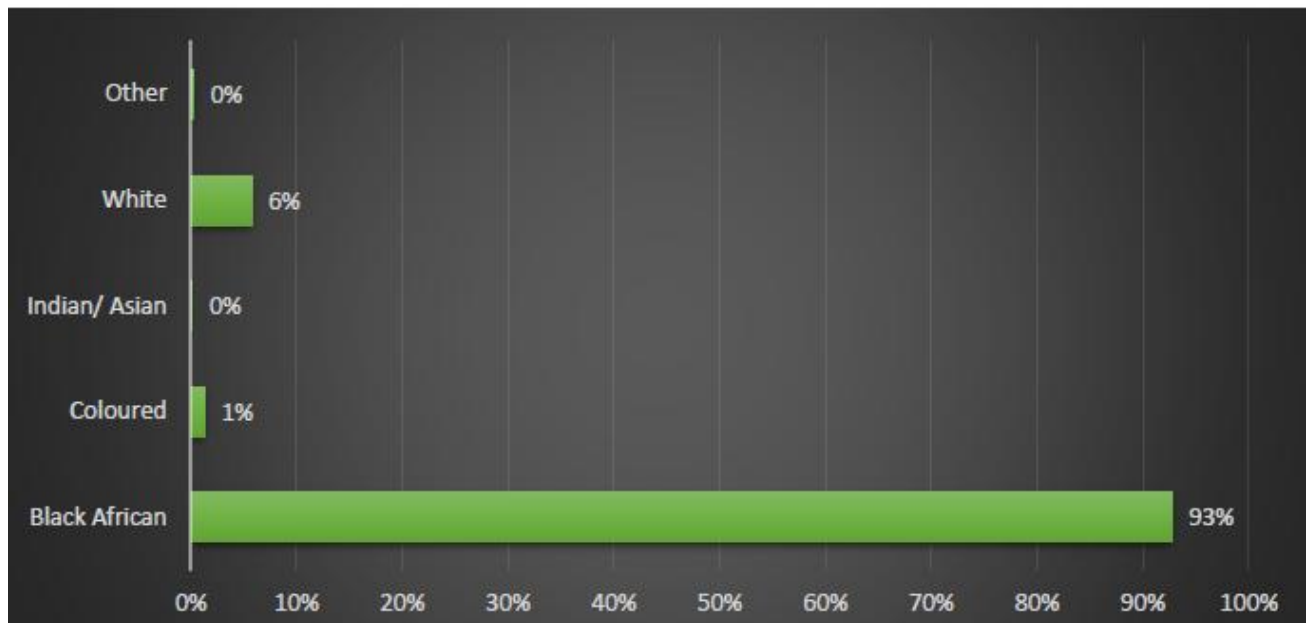


Figure 78: Emdlageni Local Municipality Race Profile (Urban-Econ , 2023)

10.2.15. Income

The greatest number of households fall into the income categories between R19 201 to R38 400 per annum. Followed by income category between R9601 – R19 200 and R38 401 – R76 800; and about 12% of the population has no income which is quite high. Bendsdorp has the Highest number of households with no income. Berrouw has the highest number of households earning between the R19 201 to R38 400.

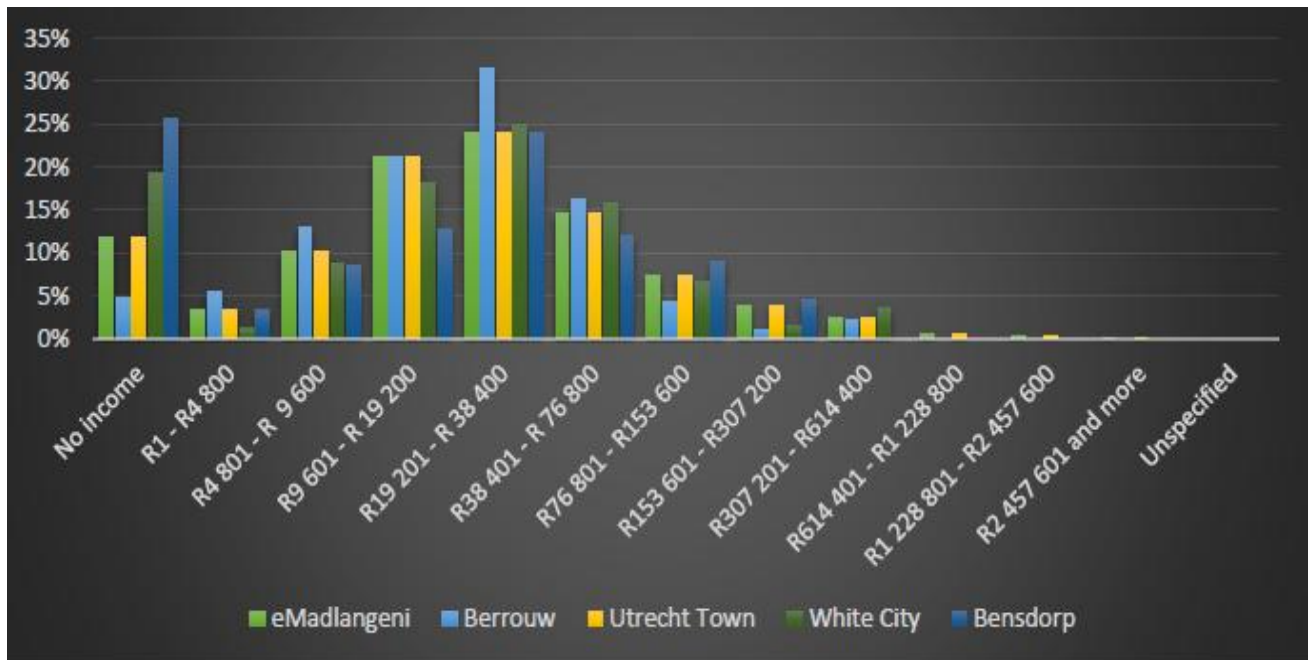


Figure 79: Affected Communities Income Profile (Urban-Econ, 2023)

ELM has been experiencing a steady increase in population size since 2011. The implications of this include service delivery in terms of housing and service infrastructure. The municipality has a generally young population with approximately 73.48% of the population falling under the age of 35. This has implications for education, youth facilities and the creation of job opportunities. ELM population is made up of 93% black population and 6 % and 1% white and coloureds respectively. The rate of the not economic active and unemployed population in the municipality is quite alarming and a cause of concern of the availability of economic opportunities within the municipality.

The proposed Project can help mitigate some of the challenges that the municipality is currently facing, by creating employment opportunities for the resident population. The mine will bring new job opportunities that require various skills from unskilled labour, semi-skilled and skilled labour. This could potentially reduce the rate of not economic active people in the AOI. This will shift the dependence of the community on agricultural sector for employment opportunities and provide the community with in-demand skills. An effective Social Labour Plan (SLP) will support the municipality in tackling some of the challenges such as the high rate of illiteracy through investment in Adult Basic Education and Training (ABET) and investment in municipal infrastructure, amongst others.

An assessment of potential impacts and proposed mitigation measures are presented in Section 12.7 of this report.

10.3. CULTURAL HERITAGE AND PALAEOLOGICAL ENVIRONMENT

10.3.1. Cultural Heritage and Paleontology

The information provided in this section was extracted from the Heritage Impact Assessment undertaken by Umlando: Archaeological Surveys and Heritage Management in 2025. The full report is attached as Appendix IV.

The heritage impact assessment included a desktop assessment as well as fieldwork.

10.3.1.1. Desktop Study

The desktop study consisted of analysing various maps for evidence of prior habitation in the study area, as well as for previous archaeological surveys. The general area is known for its high density of heritage sites (Figure 80). The Surveyor General maps indicate that both Goedgenoegd and Zandspruit and Utrecht Townlands were surveyed in 1887, and sold shortly thereafter. Buildings have been marked on the Goedgenoeg map but do not occur within the study area. These buildings still exist today. Zandspruit was later renamed to Gum Tree Grove in 1907.

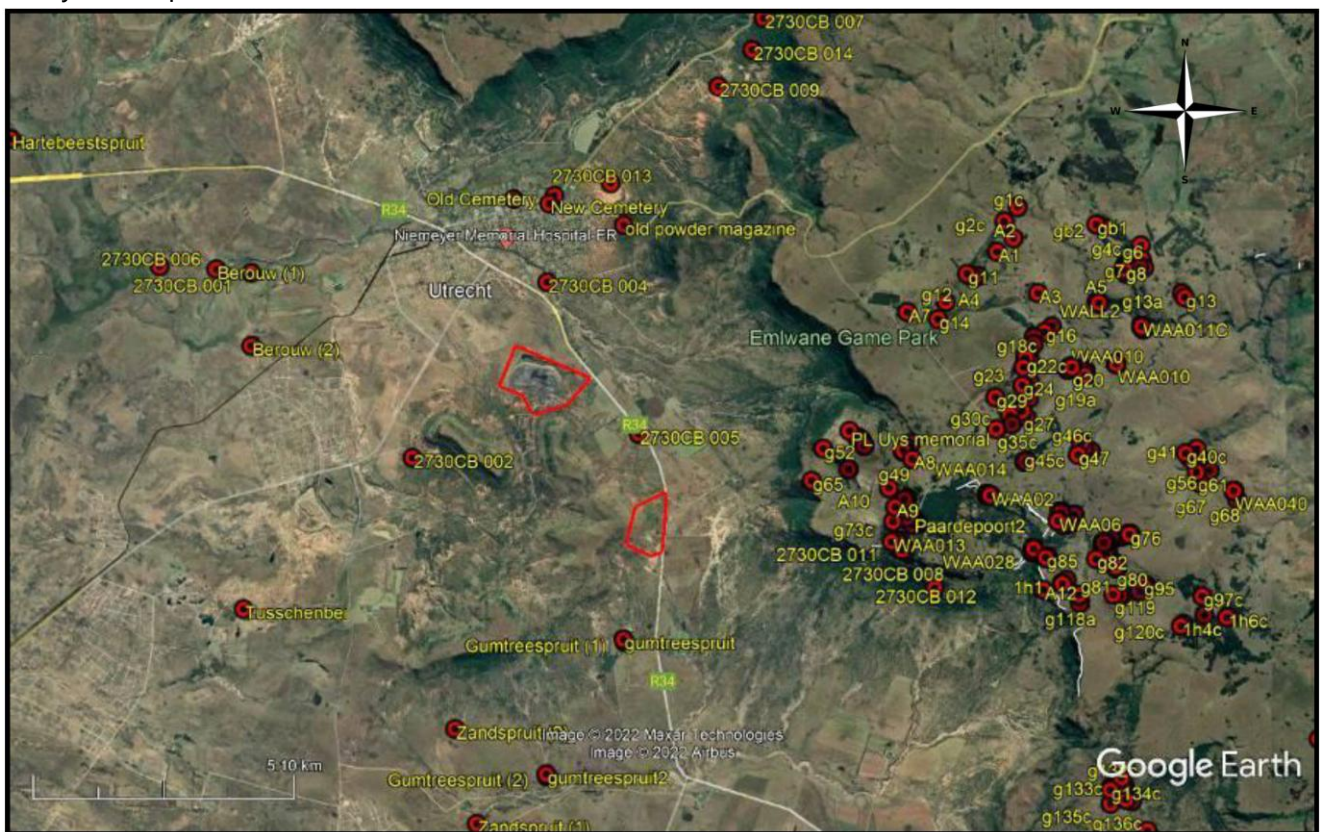


Figure 80: Location of known heritage sites in the general area (Umlando, 2025)

A Palaeontological Impact Assessment (PIA) was undertaken by Dr Alan Smith. Extracts from the PIA (Appendix IV). The following information has been extracted from the PIA:

The SAHRIS Palaeosensitivity Map considers the Vryheid Fm as a Very High Palaeosensitivity Zone (Figure 81). In practise, no significant fossils have been reported from the Vryheid Formation in this area, however invertebrate trace fossils are common (Tavener Smith, 1983; Mason and Christie, 1985; Hastie et al., 2019).



Figure 81: Palaeontological sensitivity map

Groenewald (2018) pointed out that the aquatic reptile, *Mesosaurus* (earliest known reptile fossil from the Karoo Basin), as well as the fish, *Palaeoniscus capensis*, have been recorded in the Whitehill Formation in the southern part of the Main Karoo Basin (MacRae, 1999). The Whitehill Formation (more than 500 km to the southwest), within the Main Karoo Basin, *may* be a correlative of the Vryheid Formation, however they are not physically connected so this remains an unproven theory. Further, the Vryheid Formation in this area had a different source region to the Whitehill Formation of the Cape (Hastie et al., 2019). Economic coal seams are known from the Vryheid Formation in this region (Tavener Smith, 1982; Hastie et al., 2019). This part of the stratigraphy is known as the “Natal Coal Measures” and hosts many large coal mines. Coal has been mined for more than 100 years.

Coal comprises compressed plant remains and thus constitutes a fossil bed. Plants such as *glossopteris*, *gangamopteris* and *sigillaria* can be recognized, but these are common. The chance of significant fossils being found on this site is Low, but not Zero. A “Chance Find Protocol” has therefore been included to cover this eventuality. No further palaeontological work is required, unless triggered by the “Chance Find Protocol” in which a suitably qualified palaeontologist must be consulted.

10.3.1.2. Field survey

A field survey was undertaken on 5 September 2022. Ground visibility was poor to good; however, there were enough tracks and open areas to undertake a survey. The grass tended to be thicker around old stone walling and thus inadvertently showed where the walling occurs. The occurrence of alien vegetation, especially cacti/prickly pears and sisal occur around settlements and are thus markers for settlements within dense vegetation. The only time the dense vegetation was an issue, was when low stone walls and cairns occurred. Figure 82 shows the location of the finds while Table 38 lists the co-ordinates of each site and specific features.

Table 38: Location of recorded sites and features

Site	Feature	Latitude	Longitude	Altitude (m)	Description
	Stone cairn	-27.709888200	30.349272600	1326.0	Stone Cairn
	MSA	-27.713657900	30.346060000	1323.0	Stone tools
	Pottery	-27.714912	30.343124	1334	Pottery shards
1	k1	-27.709084800	30.345942300		Stone walling
	k2	-27.709151900	30.345848000	1333.1	Stone walling
	g1	-27.709215200	30.345930800		Grave
	k3	-27.709244800	30.345906800	1333.0	Stone walling
	terrace or house	-27.709028500	30.345564900	1332.0	Stone walling
	k4	-27.709378800	30.345145000	1335.8	Stone walling
	2bricks	-27.708583000	30.345671700	1336.5	Coronation bricks
	Site 1	-27.709127742	30.345678254		
2	G6	-27.712885500	30.345099200	1336.4	Grave
	site 2	-27.712917200	30.345202000	1335.4	
	G4 or wall	-27.712877000	30.345147500	1335.3	Grave/walling
	site 4	-27.711306400	30.346086200	1337.8	walling and grave?
	K7	-27.712800	30.345191	1333	Stone walling
3	prickly pear	-27.710337600	30.346489200	1333.6	Alien invasive
	wall	-27.710305500	30.346277700	1335.4	Stone walling
	Site 3	-27.710272618	30.346413941		
4	shard	-27.711502100	30.345862900	1339.5	Pottery
	Rock concentration	-27.711117200	30.346338000	1337.1	Stone Cairn
	G7	-27.710807	30.346830	1328	Grave
	terracing	-27.711227	30.346078	1334	Terracing
	G8/wall	-27.711012	30.346046	1335	Grave/terracing
	Site 4	-27.711341155	30.345979482		
5	g2	-27.709565800	30.346370900	1328.1	Grave
	g3	-27.709558400	30.346334200	1329.2	Grave
	g5	-27.709584000	30.346282500	1329.9	Grave
	Site 5	-27.709562878	30.346346935		

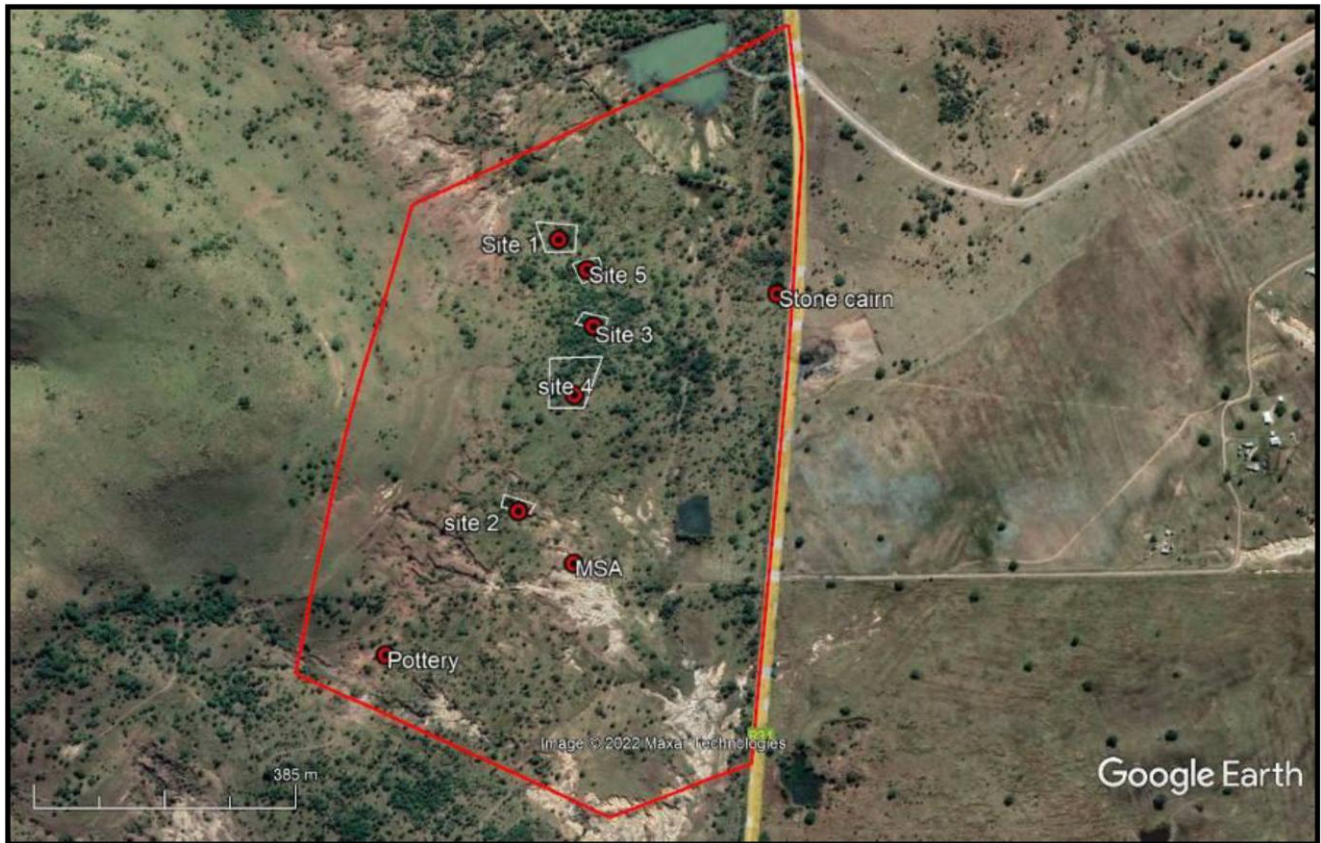


Figure 82: Recorded sites within the study area (Umlando, 2025)

Site 1:

The site is located amongst Acacia trees and dense grass. The site consists of at least three small stone walled circles that appear to be kraals. These three are in close proximity to each other and are 3m – 5m in diameter. There is a stone cairn that could be a grave near these kraals. Approximately 20m to the west, or uphill, is a terraced area that could be the foundation for a house. The site is ~50m in diameter, and more features could occur amongst the grass.

Site 1 occurs on 1937 and 1953 aerial photographs. The landowner said this site belongs to former farm labourers whose living descendents have moved away several decades ago. The graves at Site 5 probably relate to this Site 1.

Significance: The site is of low-medium significance. If there is a grave, then this is of high significance.

SAHRA Rating: 3C or 3A (if graves occur).

Mitigation: The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it. However, if the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a Public Participation Process (PPP) will be required specifically dealing with graves.

Site 2:

The site is located halfway up the hill and between two erosion gullies. The site consists of a small settlement 40m x 50m in size. The features and artefacts include:

- Stone walled kraal
- terracing (for a house)
- two possible graves
- undecorated, thin-walled pottery

The site may predate the 20th century. More of the site has probably collapsed with the erosion gullies.

Significance: The site is of medium to high significance. The occurrence of two possible graves will make this high significance.

SAHRA Rating: 3C and 3A.

Mitigation: The site is within the fenced area. The site currently has a 50m exclusion buffer around it. However, if the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains. Otherwise, it is an archaeological site with no claimants and the remains would go to KZNARI (KwaZulu-Natal Amafa & Research Institute).

Site 3:

The site is located near the base of the hill amongst semi-dense vegetation. The site consists of stone walling that could be part of a kraal or a terrace. The site probably relates to Site 1 and 4 and is thus a 20th century feature.

Significance: The site is of low significance.

SAHRA Rating: 3C.

Mitigation: The site requires no further mitigation.

Site 4:

The site is located ~200m south of Site 1. The site consists of several features and artefacts that include:

- Stone walling
- Graves
- Terracing
- Stone cairns
- Pottery

The site occurs on the 1935 and 1953 aerial photographs. It may occur on the 1965 aerial map; however, the imagery is not very clear. More features will occur in the general area, however the

vegetations was too dense to make an accurate assessment of all features. The site appears to be a settlement of several houses and related structures.

Significance: The site is of medium to high significance. The occurrence of two possible and one definite grave will make the site of high significance.

SAHRA Rating: 3C and 3A.

Mitigation: The site occurs within the fenced off area. The site currently has two 50m exclusion buffers around it. The second buffer is for Grave 7. All features fall within these 50m buffer and the buffer needs to be fenced. If the site will be affected, then it will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.

Site 5:

The site is located ~50m south of Site 1. The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both. The graves are stone cairns in an approximate northeast-southwest orientation. The graves are located in two groups and are probably divided according to males and females. This would be the traditional method of burial practice. One grave has a headstone, but no visible inscription. The site occurs on the 1935 and 1953 aerial photographs. It may occur on the 1965 aerial map; however, the imagery is not very clear.

Significance: The site is of high significance.

SAHRA Rating: 3C and 3A.

Mitigation: The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it. However, if the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.

Finds:

Isolated finds are individual features or artefacts that occur within the study area. They are too small to be recorded as a site, but need to be noted. They are all of low significance and require no further mitigation.

Stone Cairn:

A stone cairn was noted along the eastern part of the study area near the R34. It appears to be a non-specific pile of stones possibly relating to the building of the R34.

Pottery:

Pottery shards occur throughout the area. All of the shards are undecorated and no rims and lips were observed. This makes them difficult to date. The shards outside of the recorded sites are similar to the recorded sites. This suggests they are of similar age.

Middle Stone Age (MSA):

The entire study area consists of a MSA lag deposit. ESA (Early Stone Age) and LSA (Late Stone Age) artefacts probably occur here as well, but they were not noted during the survey. The stone tools cover the range of the MSA from 250 000 years ago to 30 000 years ago. The erosion gullies have a high concentration of artefacts.

11. DESCRIPTION OF CURRENT LAND USES AND SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON THE SITE

The Umgala study area is situated in the rural outskirts of the town of Utrecht with the Balele Mountains forming a ridge along the north-eastern border. Areas of the Mining Right are situated within farmlands comprised mostly of natural or near natural vegetation used for cattle grazing, while some areas comprise of existing infrastructure such as the old Umgala mine and discard dump. The Project site therefore has four primary land uses:

- Grazing areas
- Veld
- Eroded areas, and
- Disturbed areas.

No commercial crop production is currently taking place in the project area.

The surrounding areas are comprised of a mosaic of farmlands and natural grassland interspersed with rivers, drainage lines, and wetlands. A small group of hills occurs to the south and to the west of the Umgala Project sites. The soils are highly erodible, and erosion gulleys occur on many of the hillslopes. The natural vegetation in the surrounding areas is mixture of grassland and wooded areas that are concentrated on the hills and mountain slopes. Urban settlement is concentrated within the town of Utrecht and rural/informal settlement is scattered towards the south-west. The regional road R34 is routed through the centre of the study area and connects Utrecht to the N11 national highway to the west and the R33 to the south. A full description of the existing environmental features has been provided in Section 10. A Land Capability Map and Soil Capability Map is presented in Figure 83 and Figure 84 below. Additional maps are attached under Appendix II.

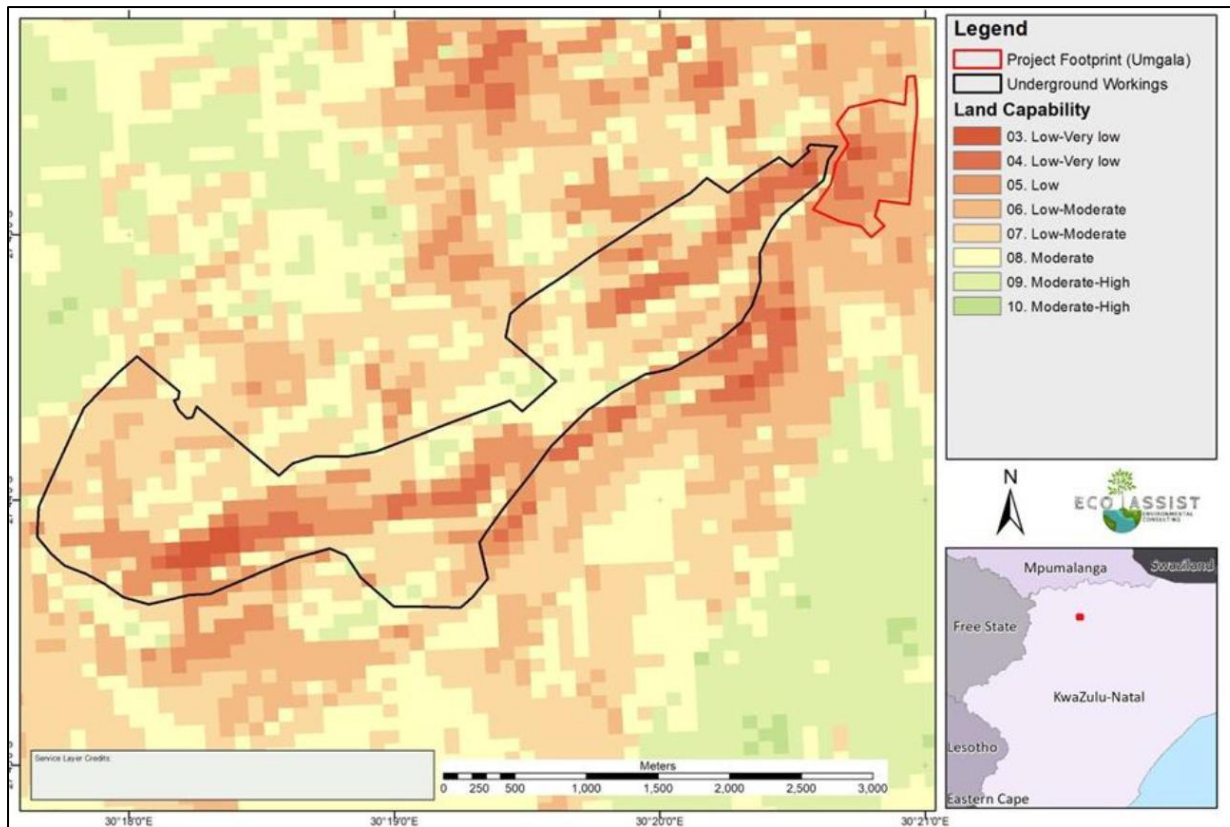


Figure 83: Land capabilities within the Umgala project area (EcoAssist, 2023)

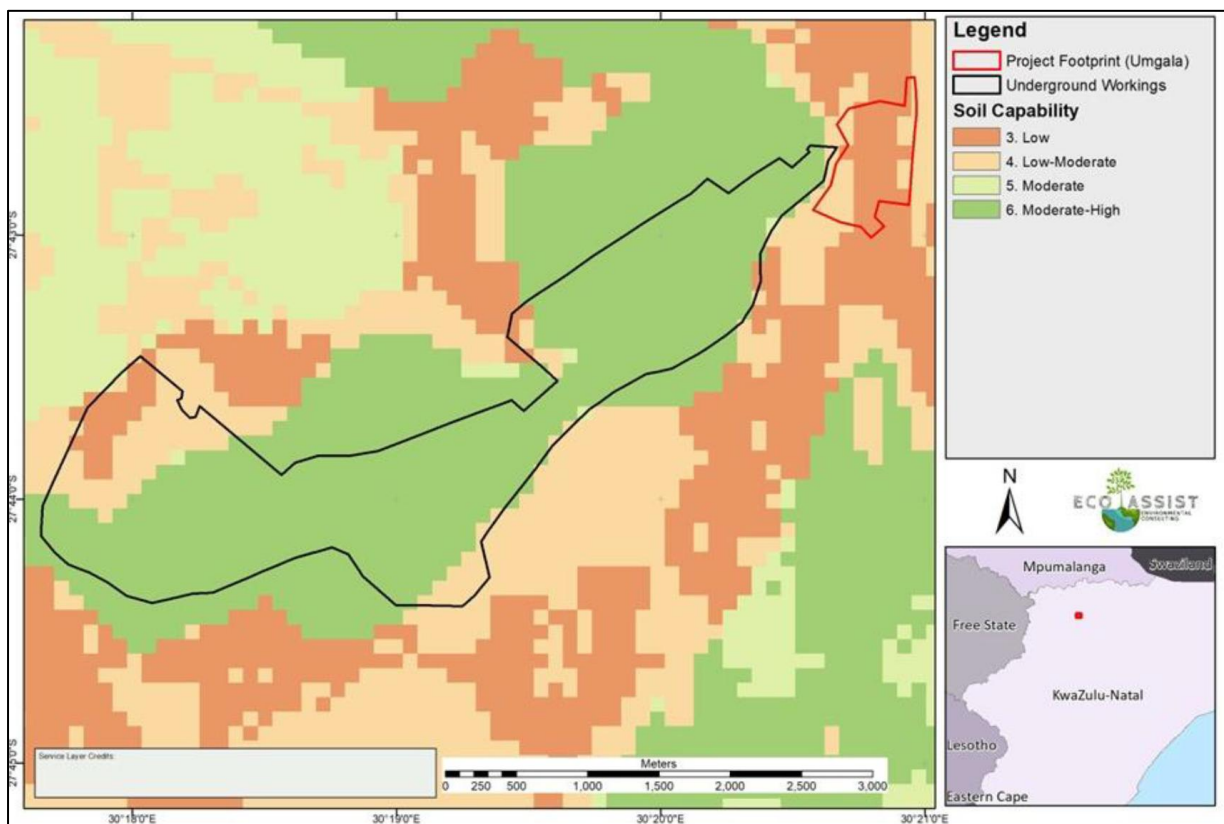


Figure 84: Soil capabilities within the Umgala project area (EcoAssist, 2023)

Zimbutu has been non-operational since mining ceased in 2004. Figure 85 shows the layout of the mine at present, following decommissioning and commencement of rehabilitation which took place in 2006. In the subsequent period since cessation, the mine has been decommissioned with most of the mine infrastructure demolished and removed from site and the operational areas rehabilitated. All infrastructure has been removed on site. Pits have been backfilled, topsoiled, contoured and re-vegetated with the exception of the Pit 19, which has been left as an evaporation pond for groundwater decant. The ETA Pit has not been backfilled as it has been left open to be used as a surface water dam by a local farmer. Water from this dam is used for livestock watering and irrigation purposes. The earmarked Pollution Control Dam (PCD) is no longer serving its function as it has gone under reclamation in previous years. The Zimbutu Discard Dump remains on site, where ongoing erosion of the discard slopes has been observed in recent years. Intervention is required to limit further degradation and to mitigate associated long-term environmental impacts such as sedimentation, water quality deterioration, and loss of soil stability. Consequently, the reclamation of the Discard Dump represents the initial step in meeting the site's rehabilitation requirement.

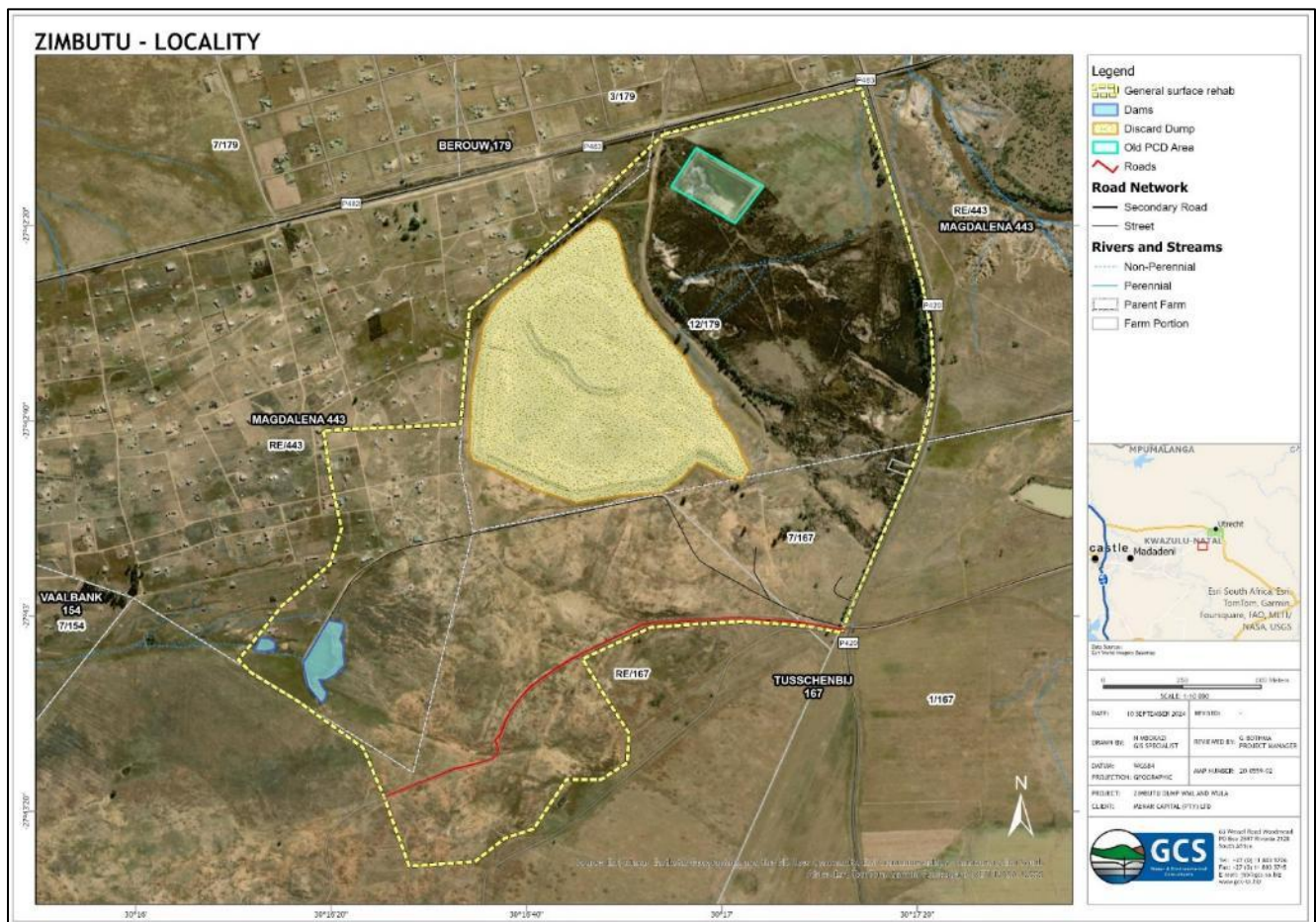


Figure 85: Zimbutu Layout Map

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

The impacts assessed in this report, were identified using input from the following:

- Views of I&APs (Pre-application and Scoping Phase)
- The existing EIAr and EMPr (dated 2009) for the Project
- The specialist studies undertaken for this application
- Screening Report
- Site visit with the project team, and
- Legislation.

During the Scoping Phase, the following impacts were identified and required further assessment in this EIAr:

- Impacts of gaseous emissions on sensitive receptors
- Dust generation
- Effect on Local Communities
- Potential impact / loss of heritage / cultural / paleo artefacts / sites
- Noise pollution / disturbance
- Change in land use
- Loss of soils and/or agricultural potential
- Disturbance of soil profiles
- Soil pollution and/or contamination
- Erosion / sedimentation of soils and drainage lines
- Alteration / destruction / pollution of drainage lines / water courses
- Groundwater pollution/contamination
- Surface water pollution/ contamination and deterioration of instream water quality
- Destruction, fragmentation and degradation of habitats and ecosystems (terrestrial and aquatic)
- Spread and/or establishment of alien and/or invasive species
- Reduced dispersal/migration of fauna (terrestrial and aquatic)
- Traffic impacts associated with the project
- Socio-economic impacts

12.1. SPECIALIST INVESTIGATIONS

Several specialist investigations were undertaken during the EIA Phase of this Project. These investigations were commissioned to ensure that the potential impacts listed above were sufficiently assessed and recommendations were made to better guide the Project.

Table 39: Summary of specialist recommendations

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
Social	Social Impact Assessment	Urban-Econ Development Economists	– Dust control measures to be in place especially in winter where the winds blow black dust from the mine to the grazing grass of the farmers. – It is recommended that the mine involve the community in all planning phases. – The mine and the municipality need to work closely together. – It is highly recommended that the mine does a house-to-house skills audit to identify the unemployed members of the community, gather a database of people to consider for job opportunities in the mine. The municipality can also assist in this regard. – The mine is urged to warn the community and not to abruptly close its doors without informing the community. – The mine to prioritize uplifting the community in terms of jobs and service delivery. – The mine not to use drinking water and ensure that drinking water doesn't get contaminated. – Provide training centres to capacitate the community with skills. – Development of Colleges in the municipality – Employ local people and capacitate the local people with specialist skills so that they can also occupy specialist positions. – Provide Bursaries to fund local students to further their studies in universities. – Develop clinics in areas that are in need. – Develop sound social labour plans – Upgrade infrastructure such as access roads that may be damaged by heavy trucks. – The mine should play a role in helping the municipality to achieve some of the Integrated Development Plan objectives of Emadlangeni Municipality. – To support SMME's in the municipality, schools and NGO's. – To contribute to the social development of the municipality. – Recognition of the chief by the mine. The chief should be always consulted in decisions that involve the community. – The mine to provide windmills, water & bore holes for the community. – Most schools in the area are overcrowded because of insufficient supply in the schools. Therefore, it would be highly appreciated for the mine to build more schools or classes for existing schools. – Support learners with study material or uniforms to those that do not have. – Build community halls for the community, and sport grounds with proper facilities. – Ensure safety of the workers and the community to be prioritised.	Section 10 Section 12 Part B
Air Quality	Atmospheric Impact Report	Soundscape	– Daily visual inspection of site operations and corrective action should dust, or smoke emissions be observed. – Quarterly inspection and reporting of dust and smoke emissions and in response to complaints. Photographic records can be useful. – Fit for purpose sampling of dustfall, PM₁₀, PM_{2.5}, and NO₂. ○ PM₁₀ and PM_{2.5} is typically sampled using gravimetric or light-scatter methods. Wind direction and speed should preferably be measured at the same location and period. ○ Dustfall sampling as per the requirements of the NDCR	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			○ At the following intervals: ▪ All: one 1-month campaign before the commencement of the construction, to establish a site-specific baseline. ▪ NO₂, PM₁₀, and PM_{2.5}: one 3-month campaign upon the commencement of each phase of the project. Thereafter as, and when needed in support of resolving complaints. – Dustfall sampling should commence prior to the construction phase and continue throughout the life of the project.	
Climate Change	Climate Change Impact Assessment	Rayten Engineering	The greatest contributor to the mines GHG emissions (based on information provided) are fugitive emissions associated with underground mining activity. It should be noted that information pertaining to Scope 3 emissions was limited, and that Scope 2 emissions were excluded as no electricity usage information could be provided. As a result, the greatest opportunity for emission reduction currently, is to minimize fugitive emissions. The mines could consider capturing CH₄ for electricity generation or as industrial fuel. Alternatively, if CH₄ utilization is not feasible, the mines could consider venting the gas to a flare, ultimately converting CH₄ to CO₂, which has a lower GWP. Mitigation measures to reduce the mine's overall carbon footprint may also include the application of energy efficiency measures (fuel use and electricity consumption) such as: – an energy efficient materials movement strategy; – energy efficient mine haul trucks; – using low carbon energy sources; – solar power as an alternative energy source to reduce the dependence on diesel for electricity generation; – carbon offsets can be introduced; – energy efficiency of lighting and cooling systems used in the offices and staff accommodation; – changing human behaviour towards improving energy efficiency (creating an organisational culture towards reducing emissions).	Section 10 Section 12 Part B
Noise	Environmental Noise Impact Assessment	Soundscape	Measures to address general industrial and transport noise are considered good practice (IFC, 2007) and should be adopted as part of the project's environmental management plan. General measures: – When selecting suppliers, choose equipment with lower sound power levels. – Install silencers for fans and suitable mufflers on engine exhausts and compressor components. – Install acoustic enclosures for equipment casing radiating noise such as generators. – Install vibration isolation for vibratory mechanical equipment such as screens, crushers, and feeders. – Avoid unnecessary activities during the night when noise impacts are generally more significant To reduce the impact of vehicles and traffic the following recommendations apply: – Avoid unnecessary revving of engines and switch off equipment/vehicles/trucks when not required. – Maintain internal road surfaces and avoid steep road gradients. – Audible reversing warning systems on vehicles should be of a type which, whilst ensuring that they give proper warning, have a minimum noise impact on nearby sensitive receptors. – Enforce speed limits.	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
Hydropedological	Hydropedology Impact Assessment	GCS Water and Environmental Consultants	– Only excavate areas applicable to the project area. – Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. – Cover excavated soils with a temporary liner to prevent contamination. – Keep the site clean of all general and domestic wastes. – All development footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential. – Retain as much indigenous vegetation as possible. – Exposed soils are to be protected using a suitable covering or revegetating. – Existing roads should be used as far as practical to gain access to the site, and crossing watercourses in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles. – Have emergency fuel & oil spill kits on site. – Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken. – Routine visual inspections of infrastructure and parking areas for signs of soil contamination. – Have emergency fuel & oil spill kits on site. – Water quality monitoring and routine visual assessment for contamination. – Discharge dewatered / rainwater collected into the nearby stream. May require authorisation. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination). – If required use silt traps or stilling basins to trap sediment runoff. – Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. – Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.	Section 10 Section 12 Part B
Visual	Visual Impact Assessment	Elemental Sustainability Proprietary Limited	– Efficient project planning: Reduce the duration of the construction phase through effective scheduling and optimal use of resources, thereby limiting the period of visual disruption. – Controlled vegetation clearance: Clearly demarcate construction zones and restrict vegetation removal to within designated boundaries. Retain surrounding grassland buffers, especially in Northern KwaZulu-Natal Moist Grassland areas, to provide natural visual screening. – Placement of laydown and camps: Locate temporary construction camps, stockpiles, and laydown areas in previously disturbed areas where feasible, avoiding ridgelines and visually exposed open slopes. – Restrict vehicle movement: Limit the movement of construction vehicles and personnel to demarcated areas and existing access routes. Reduce on-site vehicle numbers where possible to avoid dust plumes and visual congestion. – Temporary screening: Install perimeter screening (e.g., shade cloth or hessian fencing) around highly visible construction zones to reduce exposure of equipment and materials from sensitive viewpoints. – Site housekeeping: Maintain construction areas in a neat and visually orderly condition. Avoid unsightly accumulation of waste, excess materials, or abandoned equipment.	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			– Colour and materials: Use non-reflective, muted, earth-toned colours for temporary offices, fencing, and storage containers to reduce glare and better blend with the surrounding grassland environment. – Lighting controls: Restrict construction activities to daylight hours where practicable. Avoid unnecessary artificial lighting and, if required, ensure fittings are downward-directed and shielded to minimise night-time light spill. – Dust suppression: Apply approved daily dust suppression methods, including regular water spraying on exposed surfaces, unpaved roads, and stockpiles. Consider paving primary access routes if feasible. – Phased construction: Sequence activities to limit the area of exposed bare ground visible at one time. Commence early rehabilitation on completed areas to quickly re-establish vegetative cover. – Stockpile management: Shape and contour temporary material stockpiles to blend with surrounding landforms, and position them in visually discreet areas to reduce sharp contrasts with the natural landscape. – Equipment management: Use well-maintained machinery to avoid excessive exhaust, oil leaks, or unnecessary dust emissions, and ensure that equipment presents a professional, orderly appearance. – Infrastructure layout and siting: Align infrastructure with existing disturbed footprints (e.g., former processing plant site) and orient facilities in accordance with local topography to reduce direct visibility from nearby receptors, including farmsteads and the town of Utrecht. – Housekeeping: Maintain all operational areas, infrastructure, and surroundings in a neat, well-organised condition to avoid visual clutter, degraded appearance, or unsightly stockpiles. – Colour and finishes: Use non-reflective, muted colours and textures for buildings, conveyors, and stockpiles that blend with surrounding grasslands, avoiding bright or glossy finishes that increase visual contrast. – Progressive rehabilitation: Rehabilitate disturbed areas progressively, with early seeding and planting of indigenous vegetation along peripheral areas, discard dump slopes, and haul road verges to soften visual intrusion. – Screening berms and stockpiles: Shape and vegetate authorised topsoil berms to act as visual buffers between infrastructure and sensitive viewpoints, especially along the R34 and adjacent settlements. – Vegetation retention and planting: Retain existing indigenous trees where possible and supplement with indigenous tree and shrub planting along perimeter fencing and around key infrastructure to soften structural forms. – Discard dump management: Actively shape discard dumps to mimic natural landform contours, revegetate slopes as mining progresses, and avoid angular, unnatural profiles. – Lighting control: Minimise light pollution by restricting night-time lighting to what is operationally essential. Use downward-facing, shielded fixtures, timers, and motion sensors to prevent glare and unnecessary light spillage. Avoid high-mast lighting along the periphery and instead use low-profile, directional lighting in essential areas.	

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			– Traffic and movement: Regulate vehicle speed to reduce dust plumes and visual disturbance. Limit the number of operational vehicles in visually sensitive zones at any one time to avoid unnecessary visual activity. – Concurrent rehabilitation: Implement backfilling and shaping of worked-out sections in line with concurrent rehabilitation strategies to accelerate the return of landforms to a more natural state and reduce long-term visibility of disturbed surfaces.	
Hydrogeological	Geohydrological Assessment	GCS Water and Environmental Consultants	– It is recommended that several groundwater monitoring boreholes be drilled at the sited locations and as per the monitoring program. – Rock samples should be collected during mining, to maintain a clear understanding of the AMD potential of the rock being mined. It is important to use ABA and NAG as pre-emptive tools to determine if any AMD may occur. – The following can be done to improve the assumptions and understanding of the groundwater aquifer and hence improve the numerical groundwater model confidence: ○ All new exploration boreholes drilled in the area should note groundwater occurrences as well as strike depths. The data can be used to update the conceptual hydrogeological model which is incorporated into the numerical flow model. ○ Water levels of dedicated monitoring boreholes that will be drilled, as well as any new boreholes which are discovered in the area during routine hydrocensus updates, should be monitored (quarterly dedicated holes, bi-annual hydrocensus). ○ Dewatering volumes (during mining) should be recorded daily and reported bi-monthly. – It is recommended that the geochemical source terms for the site be updated during the mining phase (i.e. take geochemical samples bi-annually to verify geochemical changes of the lithology mined). Six (6) samples per annual sampling event are proposed (one from the footwall, one from the pillar and one from the highwall). – It is recommended that the numerical groundwater model and transport model be updated annually, to: ○ Recalibrate the flow system based on the dedicated monitoring boreholes drilled and routine water level monitoring data gathered for the site. ○ Confirm preferential flow paths and groundwater migration velocities as new geological data is attained via mining. ○ Evaluate the spatial impact (i.e. SO₄ plume) calibrated with the proposed monitoring borehole data. ○ Confirm long-term liabilities associated with the workings (i.e. predict likely changes in flow fields etc.); and ○ Ensure no monitoring network gaps exist (i.e. check if the monitoring network is representative of the site).	Section 10 Section 12 Part B
Hydrology	Hydrological Investigation	GCS Water and Environmental Consultants	– This assessment has concluded that the flood risk associated with the proposed mining activities is low. Further modelling could be conducted if high-resolution topography is made available. – Stormwater management should focus on the following during the construction and active phase of the mine in addition to SWMP:	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			○ Assess the site constraints and any site-specific concerns, including: Specific vegetation that may need to be identified and/or isolated from the site disturbance. ○ The type of construction should consider landform. Avoid slab-on-ground construction on steep sites. ○ Up-slope drainage catchments that must be diverted around the work site. ○ Workspace limitations may require site-specific sediment control measures and/or the extensive use of skips or bins for material storage and waste management. ○ Expected rainfall intensity during the period of disturbance (wet season vs dry season). ○ Construction is recommended to occur during the dry season. – A stabilised site access must be established and, if possible, limited to one point only. The access allows for construction vehicles to enter the work area while preventing the unnecessary tracking of sediment onto the nearby environment from multiple locations. A stabilised entry/exit point normally consists of a stabilised rock pad – Suitable material storage areas must be located up-slope of the main sediment barrier (e.g., sediment fence). – Stockpiles kept on site for more than two weeks will require an impervious cover (e.g., builder's plastic or geofabric) to protect against raindrop impact. Stockpiles of sandy material located behind a sediment fence will only need a protective cover if the stockpiles are likely to be exposed to strong winds. – On steep sites and sites with limited available space, erodible materials may need to be stored in commercial-sized bins or mini-skips before use. – Stormwater runoff should be managed as per the SWMP, and where a need for additional stormwater management is observed, measures should be taken – It is recommended that the water quality points be monitored for any changes in water chemistry and detect any significant pollution indicators.	
Wetlands	Wetlands Assessment	CEET	– It is recommended that the infrastructure designs be re-aligned, where possible, to avoid crossing watercourses. The objectives of the mitigation measures where infrastructure cross wetland areas and rivers are to ensure that the pre- and post-hydrological; geological and ecological conditions before and after installation are the same or as near as possible to reference conditions. To ensure this occurs in the long-term, the following section presents a mitigation and rehabilitation framework that should ensure that the wetlands and the contributing areas return to a condition as near to their natural state as possible. – The unavoidable loss of 22.55 Ha of Wetland Systems should be compensated through an effective Offset Program	Section 10 Section 12 Part B
Biodiversity	Terrestrial Biodiversity EIA Report	Bathusi Environmental Consultants	– <u>Offset:</u> ○ Biodiversity Offset recommendations will be considered should the Competent Authority deem this necessary upon review of the report. The present recommendation is that a Biodiversity Offset is likely to be a requirement as a result of the Endangered and Vulnerable nature of parts of the receiving environment. – <u>Rehabilitation</u>	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			○ The near-permanent nature of the proposed development (>20 years) and considering continued expansion of similar activities and infrastructure within the immediate surrounds, implies that it is extremely unlikely that the development will be decommissioned within the immediate future. Addressing unforeseen impacts that result from the development in adjacent natural habitat should be attended immediately and dealt with on a case-by-case basis. The implementation of a generic mitigation approach, which should be based on results and recommendations from a dedicated environmental monitoring programme is expected to be successful in preventing any undue impacts in the surrounding natural environment. – <u>Exclusion and avoidance:</u> ○ The proposed development plan represents an initial consideration of sensitive habitat from the study area and largely avoids these parts. An additional buffer of 100 m around these areas is strongly recommended. – <u>Minimisation of impacts:</u> ○ The recommended mitigation approach aims to minimize impacts caused by the development activity within the natural environment. The nature of the development dictates that natural habitat will be entirely compromised during land clearance activities (construction), and the resultant sterile environment will represent the status quo for the development footprint for a considerable time in future. The minimization approach therefore has the objective to limit adverse effects of the development on the surrounding ecological receiving environment and address impacts outside the development footprint caused by the development on a case-by-case basis. – <u>Avoidance or prevention:</u> ○ The nature of the development and characteristics of natural attributes within the development footprint allows for limited avoidance and prevention strategies. Loss of individual protected plants should be avoided by means of a relocation strategy for certain species. It's also recommended to avoid areas of high SEI. ○ Avoidance and prevention strategies will mostly be aimed at limiting the uncontrolled spread of impacts caused by the proposed activity into nearby/ adjacent natural habitat, notably for declared alien and invasive plant species. – <u>Permitting requirements:</u> ○ The removal and damage to any protected and conservation important plant species on the site requires compliance in terms of national and provincial legislation. In particular, the National Forest Act (1998) and Limpopo Environmental Management Act (Act No 7 of 2003, including Schedule 11 (Specially protected plants) and Schedule 12 (Protected plants)), require that permits be obtained prior to the removal, damage, or destruction of certain plant species. ○ Timelines involving permit applications need to be considered, taking cognisance of the required time of the completion, submission, and approval of permit applications by relevant authorities.	

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			It is emphasised that no activity may commence that will adversely affect protected plant species, prior to the approval of all permitting requirements. The permitting process is also dependent on the Environmental Authorisation for the project as a whole and is included as an authorisation condition. ○ A suitable Search and Rescue operation needs to be executed prior to commencement of site clearance activities. – <u>Mitigation:</u> ○ Appoint the responsible officer (Environmental Officer, EO) prior to commencement of land clearance activities. Responsibilities should include, but not necessarily be limited to, ensuring adherence to the authorisation conditions, guidance of activities, planning and reporting. The appointment of an Environmental Officer for the project should consider a suitable knowledge of biological and biodiversity aspects of the site, surrounds, and the general region. The Environmental Officer should also establish communication with a suitable ecologist as soon as possible to communicate relevant project details and direct any questions in cases of uncertainties. ○ EO should delegate and oversee the DRAFT walkdown to identify and geolocate protected plant species for permitting purposes. ○ Apply for and secure all relevant permits from DFFE and EKZN for protected plant species that occur on the site prior to any activity being undertaken. No protected plant species may be affected, removed, excavated, relocated, or impacted in any manner, except under a valid permit granted by the relevant authority and under the supervision of the appointed EO. ○ Develop and execute a Search and Rescue operation for certain plants/ trees as per recommendations from the DRAFT Walkdown Report. These plants should be relocated to a secure, suitable, and appropriate location, taking care to duplicate existing habitat conditions as far as possible. It should be noted that the transportation and relocation process of protected plant species is also subject to permitting requirements; this process should be guided by the EO and executed by a suitable horticultural specialist. ○ Develop and implement a biodiversity monitoring programme to establish long-term floristic and ecological trends and patterns and the latent and immediate effects of development and the activity on these receiving environments. ○ An Alien and Invasive Plant Management Programme should be developed and implemented at the onset of the construction phase. The aim of this programme should include (inter alia) the identification, control, and eradication of invasive plants from the site and immediate surrounds through a responsible, yet effective, management strategy that might involve a combination of physical removal methods and application of chemical treatments. The Environmental Officer shall compile relevant action plans to deal with the presence of alien and invasive species. ○ Provide consideration for the sensitive drainage lines and rivers in spatial proximity to the proposed development footprints. No effluent of damaging nature should be released or permitted to enter natural drainage lines or rivers.	

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			- Stormwater management should aim to ameliorate destructive erosion events that will result in further deterioration of the drainage channels. Erosion control should be prioritized, notably during the planning phase where slopes, runoff from paved and tarmac areas, and stormwater control measures need to be highlighted and planned to prevent erosion of surrounding natural areas. - All development areas shall be demarked, and no personnel or construction vehicles shall be allowed to access neighbouring properties or natural areas for any purpose whatsoever. - Under no circumstances shall any natural area on neighbouring properties (outside the development site footprints) be impacted, degraded, cleared, or affected in any manner. - Cleared vegetation and debris that has not been utilised must be collected and disposed of at an approved landfill site. - No painting or marking of rocks or vegetation (trees) to identify locality or other information shall be allowed, as it will disfigure the natural setting. Marking shall be done by steel stakes with tags, if required. All temporary markings will be removed upon completion of the construction. - Collection of branches, wood (dead or alive), shrubs or any vegetation for fire making purposes is strictly prohibited. - Prevent all open fires on site. - The irresponsible use of welding equipment, oxy-acetylene torches, and other naked flames, which could result in veld fires, or constitute a hazard, should be guided by safe practice guidelines. - The burning of general waste material is not to be allowed. - Provide demarcated fire-safe zones, facilities, and suitable fire control measures. - Provide temporary and suitable on-site ablution, sanitation, litter and waste management and hazardous materials management facilities until such time that adequate permanent and operational facilities can be provided. Abluting anywhere other than in provided ablutions shall not be permitted. Under no circumstances shall use of the veld for ablution purposes be permitted. - A periodic (at least annual) clean-up of the surrounding natural environment should be undertaken to remove litter and prevent unwanted deterioration of the surrounding natural environment. - Site induction for contractors and workers should include a familiarization with all aspects relating to environmental components of the project. - Ensure the implementation of erosion control measures on the perimeter of the development, aimed at avoiding exacerbation of the existing erosion patterns. - The use of locally indigenous plant species for landscaping purposes is strongly recommended. Under no circumstances shall exotic and invasive plants be used for landscaping purposes. - Rehabilitation shall be prioritised in areas where construction activities have been completed.	
Traffic	Traffic Impact Assessment	Emaan Traffic Engineers	Infrastructure layout and siting: Align infrastructure with existing disturbed footprints (e.g., former processing plant site) and orient facilities in accordance with local topography to reduce direct visibility from nearby receptors, including farmsteads and the town of Utrecht.	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			- Housekeeping: Maintain all operational areas, infrastructure, and surroundings in a neat, well-organised condition to avoid visual clutter, degraded appearance, or unsightly stockpiles. - Colour and finishes: Use non-reflective, muted colours and textures for buildings, conveyors, and stockpiles that blend with surrounding grasslands, avoiding bright or glossy finishes that increase visual contrast. - Progressive rehabilitation: Rehabilitate disturbed areas progressively, with early seeding and planting of indigenous vegetation along peripheral areas, discard dump slopes, and haul road verges to soften visual intrusion. - Screening berms and stockpiles: Shape and vegetate authorised topsoil berms to act as visual buffers between infrastructure and sensitive viewpoints, especially along the R34 and adjacent settlements. - Vegetation retention and planting: Retain existing indigenous trees where possible and supplement with indigenous tree and shrub planting along perimeter fencing and around key infrastructure to soften structural forms. - Discard dump management: Actively shape discard dumps to mimic natural landform contours, revegetate slopes as mining progresses, and avoid angular, unnatural profiles. - Lighting control: Minimise light pollution by restricting night-time lighting to what is operationally essential. Use downward-facing, shielded fixtures, timers, and motion sensors to prevent glare and unnecessary light spillage. Avoid high-mast lighting along the periphery and instead use low-profile, directional lighting in essential areas. - Traffic and movement: Regulate vehicle speed to reduce dust plumes and visual disturbance. Limit the number of operational vehicles in visually sensitive zones at any one time to avoid unnecessary visual activity. - Concurrent rehabilitation: Implement backfilling and shaping of worked-out sections in line with concurrent rehabilitation strategies to accelerate the return of landforms to a more natural state and reduce long-term visibility of disturbed surfaces.	
Heritage	Heritage Impact Assessment	Umlando: Archaeological Surveys and Heritage Management	<u>Site 1:</u> - The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it. However, if the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a Public Participation Process (PPP) will be required specifically dealing with graves. <u>Site 2:</u> - The site is within the fenced area. The site currently has a 50m exclusion buffer around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. - If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a PPP will be required specifically dealing with graves.	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			Reburial is an option if the local community claims the remains. Otherwise, it is an archaeological site with no claimants and the remains would go to KZNARI (KwaZulu-Natal Amafa & Research Institute). <u>Site 4:</u> – The site occurs within the fenced off area. The site currently has two 50m exclusion buffers around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – The second buffer is for Grave 7. All features fall within these 50m buffer and the buffer needs to be fenced. If the site will be affected, then it will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains. <u>Site 5:</u> – The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.	
Infrastructure, and sites of potential cultural significance, people and animals	Blasting Impact Assessment	Blast Management and Consulting	Sensitive areas identified within the Blasting Impact Assessment is provided in Figure 86. The following mitigation measures are provided: <u>Fly rock:</u> – Increasing the stemming length ratio to blasthole diameter – either changing to a smaller diameter blasthole or increasing the actual stemming length. – The use of aggregate stemming material of correct size ratio – 10 % of the blasthole diameter or closest size. – Increasing the stemming to 30 times the blasthole diameter will reduce the range of fly rock significantly. – The effect of increased stemming length will also assist in reducing the levels of air blast. – Covering of the heritage sites within the calculated fly rock unsafe zone, by means of conveyor/blasting mats. <u>Ground Vibration:</u> – Mitigation of ground vibration for this can be done by applying the following methods: – Do a blast design that considers the actual blasting and the ground vibration limits to be adhered to. – Change of bench heights with smaller diameter blastholes can be considered. – Multiple charge decks in a blasthole initiated separately to reduce the charge mass per delay can be considered. – Only use electronic initiation systems to reduce the number of blastholes per delay or single hole firing. – Do blast design for smaller diameter blast holes that will use fewer explosives per blast hole.	Section 10 Section 12 Part B

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			<u>Relocation:</u> - Relocation of the graves closest to the Adit outline area is an option to consider. However, the time required for establishing the Adit is limited. Only a limited number of blasts are expected to be done on the maximum depth with a charge mass per delay of 1519 Kg. It is expected that approximately minimum of four to six blasts will be conducted. This limited influence on these sites can be discussed with the heritage specialist to determine acceptance to keep these sites in place or if relocation mitigations should be considered. <u>Blast Designs:</u> - Blast designs can be reviewed before the first blast is planned and executed. Consideration should be given to the location of the blast in relation to the points of concern. The limits of the concerned points are to be factored into such a design. The following parameters can be applied to assist: changed diameter of blastholes, and electronic initiation can be applied as an additional mitigation measure. This will allow for single blast hole firing instead of multiple blast holes, where necessary, if ground vibration is of concern for the specific blast. Single-hole firing means less charge mass per delay and less influence. Attention must be given to stemming material and stemming length. <u>Stemming length:</u> - The current proposed stemming lengths used provide for limited control of fly rock. Consideration can be given to increasing this length for better control. Specific designs where distances between the blast and the point of concern are known should be considered. Recommended stemming length should range between 25 and 30 times the blast hole diameter. In cases for strict fly control, this should range between 30 and 34 times the blast hole diameter. Increased stemming lengths will also contribute to more acceptable air blast levels. <u>Safe blasting distance and evacuation:</u> - Calculated minimum safe distance is 233 m. The final blast designs that may be used will determine the final decision on the safe distance to evacuate people and animals. This distance may be greater pending the final code of practice of the mine and the responsible blaster's decision on safe distance. The blaster has a legal obligation concerning the safe distance, and he needs to determine this distance. <u>Road management:</u> - The nearest road on the eastern side of the project area – R34 is at closest distance of 160 m. Specific considerations regarding effects from blast-induced ground vibration and fly rock will be required for this road. There may also be people and animals on these routes, and will require careful planning to maintain a safe blasting radius and clearance. <u>Photographic Inspections:</u> The option of a photographic survey of all structures up to 1500 m from the Adit area is recommended. The mine will be operating for a significant number of years. This will give an advantage in any negotiations with regard to	

Environmental Aspect	Corresponding Specialist Assessment	Specialist	Key Recommendations from Specialist Report (refer to Section 12.7 for Mitigation Measures)	Reference of the Applicable Section of the Report where the Recommendation has been Included
			complaints from neighbours on structural issues due to blasting. This process can, however, only succeed if done in conjunction with a proper monitoring program. It is expected that ground vibration levels will be significantly less than proposed limits at 1500 m, but this process will ensure a record of the pre-blasting status of the nearest structures to the Adit area.	

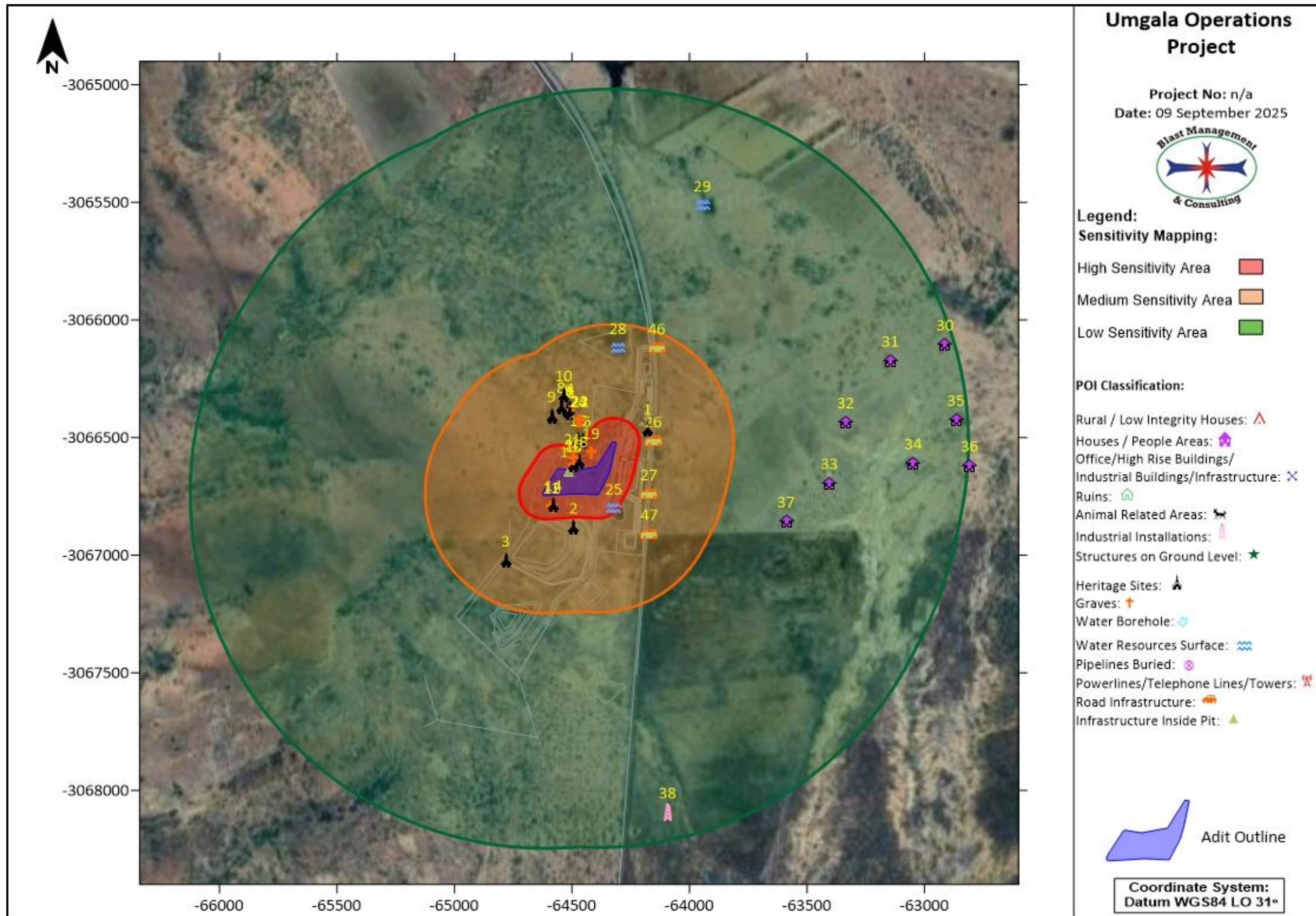


Figure 86: Identified sensitive areas - Umgala adit (Blast Management and Consulting, 2025)

12.2. METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF ENVIRONMENTAL IMPACTS

Possible impacts are identified through comments from I&APs, specialist reports, and from the EAP's experience.

The assessment of potential impacts was addressed in GCS's standard manner during Scoping and now in the EIA phase, to ensure that a wide range of impacts were comparable. The ranking criteria and rating scales were applied to all specialist studies for the Project. To enable a scientific approach to the determination of the environmental significance (importance), a numerical value is linked to each rating scale.

Clearly defined rating and rankings scales (Table 40 - Table 46) will be used to assess the impacts associated with the Project. The impacts identified by each specialist study and through PPP will be combined into a single impact rating table for ease of assessment.

Table 40: Severity or magnitude of impact

Not applicable/none/negligible	0
Minor/insignificant/non-harmful (no loss of species/habitat)	2
Low/small/potentially harmful (replaceable loss with minimal effort)	4
Moderate/significant/slightly harmful (replaceable loss of species/habitat with great effort and investment)	6
High/highly Significant/harmful (impact to human health or welfare/loss of species/habitat)	8
Very High/extremely significant/extremely harmful/within a regulated sensitive area (loss of human life/irreplaceable loss of Red Data species/conservation habitat)	10

Table 41: Spatial Scale of activity

Not applicable/none/negligible	0
Site only	1
Local (within 5km)	2
Regional/neighbouring areas (5 km to 50 km)	3
National	4
International	5

Table 42: Duration of the activity

Not applicable/none/negligible	0
Immediate (immediately reversible with minimal effort)	1
Short-term (0-5 years - reversible)	2
Medium-term (5 to 15 years – difficult to reverse with effort)	3
Long-term/life of the activity (very difficult to reverse with extensive effort)	4
Permanent/beyond life of the activity (not reversible)	5

Table 43: Frequency of activity

Not applicable/none/negligible	0
Improbable /almost never/annually or less	1
Low probability/very seldom/6 monthly	2
Medium probability/infrequent/temporary/monthly	3
Highly probable/often/semi-permanent/weekly	4
Definite/always/permanent/daily	5

Table 44: Frequency of impact

Almost never/almost impossible/>20%	1
Very seldom/highly unlikely/>40%	2
Infrequent/unlikely/seldom/>60%	3
Often/regularly/likely/possible/>80%	4
Daily/highly likely/definitely/>100%	5

Table 45: Legal Issues – governance of activity by legislation

No legislation	1
Fully covered by legislation	5

Table 46: Detection (how quickly/easily impacts/risks of activity on environment, people

Immediately (easier to mitigate)	1
Without much effort	2
Need some effort	3
Remote and difficult to observe	4
Covered (more difficult to mitigate)	5

Each impact identified must be assessed in terms of probability (likelihood of occurring); the consequence of the impact (spatial scale, severity and duration); and the associated risk (impact significance).

Consequence was then determined as follows:

$$\text{CONSEQUENCE} = \text{Severity} + \text{Spatial Scale} + \text{Duration}$$

The probability or likelihood of occurrence of the activity was then calculated based on frequencies of the activity and impact, whether the activity is governed by legislation and how easily it can be detected:

$$\text{LIKELIHOOD} = \text{Frequency of Activity} + \text{Frequency of Impact} + \text{Legal issues} + \text{Detection}$$

The significance or risk of each identified impact was then based on the product of consequence and likelihood:

$$\text{ENVIRONMENTAL SIGNIFICANCE/RISK} = \text{Consequence} \times \text{Likelihood}$$

Impacts will be rated as either of high, medium or low significance on the basis provided in Table 48.

Table 47. Each impact is assessed in terms of the level to which there is an irreplaceable loss of resources and its degree of reversibility. The ratings as described in the sub-categories in Table 48.

Table 47: Impact significance ratings

Significance	Environmental Risk Rating	Colour Code
High (positive)	>240	H
Medium (positive)	120 to 240	M
Low (positive)	<120	L
Neutral	0	N
Low (negative)	> -120	L
Medium (negative)	-120 to -240	M
High (negative)	<-240 (max = 400)	H

Table 48: Sub-categories

Significance	Extreme	Very High	High	Moderate	Significance	Extreme	Very High	High	Moderate
High	260-400	320-359	280-319	241-279	High	260-400	320-359	280-319	241-279
Significance	High	Moderate	Medium		Significance	High	Moderate	Low	
Medium	200-240	160-199	120-159		Medium	200-240	160-199	120-159	
Significance	Moderate	Moderate	Low		Significance	High	Moderate	Negligible	
Low	80-119	40-79	1-39		Low	80-119	40-79	1-39	

Table 49: Irreplaceability of resource caused by impacts

No irreplaceable resources will be impacted (the affected resource is easy to replace/rehabilitate)	Low
Resources that will be impacted can be replaced, with effort	Medium
Project will destroy unique resources that cannot be replaced	High

Table 50: Reversibility of impacts

Low reversibility to non-reversible	High
Moderate reversibility of impacts	Medium
High reversibility of impacts	Low

The significance of an impact gives one indication of the level of mitigation measures required in order to minimise negative impacts and reduce environmental damage during the construction, operational and decommissioning phases. Suitable and appropriate mitigation measures, to ensure avoidance, management and mitigation of impacts, will be identified for each of the potential impacts based on specialist recommendations and the EAP's expertise.

12.3. THE POSITIVE AND NEGATIVE IMPACTS THAT THE PROPOSED ACTIVITY WILL HAVE ON THE ENVIRONMENT AND THE COMMUNITY THAT MAY BE AFFECTED

Table 51 below provides a summary of the positive and negative impacts associated with the Project. The full impact assessment for each activity can be found in Section 12.7 below.

Table 51: Summary of positive and negative impacts

Aspect	Impact
Air quality	Construction activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.
Noise	Increase in ambient noise levels
Soil and agricultural potential	- Loss of Soil as a Valuable Resource through erosion, compaction, and contamination - Loss of Agricultural Resources and Infrastructure - Loss of Land Capability
Wetlands	- During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may result in the temporary disturbance of Wetlands. - During the construction phase, the clearance of vegetation and compaction of soil may result in increased run-off and erosion, altering hydrological and geomorphological processes. - During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may reduce ecological connectivity and disturb the watercourse/terrestrial edge. - During the construction phase, accidental spillages of wet concrete and chemical / hazardous substances may result in soil and groundwater contamination, adversely affecting the aquatic ecosystems in the broader area. - Dumping of spoil at the designated sites using haulage routes. - Disruption of the soil profile and thus creation of excess sediment; Potential disturbance to native and/or indigenous plant species; Aesthetic and potentially noise disturbance within the area. - Permanent change in the surface hydrology from hardened surfaces. Reduced infiltration rates and increased risk of erosion from permanent change in the surface hydrology from hardened surfaces. - Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems.
Aquatic	- Water quality deterioration - Building materials & solid waste (plastics, polystyrene, etc) entering / disposed of in wetlands - Contamination (oils, fuels, chemicals) - Surface water pollution - Soil contamination from chemicals - Human waste - Surface water pollution - Increased turbidity - Wetland geomorphological alteration
Geohydrology	- Lowering of water levels due to dewatering of excavations for construction - Increased fracturing and altering of flow patterns due to blasting - Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices. - Increased runoff from the site as a result of vegetation clearing and construction activities. - Poor quality seepage from the existing underground workings into the weathered and fractured aquifer.

Aspect	Impact
	– Poor quality seepage from the proposed PCD's, sumps, ROM stockpiles, Discard dump, softs dump, hards dump, top-soils dump, workshops, fuel storage, ablutions (septic tanks), dirty water trenches and processing plant into the aquifer. – Groundwater ingress due to underground mining of coal – Increased fracturing and altering of flow patterns due to blasting. – Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices
Hydropedology	– Soil & surface water contamination and sedimentation from the following activities: – Leakages from vehicles and mine machines, and seepage from mine materials (i.e., construction material for permanent facilities, cement, paint, etc.). – Erosion and sedimentation of watercourses as a result of mine preparation activities, stockpiling and initial mining phase due to unforeseen circumstances (i.e., bad weather); and – Alteration of natural drainage lines may lead to ponding or increased runoff patterns (i.e., may cause stagnant water levels or increase erosion). – Vegetation loss will likely decrease soil infiltration and increase runoff, which will likely increase erosion. – Surface water interception and reduced rainfall runoff to watercourses and drainage servitudes – Decreased groundwater recharge due to interception of natural soil water occurrences. – Soil pollution through nutrient leaching from the adit, ROM pad, PCD (will be lined so unlikely), hard and soft stockpiles. – Soil quality could be compromised if oil & fuel spills from vehicles occur during the operational phase at the site. – Disturbing the inner-soil architecture of the original soil profile will disturb natural flow processes (i.e. a result of infilling or cut-and-fill activities). – Excavated soil will be placed in other areas (i.e. on top of other soils) and will have an impact on the flow dynamics of the soil it is dumped on top of. This may reduce rainfall infiltration and induce runoff. – Impermeable areas will decrease rainfall infiltration into soils, and hence reduce interflow (A/B and A/bedrock) or lateral flow to downstream wetland areas.
Traffic	– The construction phase of the proposed mines will generate additional traffic on the surrounding road network within the study area. – The additional traffic generated by the proposed mining operations will have some impact on the space available for pedestrians. – The proposed mines are expected to generate moderate traffic volumes, which may have a limited effect on prevailing safety conditions. – There will be a moderate impact on the road network condition due to the additional heavy vehicle traffic generated during the operational phase.
Hydrology	<u>Stormwater Runoff</u> – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Increased runoff due to compaction of surfaces and changes in surface topography <u>Water quality</u> – Contaminant transport in runoff from sediment to oil and fuel spills – Spillage of PCDs, slurry dams and stormwater conduits <u>AMD</u> – Contaminant transport in runoff from overburden dumps

Aspect	Impact
Social	– Positive impact on community development due to skills development through training and capacity building – Positive impact on community due to employment creation and income generation – Positive impact on business community through stimulation of entrepreneurship and business activities in the value chain – Negative impact on community safety due to in-migration of jobseekers. – Impact on communities due to changes in family dynamics – Impact on agriculture due to changes in air and water quality – Impact on health of communities due to noise and air quality changes. – Impact on culture and heritage due to exhumation and relocation of burial sites (if applicable) – Impact on communities through misrepresentation by traditional authorities – Impact on tourism sector due to mine activities – Impact on communities due to increased incidents of crime and increased burden on police services.
Biodiversity	<u>Terrestrial biodiversity theme:</u> – Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types – Loss and deterioration of habitat included in local and regional conservation categories (e.g. CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.) – Deterioration and changes to sensitive, natural, rangerestricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint – Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes – Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types – Loss and deterioration of habitat included in local and regional conservation categories (e.g. CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.) – Deterioration and changes to sensitive, natural, rangerestricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint – Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes <u>Plant species theme:</u> – Loss of threatened plant species or other species of conservation importance (i.e. provincially protected), and/ or habitat associated with these taxa – Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity) – Deterioration and changes to sensitive, natural, rangerestricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns – Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural

Aspect	Impact
	habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns – Introduction and exacerbation of exotic and invasive species to the area – Loss of threatened plant species or other species of conservation importance (i.e. provincially protected), and/ or habitat associated with these taxa – Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity) – Deterioration and changes to sensitive, natural, range restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns – Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns – Introduction and exacerbation of exotic and invasive species to the area <u>Animal species theme:</u> – Direct and permanent loss of natural fauna habitat, IN PARTICULAR THREATENED INVERTEBRATE HABITAT within the development/mining footprints during the construction, operational and also the decommissioning phases – Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases. – Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc – Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability – Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site – Direct and permanent loss of natural fauna habitat within the development/mining footprints during the construction, operational and also the decommissioning phases – Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases. – Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc – Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability – Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site
Visual	– Negative impacts on aesthetics – Negative impact on visibility from sensitive receptors/Viewpoints – Change of visual character from a natural landscape to a built landscape – Landscape visual change
Heritage	– Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal. – Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include:

Aspect	Impact
	○ Stone walled kraal ○ terracing (for a house) ○ two possible graves ○ undecorated, thin-walled pottery – Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace – Potential disturbance to site 4 - The site consists of several features and artefacts that include: ○ Stone walling ○ Graves ○ Terracing ○ Stone cairns ○ Pottery – Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both. – Potential disturbance to finds, stone cairns, pottery, open MSA scatters
Blasting	– Ground Vibration - Exceeding Limits and Possible Damage to sites 1 – 12, 14 -17, 19, 21 -47 (as per the Blasting Impact Assessment report) – Ground Vibration - Exceeding Limits and Possible Damage to sites 13, 18, 20 (as per the Blasting Impact Assessment) – Air Blast - Exceeding Limits and Possible Damage to sites 1 – 36, 38 – 47 (as per the Blasting Impact Assessment) – Air Blast - Exceeding Limits and Possible Damage to sites 37 (as per the Blasting Impact Assessment) – Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 1,2, 4 - 27 and 47 (as per the Blasting Impact Assessment) – Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 3, 28 – 46 (as per the Blasting Impact Assessment report).

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

A list of mitigation measures is provided in the impact assessment tables (Table 56, Table 57 and in Section 12.7 below).

12.5. MOTIVATION WHERE NO ALTERNATIVES WERE CONSIDERED

A full description of the alternatives considered, including the positive and negative impacts, are provided in Section 8 in this report and therefore, not repeated here.

12.6. STATEMENT MOTIVATING THE ALTERNATIVE DEVELOPMENT LOCATION WITHIN THE OVERALL SITE

Refer to the motivation of the preferred Project location in Section 8 of the report.

12.7. ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

The impact assessment and significance for each Project activity and theme were determined by a suitably qualified specialist. These include qualitative and quantitative assessments. The section below outlines the quantitative assessments undertaken for air and noise as well as geohydrological impacts.

12.7.1. Atmospheric Impact Assessment

The atmospheric impact assessment was undertaken by Soundscape in 2024. The full report is attached as Appendix IV.

12.7.1.1. Modelling

The impact of the project on the atmospheric environment was determined through simulation of ambient pollutant concentrations and dustfall rates using an atmospheric dispersion model.

Dispersion models simulate ambient pollutant concentrations as a function of source configurations, emission strengths and meteorological characteristics, thus providing a useful tool to ascertain the spatial and temporal patterns in the ground level concentrations arising from the emissions of various sources. Increasing reliance has been placed on concentration estimates from models as the primary basis for environmental and health impact assessments, risk assessments and emission control requirements.

A Level 2 assessment was conducted as per the Regulations Regarding Air Dispersion Modelling (DEA, 2014). The methodology adopted in the simulation of air quality impacts associated with this project is described hereafter.

Version 10 of Trinity Consultant's Breeze AERMOD and the US EPA Aermod version 9.2 released in May 2021 was used in the study. The AERMOD atmospheric modelling system, developed by the American Meteorological Society and US EPA Regulatory Model Improvement Committee, includes three modules namely, a steady-state dispersion model designed for short-range (up to 50 kilometres) dispersion of air pollutant emissions from stationary industrial sources, a meteorological data pre-processor (AERMET), and a terrain pre-processor (AERMAP).

The AERMET pre-processor was used to calculate atmospheric parameters needed by the dispersion model, such as atmospheric turbulence characteristics, mixing heights, friction velocity, Monin-Obukhov length and surface heat flux from available meteorological data.

The purpose of AERMAP is to provide a physical relationship between terrain features and the behaviour of air pollution plumes.

12.7.1.2. Results

Dispersion simulation results are summarised in Table 52 and Table 53. In summary:

- No exceedance of NAAQS for CO, PM_{2.5}, or SO₂ are expected at sensitive receptors, neither incrementally nor cumulatively.
- Simulations indicate exceedance of criteria for NO₂, PM₁₀, PM_{2.5}, and dustfall at sensitive receptors.

- NO₂ concentrations reduce can be reduced to levels below the 1-hour NAAQS by ensuring diesel mobile mining equipment and generators are fitted with appropriate controls such as catalytic converters to meet international emission limits for such equipment.
- To achieve the necessary reduction in PM₁₀ emissions and ensure compliance with the 24-hour NNAQS at sensitive receptors, significant efforts must be made (Level 3 mitigation). This will involve the implementation of well-coordinated, effective, and tailored mitigation measures specific to each emission source.
- Such measures will also reduce dustfall rates to levels within the limit for residential areas.
- The non-carcinogenic health impact screening indicates no exceedances of criteria.
- Increased life-time cancer risk, conservatively estimated, is shown to be moderate to low.

Table 52: Simulation results for criteria air pollutants and dustfall

Pollutant	Averaging period	Reported percentile	Unit	NAAQS/ NDCS	Emission scenario			
					Level 1 mitigation	Level 2 mitigation	Level 3 mitigation	Cumulative (project plus background)
CO	8-hour	99 th	µg/m ³	10 000	163	-	-	356
	1-hour	99 th	µg/m ³	30 000	230	-	-	423
NO ₂	1-year	n/a	µg/m ³	40	29.4	8.54	-	13.8
	1-hour	99 th	µg/m ³	200	273	114	-	125
PM ₁₀	1-year	n/a	µg/m ³	40	27.9	15.6	8.58	29.6
	24-hour	99 th	µg/m ³	75	141	78.9	43.9	85.9
PM _{2.5}	1-year	n/a	µg/m ³	20	4.73	3.63	3.05	12.1
	24-hour	99 th	µg/m ³	40	25.7	19.1	16.1	34.1
SO ₂	1-year	n/a	µg/m ³	50	0.127	-	-	11.2
	24-hour	99 th	µg/m ³	125	0.68	-	-	22.9
	1-hour	99 th	µg/m ³	350	1.68	-	-	23.9
Dustfall	1-month	100 th	mg/m ² - day	600	622	326	156	-

Notes:

n/a not applicable
highlight exceeds NAAQS/NDCS

Table 53: Health impact screening for non-criteria pollutant concentrations

Impacts assessed ^(a)	Health, non-carcinogenic ^(d)	Health, increased lifetime cancer risk ^(e)
Indices	Long-term exposure "risk ratio"	Increased Lifetime Cancer Risk
Screening criteria	1	Moderate risk i.e., less than 1 in 10 000 Low risk i.e., less than 1 in 100 000 Very low risk i.e., less than 1 in 1 million
Diesel engine exhaust ^(b)	0.5	Moderate risk
Formaldehyde ^(c)	0.05	Low risk

Notes:

- n/a not applicable
- Maximum impact at sensitive receptors.
 - PM_{2.5} concentrations because of diesel engines and generators
 - Formaldehyde is about 19% of diesel engine exhaust emissions (NPI, 2008).

- d) Calculated as the ratio of simulated 1-year concentration and long-term inhalation reference concentration for each compound. A "risk ratio" greater than or equal to 1 indicates an exceedence. Increased lifetime cancer risk is the product of the simulated 1-year average concentration and each compound's risk factor

12.7.2. Noise Impact Assessment

A Noise Impact Assessment was undertaken by Soundscape in 2024. The full report is attached as Appendix IV

12.7.2.1. Construction phase

Where a noise source is to be introduced in an area, the noise impact is calculated by determining the difference between the cumulative expected rating level (project plus existing) and the desired rating level (existing). Noise impacts during the construction phase Table 54 will be in the order of 5 to 10 dBA at the nearest receptors i.e. those within 100 to 200 m from activities. According to SANS 10103, medium reaction and widespread complaints may be expected. At receptors further afield, the noise impact will likely be less than 5 dBA i.e. when little community response and sporadic complaints may be expected.

Table 54: Noise impact during the construction phase

Distance from construction activity (m)	Expected daytime rating level (dBA)	Desired daytime rating level (dBA)	Daytime noise impact (dBA)
100	61.1	50.2	10.8
200	56.0	50.2	5.8
400	52.5	50.2	2.3
800	50.9	50.2	0.7
1 600	50.4	50.2	0.2

12.7.2.2. Operational phase

Operational phase noise impacts, calculated by determining the difference between expected cumulative rating levels and the desired rating levels, are presented in Table 13.

Both daytime and night-time noise impacts of the project is less than 5 dBA at noise-sensitive receptors According to the SANS 10103 categories of community or group response, it may result in *little reaction with only sporadic complaints*.

An increase in noise level of 3 dBA is just detectable by a person with average hearing acuity (IFC, 2007). The only receptors likely to be exposed to a noise impact of 3 dBA or higher are the farmsteads east of the Umgala adit section.

Table 55: Noise impact during the operational phase, cumulative

Receptor ID	Receptor Description	Daytime			Nighttime		
		Expected rating level (dBA), cumulative	Desired rating level (dBA)	Noise impact (dBA)	Expected rating level (dBA), cumulative	Desired rating level (dBA)	Noise impact (dBA)
5	Farmstead	52.8	50.2	2.6	52.3	48.3	3.9
7	Farmstead	52.2	50.2	2.0	51.5	48.3	3.1
9	Farmstead	51.9	50.2	1.7	50.9	48.3	2.6
8	Farmstead	51.8	50.2	1.6	51.0	48.3	2.6
1	Farmstead	51.8	50.2	1.5	50.4	48.3	2.1
11	Farmstead	51.7	50.2	1.5	50.7	48.3	2.4
10	Farmstead	51.1	50.2	0.9	49.8	48.3	1.5
14	Watson St, Utrecht	50.9	50.2	0.7	49.5	48.3	1.1
13	Zuid St, Utrecht	50.9	50.2	0.7	49.4	48.3	1.0
6	Farmstead	50.6	50.2	0.4	49.1	48.3	0.7
2	Farmstead	50.4	50.2	0.2	48.7	48.3	0.4
12	Utrecht expansion	50.4	50.2	0.2	48.5	48.3	0.2
3	Farmstead	50.4	50.2	0.2	48.6	48.3	0.3
4	Farmstead	50.3	50.2	0.1	48.5	48.3	0.2
15	Farmstead	50.2	50.2	<0.1	48.4	48.3	0.1
18	DoT, Utrecht	50.2	50.2	<0.1	48.4	48.3	<0.1
29	Farmstead	50.2	50.2	<0.1	48.4	48.3	<0.1
Other	Mainly farmsteads	50.2	50.2	<0.1		48.3	<0.1

12.7.3. Geohydrological Impact Assessment

A geohydrological impact assessment was undertaken by GCS in 2024, The full report is attached is Appendix IV.

12.7.3.1. Calibrated flow models

The calibrated flow model is shown in Figure 87. The following observations are made from the calibrated flow model:

- Groundwater flow towards the non-perennial streams in the area is observed.
- The flow model indicates flow velocities ranging from 0.001 to 0.1 m/day. Hence, groundwater flow through the aquifer is slow, with higher velocities nearing the alluvium sediments. Groundwater movement in the weathered zone is greater than that of the deeper aquifer zones, as well as several orders greater in the alluvium zones when compared to the host rock.

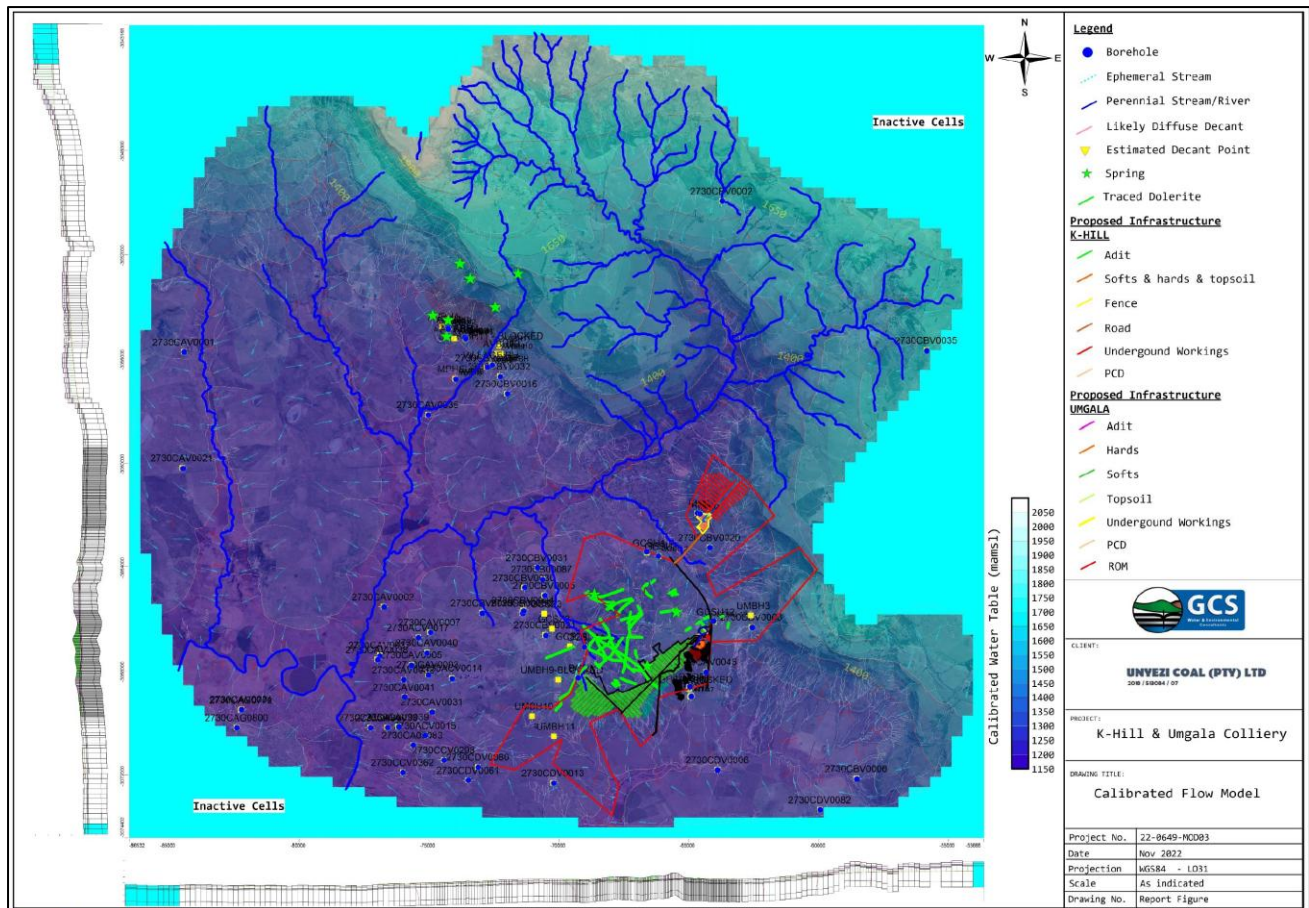


Figure 87: Calibrated flow model

12.7.3.1.1. Predicted aquifer drawdown

The predicted 2D aquifer drawdown zone at LOM is shown in Figure 88. From the drawdown zone of influence generated, the following is noted:

- A maximum aquifer drawdown of 40 m, can be, with the lowest drawdown in the order of 2 m. Greater drawdown is observed towards the eastern sections of the proposed underground workings.
- Identified groundwater users fall outside the dewatering ZOI.
- Due to the mining depth (> 120 mbgl), and the presence of the dolerite sill overlaying the mine works, dewatering of the non-perennial streams in the mountains which fall in the ZOI area is unlikely. These streams are ephemeral and hence primarily driven by runoff during rain events.
- The springs discovered in the area, F1, likely fall within a 1.9 m drawdown ZOI. Moreover, the aquifer units draining to these discharge points fall within the dewatering zone associated with the fractured aquifer to the weathered aquifer transition zone. There may be a likely impact on spring flow based on the model output. However, it should be noted that if springs are fed by groundwater from the perched aquifer above the mine works (situated on dolerite sills and the underlying Karoo sediments outcrop). Hence, there may be no dewatering impact, but the springs should be monitored during mining to confirm the interconnectivity of the perched and deeper aquifer systems.

- The springs should be monitored before and during mining to evaluate the mining impact.

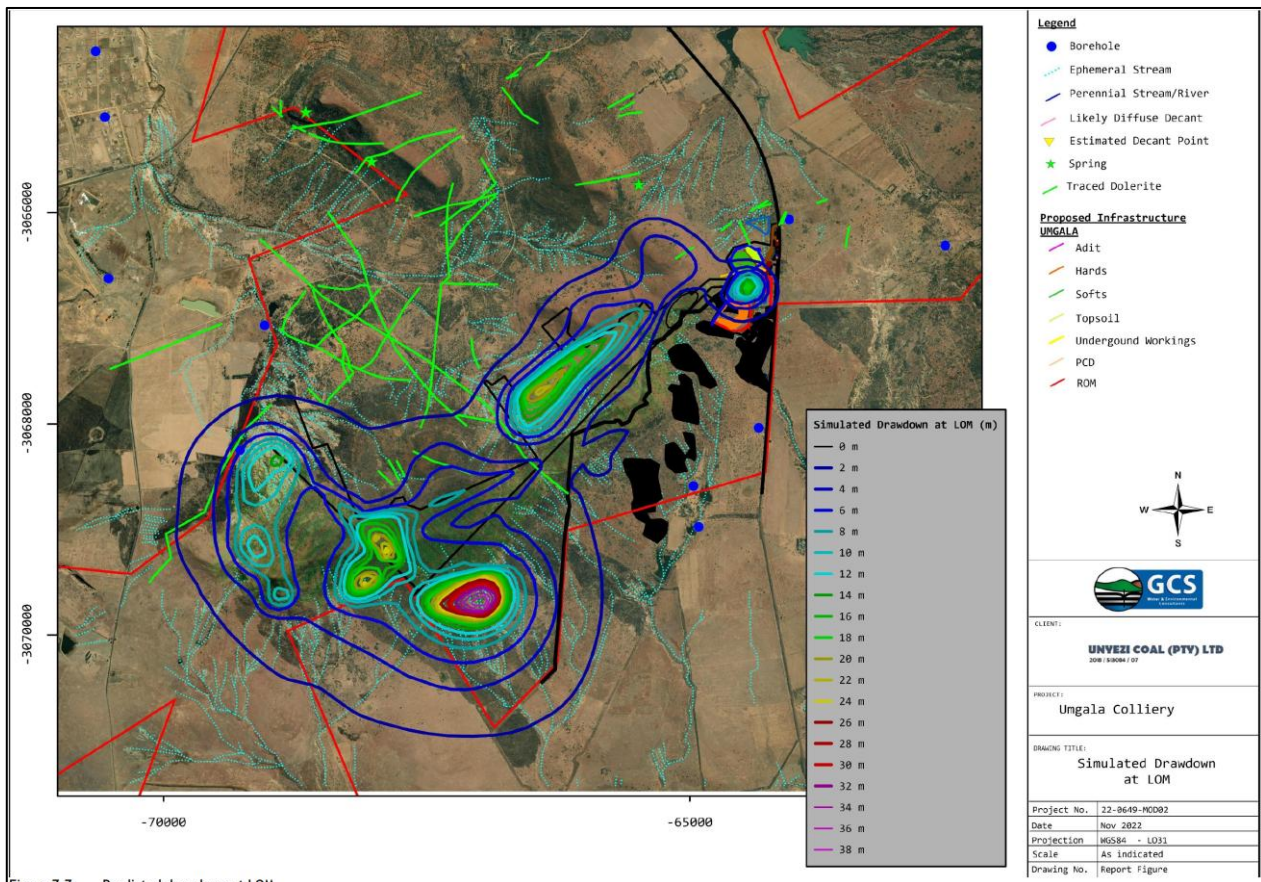


Figure 88: Predicted drawdown at LOM

12.7.3.1.2. Predicted mass transport

The predicted 2D mass transport zone of influence at 100Y after LOM is shown in Figure 89. The model presents a worst-case scenario of the solute transport 100Y after LOM. From the ZOI generated, the following is noted:

- The 200 mg/l and 500 mg/l SO₄ contours remain near the mining infrastructure.
- Due to the mining depth, and the fact that the streams are ephemeral, no impact on stream water quality is predicted.

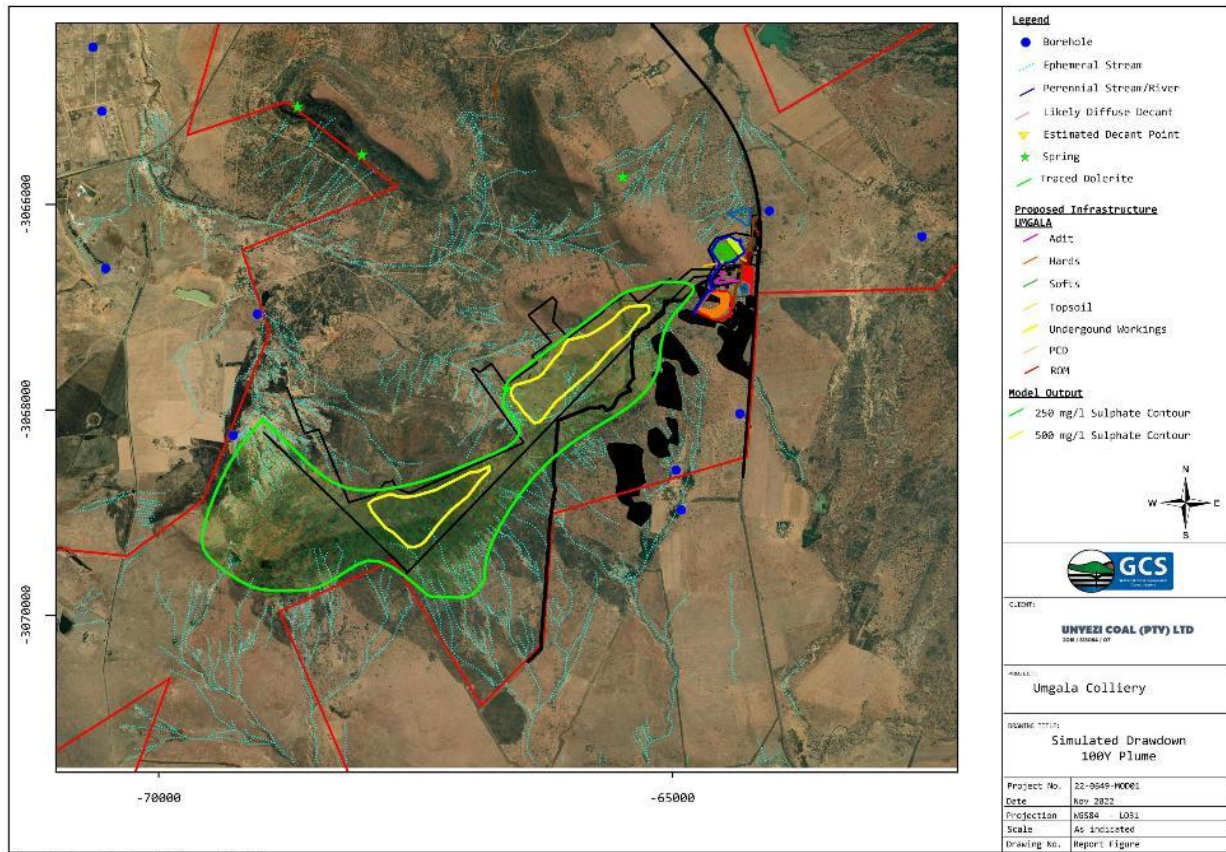


Figure 89: Simulated 100 years SO₄ plume

Table 56, Table 57 and Table 58 below indicate the significance of the identified impacts, as informed by specialist, prior to and after mitigation is implemented. Detailed assessments are found within the specialist studies provided in Appendix IV and an excel sheet indicating the detailed individual rating for each impact (including extent, duration, severity etc.) is included in Appendix V.

Table 56: Assessment of significance of potential construction phase impacts associated with the Project pre- and post- mitigation

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
Construction activities	Construction activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air Quality	M	<u>Minimise and control:</u> The following mitigation measures are proposed for all phases of the Project: – Reduce drop heights – Increase surface moisture of coal prior to loading – Increase surface moisture of coal prior to off-loading – Enclosure or chutes to reduce transfer exposure to wind. – Water sprays, cladding, and/or enclosure – Consider Chemical dust suppression if feasible – Haul road surface maintenance – Rehabilitation and revegetation as soon as possible after development of adits – Wind breaks – Water suppression during unusually high wind speed incidents – Progressive rehabilitation – Particulate filters and NO_x control i.e. catalytic converters. – Implementation of inspection and maintenance plan – Good housekeeping – Daily visual inspection of site operations and corrective action should dust, or smoke emissions be observed. – Quarterly inspection and reporting of dust and smoke emissions and in response to complaints. Photographic records can be useful. – Fit for purpose sampling of dustfall, PM₁₀, PM_{2.5}, and NO₂. ○ PM₁₀ and PM_{2.5} is typically sampled using gravimetric or light-scatter methods. Wind direction and speed should preferably be measured at the same location and period. ○ Dustfall sampling as per the requirements of the NDCR at the following intervals: ▪ All: one 1-month campaign before the commencement the construction, to establish a site-specific baseline. ▪ NO₂, PM₁₀,and PM_{2.5}: one 3-month campaign upon the commencement of each phase of the project. Thereafter as, and when needed in support of resolving complaints. ▪ Dustfall sampling should commence prior to the construction phase and continue throughout the life of the project.	L
Noise generating construction activities including traffic, earthworks, mobile construction equipment, metal and concrete works.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	L	<u>Minimise and control:</u> – Conduct noise monitoring – Noise specialist to re-evaluate and comment on noise impact of the project should any changes be made to the project or if additional information become available. – Construction activities must, as planned, be limited to daytime working hours. – Off-site transport i.e. export of coal product must be limited to daytime working hours. – All generators to be contained within acoustic enclosures and fitted with exhaust mufflers. – Implement a regular inspection and maintenance plan to withdraw from service and fix equipment noted to generate excessive noise, this includes mobile equipment, generators, fans, compressors, motors, conveyor motors and roller elements, etc.	L
Construction of the adit for underground mining works	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	M	<u>Minimise and control:</u> – Ensure proper storm water management designs are in place;	M
Clearing of areas and construction for mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	M	– If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place;	M

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
Stockpiling of soil	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	L	– If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; – Only the designated access routes are to be used to reduce any unnecessary compaction; – Compacted areas are to be ripped to loosen the soil structure; – Topsoil stockpiles are to be kept to a maximum height of 4m; – Topsoil is to be stripped when the soil is dry, as to reduce compaction; – Bush clearing contractors will only clear bushes and trees larger than 1m the remaining vegetation will be stripped with the top 0.3 m of topsoil to conserve as much of the nutrient cycle, organic matter, and seed bank as possible (only after alien vegetation has been removed); – The subsoil approximately 0.3 – 0.6 m thick will then be stripped and stockpiled separately; – The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate significantly; – Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles; – Topsoil stockpiles should only be used for the rehabilitation of the mined area; The stockpiles will be vegetated in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. – Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks; – If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities; – All vehicles are to be serviced in a correctly bunded area or at an off-site location; – Leaking vehicles will have drip trays place under them where the leak is occurring;	L
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Agricultural Resources and Infrastructure	Soil Agricultural Potential	L		L
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Land Capability	Soil Agricultural Potential	L		L
Vegetation Clearance and Earthworks, including excavation and infilling	Clearance of vegetation during site preparation, excavation, infilling and shaping of landscape. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may result in the temporary disturbance of Wetlands.	Wetlands	L	<u>Minimise:</u> Limit clearing of Wetland habitat. Limit sedimentation of wetlands through effective stormwater management interventions. <u>Preventing alien species encroachment:</u> To reduce the likelihood of alien vegetation encroaching on the denuded area resulting from the mining area and related infrastructure, the area should be re-vegetated with indigenous species, as recommended in the screening report. Hessian sacks can be used to cover exposed ground or soil with plants being planted through small slits in this hessian covering. This will ensure that the newly planted indigenous vegetation is maintained until it is has established, a monitoring program should be put in place. Once a month for two years directly post construction phase, then once every six months for a further two years a specialist should traverse the route of associated infrastructure and ensure the development of the vegetation is continuing normally. If not then it can at least be report, and the same applies if it is discovered that there is an encroachment of alien vegetation species. If herbicides are used in the removal alien vegetation, and it is not recommended that they be used, the offices of the Invasive Alien Species Programme must be contacted, to ensure the correct herbicide is used and correct method of application is followed.	L
Vegetation clearance, construction vehicle traffic and earthworks	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation by construction vehicle traffic. During the construction phase, the clearance of vegetation and compaction of soil may result in increased run-off and erosion, altering hydrological and geomorphological processes.	Wetlands	L		L
Clearance of vegetation and compaction of soil	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation and soil by construction vehicle traffic. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may reduce ecological connectivity and disturb the watercourse/terrestrial edge.	Wetlands	L	<u>Erosion control:</u> The main objective in this instance is to prevent the occurrence of gully forming erosion, which could result in significant topsoil losses. This is a considerable problem, given the time (many years) it normally takes for the formation of topsoil. The mitigation strategy for this would be in the form of planting appropriate indigenous species subsequent to the mining activities. Furthermore, a monitoring program should be put in place to ensure that the indigenous species that were planted subsequent to construction are growing and preventing the occurrence of erosion along the length of the new structures. In the event that erosion is found to be present the appropriate remedial action should be taken to prevent the exacerbation of the erosion. Monthly site inspections should take place, and the inspections should be visual inspections with fixed point photography at key points. These	L
Preparation, storage and transportation of construction materials. Potential oil leaks from construction vehicles and equipment	Accidental spillages of wet concrete and chemical / hazardous substances. During the construction phase, accidental spillages of wet concrete and chemical /hazardous substances	Wetlands	L		L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
	may result in soil and groundwater contamination, adversely affecting the aquatic ecosystems in the broader area.			inspections should take place until the project is complete and thereafter 6 monthly sites visits for two years and finally annual visits for two years after this.	
Demarcation of buffer zones and no-go areas and the creation of spoil sites (topsoil separate from subsoil)	Input of droppers for demarcation Tape and Erection of silt fencing around all spoil sites (including coverage), Dumping of spoil at the designated sites using haulage routes. Disruption of the soil profile and thus creation of excess sediment; Potential disturbance to native and/or indigenous plant species; Aesthetic and potentially noise disturbance within the area.	Wetlands	L	<u>Sedimentation:</u> The main objective in this instance is to prevent the occurrence of sedimentation in the wetland systems and the associated channels, which may result in the siltation of downstream systems, which if excessive can be a threat to these ecosystems. Thus, to prevent this from occurring appropriate indigenous species should be planted where rehabilitation is taking place. Furthermore, a monitoring program should be put in place to ensure that the indigenous species that were planted subsequent to construction are growing and preventing the occurrence of sediments in these wetlands. During construction and for a brief period after construction it is expected that sedimentation will occur. However, this should cease soon and there should be no evidence of sediments within these wetland systems. Monthly site inspections should take place, and the inspections should be visual inspections with fixed point photography at key points. These inspections should take place until the project is complete and thereafter 6 monthly site visits for two years and finally annual visits for two years after this.	L
Construction of Mine Support Infrastructure (Buildings, Conveyor Belts, Dirt Roads and Fences)	Permanent change in the surface hydrology from hardened surfaces. Reduced infiltration rates and increased risk of erosion from permanent change in the surface hydrology from hardened surfaces.	Wetlands	M		L
Establishment Mining Area Footprint	Open cast mine establishment through excavation, blasting and stabilisation activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems.	Wetlands	M	<u>Flood attenuation:</u> During construction the removal of vegetation in and around the mining and support infrastructure areas will be complete. In this region where most rainfall occurs in the form of high intensity events; it is highly likely that the occurrence of one of these storms will result in significantly more overland flow than would normally occur; due to the lack of soil surface cover. This surface cover, i.e., vegetation, increases the surface roughness and therefore the friction, thereby slowing the movement of water and increasing infiltration. As with the occurrence of sedimentation, the key aim is to ensure full surface cover is present, if possible before the occurrence of the wet season. Alternatively, adequate stormwater management interventions put in place, such as sustainable urban drainage systems. The general condition of the channels downstream of the site will reflect whether the interventions are achieving successful flood attenuation. Water quality testing will also reflect the effectiveness of the interventions in general. <u>Water quality:</u> It is expected that during construction and operation there will be runoff from this site, especially during the wet season. This may enter downstream systems, as a consequence of the proximity of some of these systems to the development. Water quality sampling is recommended to monitor water quality, and comparisons with baseline conditions should be made. The quality of water downstream of the site should at least remain the same as the quality measured upstream of the site. This will reflect whether the development is having a negative impact on water quality or not and whether the interventions being implemented are successful in achieving the objective, which, is to maintain the health of the river occurring downstream of the rehabilitation site. Testing should reflect short term results, longer term results, as well as winter and summer seasonal changes, for which results are expected to be quite different, because of the variation in the frequency of flood events. Baseline sampling at appropriate sites should take place prior to commencement of the development. Thereafter sampling should take place monthly during the construction phases of the project and every 6 months during the operation and rehabilitation. The basic water quality tests that should be undertaken are (but not limited to): – pH (which could indicate if chemicals have been spilled and are flowing into these systems),	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
				- Electrical conductivity (indicator of salinity as well as an early indicator of pollutants within the system), and - Turbidity (Clarity of water can provide an indication of the occurrence of erosion). - Toxicants <u>Soil compaction:</u> During the clearing and the construction phase an identified threat is that of increased overland flows as a result of compaction, which may potentially reduce overall water quality from this system. Mechanical clearing of alien vegetation should be conducted in winter when water levels are lower, and the ground is drier. Heavy vehicles will need to be used to excavate soil and during operations. Where possible their movement should be restricted to roads, in order to minimize unnecessary compaction. Excavation must be limited to the proposed construction areas and once the road network is in place, movement of vehicles must be limited to these roads. One access point per site should be used. Soil removed from these sites should be replaced in the same order as it is removed, in order to ensure that soil characteristics, particularly as they relate to infiltration, remain unchanged. Topsoil must be stockpiled to be spread over the sub-soil (≥ 20 cm) for rehabilitation and re-vegetation purposes. Vehicles must not be allowed to access areas where topsoil has been applied. Seeding with suitable grass species and stabilisation using hessian or netting until established is essential in preventing erosion and alien vegetation from re-establishing.	
Land and riparian clearing activity	Water quality deterioration	Aquatic	M	<u>Minimise:</u> - Limit clearing of Wetland habitat. Limit sedimentation of wetlands through effective stormwater management interventions. - Limit sediments and hydrocarbons from entering wetlands through effective stormwater management interventions and demarcation of area for vehicle servicing.	L
Construction activities	Building materials & solid waste (plastics, polystyrene, etc.) entering / disposed of in wetlands	Aquatic	H	<u>Minimise:</u> Limit building material from entering watercourses. Place temporary berms to control/divert materials away from watercourses. Develop and implement a solid waste management plan.	L
Construction activities	Contamination (oils, fuels, chemicals) - Surface water pollution	Aquatic	H	<u>Minimise:</u> Changing of oil, refueling and lubricating of equipment should not be carried out within close proximity (32m buffer) to wetlands in order to minimize the potential for water pollution.	L
Construction activities	Soil contamination from chemicals	Aquatic	M	<u>Avoid and control:</u> Oil storage & workshop areas should be surrounded by a bund wall in order to contain spillages. In the case where soil becomes contaminated with oil, it must be removed for proper disposal or treatment (e.g. bioremediation).	L
Construction activities	Human waste - Surface water pollution	Aquatic	M	<u>Avoid and control:</u> Construction workers should not use watercourses for sanitation purposes. Portable toilets should be provided.	L
Construction activities	Increased turbidity - Surface water pollution	Aquatic	H	<u>Minimise and control:</u> Install silt curtains where possible to contain increased turbidity and limit the extent of the impact during construction. Silt curtains limit re-suspended sediment to a smaller area.	L
Construction activities	Increased turbidity - Wetland geomorphological alteration	Aquatic	H	<u>Avoid and control:</u> - No soil / building material may be stockpiled within 32m from the delineated wetlands and riparian zones. Limit the physical alteration of areas within 32m of delineated wetlands. - Make use of large box culverts that ensure continuation of flow, substrate and habitat characteristics	H

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types.	Terrestrial biodiversity theme	M	<u>Avoid and control:</u> – Mitigation will entail avoiding losses of, and providing protection buffers around highly sensitive habitat, limiting development tor areas of lower sensitivity. Extent of impact should be limited to areas of lower sensitivity.	L
	Loss and deterioration of habitat included in local and regional conservation categories (e.g., CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.)	Terrestrial biodiversity theme	L	<u>Avoid and control:</u> – Loss of CBA2 habitat is unavoidable. Habitat types of elevated sensitivity/ importance on a local/ regional scale should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. No construction/ operational activity should be allowed within these areas.	L
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint	Terrestrial biodiversity theme	L	<u>Avoid and control:</u> – Highly sensitive areas should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. No construction/ operational activity should be allowed within these areas. Any further losses of habitat outside the development footprint should be avoided. Decline in habitat status of surrounding areas should be avoided through containment of activities. Erosion and pollution prevention.	L
	Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes	Terrestrial biodiversity theme	L	<u>Minimise:</u> – Ensure continued and normal ecological functionality of remaining natural habitat surrounding the development. Ensure that no unintended impacts occur, e.g. uncontrolled fires. Minimise disruption of ecological functions, e.g. surface water flow, prevent erosion and fires, ensure continued ecological corridor functionality.	L
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - south)	Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types	Terrestrial biodiversity theme	M	<u>Minimise:</u> – Mitigation will entail avoiding losses of, and providing protection buffers around highly sensitive habitat, limiting development tor areas of lower sensitivity. Extent of impact should be limited to areas of lower sensitivity	L
	Loss and deterioration of habitat included in local and regional conservation categories (e.g., CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.)	Terrestrial biodiversity theme	M	<u>Avoid and minimise:</u> – Loss of CBA habitat is unavoidable. Habitat types of elevated sensitivity/ importance on a local/ regional scale should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. No construction/ operational activity should be allowed within these areas.	M
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint	Terrestrial biodiversity theme	M	<u>Avoid and minimise:</u> – Highly sensitive areas should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. No construction/ operational activity should be allowed within these areas. Any further losses of habitat outside the development footprint should be avoided. Decline in habitat status of surrounding areas should be avoided through containment of activities. Erosion and pollution prevention.	L
	Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes	Terrestrial biodiversity theme	M	<u>Manage:</u> – Ensure continued and normal ecological functionality of remaining natural habitat surrounding the development. Ensure that no unintended impacts occur, e.g. uncontrolled fires. Minimise disruption of ecological functions, e.g. surface water flow, prevent erosion and fires, ensure continued ecological corridor functionality	L
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Loss of threatened plant species or other species of conservation importance (i.e., provincially protected), and/ or habitat associated with these taxa	Plant species theme	L	<u>Avoid and minimise:</u> – Permitting requirements and obligations (EKZN, DFFE) to be achieved prior to commencement of land clearance activities/ construction. Avoidance of areas where high density of SCC and other protected species occur. Selected species and individuals should be rescued and relocated, replanted at suitable localities (although not always a preferred option), with specific reference to required landscaping and rehabilitation of development areas.	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
	Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity).	Plant species theme	L	<u>Minimise:</u> – Avoidance of high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. – Implementing management programme.	L
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns.	Plant species theme	L	<u>Avoid and minimise:</u> – Restriction of activities and infrastructure to approved footprint only. Avoidance of uncontrolled impacts in areas outside the approved footprint where SCC and other protected species occur. Clear demarcation of approved footprint. Contractor awareness and strict control.	L
	Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns.	Plant species theme	L	<u>Minimise:</u> – Limit development to footprint area, avoid impacts in adjacent habitat, implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.	L
	Introduction and exacerbation of exotic and invasive species to the area	Plant species theme	L	<u>Minimise:</u> – Develop and implement AIP management programme, including annual monitoring programme. Appoint rapid-response team. Contractor and personnel awareness.	L
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - south)	Loss of threatened plant species or other species of conservation importance (i.e., provincially protected), and/ or habitat associated with these taxa	Plant species theme	M	<u>Avoid and minimise:</u> – Permitting requirements and obligations (EKZN, DFFE) to be achieved prior to commencement of land clearance activities/ construction. Avoidance of areas where high density of SCC and other protected species occur. Selected species and individuals should be rescued and relocated, replanted at suitable localities (although not always a preferred option), with specific reference to required landscaping and rehabilitation of development areas.	L
	Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity)	Plant species theme	M	<u>Avoid and minimise:</u> – Avoidance of high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. Implementing management programme	L
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns	Plant species theme	L	<u>Avoidance and control:</u> – Restriction of activities and infrastructure to approved footprint only. Avoidance of uncontrolled impacts in areas outside the approved footprint where SCC and other protected species occur. Clear demarcation of approved footprint. Contractor awareness and strict control	L
	Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns.	Plant species theme	L	<u>Minimise:</u> – Limit development to footprint area, avoid impacts in adjacent habitat, implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.	L
	Introduction and exacerbation of exotic and invasive species to the area	Plant species theme	M	<u>Minimise:</u> – Develop and implement AIP management programme, including annual monitoring programme. Appoint rapid-response team. Contractor and personnel awareness	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Direct and permanent loss of natural fauna habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.	Animal species theme	L	<u>Avoid:</u> – Avoidance of habitat with high SEI. Promote construction on habitat with low and very low SEI.	L
	Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases	Animal species theme	L	<u>Avoid and minimise:</u> – Avoidance of high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. Implementing management programme.	L
	Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc	Animal species theme	L	<u>Minimise:</u> – Restriction of activities and infrastructure to approved footprint only. Clear demarcation of approved footprint. Contractor awareness and strict control. Make use of technologies to reduce disorientation of nocturnal invertebrates due to spill light, dust suppression and noise suppression	L
	Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability	Animal species theme	M	<u>Avoid and minimise:</u> – Limit development to footprint area, avoid impacts in adjacent habitat, implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.	L
	Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site	Animal species theme	L	<u>Control:</u> – Control of personnel and contractor actions and movement, increased awareness, avoid excessive and unnecessary infrastructure development. Regular monitoring of snares and traps as well as illegal settlement.	L
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - north)	Direct and permanent loss of natural fauna habitat, in particular threatened invertebrate habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.	Animal species theme	H	<u>Avoid:</u> – Impact cannot be mitigated and habitat with Very High SEI should be avoided. – Biodiversity Offset recommendations will be considered should the Competent Authority deem this necessary upon review of this report. The present recommendation is that a Biodiversity Offset is likely to be a requirement as a result of the Endangered and Vulnerable nature of parts of the receiving environment.	H
	Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases	Animal species theme	M	<u>Avoid and minimise:</u> – Avoidance of high and very high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. Implementing management programme.	L
	Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc	Animal species theme	L	<u>Minimise:</u> – Restriction of activities and infrastructure to approved footprint only. Clear demarcation of approved footprint. Contractor awareness and strict control. Make use of technologies to reduce disorientation of nocturnal invertebrates due to spill light, dust suppression and noise suppression.	L
	Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability	Animal species theme	M	<u>Minimise:</u> – Limit development to footprint area, avoid impacts in adjacent habitat (especially to the west), implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.	L
	Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site	Animal species theme	L	<u>Control:</u> – Control of personnel and contractor actions and movement, increased awareness, avoid excessive and unnecessary infrastructure development. Regular monitoring of snares and traps as well as illegal settlement.	L
Dewatering	Lowering of water levels due to dewatering of excavations for construction.	Geohydrology	M	<u>Minimise:</u> – Minimise dewatering by sealing off excavations as soon as possible.	L
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	L	<u>Minimise:</u> – Grouting of intersected fractures /fissures.	L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
Construction activities	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices.	Geohydrology	L	<u>Avoid and manage:</u> – Establishment of good waste management practices on site	L
Construction and vegetation clearing	Increased runoff from the site as a result of vegetation clearing and construction activities.	Geohydrology	L	<u>Minimise and manage:</u> – Maintain as much vegetation as possible to prevent erosion. – Ensure that stockpiles are covered with appropriate erosion control barriers.	L
Earthworks and Development	Disturbing vadose zone soils during excavations/construction activities.	Vadose zone soils and subsequent aquifer (groundwater table)	L	<u>Minimise:</u> – Only excavate areas applicable to the project area. – Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. – Cover excavated soils with a temporary liner to prevent contamination. – Retain as much indigenous vegetation as possible. – Exposed soils are to be protected using a suitable covering or revegetating.	N
Earthworks and Development	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.	Vadose zone soils and subsequent aquifer (groundwater table)	L	<u>Avoid and manage:</u> – Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site. – Visual soil assessments for signs of contamination during construction (monthly)	N
Earthworks and Development	Surface water contamination and sedimentation from the following activities: – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Contaminant transport in runoff – To date, no sedimentation has taken place (i.e. no evidence observed during the site walkover assessment)	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	N	<u>Minimise and manage:</u> – Install a temporary cut-off trench to contain poor-quality runoff (if required). – Visual inspections of all vehicles entering and operating at the site. – Visual assessment for signs of erosion or contamination. – Implementation of stormwater recommendations. – Cover any temporary construction material stockpiles.	N
Earthworks and Development	– Poor quality seepage from machinery used to excavate soils. – Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.	Groundwater aquifer	L	<u>Avoid and manage:</u> – Park heavy machinery in lined areas and place drip trays under vehicles at the site. – Have fuel and oil spill cleanup kits on site and clean up these areas immediately. – Ensure that building material stockpiles are covered with a suitable temporary cover or placed in bunded areas to reduce poor-quality seepage probability. – Visual soil assessments for signs of contamination during construction (monthly)	N
Site preparation, including placement of contractor laydown areas and storage (i.e. temporary stockpiles, bunded areas etc.) facilities.	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydrogeological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydrogeological processes supporting the watercourses.	Soil quality, soil structure and land capability and soil interflow processes	M	<u>Minimise:</u> – Only excavate areas applicable to the project area. – Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. – Cover excavated soils with a temporary liner to prevent contamination. – Keep the site clean of all general and domestic wastes. – All development footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential. – Retain as much indigenous vegetation as possible. – Exposed soils are to be protected using a suitable covering or revegetating. – Existing roads should be used as far as practical to gain access to the site, and crossing watercourses in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles. – Have emergency fuel & oil spill kits on site. – Soil quality monitoring & visual assessments on monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.	L
Disturbing vadose zone during soil excavations/infilling activities	Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss.		M		L
Vegetation clearing & soil stockpiling	– Soil compaction; and		M		L

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
	- Soil erosion. Soil quality: - Natural nutrient content decreases due to soil exposure. - Loss of natural bio-organisms essential to soil processes.				
Earthworks	Oil & fuel spills from vehicles parked at the site may compromise soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table.	Soil quality	M	<u>Minimise:</u> - Routine visual inspections of infrastructure and parking areas for signs of soil contamination. - Have emergency fuel & oil spill kits on site.	N
Earthworks	Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	N	<u>Manage:</u> - Water quality monitoring and routine visual assessment for contamination. - Discharge dewatered / rainwater collected into the nearby stream. May require authorisation. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination)	N
Earthworks	The presence of shallow soils and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	M	<u>Minimise:</u> - Retain as much indigenous vegetation as possible. - Exposed soils are to be protected using a suitable covering or revegetating. - If required use silt traps or stilling basins to trap sediment runoff.	L
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impacts on aesthetics	Visual and landscape character	M	<u>Minimise:</u> - Efficient project planning: Reduce the duration of the construction phase through effective scheduling and optimal use of resources, thereby limiting the period of visual disruption. - Controlled vegetation clearance: Clearly demarcate construction zones and restrict vegetation removal to within designated boundaries. Retain surrounding grassland buffers, especially in Northern KwaZulu-Natal Moist Grassland areas, to provide natural visual screening. - Placement of laydown and camps: Locate temporary construction camps, stockpiles, and laydown areas in previously disturbed areas where feasible, avoiding ridgelines and visually exposed open slopes. - Restrict vehicle movement: Limit the movement of construction vehicles and personnel to demarcated areas and existing access routes. Reduce on-site vehicle numbers where possible to avoid dust plumes and visual congestion. - Temporary screening: Install perimeter screening (e.g., shade cloth or hessian fencing) around highly visible construction zones to reduce exposure of equipment and materials from sensitive viewpoints. - Site housekeeping: Maintain construction areas in a neat and visually orderly condition. Avoid unsightly accumulation of waste, excess materials, or abandoned equipment. - Colour and materials: Use non-reflective, muted, earth-toned colours for temporary offices, fencing, and storage containers to reduce glare and better blend with the surrounding grassland environment. - Lighting controls: Restrict construction activities to daylight hours where practicable. Avoid unnecessary artificial lighting and, if required, ensure fittings are downward-directed and shielded to minimise night-time light spill. - Dust suppression: Apply approved daily dust suppression methods, including regular water spraying on exposed surfaces, unpaved roads, and stockpiles. Consider paving primary access routes if feasible. - Phased construction: Sequence activities to limit the area of exposed bare ground visible at one time. Commence early rehabilitation on completed areas to quickly re-establish vegetative cover.	M
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character	M		M
Movement of construction vehicles and heavy machinery for site clearance	Change of visual character from a natural landscape to a built landscape	Visual and landscape character	M		M
Design of supporting infrastructure	Landscape visual change	Visual and landscape character	M		M

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
				- Stockpile management: Shape and contour temporary material stockpiles to blend with surrounding landforms, and position them in visually discreet areas to reduce sharp contrasts with the natural landscape. - Equipment management: Use well-maintained machinery to avoid excessive exhaust, oil leaks, or unnecessary dust emissions, and ensure that equipment presents a professional, orderly appearance.	
Construction activities	The construction phase of the proposed mines will generate additional traffic on the surrounding road network within the study area	Surrounding road network	L	Adequate traffic calming measures are already in place within the Utrecht town area, including rumble strips, road signage, and speed bumps	L
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	H	No mitigation required as this is a positive impact.	NA
Construction and operation of the mining operations	- Possibility of political interference, corruption, and fraud. - Blasting impacting on housing stability - Increased demand on already strained electricity supply - Increase in health & safety - Incidents on the mine - Increased traffic - Impact on livestock and agriculture - Stability of land because of underground mining and blasting operations - Limitations on development expansions of the municipality - Loss of grazing land (subsistence) - Leadership conflict - Increased tension due to influx of non-residents	Local communities	M	<u>Minimise:</u> - Dust control measures to be in place especially in winter where the winds blow black dust from the mine to the grazing grass of the farmers. - It is recommended that the mine involve the community in all planning phases. - The mine and the municipality need to work closely together. - The mine to prioritize uplifting the community in terms of jobs and service delivery. - The mine not to use drinking water and ensure that drinking water doesn't get contaminated. - Provide training centers to capacitate the community with skills. - Employ local people and capacitate the local people with specialist skills so that they can also occupy specialist positions. - Develop sound social labour plans - Upgrade infrastructure such as access roads that may be damaged by heavy trucks. - The mine should play a role in helping the municipality to achieve some of the Integrated Development Plan objectives of Emadlangeni Municipality. - To support SMME's in the municipality, schools and NGO's. - To contribute to the social development of the municipality - Recognition of the chief by the mine. The chief should be always consulted in decisions that involve the community. - Ensure safety of the workers and the community to be prioritised.	L
All construction and operational activities related to the Project.	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	H	<u>Avoid and manage:</u> The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it. However, if the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, a specialist should be consulted to assist with Grave relocation processes/permits and to inform SAHRIS.	H
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: - Stone walled kraal - terracing (for a house) - two possible graves - undecorated, thin-walled pottery	Cultural and Heritage aspects	H	<u>Avoid and manage:</u> - The site is within the fenced area but it will not be affected as it is surrounded by a highly eroded area. The site currently has a 50m exclusion buffer around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. - If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.	H

Activity	Potential Impact	Aspects Affected	Significance before mitigation	Mitigation type and measure	Significance after mitigation
				Otherwise, it is an archaeological site with no claimants and the remains would go to KZNARI (KwaZulu-Natal Amafa & Research Institute).	
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	L	No mitigation suggested or required by the specialist.	L
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling – Graves – Terracing – Stone cairns – Pottery	Cultural and Heritage aspects	H	<u>Avoid and manage:</u> – The site occurs within the fenced off area. The site currently has two 50m exclusion buffers around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – The second buffer is for Grave 7. All features fall within these 50m buffer and the buffer needs to be fenced. If the site will be affected, then it will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.	H
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	H	<u>Avoid and manage:</u> – The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.	H
	Potential disturbance to finds, stone cairns, pottery, open MSA scatters	Cultural and Heritage aspects	L	<u>Manage:</u> – Due to the low significance of the impact, there are no mitigation measures suggested, however, a Chance Find Protocol should be established for any isolated artefacts. Any material that may potentially be an artefact should be verified with an ECO and archaeologist.	L

Table 57: Assessment of significance of potential operational phase impacts associated with the Project pre- and post- mitigation

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
Operations of the mine infrastructure	Fugitive dust and combustion emissions from the project was shown to result ambient concentrations at sensitive receptors above NAAQS for NO ₂ , PM ₁₀ , and NDCR.	Air Quality	M	The mitigation measures provided in the construction phase will remain applicable in the operational phase.	L
Noise generating operational activities including coal handling and transport; coal feeders, crushers, screens; conveyors; underground mine ventilation; diesel generators; mobile equipment; ancillary services at workshops and offices	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	L	<u>Minimise and control:</u> The following noise management measures must be employed on site: – Keep a complaint register at the site(s) access point(s) – Conduct noise monitoring – Noise specialist to re-evaluate and comment on noise impact of the project should any changes be made to the project or if additional information become available. – Construction activities must, as planned, be limited to daytime working hours. – Off-site transport i.e. export of coal product must be limited to daytime working hours. – All generators to be contained within acoustic enclosures and fitted with exhaust mufflers. – Implement a regular inspection and maintenance plan to withdraw from service and fix equipment noted to generate excessive noise, this includes mobile equipment, generators, fans, compressors, motors, conveyor motors and roller elements, etc.	L
Operation of mining infrastructure	Release of GHG emissions to atmosphere	Climate Change	H	<u>Minimise:</u> Mitigation measures to reduce the mine's overall carbon footprint may also include the application of energy efficiency measures (fuel use and electricity consumption) such as: – an energy efficient materials movement strategy; – energy efficient mine haul trucks; – using low carbon energy sources; – solar power as an alternative energy source to reduce the dependence on diesel for electricity generation; – carbon offsets can be introduced; – energy efficiency of lighting and cooling systems used in the offices and staff accommodation; – changing human behaviour towards improving energy efficiency (creating an organisational culture towards reducing emissions)	M
Operation of underground mine workings	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	M	<u>Minimise and control:</u> – Ensure proper storm water management designs are in place; – If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; – If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; – Only the designated access routes are to be used to reduce any unnecessary compaction; – Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated; – Implement land rehabilitation measures; – Follow rehabilitation guidelines; – The topsoil should be moved by means of an excavator bucket, and loaded onto dump trucks; – Topsoil is to be moved when the soil is dry, as to reduce compaction; – Topsoil to be replaced for rehabilitation purposes; – The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate; and – Topsoil stockpiles should only be used for the rehabilitation of the mined area; – Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks; – If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities; – All vehicles are to be serviced in a correctly bunded area or at an off-site location;	L
Operation of mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	L		L
Operation of PCD, Discard dump, and ROM areas	Contamination of soil resources below these facilities as well as adjacent to these facilities due to contaminated runoff.	Soil Agricultural Potential	M		M
Dust suppression of haul roads	Often waste water is used as dust suppression water spray. These could lead to the build-up of contaminants in the road surface as well as adjacent to the road in areas of concentrated runoff.	Soil Agricultural Potential	M		L

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
				– Leaking vehicles will have drip trays place under them where the leak is occurring	
Operation of Mining Support infrastructure (Buildings, Conveyor Belts, Waste Dams, Haulage/Dirt Roads and Fences)	Movement and Vehicle access in and around the Support infrastructure. Impeding the flow of water. Damage to banks. Siltation of water course. Erosion of water course. Flow sediment equilibrium change	Wetlands	H	<u>Compensate:</u> – Refer to the mitigation measures provided in the construction phase table. – The unavoidable loss of 22.55 Ha of Wetland Systems should be compensated through an effective Offset or Rehabilitation Program; and	H
Operation of the mining activities	Open cast mining activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems	Wetlands	H		H
Operation of the mining activities	Above mentioned variables – surface water pollution	Aquatic	H	<u>Minimise:</u> Preserving quality of water through the implementation of above-mentioned measures applicable to the occurring impact. Ongoing monitoring should take place regularly to identify impacts.	M
Seepage	Poor quality seepage from the existing underground workings into the weathered and fractured aquifer	Geohydrology	L	<u>Minimise and manage:</u> – Drill additional monitoring boreholes downstream and in the workings to confirm seepage quality and inform closure objectives. – Update predictive tools to confirm closure objectives. – The geological sequence/material of the barriers that will be maintained, and – geohydrological characteristics should be confirmed.	L
Systematic removal of the seam reserve by underground mining methods	Groundwater ingress due to underground mining of coal.	Geohydrology	H	No mitigation is possible as dewatering is a required action for underground mining.	H
Dewatering	Lowering of the water table due to dewatering.	Geohydrology	L	<u>Minimise:</u> – Minimize dewatering (if possible) during dry seasons.	L
Seepage	Poor quality seepage from the proposed PCD's, sumps, ROM stockpiles, softs dump, hards dump, top-soils dump, workshops, fuel storage, ablutions (septic tanks), dirty water trenches and processing plant into the aquifer.	Geohydrology	H	<u>Minimise:</u> – Cover rock dumps or stockpiles with a geomembrane to reduce rainfall infiltration and hence, poor quality percolation into the aquifer. – PCD's should be lined. – Have fuel cleanup and spill kits on site. – Ensure regular cleaning of septic tanks by accredited service providers.	L
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	H	<u>Minimise and manage:</u> – Limit blasting. – Manage inflows.	L
Groundwater abstraction to supplement water needs at the mine	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices	Geohydrology	L	<u>Minimise and manage:</u> – Good housekeeping, and adherence to good health and safety practices.	L
Groundwater abstraction to supplement water needs at the mine	Dewatering the local aquifer to supply the mine with operational water.	Geohydrology	L	<u>Minimise:</u> – A sustainable aquifer yield should be determined for the abstraction boreholes. – Abstraction should not exceed the sustainable yield of the local aquifer	L
Site activities	Disturbing vadose zone soils during mining	Vadose zone soils and subsequent aquifer (groundwater table)	H	<u>Minimise and manage:</u> – Keep excavation as small as possible. – Ensure that sediment barriers are in place at mining sites, to prevent sediment runoff and erosion.	M
Site activities	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer and drainage system.	Vadose zone soils and subsequent aquifer (groundwater table)	M	<u>Minimise and manage:</u> – Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site. – Visual soil assessments for signs of contamination during operations (monthly)	L

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
Site activities	Stormwater Runoff - Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). - Increased runoff due to compaction of surfaces and changes in surface topography	Primary Surface Water Receivers - Non-perennial streams - Perennial Streams	M	<u>Minimise and control:</u> - Implementation of stormwater plan. - Water quality monitoring - Routine hydraulic monitoring of the stormwater systems (monthly). - Visual inspections of all vehicles entering and operating at the site. - Visual assessment for signs of erosion or contamination. - Cover any stockpiles with appropriate materials such as ECBs. - Vegetation of bare soils in unused areas.	L
Site activities	Water quality - Contaminant transport in runoff from sediment to oil and fuel spills - Spillage of PCDs, slurry dams and stormwater conduits	Primary Surface Water Receivers - Non-perennial streams - Perennial Streams	H	<u>Minimise and control:</u> - Water quality monitoring. - Visual inspection of stormwater systems. - Spills should be cleaned or managed immediately.	M
Site activities	AMD Contaminant transport in runoff from overburden dumps	Water environment	H	<u>Minimise and control:</u> - Verify AMD generation potential of overburden through sampling and analyses of core samples from the incline shaft location. - Ensure that all coal and carbonaceous material is removed from the overburden before placement on the stockpile. - Coal removed from overburden to be taken included in the processing plant. - A civil engineering design for leachate control and stormwater management must be undertaken.	M
Site activities	Disturbing the inner-soil architecture of the original soil profile will disturb natural flow processes (i.e. a result of infilling or cut-and-fill activities). Excavated soil will be placed in other areas (i.e. on top of other soils) and will have an impact on the flow dynamics of the soil it is dumped on top of. This may reduce rainfall infiltration and induce runoff. Impermeable areas will decrease rainfall infiltration into soils, and hence reduce interflow (A/B and A/bedrock) or lateral flow to downstream wetland areas.	Soil interflow processes	H	<u>Minimise and control:</u> - Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. - Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.	M
Site activities	The presence of adit, PCD and stockpiles will have long-term implications in terms of altering the natural hydrogeological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes	H	<u>Minimise and control:</u> Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.	M
Site activities	Seepage/leakages/overland flow from the PCD and stockpiles may impact soil quality.	Soil quality	L	<u>Avoid and manage:</u> - Have emergency fuel & oil spill kits on site. - Ensure PCDs are operated at levels that prevent overflow during 1-2 to 1:100-year flood events.	N
Site activities	The presence of shallow soils will and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	M	<u>Minimise:</u> - Retain as much indigenous vegetation as possible. - Exposed soils are to be protected using a suitable covering or revegetating. - If required use silt traps or stilling basins to trap sediment runoff.	L

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
Transport and movement of vehicles during operational activities	The additional traffic generated by the proposed mining operations will have some impact on the space available for pedestrians.	Existing pedestrians	L	<u>Minimise and control:</u> – Provide training and upskilling for shaft vehicle operators. – Conduct vehicle compliance inspections. – Conduct regular driver alcohol/ drug-tests regularly	L
Transport and movement of vehicles during operational activities	The proposed mines are expected to generate moderate traffic volumes, which may have a limited effect on prevailing safety conditions	Road safety	L		L
Transport and movement of vehicles during operational activities	There will be a moderate impact on the road network condition due to the additional heavy vehicle traffic generated during the operational phase	Condition of the Road Surface	M		L
Daily operational activities	Negative impacts on aesthetics	Visual and landscape character	M	<u>Manage, minimize and control:</u> – Infrastructure layout and siting: Align infrastructure with existing disturbed footprints (e.g., former processing plant site) and orient facilities in accordance with local topography to reduce direct visibility from nearby receptors, including farmsteads and the town of Utrecht. – Housekeeping: Maintain all operational areas, infrastructure, and surroundings in a neat, well-organised condition to avoid visual clutter, degraded appearance, or unsightly stockpiles. – Colour and finishes: Use non-reflective, muted colours and textures for buildings, conveyors, and stockpiles that blend with surrounding grasslands, avoiding bright or glossy finishes that increase visual contrast. – Progressive rehabilitation: Rehabilitate disturbed areas progressively, with early seeding and planting of indigenous vegetation along peripheral areas, discard dump slopes, and haul road verges to soften visual intrusion. – Screening berms and stockpiles: Shape and vegetate authorised topsoil berms to act as visual buffers between infrastructure and sensitive viewpoints, especially along the R34 and adjacent settlements. – Vegetation retention and planting: Retain existing indigenous trees where possible and supplement with indigenous tree and shrub planting along perimeter fencing and around key infrastructure to soften structural forms. – Discard dump management: Actively shape discard dumps to mimic natural landform contours, revegetate slopes as mining progresses, and avoid angular, unnatural profiles. – Lighting control: Minimise light pollution by restricting night-time lighting to what is operationally essential. Use downward-facing, shielded fixtures, timers, and motion sensors to prevent glare and unnecessary light spillage. Avoid high-mast lighting along the periphery and instead use low-profile, directional lighting in essential areas. – Traffic and movement: Regulate vehicle speed to reduce dust plumes and visual disturbance. Limit the number of operational vehicles in visually sensitive zones at any one time to avoid unnecessary visual activity. – Concurrent rehabilitation: Implement backfilling and shaping of worked-out sections in line with concurrent rehabilitation strategies to accelerate the return of landforms to a more natural state and reduce long-term visibility of disturbed surfaces. The following additional mitigation measures are provided in the VIA: <u>Avoidance:</u> – Plan the layout of infrastructure, such as discard dumps, haul roads, and pipelines, in areas partially shielded by topography and away from high-sensitivity receptors, including farmsteads, schools, and the town of Utrecht.	M
Daily operational activities of the Mine and associated infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character	M		M
Movement of heavy machinery	Change of visual character	Visual and landscape character	M		L
Night lighting for security and operational activities	Light pollution (Glare, spill light, sky glow)	Visual and landscape character	M		L
Daily operational activities of the Mine, and associated infrastructure.	Landscape visual change	Visual and landscape character	M		M

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
				- Avoid siting new structures on ridges or elevated slopes where they would be highly visible from surrounding receptors. - Retain existing indigenous trees and grassland buffers, particularly along the site perimeter and adjacent to the R34, to act as natural visual barriers. <u>Minimisation:</u> - Apply earth-toned, matte finishes to buildings, conveyors, and surface infrastructure to reduce glare and contrast with surrounding vegetation. - Limit the number of operational vehicles in visually exposed areas at any given time and regulate vehicle speeds to reduce dust plumes and dynamic disturbance. - Restrict lighting to operationally essential areas, using downward-directed, shielded fixtures fitted with timers or motion sensors. - Avoid high-mast floodlighting along the site boundaries; instead, use low-profile lighting systems to maintain a low-light footprint, particularly near schools and settlements. <u>Rectification:</u> - Implement concurrent rehabilitation of disturbed areas, including discard dump shaping, haul road re-vegetation, and planting along pipeline corridors, to restore visual continuity over time. - Backfill and reshape inactive working areas where feasible to return landform structure and reduce long-term scarring. <u>Reduction (over time):</u> - Undertake progressive rehabilitation of completed areas throughout the life of mine to minimise the cumulative extent of exposed ground. - Construct vegetated screening berms or bunds using topsoil and overburden strategically placed between infrastructure and sensitive viewpoints (e.g., VP1, VP8–11, VP13–15). - Establish indigenous planting belts along the perimeter fence, haul routes, and key boundaries to soften the scale of built elements and integrate them into the landscape. <u>Compensation:</u> - In cases where visual intrusion cannot be effectively reduced (e.g., at high-exposure receptors within 0–2 km), implement offset initiatives, such as strengthening community buffer zones or enhancing green corridors in affected areas. - Engage with local landowners and communities to identify site-specific visual concerns and collaboratively implement screening solutions, such as tree planting, fenceline treatments, or rehabilitated buffer zones.	
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	H	No mitigation required as this is a positive impact.	NA
Construction and operation of the mining operations	- Possibility of political interference, corruption, and fraud. - Blasting impacting on housing stability - Increased demand on already strained electricity supply - Increase in health & safety - Incidents on the mine - Increased traffic - Impact on livestock and agriculture	Local communities	M	Refer to mitigation measures prescribed above for Socio-Economic impacts and adhere to approved SLP	L

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
	- Stability of land because of underground mining and blasting operations - Limitations on development expansions of the municipality - Loss of grazing land (subsistence) - Leadership conflict - Increased tension due to influx of non-residents				
All construction, operational and decommissioning activities related to the Project.	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	H	The mitigation measures provided in the construction phase will remain relevant during the operational and decommissioning phases.	H
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: - Stone walled kraal - terracing (for a house) - two possible graves - undecorated, thin-walled pottery	Cultural and Heritage aspects	H		H
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	L		L
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: - Stone walling - Graves - Terracing - Stone cairns - Pottery	Cultural and Heritage aspects	H		H
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	H		H
	Potential disturbance to finds, stone cairns. Pottery, Open MSA scatters	Cultural and Heritage aspects	L		L
Blasting	Ground Vibration - Exceeding Limits and Possible Damage to sites 1 – 12, 14 -17, 19, 21 -47 (as per the Blasting Impact Assessment report)	Existing infrastructure, potential sites of cultural significance, people and animals	L	<u>Minimise and control:</u> - Develop a specific blast design that considers the distance between the heritage sites and blast - Shorter blast holes - Smaller diameter blast hole - Using electronic initiation to ensure single hole firing - Use of specialist to assist with drilling and blasting mitigation - Relocation of Heritage graves	L
Blasting	Ground Vibration - Exceeding Limits and Possible Damage to sites 13, 18, 20 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	M		L
Blasting	Air Blast - Exceeding Limits and Possible Damage to sites 1 – 36, 38 – 47 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	L	<u>Minimise and control:</u> - Specific blast design to be done - Shorter blast holes - Smaller diameter blast hole - Use of specific stemming materials to manage air blast - Increased stemming lengths to reduce air blast effect - Use electronic detonators to manipulate firing sequence - R34 Stop and Go when blasting within the unsafe distance - Evacuation and Closure on gravel roads - Ensure proper clearance of unsafe areas prior to blasting.	L
Blasting	Air Blast - Exceeding Limits and Possible Damage to sites 37 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	M		L

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type and measure	Significance (after mitigation)
Blasting	Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 1,2, 4 - 27 and 47 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	M	<u>Minimise and control:</u> - Smaller diameter blast hole - Use of specific stemming materials to manage confinement of blast hole - Increased stemming lengths to reduce fly rock risk - R34 Stop and Go when blasting within the unsafe distance - Ensure proper clearance of unsafe areas prior to blasting. - Relocation of Heritage graves. - Cover protection over closest Heritage sites	L
Blasting	Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 3, 28 – 46 (as per the Blasting Impact Assessment report).	Existing infrastructure, potential sites of cultural significance, people and animals	L		L

Table 58: Assessment of significance of potential decommissioning phase impacts associated with the Project pre- and post- mitigation

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type	Significance (after mitigation)
Decommissioning activities	Decommissioning activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air quality	M	The mitigation measures provided in the construction phase will also be relevant during the decommissioning phase.	L
Noise generating construction and closure activities including traffic, earthworks, mobile construction equipment, metal and concrete works and demolition.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	L	Refer to the mitigation measures provided in the construction phase.	L
Removal of the infrastructure	Compaction and contamination of areas through heavy machinery movement and hydrocarbon spills.	Soil Agricultural Potential	M	<u>Minimise and manage:</u> - The rehabilitated area must be assessed once a year for compaction, fertility, and erosion; - The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations can be implemented before the start of the wet season) as to correct any nutrient deficiencies; - Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated; - If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; - If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; - Only the designated access routes are to be used to reduce any unnecessary compaction; and - Areas of subsidence must be reported and remediated as soon as possible with the best practices at the time of occurrence.	L
Rehabilitation of excavated areas as well as disturbed footprint areas.	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	M		L
Rehabilitation finalisation	Re-establishment of semi-natural conditions to provide a sustainable non-degrading disturbance footprint area.	Soil Agricultural Potential	M	No mitigation proposed due to the impact being positive.	N/A
Decommissioning of the Mine and Repurposing of Support Infrastructure	- Decrease erosion potential; Increase biodiversity; - Remove all potential contaminants - Reinstate natural topography.	Wetlands	L	No mitigation proposed due to the impact being positive.	N/A
Infiltration of groundwater into underground workings	Groundwater pollution plume (AD/ND/SD) is generated by the underground workings.	Geohydrology	H	<u>Minimise and manage:</u> - The underground workings must be allowed to flood to prevent the oxidation of minerals. - The adit should be plugged. - Ensure routine updates of the numerical flow and transport models to confirm closure objectives.	M

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type	Significance (after mitigation)
Decant or seepage	Contaminated decant might flow into neighbouring streams or seep back into the aquifer. Decant is likely at the adit, and poor quality seepage is likely at several positions where the topography is <30m from the coal floor (i.e., if the system is under pressure diffuse seepage, may occur).	Geohydrology	M	<u>Minimise and manage:</u> – Plug the adits at closure. – Ensure that all boreholes drilled into the mine works are decommissioned. – Ensure routine updates of the numerical flow and transport models to confirm closure objectives.	L
Cessation of mining	Recovery of groundwater levels after cessation of mining.	Geohydrology	L	Impact is positive. No mitigation required.	N/A
Decommissioning of non-essential infrastructure to rehabilitate and close the Adit and associated infrastructure	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses. – Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss. – Soil compaction; and – Soil erosion. – Soil quality: – Natural nutrient content decreases due to soil exposure. – Loss of natural bio-organisms essential to soil processes.	Soil interflow processes, soil structure and land capability and soil quality.	H	No mitigation is required. Rehabilitation will likely improve the impact of the development on the hydropedology assessment. General risks associated with the construction phase will likely exist during earthworks and rehabilitation activities.	N/A
Re-Disturbing vadose zone during soil excavations/ infilling activities		Soil interflow processes, soil structure and land capability and soil quality.	H		N/A
Re-vegetation and rehabilitation		Soil interflow processes, soil structure and land capability and soil quality.	H		N/A
Site activities	The presence of the Adit will have long-term implications in terms of altering the natural hydropedological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes, soil structure and land capability and soil quality.	M	<u>Minimise and control:</u> – Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. – Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units	M
Decommission of infrastructure	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	H	The impact significance and mitigation measures provided in the Construction phase will remain relevant during the Operational phase.	H
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: – Stone walled kraal – terracing (for a house) – two possible graves – undecorated, thin-walled pottery	Cultural and Heritage aspects	H		H
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	L		L
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling – Graves – Terracing – Stone cairns – Pottery	Cultural and Heritage aspects	H		H

Activity	Potential Impact	Aspects Affected	Significance (before mitigation)	Mitigation type	Significance (after mitigation)
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	H		H
	Potential disturbance to finds, stone cairns. Pottery, Open MSA scatters	Cultural and Heritage aspects	L		L

13. CUMULATIVE IMPACTS

A cumulative impact may result from an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may either be countervailing (net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (net adverse cumulative impact is greater than the sum of the individual impacts).

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified. Despite these challenges, the following cumulative impacts were identified within specialist reports (details are provided within the studies appended under Appendix IV).

13.1. BIODIVERSITY ASSESSMENT

13.1.1. Terrestrial Biodiversity Theme

- Decline in the aesthetic appeal (from an ecological perspective) of the landscape (Low impact significance after mitigation)
- Exacerbation of existing levels of habitat fragmentation and isolation and adverse effects on ecological integrity and functionality (Low impact significance after mitigation)
- Losses of habitat or areas representing local/ regional and national conservation targets and obligations (loss of natural habitat) (Medium impact significance after mitigation)

13.1.2. Plant Species Theme

- Increased plundering of natural resources due to increased human encroachment, as well as cumulative impacts on populations of plants of conservation consideration, etc. (Low impact significance after mitigation)
- Loss of areas representing important centres of floristic importance or diversity, or areas providing for floristic conservation purposes (Low impact significance after mitigation)

13.1.3. Animal species theme

- Cumulative impacts on local/ regional and national conservation targets and obligations (e.g. loss of natural grassland habitat) and expansion of mining operations in the wider study area (High impact significance after mitigation)

13.2. SOILS, LAND USE AND LAND CAPABILITY ASSESSMENT

- Contamination of soils and the loss of soils as a valuable resource (Low impact significance after mitigation)
- Loss of high potential agricultural land (Low impact significance after mitigation)

13.3. NOISE IMPACT ASSESSMENT

- Noise generating construction and closure activities including traffic, earthworks, mobile construction equipment, metal and concrete works, demolition (Low impact significance after mitigation)
- Noise generating operational activities including coal handling and transport; coal feeders, crushers, screens; conveyors; underground mine ventilation; diesel generators; mobile equipment; ancillary services at workshops and offices (Low impact significance after mitigation)

13.4. VISUAL IMPACT ASSESSMENT

- From sensitive viewpoints within 0–2 km of the infrastructure footprint, cumulative impacts are expected to be moderate to high. Here, the layering of new infrastructure over existing disturbed areas, together with increased vehicle movement, dust emissions, and night-time lighting, will reinforce an already industrial character.
- In contrast, from receptors located 2–5 km away, cumulative impacts are expected to be low to moderate. Distance attenuation, slope shielding, and pockets of vegetation reduce exposure, though panoramic views from elevated positions may still capture multiple layers of mining activity in combination with agricultural transformation.
- At a regional scale, the cumulative impact of the project is considered low to negligible, as mining is already an established land use within the Utrecht area and forms part of its historic landscape character. The project will not introduce an entirely new visual identity but will contribute to the progressive industrialisation of the local valley system, particularly within the immediate 2 km zone of influence.
- In conclusion, while the Umgala Mining Project will align with the existing mining-agricultural context, its operations will contribute to a reinforced industrial landscape character in areas of close visual proximity. Cumulative impacts are therefore assessed as Medium in localised high-visibility zones and low at a broader regional scale, with the eventual outcome dependent on the effectiveness and success of rehabilitation measures over time.

14. ENVIRONMENTAL IMPACT STATEMENT

14.1. SUMMARY OF KEY FINDINGS OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The impact assessment tables above (Table 56, Table 57 and Table 58) include various mining-related activities and their potential environmental and social impacts. Although majority of the impacts are reduced to low or medium significance through appropriate management and mitigation measures, some impacts remain highly significant because of their severity or permanent nature. The impacts that remain high in each phase are summarised in the subsections below.

14.1.1. Construction Phase

The following activities and associated impacts have high significance impacts after mitigation:

- Construction activities that lead to an increased turbidity wetland geomorphological alteration.
- Construction activities that may lead to the potential disturbance to heritage sites 1, site 2, site 4 and site 5.
- Direct and permanent loss of natural fauna habitat, in particular threatened invertebrate habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.
- On the positive side, community impacts include employment creation and income generation, which are considered highly significant beneficial effects.

14.1.2. Operational phase

During the operational phase of the mining project, a range of activities including underground mining, infrastructure operation, vehicle movement, and site maintenance pose potential environmental and social risks. These impacts affect air quality, soil, wetlands, geohydrology, surface water, and community wellbeing. Most impacts are reduced to low or medium significance through mitigation strategies such as dust suppression, stormwater control, soil rehabilitation, and community engagement, however, some impacts remain highly significant due to their severity, permanence, or complexity. These include:

- Movement and vehicle access around infrastructure disrupt water flow, damage banks, and cause erosion and siltation in wetlands. This impact remains high even after mitigation.
- Open cast mining near watercourses leads to complete removal of vegetation, topsoil, and subsoil, resulting in total loss of wetland hydrological and ecological functions. The impact is considered as having high significance both before and after mitigation.
- Operational activities that may lead to the potential disturbance to heritage sites 1, site 2, site 4 and site 5.
- Direct and permanent loss of natural fauna habitat, in particular threatened invertebrate habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.
- Systematic removal of the seam reserve by underground mining methods will lead to groundwater ingress due to underground mining of coal.
- The positive impacts related to social impacts will persist during the operational phase.

13.1.3. Decommissioning phase

- The decommissioning phase involves activities such as dismantling infrastructure, rehabilitating disturbed areas, and managing residual environmental risks. These actions affect air quality, soil, wetlands, geohydrology, and community wellbeing. Decommissioning activities may lead to the potential disturbance to heritage sites 1, site 2, site 4 and site 5. In

addition, direct and permanent loss of natural fauna habitat, in particular threatened invertebrate habitat within the development/mining footprints during the construction, operational and also the decommissioning phases. This impact is the only impact that remains high after mitigation during the decommissioning phase.

14.2. FINAL SITE MAP

The final site layout including buffer zones around heritage sites that must be maintained is presented in Figure 90 and Figure 91.

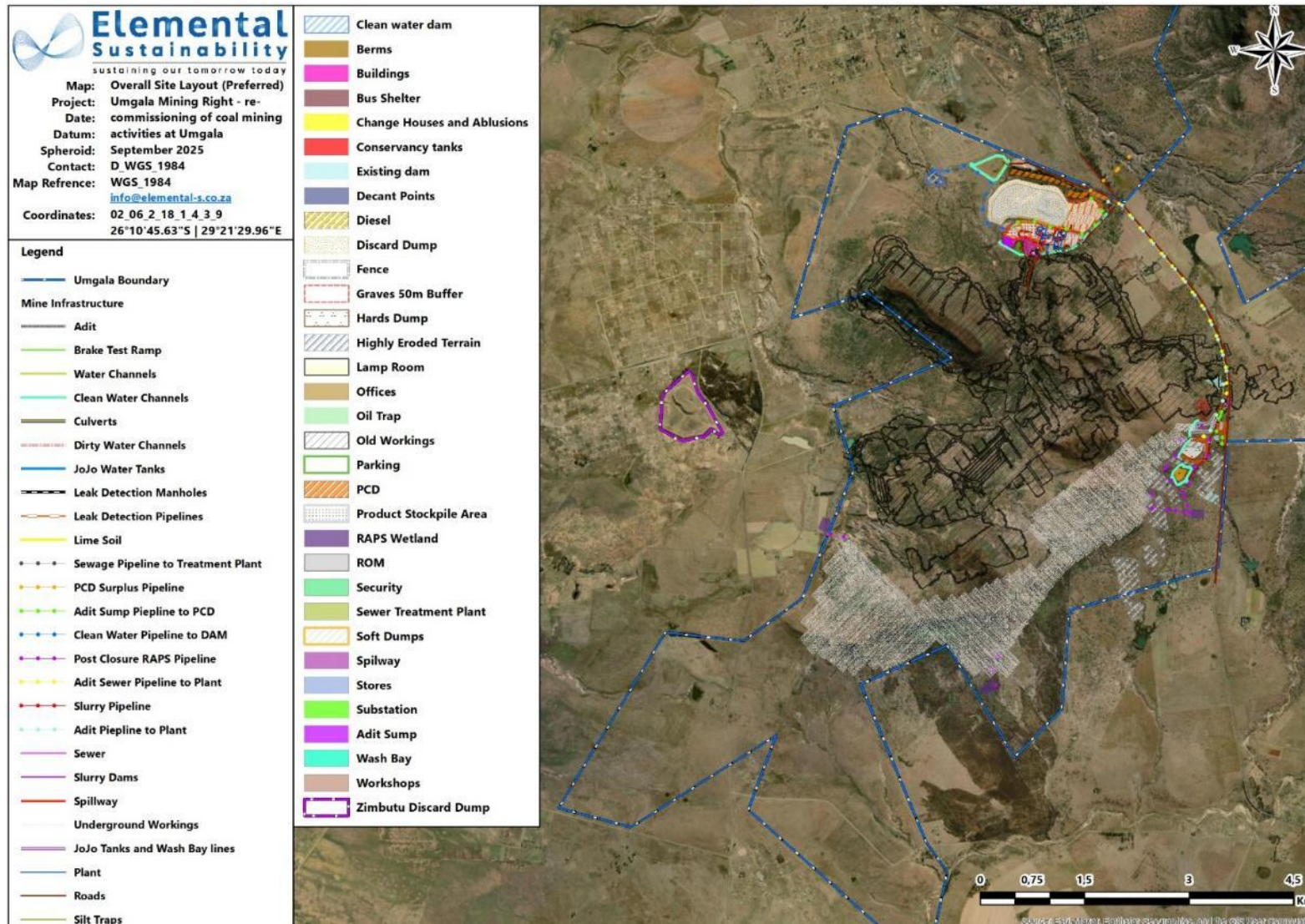


Figure 90: Final site layout map

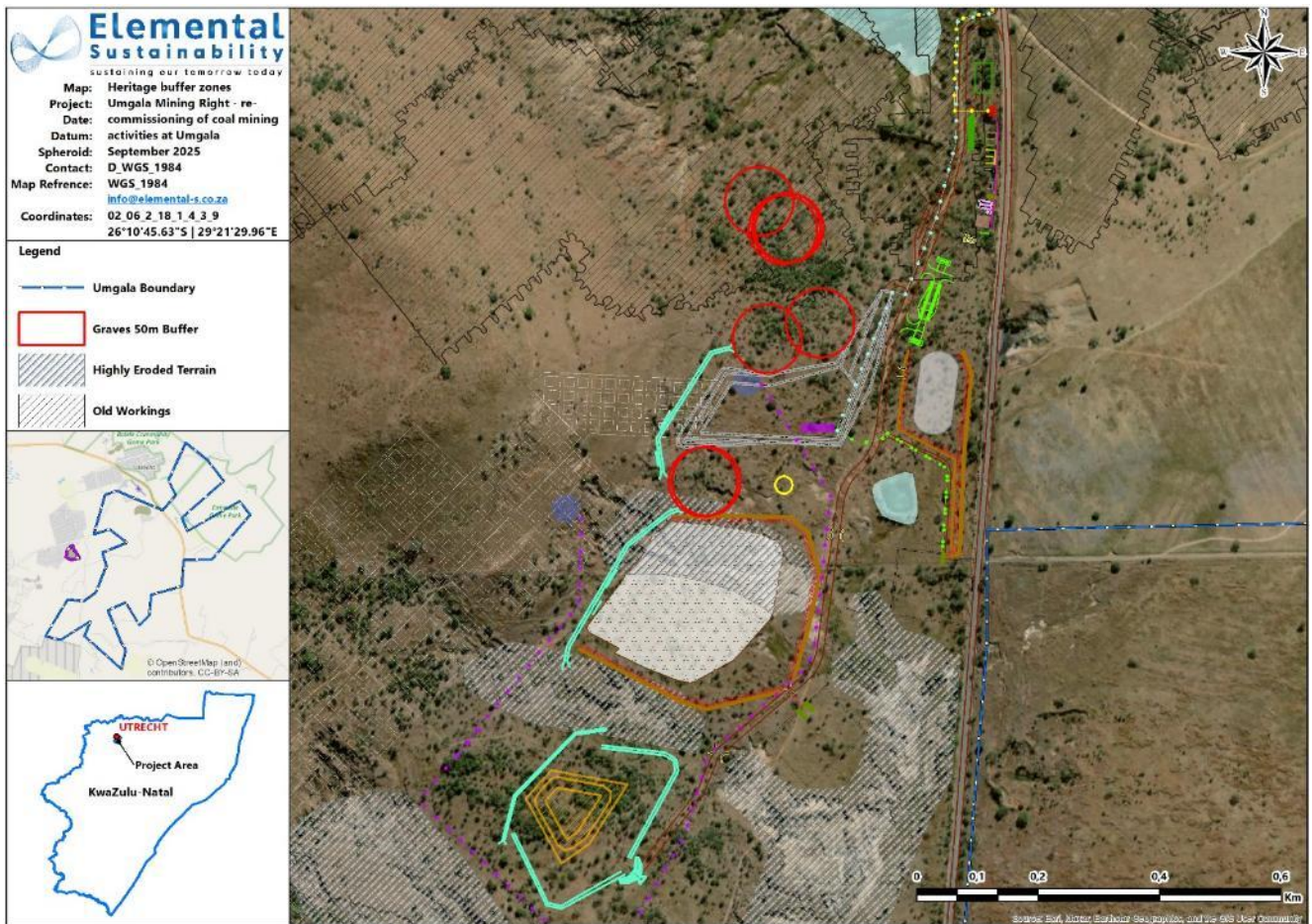


Figure 91: Umgala site 2 with heritage buffer zones

15. PROPOSED IMPACT MANAGEMENT OBJECTIVES AND IMPACT MANAGEMENT OUTCOMES FOR INCLUSION IN THE EMPR

Specialist recommendations which could be included as conditions have been discussed in Table 39. Specialist management measures as well as the significance of the impacts prior and post mitigation are provided in Table 56, Table 57 and Table 58 and contained in the respective studies.

Table 59 below provides a summary of the likely impacts and the corresponding management objectives and management outcomes for the Project.

Table 59: Impact management objectives and the impact management outcomes for inclusion in the EMPr

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Construction phase				
Construction activities	Dust generation exceeding NAAQS and NDCR	Air Quality	Prevent and minimise particulate emissions so that ambient PM10/PM2.5 and dustfall remain within National Dust Control Regulations limits; implement Dust Management Plan.	Dust suppressed; monitoring shows compliance with NAAQS and NDCR; minimal nuisance to receptors.
Noise generating construction activities	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	Limit construction noise with equipment maintenance, attenuation, restricted working hours and compliance with SANS 10103.	Noise levels remain within guideline limits; no significant disturbance or complaints.
Construction of the adit for underground mining works	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil; Agricultural Potential	Strip and stockpile topsoil, implement erosion control, restrict compaction, prevent contamination.	Topsoil preserved and usable for rehabilitation; no widespread contamination or compaction.
Clearing of areas and construction for mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil; Agricultural Potential	Limit footprint, manage topsoil, prevent contamination from hydrocarbons and cement.	Soils remain viable for rehabilitation; agricultural potential maintained post-closure.
Stockpiling of soil	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil; Agricultural Potential	Protect and manage stockpiles with erosion control, seeding, drainage.	Stable stockpiles with preserved fertility and structure.
Clearing of areas and stockpiling of soil	Loss of Agricultural Resources and Infrastructure	Soil; Agricultural Potential	Avoid unnecessary clearing, compensate unavoidable losses, rehabilitate disturbed areas.	Agricultural potential restored where possible; residual loss documented.
Clearing of areas and stockpiling of soil	Loss of Land Capability	Soil; Agricultural Potential	Preserve topsoil and restore land capability during rehabilitation.	Land rehabilitated to equal or improved capability.
Vegetation clearance & earthworks	Temporary disturbance of wetlands	Wetlands	Avoid wetlands, establish buffers, install silt fences, rehabilitate disturbed areas.	Wetland function outside footprint retained; rehabilitation successful.
Vegetation clearance & traffic	Runoff and erosion altering hydrological processes	Wetlands	Implement stormwater controls, sediment traps, progressive rehabilitation.	Hydrological processes maintained; erosion under control.
Vegetation clearance & compaction	Reduced ecological connectivity, disturbance to riparian edges	Wetlands	Maintain riparian buffers, restrict access routes, rehabilitate crossings.	Connectivity preserved; riparian edges stable. Implement Offset or rehabilitation plans
Storage/transport of construction materials	Spillages causing contamination of soil/groundwater	Wetlands; Aquatic systems	Bunded storage, spill kits, emergency plans, training.	No significant spills; aquatic ecosystems unaffected.
Demarcation of buffer zones and spoil sites	Disturbance of soil profile, vegetation loss	Wetlands; Soil	Designate no-go areas, manage spoil sites away from drainage lines.	Spoil sites stable; minimal disturbance beyond footprint.
Construction of mine support infrastructure	Permanent change in hydrology, reduced infiltration, increased erosion	Wetlands; Hydrology	Design stormwater to mimic natural drainage, install culverts, erosion protection.	No downstream erosion or hydrological imbalance.
Establishment mining area footprint	Loss of wetland functions	Wetlands	Avoid wetlands where possible; implement offsets and rehabilitation.	Wetland function restored or offset as per permits.
Land and riparian clearing	Water quality deterioration	Aquatic	Prevent sedimentation through buffer zones, erosion control.	Water quality remains within baseline conditions.
Construction activities	Solid waste entering wetlands	Aquatic	Implement waste management system; no dumping in wetlands.	Wetlands and aquatic systems remains free of litter/pollution.
Construction activities	Chemical contamination of surface water	Aquatic	Bund fuel areas, emergency response plan.	Surface water monitoring shows no exceedances.
Construction activities	Soil contamination from chemicals	Aquatic; Soil	Designate refueling/maintenance areas, no direct discharge.	No soil contamination recorded.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Construction activities	Human waste contamination	Aquatic	Provide chemical toilets; regular servicing.	No human waste observed; no health risks.
Construction activities	Increased turbidity	Aquatic	Install sediment controls, monitor turbidity.	No long-term turbidity increases detected.
Construction activities	Geomorphological alteration	Aquatic	Minimise disturbance; install sediment ponds.	Geomorphology stable outside footprint.
Dewatering	Lowering of water levels	Geohydrology	Limit dewatering volumes/duration; treat return water.	Groundwater levels recover post-construction.
Blasting	Fracturing and altered flow patterns	Geohydrology	Controlled blasting; vibration monitoring.	No significant alteration to groundwater patterns.
Construction	Groundwater contamination from spills or from discard dump and PCDs	Geohydrology	Bunded storage, correct lining in terms of Waste Classification, groundwater monitoring.	No contamination above baseline.
Vegetation clearing	Increased runoff	Geohydrology	Stormwater controls; revegetation.	No abnormal erosion detected.
Earthworks	Disturbing vadose zone	Vadose zone soils; Aquifer	Minimise disturbance; progressive rehab.	Vadose zone restored post-works.
Earthworks	Seepage contamination (oil, grease, fuel)	Vadose soils; Aquifer	Vehicle maintenance, inspections, spill cleanup.	No hydrocarbon exceedances in monitoring.
Earthworks	Surface water contamination/sedimentation from storms	Streams	Install sediment ponds; emergency response plans.	No abnormal sedimentation downstream.
Contractor laydown areas	Alteration to soil interflow; erosion	Soil structure & capability	Locate away from drainage lines, erosion control, restore.	Soil function restored; erosion minimised.
Vegetation clearing & stockpiling	Soil erosion and nutrient loss	Soil	Protect stockpiles, seed or vegetate, monitor fertility.	Stockpiles viable for rehabilitation.
Earthworks (vehicle spills)	Soil and groundwater contamination	Soil quality	Designated refueling/parking; spill kits.	No migration of pollution.
Earthworks	Temporary dewatering of perched aquifers	Perched aquifers	Limit dewatering; return flows.	Aquifers recover post-event.
Earthworks	Soil erosion from shallow/sodic soils	Soil	Stabilisation (mulch, geotextiles, drains).	Erosion under control.
Construction traffic	Road network impacts	Roads; Pedestrians	Traffic Management Plan; signage; speed limits.	Safe traffic; minimal damage to roads.
Construction and operation	Socio-economic impacts (employment, community)	Local communities	Prioritise local hiring/procurement; grievance system.	Local benefits realised; grievances managed.
Construction activities	Dust generation exceeding NAAQS and NDCR	Air Quality	Prevent and minimise particulate emissions so that ambient PM10/PM2.5 and dustfall remain within National Dust Control Regulations limits; implement Dust Management Plan.	Dust suppressed; monitoring shows compliance with NAAQS and NDCR; minimal nuisance to receptors.
Noise generating construction activities	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	Limit construction noise with equipment maintenance, attenuation, restricted working hours and compliance with SANS 10103	Noise levels remain within guideline limits; no significant disturbance or complaints.
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impacts on aesthetics	Visual and landscape character	Minimise visual disturbance and maintain overall landscape character during and after vegetation clearance. Ensure progressive rehabilitation to reduce long-term visual impacts.	Site clearing is restricted to the approved footprint and phased where possible. Aesthetically compatible rehabilitation measures (e.g., reseeded, landscaping)
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character	Reduce visual intrusion on nearby sensitive receptors (e.g., residences, tourist routes, cultural heritage sites)	Implementation of visual screening (berms, tree buffers, vegetation) reduces line-of-sight exposure.
Movement of construction vehicles and heavy machinery for site clearance	Change of visual character from a natural landscape to a built landscape	Visual and landscape character	Limit the visual footprint and duration of construction activities.	Construction areas remain confined to demarcated zones, avoiding unnecessary disturbance.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Design of supporting infrastructure	Landscape visual change	Visual and landscape character	Ensure infrastructure design considers landscape integration with the environment.	Supporting infrastructure (roads, buildings, utilities) has a low visual profile and integrates into the existing landform and vegetation.
Project planning, site preparation and land clearance, construction activities, operational activities	Unmitigated and uncontrolled loss of habitat types of elevated sensitivity and conservation importance on a local and regional scale	Terrestrial biodiversity theme	To ensure that plant species of conservation concern (SCC), protected taxa, and areas of elevated floristic sensitivity are identified, documented, and effectively managed prior to and during site preparation and construction	Localities, number, and diversity of protected plant taxa within the authorised footprint accurately recorded through a final walkthrough. All required EKZN and DFFE permits obtained and adhered to. Relocation programme successfully implemented with survival of relocated individuals monitored. Areas of elevated floristic sensitivity excluded from development footprint, with buffers maintained to support ecological integrity.
Uncontrolled construction and operational activities that are not effectively contained in authorised footprint, uncontrolled movement of vehicles and personnel, unauthorised utilisation of natural resources outside the development footprint, unmitigated erosion and pollution events, unplanned fire events	Deterioration and alteration of present ecological status of natural and sensitive habitat types that are in proximity to the development footprint (not part of the authorised footprint), that will cause secondary impacts such as disruption of ecological integrity and functionality on a local and landscape scale.	Terrestrial biodiversity theme	To prevent unauthorised disturbance and degradation of sensitive habitats, protect SCC, and maintain ecological integrity within and adjacent to the authorised development footprint.	Development footprint effectively demarcated with fencing or other permanent measures. No unauthorised vehicle or personnel movement outside of the approved footprint. Awareness programmes ensure all site personnel comply with biodiversity protection measures. Environmental Monitoring Programme operational, providing regular feedback and corrective actions. If residual losses occur, biodiversity offsets are identified and secured.
Site preparation, construction activities, operational activities/ environmental management, movement of personnel and vehicles	Displacement of natural vegetation by alien and invasive plants, displacement of natural vegetation by locally endemic encroacher species. Spread of AIP species via nearby riparian habitat toward other areas of elevated sensitivity and importance, e.g., Olifants River	Plant species theme	To prevent the introduction, spread, and dominance of AIP and encroacher species in and around the project footprint.	AIP Management Plan developed and implemented at project onset. Regular inspections and control measures prevent AIP spread to riparian systems and adjacent habitats. Eradication and control efforts documented, with measurable reduction in AIP cover and encroacher pressure.
Project planning, site preparation and land clearance, construction activities	Unmitigated and uncontrolled loss of natural habitat types of elevated fauna sensitivity (very high SEI), uncontrolled loss of invertebrate SCC and other protected fauna taxa	Animal species theme	To avoid or minimise the loss of fauna SCC, maintain habitat connectivity, and provide for safe relocation of fauna during site clearance and construction.	Final walkthrough confirms presence and extent of SCC and protected fauna taxa. Biodiversity Management Plan implemented for adjacent habitats, ensuring conservation of ecological corridors and ecosystem services. Wildlife management and rescue plan executed, with individuals safely relocated in compliance with permit requirements. Environmental awareness training ensures staff recognise and protect fauna and habitats. Monitoring detects and prevents poaching, squatting, or illegal harvesting. Ongoing rehabilitation trials and monitoring confirm effectiveness of fauna protection strategies.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
				Additional surveys for invertebrates generate baseline and monitoring data, with results feeding into adaptive management
All construction, operational and decommissioning activities related to the Project.	– Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal. – Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: ○ Stone walled kraal ○ terracing (for a house) ○ two possible graves ○ undecorated, thin-walled pottery – Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace – Potential disturbance to site 4 - The site consists of several features and artefacts that include: ○ Stone walling ○ Graves ○ Terracing ○ Stone cairns ○ Pottery – Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	Avoid disturbance to cultural and heritage aspects on site.	Cultural and heritage aspects remain intact and no loss of heritage resources, grievances from communities.
AI construction phase	– Impact on community due to employment creation and income generation	Socio-economic / communities	Adherence and implementation of approved and updated SLP.	Adherence and compliance to SLP commitments.
Operational Phase				
Operations of the mine infrastructure	Fugitive dust and combustion emissions from the project was shown to result ambient concentrations at sensitive receptors above NAAQS for NO2, PM10, and NDCR.	Air Quality	Implement dust suppression, cover stockpiles, maintain equipment, and monitor air quality to remain within NAAQS and NDCR.	Air quality monitoring shows compliance; no nuisance dust at receptors.
Noise generating operational activities including coal handling and transport; coal feeders, crushers, screens; conveyors; underground mine ventilation; diesel generators; mobile equipment; ancillary services at workshops and offices	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	Maintain and attenuate equipment, enclose noisy machinery, schedule operations during daytime, comply with SANS 10103.	Noise levels within guideline limits; minimal disturbance to communities and receptors.
Operation of underground mine workings	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Operation of mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Operation of PCD, Discard dump, and ROM areas	Contamination of soil resources below these facilities as well as adjacent to these facilities due to contaminated runoff.	Soil Agricultural Potential	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Dust suppression of haul roads	Often waste water is used as dust suppression water spray. These could lead to the build-up of contaminants in the road surface as well as adjacent to the road in areas of concentrated runoff.	Soil Agricultural Potential	Implement dust suppression, cover stockpiles, maintain equipment, and monitor air quality to remain within NAAQS and NDCR.	Air quality monitoring shows compliance; no nuisance dust at receptors.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Operation of Mining Support infrastructure (Buildings, Conveyor Belts, Waste Dams, Haulage/Dirt Roads and Fences)	Movement and Vehicle access in and around the Support infrastructure. Impeding the flow of water. Damage to banks. Siltation of water course. Erosion of water course. Flow sediment equilibrium change	Wetlands	Avoid direct wetland disturbance, establish buffer zones, manage stormwater, and rehabilitate post-disturbance.	Wetland functionality maintained or rehabilitated; no long-term degradation.
Operation of the mining activities	Open cast mining activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems	Wetlands	Avoid direct wetland disturbance, establish buffer zones, manage stormwater, and rehabilitate post-disturbance.	Wetland functionality maintained or rehabilitated; no long-term degradation.
Operation of the mining activities	Above mentioned variables – surface water pollution	Aquatic	Implement erosion control, bunding, and water treatment systems to prevent pollution of surface waters.	Water quality remains within baseline; aquatic ecosystems not degraded.
Seepage	Poor quality seepage from the existing underground workings into the weathered and fractured aquifer	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Systematic removal of the seam reserve by underground mining methods	Groundwater ingress due to underground mining of coal.	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Dewatering	Lowering of the water table due to dewatering.	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Seepage	Poor quality seepage from the proposed PCD's, sumps, Discard dumps, ROM stockpiles, softs dump, hards dump, top-soils dump, workshops, fuel storage, ablutions (septic tanks), dirty water trenches and processing plant into the aquifer.	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Groundwater abstraction to supplement water needs at the mine	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Groundwater abstraction to supplement water needs at the mine	Dewatering the local aquifer to supply the mine with operational water.	Geohydrology	Monitor and control dewatering, seal potential seepage sources, and manage spills with emergency response plans.	Groundwater levels and quality remain stable; no significant contamination.
Site activities	Disturbing vadose zone soils during mining	Vadose zone soils and subsequent aquifer (groundwater table)	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Site activities	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer and drainage system.	Vadose zone soils and subsequent aquifer (groundwater table)	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Site activities	Stormwater Runoff – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Increased runoff due to compaction of surfaces and changes in surface topography	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	Install sediment traps, stormwater control measures, and emergency response procedures.	No abnormal sedimentation or water contamination detected downstream.
Site activities	Water quality – Contaminant transport in runoff from sediment to oil and fuel spills – Spillage of PCDs, slurry dams and stormwater conduits	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	Implement erosion control, bunding, and water treatment systems to prevent pollution of surface waters.	Water quality remains within baseline; aquatic ecosystems not degraded.
Site activities	AMD – Contaminant transport in runoff from overburden dumps	Water environment	Implement best practice environmental and operational controls relevant to the activity.	No significant residual impact; compliance with environmental standards achieved.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Site activities	Disturbing the inner-soil architecture of the original soil profile will disturb natural flow processes (i.e. a result of infilling or cut-and-fill activities). Excavated soil will be placed in other areas (i.e. on top of other soils) and will have an impact on the flow dynamics of the soil it is dumped on top of. This may reduce rainfall infiltration and induce runoff. Impermeable areas will decrease rainfall infiltration into soils, and hence reduce interflow (A/B and A/bedrock) or lateral flow to downstream wetland areas.	Soil interflow processes	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Site activities	The presence of adit, PCD and stockpiles will have long-term implications in terms of altering the natural hydrogeological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Site activities	Seepage/leakages/overland flow from the PCD and stockpiles may impact soil quality.	Soil quality	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Site activities	The presence of shallow soils will and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Daily operational activities	Negative impacts on aesthetics	Visual and landscape character	Minimise visual intrusion of operational activities through effective design, screening, and progressive rehabilitation.	The mine and infrastructure blend more effectively into the surrounding landscape, reducing visual contrast and maintaining visual quality for surrounding land users.
Daily operational activities of the Mine and associated infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character	Reduce visibility of mining operations from sensitive receptors by applying visual barriers, vegetative screening, and maintaining buffer zones.	Sensitive viewpoints experience limited exposure to mine operations, with reduced disturbance to the scenic quality and visual amenity.
Movement of heavy machinery	Change of visual character	Visual and landscape character	Limit visibility of moving equipment through designated haul roads, restricted operating hours (where feasible), and visual buffers.	The sense of landscape character is maintained with reduced perception of movement and industrial activity in the broader viewshed.
Night lighting for security and operational activities	Light pollution (Glare, spill light, sky glow)	Visual and landscape character	Minimise light pollution through use of directional, shielded, and low-intensity lighting that complies with best-practice guidelines.	Night-sky quality and surrounding visual character are preserved, with reduced glare and spill-over effects on nearby communities and ecological receptors.
Daily operational activities of the Mine, and associated infrastructure.	Landscape visual change	Visual and landscape character	Integrate infrastructure with natural surroundings through appropriate siting, colour schemes, and progressive rehabilitation.	The overall landscape visual character is conserved as far as practicable, with gradual re-establishment of natural features over the life of mine.
Transport and movement of vehicles during operational activities	The additional traffic generated by the proposed mining operations will have some impact on the space available for pedestrians.	Existing pedestrians	Implement best practice environmental and operational controls relevant to the activity.	No significant residual impact; compliance with environmental standards achieved.
Transport and movement of vehicles during operational activities	The proposed mines are expected to generate moderate traffic volumes, which may have a limited effect on prevailing safety conditions	Road safety	Implement traffic management plan, enforce speed limits, maintain roads, and ensure pedestrian safety.	Safe traffic conditions maintained; minimal damage to road infrastructure.
Transport and movement of vehicles during operational activities	There will be a moderate impact on the road network condition due to the additional heavy vehicle traffic generated during the operational phase	Condition of the Road Surface	Implement traffic management plan, enforce speed limits, maintain roads, and ensure pedestrian safety.	Safe traffic conditions maintained; minimal damage to road infrastructure.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	Implement best practice environmental and operational controls relevant to the activity. Adherence and implementation of approved and updated SLP	No significant residual impact; compliance with environmental standards achieved.
Construction and operation of the mining operations	– Possibility of political interference, corruption, and fraud. – Blasting impacting on housing stability – Increased demand on already strained electricity supply – Increase in health & safety – Incidents on the mine – Increased traffic – Impact on livestock and agriculture – Stability of land because of underground mining and blasting operations – Limitations on development expansions of the municipality – Loss of grazing land (subsistence) – Leadership conflict – Increased tension due to influx of non-residents	Local communities	Implement best practice environmental and operational controls relevant to the activity.	No significant residual impact; compliance with environmental standards achieved.
All construction, operational and decommissioning activities related to the Project.	– Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal. – Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: - o Stone walled kraal - o terracing (for a house) - o two possible graves - o undecorated, thin-walled pottery – Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace – Potential disturbance to site 4 - The site consists of several features and artefacts that include: - o Stone walling - o Graves - o Terracing - o Stone cairns - o Pottery – Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	Avoid disturbance to cultural and heritage aspects on site.	Cultural and heritage aspects remain intact and no loss of heritage resources, grievances from communities.
Decommissioning phase				
Decommissioning activities	Decommissioning activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air quality	Refer to construction phase management objectives.	Implement best practice environmental and operational controls relevant to the activity.
Noise generating construction and closure activities including traffic, earthworks, mobile construction equipment, metal and concrete works and demolition.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	Refer to construction phase management objectives.	Refer to construction phase management outcomes.
Removal of the infrastructure	Compaction and contamination of areas through heavy machinery movement and hydrocarbon spills.	Soil Agricultural Potential	Refer to construction phase management objectives.	Refer to construction phase management outcomes.
Rehabilitation of excavated areas as well as disturbed footprint areas.	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	Refer to construction phase management objectives.	Refer to construction phase management outcomes.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
Rehabilitation finalisation	Re-establishment of semi-natural conditions to provide a sustainable non-degrading disturbance footprint area.	Soil Agricultural Potential	No significant residual impact; compliance with environmental standards achieved.	Refer to construction phase management outcomes.
Decommissioning of the Mine and Repurposing of Support Infrastructure	– Decrease erosion potential; Increase biodiversity; – Remove all potential contaminants – Reinstate natural topography.	Wetlands	Avoid direct wetland disturbance, establish buffer zones, manage stormwater, and rehabilitate post-disturbance.	Wetland functionality maintained or rehabilitated; no long-term degradation.
Infiltration of groundwater into underground workings	Groundwater pollution plume (AD/ND/SD) is generated by the underground workings.	Geohydrology	Refer to construction phase management objectives.	Implement best practice environmental and operational controls relevant to the activity.
Decant or seepage	Contaminated decant might flow into neighbouring streams or seep back into the aquifer. Decant is likely at the adit, and poor quality seepage is likely at several positions where the topography is <30m from the coal floor (i.e., if the system is under pressure diffuse seepage, may occur). Seepage from the Discard dump section	Geohydrology	Refer to construction phase management objectives.	Refer to construction phase management outcomes.
Cessation of mining	Recovery of groundwater levels after cessation of mining.	Geohydrology	Refer to construction phase management objectives.	Refer to construction phase management outcomes.
Decommissioning of non-essential infrastructure to rehabilitate and close the Adit and associated infrastructure.	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs).	Soil interflow processes, soil structure and land capability and soil quality.	No significant residual impact; compliance with environmental standards achieved.	Compliance with environmental standards achieved.
Re-Disturbing vadose zone during soil excavations/infilling activities.	– Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses.	Soil interflow processes, soil structure and land capability and soil quality.	Refer to construction phase management objectives.	Refer to construction phase management outcomes.
Re-vegetation and rehabilitation.	Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss. – Soil compaction; and – Soil erosion. Soil quality: – Natural nutrient content decreases due to soil exposure. – Loss of natural bio-organisms essential to soil processes.	Soil interflow processes, soil structure and land capability and soil quality.	Preserve topsoil, prevent compaction and contamination, manage spills, and implement erosion control.	Soils remain viable for rehabilitation; agricultural potential restored or maintained.
Site activities	The presence of the Adit will have long-term implications in terms of altering the natural hydropedological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes, soil structure and land capability and soil quality.	Refer to construction phase management objectives.	Refer to construction phase management outcomes.
All construction, operational and decommissioning activities related to the Project.	– Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal. – Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: - o Stone walled kraal - o terracing (for a house) - o two possible graves - o undecorated, thin-walled pottery – Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace – Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling - o Graves	Cultural and Heritage aspects	Avoid disturbance to cultural and heritage aspects on site.	Cultural and heritage aspects remain intact and no loss of heritage resources, grievances from communities.

Activity	Potential Impact	Aspects Affected	Management Objective	Management Outcome
	○ Terracing ○ Stone cairns ○ Pottery – Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.			

16. FINAL PROPOSED ALTERNATIVE

Refer to Section 8 for details relating to the final proposed alternative.

17. ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

Refer to Table 39 for a summary of the recommendations which have been made by the specialist and EAP, which would not formally form part of the EMPr, but which must be considered by the Applicant and included in the Authorisation. In addition, the mitigation measures provided in Table 56 - Table 58 must be implemented by the Applicant.

18. GAPS, ASSUMPTIONS AND LIMITATIONS

Limitations as per specialist study have been provided within each specialist investigation as to comply with Appendix 6 of the Impact Regulations. A summary of the gaps, assumptions and limitations of each specialist study is provided in the sections below.

18.1. SOCIAL IMPACT ASSESSMENT

The demarcation of the affected community areas is not fully aligned between different sources of information. This causes the data between the various sources to not be completely correlated mainly because of differences in the naming and demarcation of the sub-places, municipal wards and local place names. Census 2011, the Community Survey 2016, and information generated by the Quantec Regional Economic Database as derived from the Census and the Community Survey. The Census 2011 provides demographic information at a municipal and sub-place level whereas the Community Survey 2016 provides information only at a municipal level. Quantec uses both these sources of information to generate estimates for the 2018 population at a municipal level. This means that the only information profiling the community at sub-place level is the 2011 Census.

The information and data used in this report provides as accurate and up to date indication of the Emadlangeni Local Municipality population as per available data sources. However, due to the inconsistencies in the sources as indicated above, the information does not align in all cases. Population estimates for some of the affected communities could not be determined because of the changes in the demarcation of sub-places and local names. Such communities include, Berrouw, and Vaal Bank.

It should also be noted that sub-place information is only available for the 2011 Census for the following areas, and not all the affected communities as identified:

- Berrouw
- Bernsdop
- Utrecht town
- White City

- Vaal Bank -information of this area is not available in both the 2001 and 2011 Census statistics. Therefore, it is not included in the profiling of the affected communities, although this community was interviewed and identified as one of the affected communities.

Despite the difficulties presented in the above data sources, it is believed that the profiles of the communities are of a sufficient level of accuracy to reflect the current demographic profile of the affected communities.

18.2. GEOHYDROLOGICAL ASSESSMENT

The following model assumptions and limitations are recognised:

- Groundwater-specific yield and specific storage values were derived from literature ranges for the rock encountered in the study area. It is assumed that specific yield and specific storage values in the model domain are like literature values.
- Dispersivity parameters were estimated from the available literature on the rocks encountered in the study area.
- It is assumed that SO₄ accurately displays the calibrated and predicated zone of influence due to the physical and chemical attributes of SO₄.
- Conductance for river and stream drainage cells was derived from the literature. It is assumed that conductance in the model domain is like literature values.
- The model does not consider kinetic mineral reactions (i.e. oxidation of pyrite within the coal waste).
- The transport model assumes that the hard dump, soft dump, topsoil, ROM and PCD will be lined. Hence, no pollution migration into the aquifer is modelled for these facilities. These facilities will also be rehabilitated after LOM, hence long-term impacts associated with these facilities are unlikely.
- No transport model calibration took place, as the proposed mine is in an area where no mining has yet occurred.

18.3. HYDROLOGICAL ASSESSMENT

In line with the development of the flood lines, the following assumptions were made:

- The topographic data provided was of sufficient accuracy and coverage to enable conceptual hydraulic modelling at a suitable level of detail.
- The Manning's 'n' values used are considered suitable for use in the flooding events modelled, representing all the channels and floodplains.
- No abstractions or discharges into the stream sections were considered during the modelling.
- Further flood modelling work could be conducted to analyse a floodplain more representative of the site, but more detailed topographical data would have to be procured.

18.4. HYDROPEDOLOGICAL ASSESSMENT

The following assumptions were made:

- Constant evaporation is assumed for the sub-catchments – sink in the water balance model.
- Limited groundwater ingress is likely for the adit area, as available data suggest that the main aquifer units (i.e. the weathered zone contacts with more competent rock) occur at depth > 30 m. If groundwater is intercepted in this zone, it will likely be in the range of the median aquifer yield (70 to 172.8 m³/day) – (GCS, 2022).
- As a worst-case approach, it is simulated that the underground workings will remove deep percolation to the downstream water bodies. However, soil data suggest that this will not be the case. Responsive (shallow) soils don't promote ingress into the underlying lithologies.
- Groundwater contribution to baseflow is assumed to be in the order of 43.8 mm/yr. (DWAF, 2006) – Hughes Model.
- Upstream interception along the length of the proposed clean water diversion trenches up to a maximum depth of 3 m is assumed.
- No artificial recharge, other than in the case of a mitigation measure (i.e., attenuated stormwater releases to wetlands/streams/drainage lines), is accounted for. Artificial recharge from dams is not considered.
- The activities proposed are evaluated. The PCD will be lined, and hence are assessed as being impermeable or no-flow boundaries. This was done to evaluate the likely impacts of PES/EIS.
- The above-mentioned assumptions were made to give a worst-case overview of the likely impacts on the hydrogeological flow water balance, as a result of the activities at the site.

18.5. WETLAND ASSESSMENT

In order to apply generalized and often rigid scientific methods or techniques to natural, dynamic environments, a number of assumptions are made. Furthermore, a number of limitations exist when assessing such complex ecological systems. The following constraints may have affected this assessment:

- A Garmin GPSMAP 64 was used in the mapping of waypoints on-site. The accuracy of the GPS is affected by the availability of corresponding satellites and accuracy ranges from 1 to 3 m after post-processing corrections have been applied.
- A Munsell Soil Colour Chart was used to assess soil morphology. This tool requires that a dry sample of soil be assessed. However, due to in-field time constraints, slightly wet soil samples were assessed. Wet samples would have consistently lower values than dry soils; and this is taken into consideration.

- Although the vegetation was taken into account, protected and threatened species, such as bulbs that have not emerged, may not have been identified. If development is to extend into sensitive areas (such as buffer areas), a vegetation survey will be required.
- Due to the level of transformation at some sections of the site, soils assessments had to take that into consideration. Some of the areas of interest had completely modified soils due to existing mine developments and roads.
- The site visit was undertaken during the start of a drought period (September El Nino Southern Oscillation, expected to continue throughout the summer) which meant that precaution was taken to ensure that drier wetland systems were not excluded in this assessment.

18.6. AIR QUALITY IMPACT ASSESSMENT

- Key assumptions and limitations to the assessment that should be noted when considering dispersion modelling results are:
- The quantification of emissions and impacts are, as is typical of an AIR, limited to operational phase impacts. Construction and other phases of the operation are addressed qualitatively.
- Some sources of emission were omitted from the study either because their contribution is considered immaterial or because insufficient information was available for its quantification e.g., on-site diesel storage, grading, underground-mine ventilation.
- Mining and processing were conservatively assumed to occur every day of the year. The processing plant's operational hours were set to 18 hours per day. Mining was assumed to be continuous i.e. 24 hours per day.
- Despite differences observed in the weather data sets for Vryheid (SAWS) and Utrecht (simulated) it was decided to utilize the simulated MM5 dataset in dispersion simulations. This decision was based on the dataset's site-specific nature, and its comprehensive inclusion of all necessary surface weather parameters, as well as upper air (or profile) data, which are essential for the dispersion model.
- The conversion process of NO to NO₂ were, as prescribed by the Regulations Regarding Air Dispersion Modelling, based on the Ambient Ratio Method (ARM).
- AERMOD cannot simulate sub-1-hour pollutant concentrations without sub-hourly meteorological data.
- For this assessment formaldehyde was selected as an "indicator" compound as it is prevalent in diesel exhaust VOC and has the highest potential for health impacts.
- The estimation of increased lifetime cancer risk is considered conservative as it assumed that the exposed person will be exposed to the pollutant under consideration consistently over a 70-year lifetime.
- Background ambient air quality is not currently measured in the area.
- Cumulative concentrations of CO, NO₂, PM₁₀, PM_{2.5}, and SO₂ are based on the median of hourly data collected at some distance from the project. The representativeness of this data for the project area is uncertain.

- In the absence of ambient data, cumulative ambient VOC, and diesel exhaust (DE) concentrations could not be quantified.
- There will always be some error in any geophysical model, but it is desirable to structure the model in such a way to minimise the total error. Dispersion modelling is generally accepted as a necessary and valuable tool in air quality management.

18.7. SOILS, LAND CAPABILITY, AND LAND USE SPECIALIST ASSESSMENT

The following aspects were considered as limitations of the assessment:

- Hand augers were used, and the limiting layer was the depth to which the auger could drill;
- The assessment is based on the design and layout information provided by the client;
- It has been assumed that the extent of the development area provided by the responsible party is accurate;
- The GPS used for ground truthing is accurate to within five meters. Therefore, the observation site's delineation plotted digitally may be offset by up to five meters to either side; and
- Only a soil auger was used for this assessment, no open pits were dug.

18.8. AQUATIC ASSESSMENT

Due to the limited historic information available at the time of writing this report a temporal analysis of the water quality and aquatic integrity could not be determined.

Note inserted by EAP: Temporal trends are being evaluated by another specialist as part of the WULA and follow up aquatic assessments are in process to obtain data from two different seasons.

18.9. TERRESTRIAL BIODIVERSITY ASSESSMENT

- Only sections of the study areas to be affected by surface infrastructure were sampled, according to previous reports.
- To obtain a comprehensive understanding of the dynamics of the biodiversity of the sites, with specific reference to species of conservation concern, studies should include sampling through the different seasons of the year, over several years, and extensive sampling of the area. Such long-term research efforts are generally not feasible for non-academic studies such as this EIA report, and surveys for this project were conducted in distinctive bouts during summer season. Species and diversity information can therefore not be accepted as exhaustive or entirely comprehensive.
- Sufficient spatial and GIS information was available for a comprehensive evaluation of the importance and sensitivity of the site from a regional and local perspective.
- To allow for minor information gaps and (known) lack of site-specific information pertaining to certain plant and animal species of conservation concern that were highlighted in the Environmental Screening Report, the habitat presence, status, and integrity was subjectively correlated to habits and life requirements of these species.

- While it is assumed that 3rd party information is correct, some scale-related inaccuracies are reasonably expected. These errors are typically the result of interrogation of data collected from a wide geographic scale, and the data might therefore not be entirely appropriate for fine-scaled application and evaluations (site-specific). Where noted, this was stated and suitable allowances made.
- No significant limitations were encountered during the peak wet season site inspections; sufficient data and information were collected for the purpose of this report.
- The Precautionary Principle (IUCN, 2004) was nonetheless applied where any uncertainty was encountered.

Despite minor limitations, it is therefore contended that available 3rd party information and data obtained from the site inspections are sufficiently detailed to present a reasoned and considered specialist opinion on the themes of this assessment. No significant information or procedural limitations were encountered within the context of this assessment, or which could reasonably affect results and/ or recommendations. Overall confidence in the accuracy of results and findings is therefore high.

19. REASONED OPINION AS WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED

19.1. REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT

Based on the findings of the impact assessment in Section 12.7 and considering the current conditions of the site, it is clear that the proposed mining activity is associated with a number of high environmental impacts. However, the removal of Knights Hill from the application has resulted in the avoidance of particularly sensitive areas, thereby reducing the overall risk footprint of the Project.

While some residual negative impacts remain, the specialist studies indicate that most of these can be reduced to acceptable levels through the diligent implementation of the mitigation and monitoring measures outlined. These measures must be made legally binding and closely monitored to ensure compliance throughout the operational and decommissioning phases. Where impacts cannot be mitigated, such as the case with the animal theme within the Umgala 2 – Southern Section (Site 1), offsetting will be investigated and where feasible, implemented before the commencement of activities at the highly sensitive areas are undertaken. The Applicant acknowledges the risk of not proceeding with the Project at full scale if no viable offset strategies and locations are obtained.

It is therefore the opinion of the EAP that the Project be authorised provided that a condition be included in the EA for the Applicant to undertake a thorough biodiversity and wetland offset investigation and implement a viable wetland and biodiversity offset programme. In addition, it should only be authorised provided that the necessary mitigation measures, monitoring programmes, and offset programmes be implemented as stipulated in the EMPr.

19.2. CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

Refer to Section 17, which states the conditions which could be included in the authorisation. Table 39 provides a summary of recommendations from each specialist which could be included as conditions of the authorisation.

In addition, the following specific conditions are provided in the specialist studies:

- The issuance of environmental authorisation must be subject to the implementation of a fugitive dust and emissions management and monitoring plan
- Implementation of the wetland offset programme (once developed)
- Undertaking additional surveys and studies relating to biodiversity offset and incorporation of the findings, and mitigation measures in the EMPr based on the following:
 - Results of Biodiversity study (BEC, 2025) study and the study of Cossypha (2025) showed that Site 1 (Umgala 2 – southern portion) exhibit important biodiversity features. Should the authorities grant the application for Site 1, detailed surveys will be required to determine the exact extent of the local population of *Peringueyella zulu* to allow the significance of potential impacts on this species to be fully evaluated. Development of Site 1 should not be allowed at present, since this is the only locality where an extant population of a critically endangered species, *Peringueyella zulu*, is known to exist, implying that a biodiversity offset potentially is not feasible at this stage. However, should the authorities grant the application for Site 1, anticipated impacts would need to be compensated for by a 'like-for-like' type offset that includes sufficient protection of this species habitat, as well as other SCC confirmed in the project area. The offset will need to compensate for the loss of individuals and habitat within Site 1 and in adjacent areas likely to be impacted from impacts such as habitat loss, dust, and light pollution.
- It is suggested that activities may commence at low sensitive areas (Umgala 1, i.e. Northern section), whilst biodiversity offsets studies are undertaken. The Applicant acknowledges the risk of not proceeding with activities at highly sensitive areas, should no viable offset site and strategy be identified.

19.3. REHABILITATION REQUIREMENTS

The *National Environmental Management Act, 1998 (Act No. 107 of 1998)* (NEMA) prescribes that mines must comply with the prescribed financial provision for the rehabilitation, closure and on-going post-decommissioning management of negative environmental impacts arising from the mining operation. This Report aims to meet the NEMA requirements and has been prepared in terms of the NEMA Financial Provisioning Regulations, 2015 (as amended).

"Unless regulation 17A applies, a holder, or holder of a right or permit, who applied for such right or permit prior to 20 November 2015, regardless of when the right or permit was obtained –

- (a) must by no later than a date published in the Government Gazette comply with these Regulations; and

- (b) shall, until such date published in the Government Gazette contemplated in paragraph (a), be regarded as complying with the provisions of these Regulations, if such holder has complied with the provisions and arrangements regarding financial provisioning, approved as part of the right or permit issued in terms of the *Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)*.”

The legal requirement to financially provide for the rehabilitation or management of the negative environmental impacts resulting from a prospecting right, mining right or mining permit are obtained from both the *Mineral and Petroleum Resources Development Act, 2002 (MPRDA)* and NEMA FPR (the Financial Provisioning Regulations, 2015) (As amended). Although the NEMA FPR regulation repeals Regulation 53 and 54 of the MPRDA requirements it also extends it to cater for a transitional period as set out above in Government Notice No. R. 4296 of 1 February 2024.

In terms of the Transitional arrangements, as set out in Regulation 17 of the NEMA FPR:

- 17(1) *Any actions taken in terms of regulation 53 and 54 of the MPRDA Regulations (2004) which can be undertaken in terms of a provision of the NEMA regulations must be considered to have been undertaken in terms of the NEMA regulations,*
- 17(2) *Financial provision submitted in terms of regulations 53 and 54 of the Mineral and Petroleum Resources Development Regulations, 2004 for which approval is pending when these Regulations take effect, must despite the repeal of regulations 53 and 54 of the Mineral and Petroleum Resources Development Regulations, 2004 be dispensed with in terms of regulations 53 and 54 the Mineral and Petroleum Resources Development Regulations, 2004 as if regulations 53 and 54 of the Mineral and Petroleum Resources Development Regulations, 2004 were not repealed.*

Financial provision that was approved in terms of the MPRDA Regulations must be regarded as approved in terms of the NEMA regulations and the holder must review and align such financial provision with the provisions of the NEMA regulations. For this reason, this report is submitted in terms of Regulation 53 and 54, and Section 41(1) of the MPRDA.

- Section 41(1) *“an applicant for a prospecting right, mining right or mining permit must, before the Minister approves the environmental management plan or environmental management programme (EMP) in terms of Section 39(4), make the prescribed “financial provision” for the rehabilitation or management of negative environmental impacts”,*

Rehabilitation for this project should be undertaken in consultation with the Closure and Financial Provision Assessment (Elemental-S, 2025; Appendix IV) In order to achieve the final landform design, the closure objectives and relinquishing criteria must be met. This will require that slopes and surfaces will be stabilised to prevent subsequent rehabilitation and revegetation from being less effective and maintenance being prolonged.

Final landform design will take the following factors into consideration:

- Erosion potential of material on site
- Recognition of pre-mining surface and groundwater flow
- Alignment with existing topographical features
- Slope angles and length to be visually compatible with the surrounding area and stable under local rainfall patterns and erosion processes
- Recognition that unconsolidated material from disturbed areas will require greater protective measures to minimise erosion, and
- Drainage pattern for the overall site should be planned as part of the overall landscaping, with drainage patterns and densities monitored during the operation phase on, and near site providing a guide to site requirements.

19.4. PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED

The period for which environmental authorisation is required is 29 years. Although the estimated Life of Mine (LOM) for Umgala Adit area ranges between 10 up to 13 years, the plant is anticipated to operate for several years more. This is due to the plant receiving coal from various mining sites (Zimbutu, Aasvoelkrans, Knights Hill and Umgala Adit) as well. As such authorisation is requested until the year 2055. The applicant has applied for Mining Right renewal and a submission related to this was submitted in 2023.

20. FINANCIAL PROVISION

20.1. DETERMINATION OF THE AMOUNT OF FINANCIAL PROVISION

A Closure and Financial Provision Assessment was undertaken for the Project. Refer to the full report attached under Appendix IV and Section 19 (Part A) for the financial provision calculations and amount.

20.1.1. Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation

The closure objectives were determined to be the best environmental option. Project will be undertaken in a manner which facilitates site rehabilitation and the restoration of existing land capabilities where practically possible.

The following closure objectives apply to the Project:

Regulation 61 of the MPRDA GN527, provides that closure objectives form part of the environmental authorisation and, as the case may be, must:

- Identify the key objectives for mine closure to guide the project design, development and management of environmental impacts in accordance with the National Environmental Management Act, 1998 and the Environmental Impact Assessment Regulations, 2014;
- Provide broad future land use objective (s) for the site; and

- Provide proposed closure costs in accordance with the National Environmental Management Act, 1998 and the Financial Provision Regulations, 2015.

In accordance with the Welgedacht Exploration Company's policy on environmental management, the most up to date technology was, and will be used, to obtain the Best Available Techniques Not Entailing Excessive Costs (BATNEEC) and sustainable environmental policy in the mining and rehabilitation of the area.

Based on the above requirements, as well as the principles for mine closure set out under Regulation 56 of the GN527 (refer to the MPRDA Regulations in section 2.1 of this report), the following closure objectives have been set out:

- Objective 1: Ensure all areas are rehabilitated as far as practicable All structures must be removed. Any structures, e.g. roads or power lines which will not be used in the future must be removed and the affected areas rehabilitated.
- Objective 2: Ensure the safety of humans and the environment Upon closure of the mine, the entire mining site should pose a low to zero risk to the health and safety to humans and the environment through rehabilitating the site to as close to its original natural state as possible. All infrastructure in continued use, must be checked and cleared to minimise any potential health and safety risks they may pose.
- Objective 3: Eliminate or minimise the production of harmful substances Upon closure of the mine, there must be minimal exposure to long-term risk and no latent or residual impacts leading to remediation measures that require government funding. The aim is to provide a long-term stabilisation of the geochemical, geotechnical, hydrological, geohydrological and other conditions of the disturbed mining areas. This is done to reduce any further or on-going environmental degradation, ensure sustainable post-mining use of the land as well as to protect public health.
- Objective 4: Control the entry of harmful substances into water resources. Where the production of harmful substances can't be controlled, e.g. mine decant or seepage from the Discard Dump, this must be monitored and controlled to prevent the contamination of water resources and the associated problems, e.g. unsuitable drinking water for other water users, impacts on the aquatic environment.
- Objective 5: Make land suitable for the return pre-mining land use (grazing)
- The land must be fully rehabilitated and self-sustaining. Furthermore, structures which may pose a danger to people of livestock must not remain at the mine site. The land should be managed as veld, with palatable grass species for livestock before being handed over to locals for use as grazing land.
- Objective 6: Minimise negative impacts and maximize benefits for communities
- Negative environmental impacts and nuisance factors must be reduced or eliminated, and where possible, the local communities must be provided with opportunities to sustain their livelihood or improve their standard of living.

- Objective 7: Comply with all legal requirements The legal requirements set out under section 2.1 of this report must be met. This includes obtaining the WULA required in terms of the NWA.

Refer to the Closure and Financial Provision Report under Appendix IV for a full description of the closure action plan for this Project.

20.1.2. *Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.*

This Draft Environmental Impact Assessment Report (Part 1) and the Environmental Management Programme will be subjected to a public participation process, whereby I&APs will be given 30 days from 29 September 2025 to 29 October 2025 to review and comment. All comments and responses will be included in the final EIAr and EMPr to be submitted to the DMRE for a decision. A copy of the draft Closure and Financial Provision Assessment Report will be made available within Appendix IV for public review.

20.1.3. *Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main activities, including the anticipated area at the time of closure*

A specific rehabilitation plan for the project has been provided in the Closure and Financial Provision Assessment Report (Elemental-S, 2025) which may be found under Appendix IV.

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

A Closure and Financial Provision Assessment was undertaken for the Project. Refer to Appendix IV for the full report. A summary of the unscheduled closure cost is presented in Table 60. A summary of the scheduled closure cost is presented in Table 61.

Table 60: Summary of Unscheduled Liability – Umgala (incl. Knight's Hill) and Zimbutu

Kangra Operations	Unscheduled Closure Liability
Welgedacht - Umgala / Knights Hill Section	R73 489 623,98
Water treatment costs - Umgala / Knights Hill Section	R25 770 012.00
Sub Total (Incl P&G and VAT)	R99 259 636.98
Kangra Operations	Unscheduled Closure Liability
Welgedacht - Zimbutu Section	R3 870 242.00
Water treatment costs - Zimbutu Section	R1 778 542.00
Sub Total (Incl P&G and VAT)	R5 648 784,19

Table 61: Summary of Scheduled Liability – Umgala/Knight's Hill and Zimbutu

Kangra Operations	Scheduled Closure Liability

Welgedacht - Umgala / Knights Hill Section and Zimbutu	R13 879 264,35
Sub Total (Incl P&G and VAT)	R13 879 264,35

The Guarantees are available and have been provided to the Department of Mineral Resources and Energy, as provided by the applicant to Elemental-S with the same presented in Table 62. The sole object of these Bank Guarantees is to apply their assets for rehabilitation.

Table 62: Environmental Financial Provision Guarantees

DMRE Number	Guarantee Number	Guarantee Value
KZN30/5/1/2/2/122MR (10125MR)	CQ/G/30456/1218/010	R97 583 000
KZN30/5/1/2/2/122MR (10125MR)	CQ/G/30456/1218/012	R5 160 000
Total Guarantee Value		R102 743 600

20.2. EXPLAIN HOW THE AFORESAID AMOUNT WAS DERIVED

Section 20.1 above of the EMP_r (Part B) provides details on the proposed closure cost. The outlined assumptions and limitations also underpin the basis of this closure cost determination. It is important to note that the estimation is based on existing information. The closure cost calculation has been performed in accordance with NEMA GNR 1147 financial provision and MPRDA requirements. If the Project is granted by the Department, the financial provision will require updating annually, and as such any future disturbances post Year 1 will be determined and closure provisions made accordingly.

20.2.1. Methodology

The costing methodology applied is summarized as follows:

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

The “Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine” will be used to assess Umgala’s closure liability. The DMRE Guideline format makes use of a set template for which defined rates and multiplication factors are used. The multiplication and weighting factors which ultimately define the rate to be used are determined by amongst others the topography, the classification of the mine according to mineral mined, the risk class of the mine and its proximity to built-up or urban areas.

20.2.2. **Confirm that this amount can be provided for from operating expenditure**

The closure cost and provisions are presented in Table 63 below.

Table 63: Closure Provision Summary

Closure Provision for Welgedacht - Umgala / Knights Hill and Zimbutu		
	Unscheduled Cost	Scheduled Cost
Unscheduled – Total Liability (Umgala)	R99 259 636	
Unscheduled – Total Liability (Zimbutu)	R5 648 784	
Scheduled – Total Liability		R13 879 264
TOTAL CLOSURE LIABILITY	R104 908 420	R13 879 264
Total Guarantee Value (CQ/G/30456/1218/010)	R97 583 000	
Total Guarantee Value (CQ/G/30456/1218/012)	R5 160 000	
TOTAL PROVISION	R102 743 600	
Shortfall on Provision	R2 164 820	

Additional contribution is currently required towards the Rehabilitation Trust as insufficient provision is currently in place for the Un-scheduled Closure Cost. An additional contribution required is **R2 164 820.00**. The provision of this amount should be included as a condition of the Environmental Authorisation.

21. **DEVIATIONS FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY**

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

The methodology described in Section 12.2 of this Draft EIA Report has been retained and applied to assess the expected impacts of the Project. Where specialist studies used a different approach, their impact ratings were converted to match the method used in this report, in agreement with the relevant specialists. This ensured that the assessment remained consistent while still reflecting the specialists' findings accurately.

21.2. **MOTIVATION FOR THE DEVIATION**

Deviations from the initial scoping report include the removal of Knights Hill from the application. Further, additional specialist studies that were not indicated in the Scoping Report were undertaken in EIA Phase and included in this report. These include the Climate Change Impact Assessment, Visual Impact Assessment, Blast Risk Assessment.

22. **OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY**

In the Scoping Report acceptance letter, the Competent Authority provided the following conditions that should be met to during the EIA Phase. These conditions and responses are provided in Table 64 below.

Table 64: Specific conditions outlined by the Competent Authority in the Scoping Report acceptance letter

Condition	Reference to section in the report where conditions were met
The EAP must ensure the undertaking of the identified specialist studies	Refer to the list of specialist studies that were undertaken as part of the EIA in Section 2.3 and Table 4. The relevant specialist studies are also attached under Appendix IV.
All specialist reports must comply with Appendix 6 of the EIA Regulations, 2014 (as amended) or the applicable published protocols.	Declarations of compliance to Appendix 6 or the published protocols are included in the specialist reports attached under Appendix IV.
The following specialist studies as identified in the scoping report by the EAP must be undertaken: – Soil, Land Use and Land Capability Assessment – Hydropedological Assessment – Aquatic Biodiversity Impact Assessment – Terrestrial and Aquatic Biodiversity Impact Assessment – Geohydrological Impact Assessment – Hydrological Impact Assessment – Archaeological, Paleontological and Cultural Heritage Assessment – Socio-economic Impact Assessment – Noise Impact Assessment – Traffic Impact Assessment – Air Quality Impact Assessment	All of the listed specialist studies were undertaken and attached to Appendix IV of the report.
In addition to the above and in respect of the mandatory environmental screening tool report, you must either undertake the identified specialist studies or motivate in the assessment report the reason for not including any of the identified specialist studies including the provision of photographic evidence (where possible) of the site situation. The studies/ assessment identified but not considered by the EAP are as follows: – Landscape/Visual Impact Assessment – Geotechnical assessment – Climate Impact Assessment – Health Impact Assessment – Seismic Assessment	In compliance to this condition, the following additional specialist studies were undertaken: – Landscape/Visual Impact Assessment – Geotechnical assessment – Climate Impact Assessment – Blasting Risk Assessment (in replacement of the Seismic Assessment) A separate Health Impact Assessment was not undertaken for this Project. The potential health-related aspects associated with the proposed activity are already comprehensively addressed within the following specialist studies conducted as part of the EIA process. In particular: – Noise Impact Assessment: Evaluated potential effects of noise generation on surrounding communities, including

Condition	Reference to section in the report where conditions were met
	disturbance, nuisance, and potential health implications linked to prolonged exposure. – Air Quality Impact Assessment: Assessed emissions and dust, including potential exposure risks for nearby receptors, with consideration of applicable health-based air quality standards. – Social Impact Assessment: Considered broader community wellbeing, including indirect health determinants such as changes to quality of life, safety, and access to services. Collectively, these studies address the principal pathways through which the proposed development could affect human health.

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

22.1.1. Impact on the socio-economic conditions of any directly affect person

Socio-economic conditions were discussed under Section 0 of this report. The impacts of the Project have been assessed in Section 12.7.

22.1.2. Impact on any national estate referred to in section 3(2) of the national heritage resource act

The Heritage Impact Assessment Report (Umlando: Archaeological Surveys and Heritage Management, 2025) identified heritage resources within the mining right boundary. The infrastructure layout plan was subsequently revised to avoid these sites and the associated 50 m buffers.

22.1.3. Other matters required in terms of Section 24(4)(A) and (B) of the Act

Please refer to Section 8 where alternatives have been discussed in detail.

PART B: ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

23. DETAILS OF THE EAP

The information is contained under Part A in Section 2.1 and 2.2.

23.1. EXPERTISE OF THE EAP

23.1.1. The qualifications of the EAP (with evidence)

The information can be found in Section 2. Please refer to **Table 3** for a summary of the qualification and experience of the EAP. Refer to Appendix I for more details regarding the EAP.

23.1.1.1. Summary of the EAP's past experience

The information can be found in Section 2. Please refer to **Table 3** for a summary of the qualification and experience of the EAP. Refer to Appendix I.

24. DESCRIPTION OF THE ASPECTS OF THE ACTIVITY

Please refer to Section 3 of Part A for a full description of the Project.

25. COMPOSITE MAP

Please refer to Appendix II for the sensitivity map that shows all sensitive features/areas identified by specialist studies.

26. DESCRIPTION OF IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENTS

26.1. VOLUMES AND RATE OF WATER USE REQUIRED FOR THE OPERATION

The water use requirements are outlined in the water balance provided in the proposed Umgala Plant and Adit Water and Stormwater Report, compiled by GFK, 2025. The full report is attached as Appendix IV.

26.1.1. WATER BALANCE RESULTS DURING OPERATION - UMGALA ADIT

A water balance of water inflow and outflow of water at the adit, considering the average flows is presented in Figure 92 below. Considering all inflows and outflows the following summary can be made:

- All dust control will be achieved by using water from the PCD's for the maximum groundwater (GW) scenario. However, for the average GW scenario water from a borehole will need to be incorporated to meet the demands.
- Surplus water of average 15,700m³/ annum is present when the average and 129,360m³/annum when the maximum groundwater is realised. This water is pumped to the plant area for further use.

- Water demands for the UG continuous miner and drilling and blasting are met using the runoff from the PCD's and groundwater dewatering water.

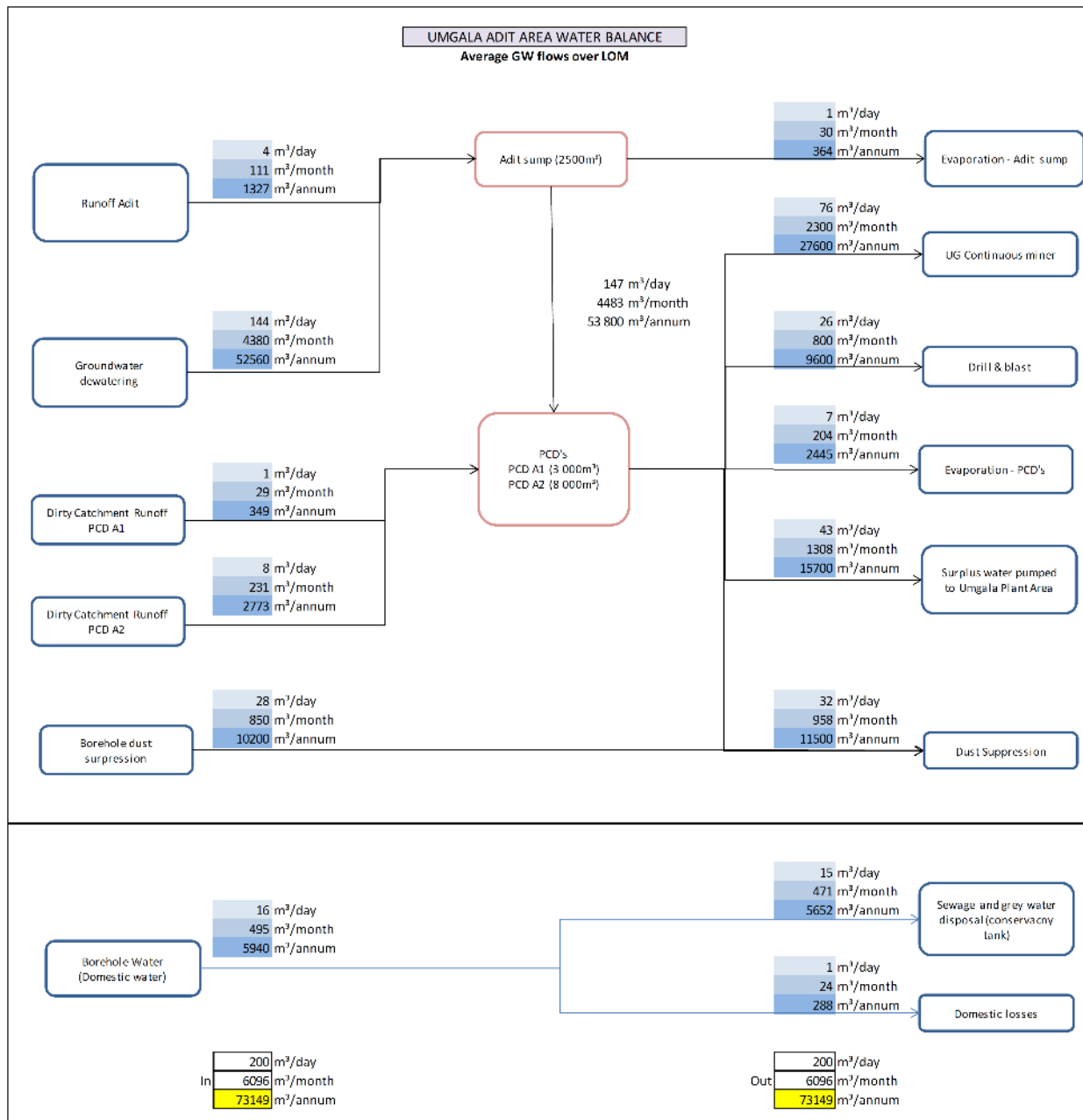


Figure 92: Mean annual flows over the LOM for the average groundwater scenario (GFK, 2025)

26.1.2. WATER BALANCE RESULTS DURING OPERATION -UMGALA PLANT AREA

A water balance diagram showing the inflows and outflows of water use at the Umgala Plant is presented in Figures Figure 93 and Figure 94 below. Considering all inflows and outflows the following summary can be made:

- Not all dust control water can be obtained from the PCD's or RWD's for both scenarios modelled, with dust make-up water required from boreholes.

- A deficit in water for the plant is observed after considering all surplus water pumped to the plant area from the Umgala Adit (both scenarios), as well as runoff in the PCD and water stored in the RWD's for both scenarios. This is much less for the maximum scenario as for the average scenario.
- Plant make-up water from the new proposed clean water dam will be required.
- Treated effluent from the sewer treatment plant (STP) will be recycled to the PCD from where it can be used for the plant.
- On average only 84 100m³/year plant water can be successfully abstracted from the clean water dam to supplement the deficit in plant water demands should the average scenario realise, and 63 800 m³/year for the maximum scenarios, which is not enough. A third viable water source would need to be located and investigated by the mine to supplement the remaining average deficit of 46200 to 159 300m³/annum. This could possibly be obtained from the old underground workings. No details related to water from the old underground workings were available at the time of writing this report.

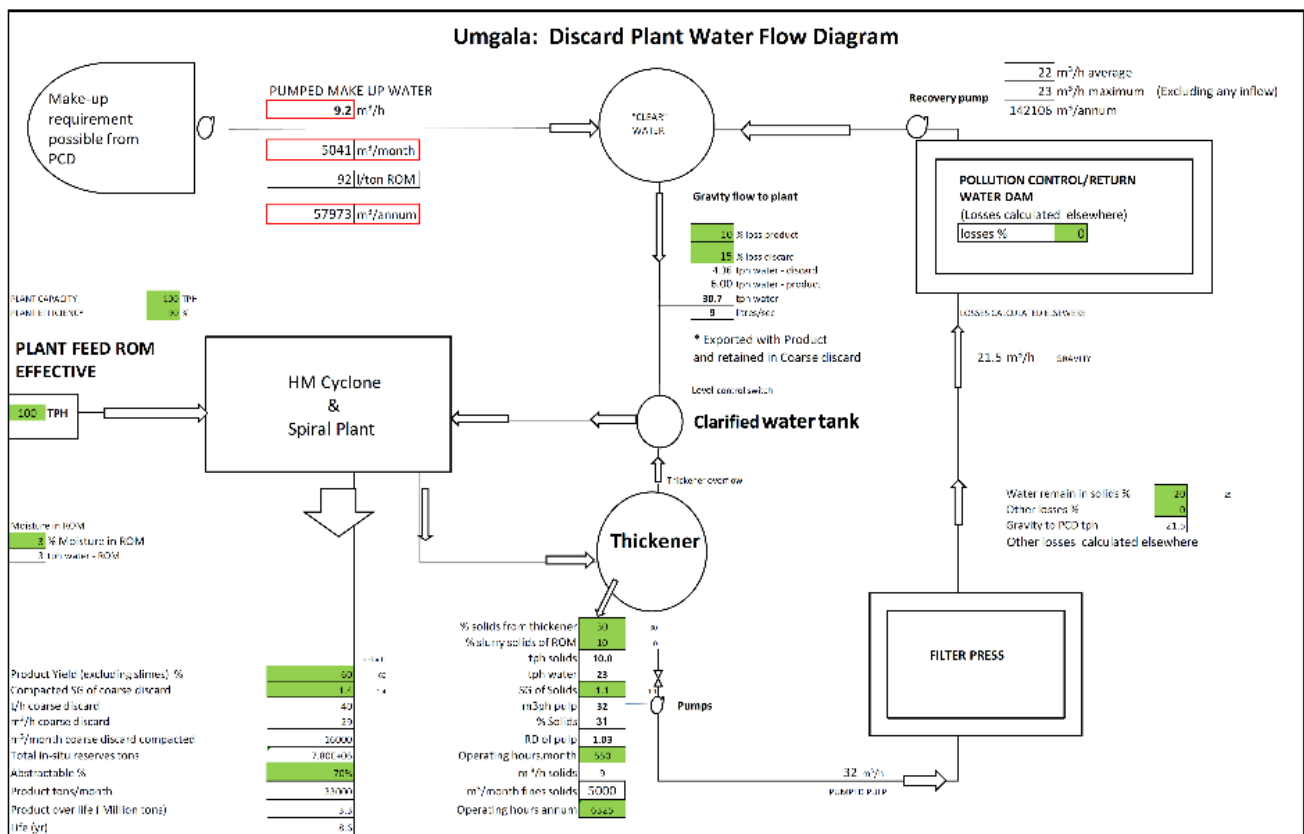


Figure 93: 100t/hr Discard Plant water balance flow diagram (GFK, 2025)

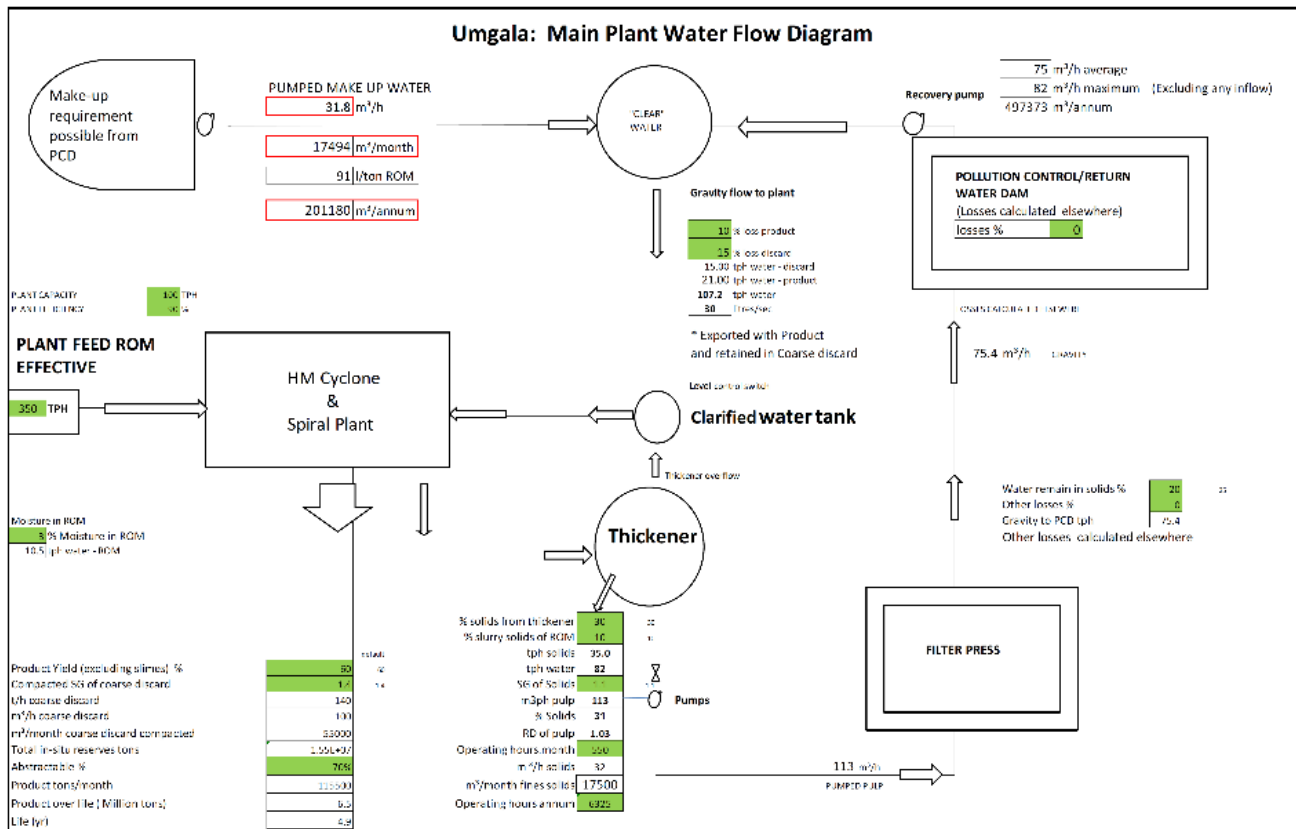


Figure 94: 350t/hr ROM Plant water balance flow diagram (GFK, 2025)

26.2. HAS A WATER USE LICENCE BEEN APPLIED FOR?

A Water Use Licence Application has been initiated on E-Wulaas. The technical information related to the WULA is still under compilation and will be submitted once finalised.

27. IMPACTS TO BE MITIGATED IN THEIR RESPECTIVE PHASE

Table 65 below details the mitigation measures to rehabilitate the environment, compliance with standards and time period for implementation.

Table 65: Impacts to be mitigated in their respective phases, compliance with standards and time period for implementation

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Construction phase					
Construction activities	Construction activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air Quality	<u>Minimise and control:</u> The following mitigation measures are proposed for all phases of the Project: – Reduce drop heights – Increase surface moisture of coal prior to loading – Increase surface moisture of coal prior to off-loading – Enclosure or chutes to reduce transfer exposure to wind. – Water sprays, cladding, and/or enclosure – Chemical dust suppression – Haul road surface maintenance – Rehabilitation and revegetation as soon as possible after development of adits – Wind breaks – Water suppression during unusually high wind speed incidents – Progressive rehabilitation – Particulate filters and NO_x control i.e. catalytic converters. – Implementation of inspection and maintenance plan – Good housekeeping – Daily visual inspection of site operations and corrective action should dust, or smoke emissions be observed. – Quarterly inspection and reporting of dust and smoke emissions and in response to complaints. Photographic records can be useful. – Fit for purpose sampling of dustfall, PM₁₀, PM_{2.5}, and NO₂. ○ PM₁₀ and PM_{2.5} is typically sampled using gravimetric or light-scatter methods. Wind direction and speed should preferably be measured at the same location and period. ○ Dustfall sampling as per the requirements of the NDCR at the following intervals: ▪ All: one 1-month campaign before the commencement the construction, to establish a site-specific baseline. ▪ NO₂, PM₁₀, and PM_{2.5}: one 3-month campaign upon the commencement of each phase of the project. Thereafter as, and when needed in support of resolving complaints. ▪ Dustfall sampling should commence prior to the construction phase and continue throughout the life of the project.	National Environment Management: Air Quality Act (NEMAQA) Act 39 of 2004 Dust Control Regulations	Continuous during construction phase
Noise generating construction activities including traffic, earthworks, mobile construction equipment, metal and concrete works.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	<u>Minimise and control:</u> – Conduct noise monitoring – Noise specialist to re-evaluate and comment on noise impact of the project should any changes be made to the project or if additional information become available. – Construction activities must, as planned, be limited to daytime working hours.	Noise Regulations South African National Standard (SANS) 10103:2008 <i>Occupational Health and Safety Act(OHSA), Act 85 of 1993</i>	Continuous during construction phase

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			- Off-site transport i.e. export of coal product must be limited to daytime working hours. - All generators to be contained within acoustic enclosures and fitted with exhaust mufflers. - Implement a regular inspection and maintenance plan to withdraw from service and fix equipment noted to generate excessive noise, this includes mobile equipment, generators, fans, compressors, motors, conveyor motors and roller elements, etc.		
Construction of the adit for underground mining works	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	<u>Minimise and control:</u> - Ensure proper storm water management designs are in place; - If any erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; - If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; - Only the designated access routes are to be used to reduce any unnecessary compaction; - Compacted areas are to be ripped to loosen the soil structure; - The topsoil should be stripped by means of an excavator bucket, and loaded onto dump trucks; - Topsoil stockpiles are to be kept to a maximum height of 4m; - Topsoil is to be stripped when the soil is dry, as to reduce compaction; - Bush clearing contractors will only clear bushes and trees larger than 1m the remaining vegetation will be stripped with the top 0.3 m of topsoil to conserve as much of the nutrient cycle, organic matter, and seed bank as possible (only after alien vegetation has been removed); - The subsoil approximately 0.3 – 0.6 m thick will then be stripped and stockpiled separately; - The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate significantly; - Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles;	NEMA Duty of Care <i>Conservation of Agricultural Resources Act (CARA), No. 43 of 1983</i>	Continuous during construction phase
Clearing of areas and construction for mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential			
Stockpiling of soil	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential			

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Agricultural Resources and Infrastructure	Soil Agricultural Potential	– Topsoil stockpiles should only be used for the rehabilitation of the mined area; – The stockpiles will be vegetated in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil. – Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks; – If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities; – All vehicles are to be serviced in a correctly bunded area or at an off-site location; – Leaking vehicles will have drip trays place under them where the leak is occurring;		
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Land Capability	Soil Agricultural Potential			
Vegetation Clearance and Earthworks, including excavation and infilling	Clearance of vegetation during site preparation, excavation, infilling and shaping of landscape. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may result in the temporary disturbance of Wetlands.	Wetlands	<u>Minimise:</u> Limit clearing of Wetland habitat. Limit sedimentation of wetlands through effective stormwater management interventions. <u>Preventing alien species encroachment:</u> To reduce the likelihood of alien vegetation encroaching on the denuded area resulting from the mining area and related infrastructure, the area should be re-vegetated with indigenous species, as recommended in the screening report. Hessian sacks can be used to cover exposed ground or soil with plants being planted through small slits in this hessian covering. This will ensure that the newly planted indigenous vegetation is maintained until it is has established, a monitoring program should be put in place. Once a month for two years directly post construction phase, then once every six months for a further two years a specialist should traverse the route of associated infrastructure and ensure the development of the vegetation is continuing normally. If not then it can at least be report, and the same applies if it is discovered that there is an encroachment of alien vegetation species. If herbicides are used in the removal alien vegetation, and it is not recommended that they be used, the offices of the Invasive Alien Species Programme must be contacted, to ensure the correct herbicide is used and correct method of application is followed. <u>Erosion control:</u> The main objective in this instance is to prevent the occurrence of gully forming erosion, which could result in significant topsoil losses. This is a considerable problem, given the time (many years) it normally takes for the formation of topsoil. The mitigation strategy for this would be in the form of planting	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i> NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during construction phase
Vegetation clearance, construction vehicle traffic and earthworks	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation by construction vehicle traffic. During the construction phase, the clearance of vegetation and compaction of soil may result in increased run-off and erosion, altering hydrological and geomorphological processes.	Wetlands			
Clearance of vegetation and compaction of soil	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation and soil by construction vehicle traffic. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may reduce ecological connectivity and disturb the watercourse/terrestrial edge.	Wetlands			
Preparation, storage and transportation of construction materials. Potential oil leaks from	Accidental spillages of wet concrete and chemical / hazardous substances. During the construction phase, accidental spillages of wet concrete and chemical /hazardous substances	Wetlands			

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
construction vehicles and equipment	may result in soil and groundwater contamination, adversely affecting the aquatic ecosystems in the broader area.		appropriate indigenous species subsequent to the mining activities. Furthermore, a monitoring program should be put in place to ensure that the indigenous species that were planted subsequent to construction are growing and preventing the occurrence of erosion along the length of the new structures. In the event that erosion is found to be present the appropriate remedial action should be taken to prevent the exacerbation of the erosion. Monthly site inspections should take place, and the inspections should be visual inspections with fixed point photography at key points. These inspections should take place until the project is complete and thereafter 6 monthly sites visits for two years and finally annual visits for two years after this.		
Demarcation of buffer zones and no-go areas and the creation of spoil sites (topsoil separate from subsoil)	Input of droppers for demarcation Tape and Erection of silt fencing around all spoil sites (including coverage), Dumping of spoil at the designated sites using haulage routes. Disruption of the soil profile and thus creation of excess sediment; Potential disturbance to native and/or indigenous plant species; Aesthetic and potentially noise disturbance within the area.	Wetlands	<u>Sedimentation:</u> The main objective in this instance is to prevent the occurrence of sedimentation in the wetland systems and the associated channels, which may result in the siltation of downstream systems, which if excessive can be a threat to these ecosystems. Thus, to prevent this from occurring appropriate indigenous species should be planted where rehabilitation is taking place. Furthermore, a monitoring program should be put in place to ensure that the indigenous species that were planted subsequent to construction are growing and preventing the occurrence of sediments in these wetlands. During construction and for a brief period after construction it is expected that sedimentation will occur. However, this should cease soon and there should be no evidence of sediments within these wetland systems. Monthly site inspections should take place, and the inspections should be visual inspections with fixed point photography at key points. These inspections should take place until the project is complete and thereafter 6 monthly site visits for two years and finally annual visits for two years after this.		
Construction of Mine Support Infrastructure (Buildings, Conveyor Belts, Dirt Roads and Fences)	Permanent change in the surface hydrology from hardened surfaces. Reduced infiltration rates and increased risk of erosion from permanent change in the surface hydrology from hardened surfaces.	Wetlands	<u>Flood attenuation:</u> During construction the removal of vegetation in and around the mining and support infrastructure areas will be complete. In this region where most rainfall occurs in the form of high intensity events; it is highly likely that the occurrence of one of these storms will result in significantly more overland flow than would normally occur; due to the lack of soil surface cover. This surface cover, i.e., vegetation, increases the surface roughness and therefore the friction, thereby slowing the movement of water and increasing infiltration. As with the occurrence of sedimentation, the key aim is to ensure full surface cover is present, if possible before the occurrence of the wet season. Alternatively, adequate stormwater management interventions put in place, such as sustainable urban drainage systems. The general condition of the channels downstream of the site will reflect whether the interventions are achieving successful flood attenuation. Water quality testing will also reflect the effectiveness of the interventions in general.		
Establishment Mining Area Footprint	Open cast mine establishment through excavation, blasting and stabilisation activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems.	Wetlands	<u>Water quality:</u> It is expected that during construction and operation there will be runoff from this site, especially during the wet season. This may enter downstream systems,		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			as a consequence of the proximity of some of these systems to the development. Water quality sampling is recommended to monitor water quality, and comparisons with baseline conditions should be made. The quality of water downstream of the site should at least remain the same as the quality measured upstream of the site. This will reflect whether the development is having a negative impact on water quality or not and whether the interventions being implemented are successful in achieving the objective, which, is to maintain the health of the river occurring downstream of the rehabilitation site. Testing should reflect short term results, longer term results, as well as winter and summer seasonal changes, for which results are expected to be quite different, because of the variation in the frequency of flood events. Baseline sampling at appropriate sites should take place prior to commencement of the development. Thereafter sampling should take place monthly during the construction phases of the project and every 6 months during the operation and rehabilitation. The basic water quality tests that should be undertaken are (but not limited to): – pH (which could indicate if chemicals have been spilled and are flowing into these systems), – Electrical conductivity (indicator of salinity as well as an early indicator of pollutants within the system), and – Turbidity (Clarity of water can provide an indication of the occurrence of erosion). – Toxicants <u>Soil compaction:</u> During the clearing and the construction phase an identified threat is that of increased overland flows as a result of compaction, which may potentially reduce overall water quality from this system. Mechanical clearing of alien vegetation should be conducted in winter when water levels are lower, and the ground is drier. Heavy vehicles will need to be used to excavate soil and during operations. Where possible their movement should be restricted to roads, in order to minimize unnecessary compaction. Excavation must be limited to the proposed construction areas and once the road network is in place, movement of vehicles must be limited to these roads. One access point per site should be used. Soil removed from these sites should be replaced in the same order as it is removed, in order to ensure that soil characteristics, particularly as they relate to infiltration, remain unchanged. Topsoil must be stockpiled to be spread over the sub-soil (≥ 20 cm) for rehabilitation and re-vegetation purposes. Vehicles must not be allowed to access areas where topsoil has been applied. Seeding with suitable grass species and stabilisation using hessian or netting until established is essential in preventing erosion and alien vegetation from re-establishing.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Land and riparian clearing activity	Water quality deterioration	Aquatic	<u>Minimise:</u> - Limit clearing of Wetland habitat. Limit sedimentation of wetlands through effective stormwater management interventions. - Limit sediments and hydrocarbons from entering wetlands through effective stormwater management interventions and demarcation of area for vehicle servicing.	National Water Act (NWA) (Act 36 of 1998) as amended NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during construction phase
Construction activities	Building materials & solid waste (plastics, polystyrene, etc.) entering / disposed of in wetlands	Aquatic	<u>Minimise:</u> Limit building material from entering watercourses. Place temporary berms to control/divert materials away from watercourses. Develop and implement a solid waste management plan.		
Construction activities	Contamination (oils, fuels, chemicals) - Surface water pollution	Aquatic	<u>Minimise:</u> Changing of oil, refueling and lubricating of equipment should not be carried out within close proximity (32m buffer) to wetlands in order to minimize the potential for water pollution.		
Construction activities	Soil contamination from chemicals	Aquatic	<u>Avoid and control:</u> Oil storage & workshop areas should be surrounded by a bund wall in order to contain spillages. In the case where soil becomes contaminated with oil, it must be removed for proper disposal or treatment (e.g. bioremediation).		
Construction activities	Human waste - Surface water pollution	Aquatic	<u>Avoid and control:</u> Construction workers should not use watercourses for sanitation purposes. Portable toilets should be provided.		
Construction activities	Increased turbidity - Surface water pollution	Aquatic	<u>Minimise and control:</u> Install silt curtains where possible to contain increased turbidity and limit the extent of the impact during construction. Silt curtains limit re-suspended sediment to a smaller area.		
Construction activities	Increased turbidity - Wetland geomorphological alteration	Aquatic	<u>Avoid and control:</u> - No soil / building material may be stockpiled within 32m from the delineated wetlands and riparian zones. Limit the physical alteration of areas within 32m of delineated wetlands. - Make use of large box culverts that ensure continuation of flow, substrate and habitat characteristics		
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types.	Terrestrial biodiversity theme	<u>Avoid and control:</u> - Mitigation will entail avoiding losses of, and providing protection buffers around highly sensitive habitat, limiting development to areas of lower sensitivity. - Extent of impact should be limited to areas of lower sensitivity.	NEMA Duty of Care National Environmental Management Biodiversity Act (Act 10 of 2004)(NEMBA) and Regulations there under.	Continuous during construction phase
	Loss and deterioration of habitat included in local and regional conservation categories (e.g., CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.)	Terrestrial biodiversity theme	<u>Avoid and control:</u> - Loss of CBA2 habitat is unavoidable. - Habitat types of elevated sensitivity/ importance on a local/ regional scale should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			No construction/ operational activity should be allowed within these areas.		
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint	Terrestrial biodiversity theme	<u>Avoid and control:</u> - Highly sensitive areas should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. - No construction/ operational activity should be allowed within these areas. - Any further losses of habitat outside the development footprint should be avoided. - Decline in habitat status of surrounding areas should be avoided through containment of activities. - Erosion and pollution prevention.		
	Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes	Terrestrial biodiversity theme	<u>Minimise:</u> - Ensure continued and normal ecological functionality of remaining natural habitat surrounding the development. - Ensure that no unintended impacts occur, e.g. uncontrolled fires. - Minimise disruption of ecological functions, e.g. surface water flow, prevent erosion and fires, ensure continued ecological corridor functionality.		
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - south)	Loss and deterioration of natural and sensitive habitat types, including essential habitat refugia, atypical and unique/ range-restricted habitat types	Terrestrial biodiversity theme	<u>Minimise:</u> - Mitigation will entail avoiding losses of, and providing protection buffers around highly sensitive habitat, limiting development to areas of lower sensitivity. - Extent of impact should be limited to areas of lower sensitivity.		
	Loss and deterioration of habitat included in local and regional conservation categories (e.g., CBA, NPAES, SAPAD, SACAD, threatened ecosystems, etc.)	Terrestrial biodiversity theme	<u>Avoid and minimise:</u> - Loss of CBA habitat is unavoidable. - Habitat types of elevated sensitivity/ importance on a local/ regional scale should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. - No construction/ operational activity should be allowed within these areas.		
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint	Terrestrial biodiversity theme	<u>Avoid and minimise:</u> - Highly sensitive areas should be excluded from the development, also with reference to the implementation of a suitable buffer around these areas. - No construction/ operational activity should be allowed within these areas. - Any further losses of habitat outside the development footprint should be avoided. - Decline in habitat status of surrounding areas should be avoided through containment of activities. - Erosion and pollution prevention.		
	Disruption of ecological processes, services, and infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration patterns, ecological interaction, and processes	Terrestrial biodiversity theme	<u>Manage:</u> - Ensure continued and normal ecological functionality of remaining natural habitat surrounding the development. - Ensure that no unintended impacts occur, e.g. uncontrolled fires. - Minimise disruption of ecological functions, e.g. surface water flow, prevent erosion and fires, ensure continued ecological corridor functionality		
All Project related activities during construction, operational	Loss of threatened plant species or other species of conservation importance (i.e.,	Plant species theme	<u>Avoid and minimise:</u> Permitting requirements and obligations (EKZN, DFFE) to be achieved prior to commencement of land clearance activities/ construction. Avoidance of		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
and decommissioning phase at Site 2 (Umgala 1 - north)	provincially protected), and/ or habitat associated with these taxa		areas where high density of SCC and other protected species occur. Selected species and individuals should be rescued and relocated, replanted at suitable localities (although not always a preferred option), with specific reference to required landscaping and rehabilitation of development areas.		
	Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity).	Plant species theme	<u>Minimise:</u> – Avoidance of high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. – Implementing management programme.		
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered suitable for plant SCC, habitat types that exhibit high floristic diversity patterns.	Plant species theme	<u>Avoid and minimise:</u> – Restriction of activities and infrastructure to approved footprint only. Avoidance of uncontrolled impacts in areas outside the approved footprint where SCC and other protected species occur. Clear demarcation of approved footprint. Contractor awareness and strict control.		
	Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns.	Plant species theme	<u>Minimise:</u> – Limit development to footprint area, avoid impacts in adjacent habitat, implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.		
	Introduction and exacerbation of exotic and invasive species to the area	Plant species theme	<u>Minimise:</u> – Develop and implement AIP management programme, including annual monitoring programme. Appoint rapid-response team. Contractor and personnel awareness.		
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - south)	Loss of threatened plant species or other species of conservation importance (i.e., provincially protected), and/ or habitat associated with these taxa	Plant species theme	<u>Avoid and minimise:</u> – Permitting requirements and obligations (EKZN, DFFE) to be achieved prior to commencement of land clearance activities/ construction. Avoidance of areas where high density of SCC and other protected species occur. Selected species and individuals should be rescued and relocated, replanted at suitable localities (although not always a preferred option), with specific reference to required landscaping and rehabilitation of development areas.		
	Loss and deterioration of natural and sensitive habitat types, and unique or range restricted habitat types that exhibit high floristic diversity patterns (loss of floristic diversity)	Plant species theme	<u>Avoid and minimise:</u> – Avoidance of high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. Implementing management programme		
	Deterioration and changes to sensitive, natural, range-restricted, or untransformed habitat that may be present in the immediate or near vicinity to the development footprint, specifically relating to habitat types considered	Plant species theme	<u>Avoidance and control:</u> – Restriction of activities and infrastructure to approved footprint only. Avoidance of uncontrolled impacts in areas outside the approved footprint where SCC and other protected species occur. Clear demarcation of approved footprint. Contractor awareness and strict control		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	suitable for plant SCC, habitat types that exhibit high floristic diversity patterns.				
	Disruption of ecological processes, services, and ecological infrastructure and altered ecological functionality (including fire, erosion) of surrounding areas and natural habitat, disruption of movement/ migration corridors, ecological interaction, and ecological processes that may affect floristic diversity patterns.	Plant species theme	<u>Minimise:</u> Limit development to footprint area, avoid impacts in adjacent habitat, implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.		
	Introduction and exacerbation of exotic and invasive species to the area	Plant species theme	<u>Minimise:</u> Develop and implement AIP management programme, including annual monitoring programme. Appoint rapid-response team. Contractor and personnel awareness		
All Project related activities during construction, operational and decommissioning phase at Site 2 (Umgala 1 - north)	Direct and permanent loss of natural fauna habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.	Animal species theme	<u>Avoid:</u> Avoidance of habitat with high SEI. Promote construction on habitat with low and very low SEI.		
	Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases	Animal species theme	<u>Avoid and minimise:</u> Avoidance of high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. Implementing management programme.		
	Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc	Animal species theme	<u>Minimise:</u> Restriction of activities and infrastructure to approved footprint only. Clear demarcation of approved footprint. Contractor awareness and strict control. Make use of technologies to reduce disorientation of nocturnal invertebrates due to spill light, dust suppression and noise suppression		
	Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability	Animal species theme	<u>Avoid and minimise:</u> Limit development to footprint area, avoid impacts in adjacent habitat, implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.		
	Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site	Animal species theme	<u>Control:</u> Control of personnel and contractor actions and movement, increased awareness, avoid excessive and unnecessary infrastructure development. Regular monitoring of snares and traps as well as illegal settlement.		
All Project related activities during construction, operational and decommissioning phase at Site 1 (Umgala 2 - north)	Direct and permanent loss of natural fauna habitat, in particular threatened invertebrate habitat within the development/mining footprints during the construction, operational and also the decommissioning phases.	Animal species theme	<u>Avoid:</u> - Impact cannot be mitigated and habitat with Very High SEI should be avoided. - Biodiversity Offset recommendations will be considered should the Competent Authority deem this necessary upon review of this report. The present recommendation is that a Biodiversity Offset is likely to be a requirement as a result of the Endangered and Vulnerable nature of parts of the receiving environment.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	Indirect loss of threatened and near threatened bird and mammal species due to the displacement from the area during the construction and operational phases	Animal species theme	<u>Avoid and minimise:</u> – Avoidance of high and very high sensitivity areas through layout design. Minimising development footprint, ensuring ecological functionality and connectivity. Control of actions and movement of personnel and vehicles. Implementing management programme.		
	Decreased habitat quality of surrounding areas due to peripheral impacts such as spillages, litter, increased erosion, contaminants, etc	Animal species theme	<u>Minimise:</u> – Restriction of activities and infrastructure to approved footprint only. Clear demarcation of approved footprint. Contractor awareness and strict control. Make use of technologies to reduce disorientation of nocturnal invertebrates due to spill light, dust suppression and noise suppression.		
	Indirect ecological impacts at all phases pertaining to the loss of the ecological connectivity across the study site and regional habitat fragmentation associated negative impacts on population viability	Animal species theme	<u>Minimise:</u> – Limit development to footprint area, avoid impacts in adjacent habitat (especially to the west), implement biodiversity monitoring programmes, control contractor and personnel movement and actions in areas outside approved footprint. Avoid unintended events, e.g., fires, erosion, etc.		
	Increased plundering of natural resources and poaching of wildlife due to increased human encroachment and accessibility to the site	Animal species theme	<u>Control:</u> – Control of personnel and contractor actions and movement, increased awareness, avoid excessive and unnecessary infrastructure development. Regular monitoring of snares and traps as well as illegal settlement.		
Dewatering	Lowering of water levels due to dewatering of excavations for construction.	Geohydrology	<u>Minimise:</u> – Minimise dewatering by sealing off excavations as soon as possible.	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i>	
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	<u>Minimise:</u> – Grouting of intersected fractures /fissures.		
Construction	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices.	Geohydrology	<u>Avoid and manage:</u> – Establishment of good waste management practices on site		
Construction and vegetation clearing	Increased runoff from the site as a result of vegetation clearing and construction activities.	Geohydrology	<u>Minimise and manage:</u> – Maintain as much vegetation as possible to prevent erosion. – Ensure that stockpiles are covered with appropriate erosion control barriers.		
Earthworks and Development	Disturbing vadose zone soils during excavations/construction activities.	Vadose zone soils and subsequent aquifer (groundwater table)	<u>Minimise:</u> – Only excavate areas applicable to the project area. – Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. – Cover excavated soils with a temporary liner to prevent contamination. – Retain as much indigenous vegetation as possible. – Exposed soils are to be protected using a suitable covering or revegetating.		
Earthworks and Development	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.	Vadose zone soils and subsequent aquifer (groundwater table)	<u>Avoid and manage:</u> – Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site. – Visual soil assessments for signs of contamination during construction (monthly)	NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during construction phase
Earthworks and Development	Surface water contamination and sedimentation from the following activities:	Primary Surface Water Receivers – Non-perennial streams	<u>Minimise and manage:</u> – Install a temporary cut-off trench to contain poor-quality runoff (if required).		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	- Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). - Contaminant transport in runoff - To date, no sedimentation has taken place (i.e. no evidence observed during the site walkover assessment)	Perennial Streams	- Visual inspections of all vehicles entering and operating at the site. - Visual assessment for signs of erosion or contamination. - Implementation of stormwater recommendations. - Cover any temporary construction material stockpiles.		
Earthworks and Development	- Poor quality seepage from machinery used to excavate soils. - Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.	Groundwater aquifer	<u>Avoid and manage:</u> - Park heavy machinery in lined areas and place drip trays under vehicles at the site. - Have fuel and oil spill cleanup kits on site and clean up these areas immediately. - Ensure that building material stockpiles are covered with a suitable temporary cover or placed in bunded areas to reduce poor-quality seepage probability. - Visual soil assessments for signs of contamination during construction (monthly)		
Site preparation, including placement of contractor laydown areas and storage (i.e. temporary stockpiles, bunded areas etc.) facilities.	Soil interflow processes: - Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). - Alteration to natural hydrogeological flow paths. - Impacts on the macro-soil structure. - Impacts on the hydrogeological processes supporting the watercourses. Soil structure & land capability: - Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. - Vegetation loss. - Soil compaction; and - Soil erosion. Soil quality: - Natural nutrient content decreases due to soil exposure. - Loss of natural bio-organisms essential to soil processes.	Soil quality, soil structure and land capability and soil interflow processes	<u>Minimise:</u> - Only excavate areas applicable to the project area. - Backfill the material in the same order it was excavated to reduce contamination of deeper soils with shallow oxidised soils. - Cover excavated soils with a temporary liner to prevent contamination. - Keep the site clean of all general and domestic wastes. - All development footprint areas are to remain as small as possible and vegetation clearing is to be limited to what is essential. - Retain as much indigenous vegetation as possible. - Exposed soils are to be protected using a suitable covering or revegetating. - Existing roads should be used as far as practical to gain access to the site, and crossing watercourses in areas where no existing crossing is apparent should be unnecessary, but if it is essential crossings should be made at right angles. - Have emergency fuel & oil spill kits on site. - Soil quality monitoring & visual assessments on monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.	Conservation of Agricultural Resources Act (CARA), No. 43 of 1983	Continuous during construction phase

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Disturbing vadose zone during soil excavations/infilling activities	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss. – Soil compaction; and – Soil erosion. Soil quality: – Natural nutrient content decreases due to soil exposure. – Loss of natural bio-organisms essential to soil processes.	Soil quality, soil structure and land capability and soil interflow processes			
Vegetation clearing & soil stockpiling.	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss. – Soil compaction; and – Soil erosion. Soil quality:	Soil quality, soil structure and land capability and soil interflow processes			

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	- Natural nutrient content decreases due to soil exposure. - Loss of natural bio-organisms essential to soil processes.				
Earthworks	Oil & fuel spills from vehicles parked at the site may compromise soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table.	Soil quality	<u>Minimise:</u> - Routine visual inspections of infrastructure and parking areas for signs of soil contamination. - Have emergency fuel & oil spill kits on site.		
Earthworks	Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	<u>Manage:</u> - Water quality monitoring and routine visual assessment for contamination. - Discharge dewatered / rainwater collected into the nearby stream. May require authorisation. If water is contaminated, discharge to the closest greywater system (depending on the extent of contamination)	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i> NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during construction phase
Earthworks	The presence of shallow soils will and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	<u>Minimise:</u> - Retain as much indigenous vegetation as possible. - Exposed soils are to be protected using a suitable covering or revegetating. - If required use silt traps or stilling basins to trap sediment runoff.	<i>Conservation of Agricultural Resources Act (CARA), No. 43 of 1983</i>	Continuous during construction phase
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impacts on aesthetics	Visual and landscape character	<u>Minimise:</u> - Efficient project planning: Reduce the duration of the construction phase through effective scheduling and optimal use of resources, thereby limiting the period of visual disruption. - Controlled vegetation clearance: Clearly demarcate construction zones and restrict vegetation removal to within designated boundaries. Retain surrounding grassland buffers, especially in Northern KwaZulu-Natal Moist Grassland areas, to provide natural visual screening. - Placement of laydown and camps: Locate temporary construction camps, stockpiles, and laydown areas in previously disturbed areas where feasible, avoiding ridgelines and visually exposed open slopes. - Restrict vehicle movement: Limit the movement of construction vehicles and personnel to demarcated areas and existing access routes. Reduce on-site vehicle numbers where possible to avoid dust plumes and visual congestion. - Temporary screening: Install perimeter screening (e.g., shade cloth or hessian fencing) around highly visible construction zones to reduce exposure of equipment and materials from sensitive viewpoints. - Site housekeeping: Maintain construction areas in a neat and visually orderly condition. Avoid unsightly accumulation of waste, excess materials, or abandoned equipment. - Colour and materials: Use non-reflective, muted, earth-toned colours for temporary offices, fencing, and storage containers to reduce glare and better blend with the surrounding grassland environment. - Lighting controls: Restrict construction activities to daylight hours where practicable. Avoid unnecessary artificial lighting and, if required, ensure fittings are downward-directed and shielded to minimise night-time light spill.	<i>Occupational Health and Safety Act (OHSA), Act 85 of 1993</i> South African National Standard (SANS) 10103:2008 Best Practice	Continuous during construction phase
Removal of vegetation for site clearing / preparation for all proposed infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character			Continuous during construction phase
Movement of construction vehicles and heavy machinery for site clearance	Change of visual character from a natural landscape to a built landscape	Visual and landscape character			Continuous during construction phase
Design of supporting infrastructure	Landscape visual change	Visual and landscape character			Continuous during construction phase

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			- Dust suppression: Apply approved daily dust suppression methods, including regular water spraying on exposed surfaces, unpaved roads, and stockpiles. Consider paving primary access routes if feasible. - Phased construction: Sequence activities to limit the area of exposed bare ground visible at one time. Commence early rehabilitation on completed areas to quickly re-establish vegetative cover. - Stockpile management: Shape and contour temporary material stockpiles to blend with surrounding landforms, and position them in visually discreet areas to reduce sharp contrasts with the natural landscape. - Equipment management: Use well-maintained machinery to avoid excessive exhaust, oil leaks, or unnecessary dust emissions, and ensure that equipment presents a professional, orderly appearance.		
Construction activities	The construction phase of the proposed mines will generate additional traffic on the surrounding road network within the study area	Surrounding road network	Adequate traffic calming measures are already in place within the Utrecht town area, including rumble strips, road signage, and speed bumps	<i>Occupational Health and Safety Act (OHSA), Act 85 of 1993</i> <i>National Roads Amendment Act, 1996.</i>	Continuous during construction phase
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	No mitigation required as this is a positive impact.	Social and Labour Plan	Continuous during all phases
Construction and operation of the mining operations	- Possibility of political interference, corruption, and fraud. - Blasting impacting on housing stability - Increased demand on already strained electricity supply - Increase in health & safety - Incidents on the mine - Increased traffic - Impact on livestock and agriculture - Stability of land because of underground mining and blasting operations - Limitations on development expansions of the municipality - Loss of grazing land (subsistence) - Leadership conflict - Increased tension due to influx of non-residents	Local communities	<u>Minimise:</u> - Dust control measures to be in place especially in winter where the winds blow black dust from the mine to the grazing grass of the farmers. - It is recommended that the mine involve the community in all planning phases. - The mine and the municipality need to work closely together. - The mine to prioritize uplifting the community in terms of jobs and service delivery. - The mine not to use drinking water and ensure that drinking water doesn't get contaminated. - Provide training centers to capacitate the community with skills. - Employ local people and capacitate the local people with specialist skills so that they can also occupy specialist positions. - Develop sound social labour plans - Upgrade infrastructure such as access roads that may be damaged by heavy trucks. - The mine should play a role in helping the municipality to achieve some of the Integrated Development Plan objectives of Emadlangeni Municipality. - To support SMME's in the municipality, schools and NGO's. - To contribute to the social development of the municipality - Recognition of the chief by the mine. The chief should be always consulted in decisions that involve the community. - Ensure safety of the workers and the community to be prioritised.	<i>Occupational Health and Safety Act (OHSA), Act 85 of 1993</i> Social and Labour Plan	Continuous during all phases
All construction, operational and decommissioning activities related to the Project.	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	<u>Avoid and manage:</u> The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it. However, if the mine is expanded and the site affected then mitigation will be required. The site	South African Heritage Resources Agency (SAHRA) and the <i>National Heritage</i>	Continuous during all phases

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, a specialist should be consulted to assist with Grave relocation processes/permits and to inform SAHRIS.	Resources Act (Act 25 of 1999)(NHRA)	
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: – Stone walled kraal – terracing (for a house) – two possible graves – undecorated, thin-walled pottery	Cultural and Heritage aspects	<u>Avoid and manage:</u> – The site is within the fenced area. The site currently has a 50m exclusion buffer around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains. Otherwise, it is an archaeological site with no claimants and the remains would go to KZNARI (KwaZulu-Natal Amafa & Research Institute).		
	– Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	No mitigation suggested or required by the specialist.		
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: – Stone walling – Graves – Terracing – Stone cairns – Pottery	Cultural and Heritage aspects	<u>Avoid and manage:</u> – The site occurs within the fenced off area. The site currently has two 50m exclusion buffers around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – The second buffer is for Grave 7. All features fall within these 50m buffer and the buffer needs to be fenced. If the site will be affected, then it will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.		
	– Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	<u>Avoid and manage:</u> – The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. – If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.		
	– Potential disturbance to finds, stone cairns, pottery, open MSA scatters	Cultural and Heritage aspects	<u>Manage:</u> – Due to the low significance of the impact, there are no mitigation measures suggested, however, a Chance Find Protocol should be established for any isolated artefacts. Any material that may potentially be an artefact should be verified with an ECO and archaeologist.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Operational phase					
Operations of the mine infrastructure	Fugitive dust and combustion emissions from the project was shown to result ambient concentrations at sensitive receptors above NAAQS for NO ₂ , PM ₁₀ , and NDCR.	Air Quality	The mitigation measures provided in the construction phase will remain applicable in the operational phase.	<i>National Environment Management: Air Quality Act (NEMAQA) Act 39 of 2004</i> Dust Control Regulations	Continuous during operational phase
Noise generating operational activities including coal handling and transport; coal feeders, crushers, screens; conveyors; underground mine ventilation; diesel generators; mobile equipment; ancillary services at workshops and offices	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	The following noise management measures must be employed on site: – Keep a complaint register at the site(s) access point(s) (see details below). – Conduct noise monitoring (see details below). – Noise specialist to re-evaluate and comment on noise impact of the project should any changes be made to the project or if additional information become available. – Construction activities must, as planned, be limited to daytime working hours. – Off-site transport i.e. export of coal product must be limited to daytime working hours. – All generators to be contained within acoustic enclosures and fitted with exhaust mufflers. – Implement a regular inspection and maintenance plan to withdraw from service and fix equipment noted to generate excessive noise, this includes mobile equipment, generators, fans, compressors, motors, conveyor motors and roller elements, etc.	Noise Regulations South African National Standard (SANS) 10103:2008 <i>Occupational Health and Safety Act(OHSA), Act 85 of 1993</i>	Continuous during operational phase
Operation of underground mine workings	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	<u>Minimise and control:</u> – Ensure proper storm water management designs are in place; – If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; – If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; – Only the designated access routes are to be used to reduce any unnecessary compaction; – Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated; – Implement land rehabilitation measures; – Follow rehabilitation guidelines; – The topsoil should be moved by means of an excavator bucket, and loaded onto dump trucks; – Topsoil is to be moved when the soil is dry, as to reduce compaction; – Topsoil to be replaced for rehabilitation purposes; – The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate; and – Topsoil stockpiles should only be used for the rehabilitation of the mined area; – Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks; – If a spill occurs, it is to be cleaned up immediately and reported to the appropriate authorities;	NEMA Duty of Care <i>Conservation of Agricultural Resources Act (CARA), No. 43 of 1983</i>	Continuous during operational phase
Operation of mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential			
Operation of PCD, Discard dump, and ROM areas	Contamination of soil resources below these facilities as well as adjacent to these facilities due to contaminated runoff.	Soil Agricultural Potential			
Dust suppression of haul roads	Often waste water is used as dust suppression water spray. These could lead to the build-up of contaminants in the road surface as well as adjacent to the road in areas of concentrated runoff.	Soil Agricultural Potential			

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			- All vehicles are to be serviced in a correctly bunded area or at an off-site location; - Leaking vehicles will have drip trays place under them where the leak is occurring		
Operation of Mining Support infrastructure (Buildings, Conveyor Belts, Waste Dams, Haulage/Dirt Roads and Fences)	Movement and Vehicle access in and around the Support infrastructure. Impeding the flow of water. Damage to banks. Siltation of water course. Erosion of water course. Flow sediment equilibrium change	Wetlands	<u>Minimise and offset:</u> - Refer to the mitigation measures provided in the construction phase table. - The unavoidable loss of 22.55 Ha of Wetland Systems should be compensated through an effective Offset Program; and - The access, design and layout of infrastructure should be designed to avoid encroaching 32m of the delineated wetland boundaries	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i> NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during operational phase
Operation of the mining activities	Open cast mining activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems	Wetlands			
Operation of the mining activities	Above mentioned variables – surface water pollution	Aquatic	<u>Minimise:</u> Preserving quality of water through the implementation of above-mentioned measures applicable to the occurring impact. Ongoing monitoring should take place regularly to identify impacts	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i> NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during operational phase
Seepage	Poor quality seepage from the existing underground workings into the weathered and fractured aquifer	Geohydrology	<u>Minimise and manage:</u> - Drill additional monitoring boreholes downstream and in the workings to confirm seepage quality and inform closure objectives. - Update predictive tools to confirm closure objectives. - The geological sequence/material of the barriers that will be maintained, and - geohydrological characteristics should be confirmed.	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i> NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during operational phase
Systematic removal of the seam reserve by underground mining methods	Groundwater ingress due to underground mining of coal.	Geohydrology	No mitigation is possible as dewatering is a required action for underground mining.		
Dewatering	Lowering of the water table due to dewatering.	Geohydrology	<u>Minimise:</u> Minimize dewatering (if possible) during dry seasons.		
Seepage	Poor quality seepage from the proposed PCD's, sumps, Discard dump, ROM stockpiles, softs dump, hards dump, top-soils dump, workshops, fuel storage, ablutions (septic tanks), dirty water trenches and processing plant into the aquifer.	Geohydrology	<u>Minimise:</u> - Cover rock dumps or stockpiles with a geomembrane to reduce rainfall infiltration and hence, poor quality percolation into the aquifer. - PCD's should be lined. - Have fuel cleanup and spill kits on site. - Ensure regular cleaning of septic tanks by accredited service providers.		
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	<u>Minimise and manage:</u> - Limit blasting. - Manage inflows.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Groundwater abstraction to supplement water needs at the mine	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices	Geohydrology	<u>Minimise and manage:</u> – Good housekeeping, and adherence to good health and safety practices.		
Groundwater abstraction to supplement water needs at the mine	Dewatering the local aquifer to supply the mine with operational water.	Geohydrology	<u>Minimise:</u> – A sustainable aquifer yield should be determined for the abstraction boreholes. – Abstraction should not exceed the sustainable yield of the local aquifer		
Site activities	Disturbing vadose zone soils during mining	Vadose zone soils and subsequent aquifer (groundwater table)	<u>Minimise and manage:</u> – Keep excavation as small as possible. – Ensure that sediment barriers are in place at mining sites, to prevent sediment runoff and erosion.		
Site activities	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer and drainage system.	Vadose zone soils and subsequent aquifer (groundwater table)	<u>Minimise and manage:</u> – Park heavy machinery in lined and bunded areas and place drip trays under vehicles at the site. – Visual soil assessments for signs of contamination during operations (monthly)		
Site activities	Stormwater Runoff – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Increased runoff due to compaction of surfaces and changes in surface topography	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	<u>Minimise and control:</u> – Implementation of stormwater plan. – Water quality monitoring – Routine hydraulic monitoring of the stormwater systems (monthly). – Visual inspections of all vehicles entering and operating at the site. – Visual assessment for signs of erosion or contamination. – Cover any stockpiles with appropriate materials such as ECBs. – Vegetation of bare soils in unused areas.	National Water Act (NWA) (Act 36 of 1998) as amended NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during operational phase
Site activities	Water quality – Contaminant transport in runoff from sediment to oil and fuel spills – Spillage of PCDs, slurry dams and stormwater conduits	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	<u>Minimise and control:</u> – Water quality monitoring. – Visual inspection of stormwater systems. – Spills should be cleaned or managed immediately.		
Site activities	AMD – Contaminant transport in runoff from overburden dumps and discard dump	Water environment	<u>Minimise and control:</u> – Verify AMD generation potential of overburden through sampling and analyses of core samples from the incline shaft location. – Ensure that all coal and carbonaceous material is removed from the overburden before placement on the stockpile. – Coal removed from overburden to be taken included in the processing plant. – A civil engineering design for leachate control and stormwater management must be undertaken.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Site activities	Disturbing the inner-soil architecture of the original soil profile will disturb natural flow processes (i.e. a result of infilling or cut-and-fill activities). Excavated soil will be placed in other areas (i.e. on top of other soils) and will have an impact on the flow dynamics of the soil it is dumped on top of. This may reduce rainfall infiltration and induce runoff. Impermeable areas will decrease rainfall infiltration into soils, and hence reduce interflow (A/B and A/bedrock) or lateral flow to downstream wetland areas.	Soil interflow processes	<u>Minimise and control:</u> - Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. - Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.	<i>Conservation of Agricultural Resources Act (CARA), No. 43 of 1983</i>	Continuous during operational phase
Site activities	The presence of adit, PCD and stockpiles will have long-term implications in terms of altering the natural hydropedological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes	<u>Minimise and control:</u> Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.		
Site activities	Seepage/leakages/overland flow from the PCD and stockpiles may impact soil quality.	Soil quality	<u>Avoid and manage:</u> - Have emergency fuel & oil spill kits on site. - Ensure PCDs are operated at levels that prevent overflow during 1-2 to 1:100-year flood events.		
Site activities	The presence of shallow soils will and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	<u>Minimise:</u> - Retain as much indigenous vegetation as possible. - Exposed soils are to be protected using a suitable covering or revegetating. - If required use silt traps or stilling basins to trap sediment runoff.		
Transport and movement of vehicles during operational activities	The additional traffic generated by the proposed mining operations will have some impact on the space available for pedestrians.	Existing pedestrians	<u>Minimise and control:</u> - Provide training and upskilling for shaft vehicle operators. - Conduct vehicle compliance inspections. - Conduct regular driver alcohol/ drug-tests regularly	<i>Occupational Health and Safety Act (OHSA), Act 85 of 1993</i> <i>National Roads Amendment Act, 1996.</i>	Continuous during operational phase
	The proposed mines are expected to generate moderate traffic volumes, which may have a limited effect on prevailing safety conditions	Road safety			
	There will be a moderate impact on the road network condition due to the additional heavy vehicle traffic generated during the operational phase	Condition of the Road Surface	<u>Minimise and control:</u> - Conduct regular road safety audits; - Work closely with local authorities to assess and reinforce the road infrastructure, including repair and upgrades.		
Daily operational activities	Negative impacts on aesthetics	Visual and landscape character	<u>Manage, minimize and control:</u> Infrastructure layout and siting: Align infrastructure with existing disturbed footprints (e.g., former processing plant site) and orient facilities in accordance with local topography to reduce direct visibility from nearby receptors, including farmsteads and the town of Utrecht.	<i>Occupational Health and Safety Act (OHSA), Act 85 of 1993</i>	Continuous during operational phase
Daily operational activities of the Mine and associated infrastructure	Negative impact on visibility from sensitive receptors/Viewpoints	Visual and landscape character		South African National Standard (SANS) 10103:2008	
Movement of heavy machinery	Change of visual character	Visual and landscape character			
Night lighting for security and operational activities	Light pollution (Glare, spill light, sky glow)	Visual and landscape character			

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Daily operational activities of the Mine, and associated infrastructure.	Landscape visual change	Visual and landscape character	- Housekeeping: Maintain all operational areas, infrastructure, and surroundings in a neat, well-organised condition to avoid visual clutter, degraded appearance, or unsightly stockpiles. - Colour and finishes: Use non-reflective, muted colours and textures for buildings, conveyors, and stockpiles that blend with surrounding grasslands, avoiding bright or glossy finishes that increase visual contrast. - Progressive rehabilitation: Rehabilitate disturbed areas progressively, with early seeding and planting of indigenous vegetation along peripheral areas, discard dump slopes, and haul road verges to soften visual intrusion. - Screening berms and stockpiles: Shape and vegetate authorised topsoil berms to act as visual buffers between infrastructure and sensitive viewpoints, especially along the R34 and adjacent settlements. - Vegetation retention and planting: Retain existing indigenous trees where possible and supplement with indigenous tree and shrub planting along perimeter fencing and around key infrastructure to soften structural forms. - Discard dump management: Actively shape discard dumps to mimic natural landform contours, revegetate slopes as mining progresses, and avoid angular, unnatural profiles. - Lighting control: Minimise light pollution by restricting night-time lighting to what is operationally essential. Use downward-facing, shielded fixtures, timers, and motion sensors to prevent glare and unnecessary light spillage. Avoid high-mast lighting along the periphery and instead use low-profile, directional lighting in essential areas. - Traffic and movement: Regulate vehicle speed to reduce dust plumes and visual disturbance. Limit the number of operational vehicles in visually sensitive zones at any one time to avoid unnecessary visual activity. - Concurrent rehabilitation: Implement backfilling and shaping of worked-out sections in line with concurrent rehabilitation strategies to accelerate the return of landforms to a more natural state and reduce long-term visibility of disturbed surfaces. The following additional mitigation measures are provided in the VIA: <u>Avoidance:</u> - Plan the layout of infrastructure, such as discard dumps, haul roads, and pipelines, in areas partially shielded by topography and away from high-sensitivity receptors, including farmsteads, schools, and the town of Utrecht. - Avoid siting new structures on ridges or elevated slopes where they would be highly visible from surrounding receptors. - Retain existing indigenous trees and grassland buffers, particularly along the site perimeter and adjacent to the R34, to act as natural visual barriers. <u>Minimisation:</u> - Apply earth-toned, matte finishes to buildings, conveyors, and surface infrastructure to reduce glare and contrast with surrounding vegetation. - Limit the number of operational vehicles in visually exposed areas at any given time and regulate vehicle speeds to reduce dust plumes and dynamic disturbance.	Best Practice	

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
			– Restrict lighting to operationally essential areas, using downward-directed, shielded fixtures fitted with timers or motion sensors. – Avoid high-mast floodlighting along the site boundaries; instead, use low-profile lighting systems to maintain a low-light footprint, particularly near schools and settlements. <u>Rectification:</u> – Implement concurrent rehabilitation of disturbed areas, including discard dump shaping, haul road re-vegetation, and planting along pipeline corridors, to restore visual continuity over time. – Backfill and reshape inactive working areas where feasible to return landform structure and reduce long-term scarring. <u>Reduction (over time):</u> – Undertake progressive rehabilitation of completed areas throughout the life of mine to minimise the cumulative extent of exposed ground. – Construct vegetated screening berms or bunds using topsoil and overburden strategically placed between infrastructure and sensitive viewpoints (e.g., VP1, VP8–11, VP13–15). – Establish indigenous planting belts along the perimeter fence, haul routes, and key boundaries to soften the scale of built elements and integrate them into the landscape. <u>Compensation:</u> – In cases where visual intrusion cannot be effectively reduced (e.g., at high-exposure receptors within 0–2 km), implement offset initiatives, such as strengthening community buffer zones or enhancing green corridors in affected areas. Engage with local landowners and communities to identify site-specific visual concerns and collaboratively implement screening solutions, such as tree planting, fenceline treatments, or rehabilitated buffer zones.		
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	No mitigation required as this is a positive impact.	N/A	N/A
Construction and operation of the mining operations	– Possibility of political interference, corruption, and fraud. – Blasting impacting on housing stability – Increased demand on already strained electricity supply – Increase in health & safety – Incidents on the mine – Increased traffic – Impact on livestock and agriculture – Stability of land because of underground mining and blasting operations – Limitations on development expansions of the municipality – Loss of grazing land (subsistence) – Leadership conflict	Local communities	– Adherence to approved and updated SLP	<i>Occupational Health and Safety Act (OHSA), Act 85 of 1993</i> Grievance mechanisms Social and Labour Plan	Continuous during all phases

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	Increased tension due to influx of non-residents				
All construction, operational and decommissioning activities related to the Project.	Potential disturbance to site 1 - The site consists of at least three small stone walled circles that appear to be kraal.	Cultural and Heritage aspects	<u>Avoid and manage:</u> The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it. However, if the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, a specialist should be consulted to assist with Grave relocation processes/permits and to inform SAHRIS.	South African Heritage Resources Agency (SAHRA) and the <i>National Heritage Resources Act</i> (Act 25 of 1999)(NHRA)	Continuous during all phases
	Potential disturbance to site 2 - The site consists of a small settlement 40m x 50m in size. The features and artefacts include: - Stone walled kraal - terracing (for a house) - two possible graves - undecorated, thin-walled pottery	Cultural and Heritage aspects	<u>Avoid and manage:</u> - The site is within the fenced area. The site currently has a 50m exclusion buffer around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. - If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. The area around the site will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. If there are graves and they are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains. Otherwise, it is an archaeological site with no claimants and the remains would go to KZNARI (KwaZulu-Natal Amafa & Research Institute).		
	Potential disturbance to site 3 - The site consists of stone walling that could be part of a kraal or a terrace	Cultural and Heritage aspects	No mitigation suggested or required by the specialist.		
	Potential disturbance to site 4 - The site consists of several features and artefacts that include: - Stone walling - Graves - Terracing - Stone cairns - Pottery	Cultural and Heritage aspects	<u>Avoid and manage:</u> - The site occurs within the fenced off area. The site currently has two 50m exclusion buffers around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. - The second buffer is for Grave 7. All features fall within these 50m buffer and the buffer needs to be fenced. If the site will be affected, then it will need to be re-assessed after the grass has been burnt/cut. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.		
	Potential disturbance to site 5 - The site consists of at least three graves. These graves could be related to Site 1, Site 3, or both.	Cultural and Heritage aspects	<u>Avoid and manage:</u> - The site is outside of the fenced area and will not be affected. The site currently has a 50m buffer no-go around it and should be fenced off prior to construction. Photo evidence of the fenced off sites should be submitted to the ECO. - If the mine is expanded and the site affected then mitigation will be required. The site would then need to be mapped and photographed. This will determine if more graves occur at the site and will also assist in site mapping. The mine will need to decide if the graves will be affected. If there are graves are to be affected, then a PPP will be required specifically dealing with graves. Reburial is an option if the local community claims the remains.		

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	– Potential disturbance to finds, stone cairns, pottery, open MSA scatters	Cultural and Heritage aspects	<u>Manage:</u> – Due to the low significance of the impact, there are no mitigation measures suggested, however, a Chance Find Protocol should be established for any isolated artefacts. Any material that may potentially be an artefact should be verified with an ECO and archaeologist.		
Blasting	– Ground Vibration - Exceeding Limits and Possible Damage to sites 1 – 12, 14 -17, 19, 21 -47 (as per the Blasting Impact Assessment report)	Existing infrastructure, potential sites of cultural significance, people and animals	<u>Minimise and control:</u> – Develop a specific blast design that considers the distance between the heritage sites and blast – Shorter blast holes – Smaller diameter blast hole – Using electronic initiation to ensure single hole firing – Use of specialist to assist with drilling and blasting mitigation – Relocation of Heritage graves	Mine Health and Safety Act (Act 29 of 1996)	Continuous during operational phase
	– Ground Vibration - Exceeding Limits and Possible Damage to sites 13, 18, 20 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	<u>Minimise and control:</u> – Specific blast design to be done – Shorter blast holes – Smaller diameter blast hole – Use of specific stemming materials to manage air blast – Increased stemming lengths to reduce air blast effect – Use electronic detonators to manipulate firing sequence – R34 Stop and Go when blasting within the unsafe distance – Evacuation and Closure on gravel roads – Ensure proper clearance of unsafe areas prior to blasting.		
	– Air Blast - Exceeding Limits and Possible Damage to sites 1 – 36, 38 – 47 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals	<u>Minimise and control:</u> – Smaller diameter blast hole – Use of specific stemming materials to manage confinement of blast hole – Increased stemming lengths to reduce fly rock risk – R34 Stop and Go when blasting within the unsafe distance – Ensure proper clearance of unsafe areas prior to blasting. – Relocation of Heritage graves. – Cover protection over closest Heritage sites		
	– Air Blast - Exceeding Limits and Possible Damage to sites 37 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals			
	– Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 1,2, 4 - 27 and 47 (as per the Blasting Impact Assessment)	Existing infrastructure, potential sites of cultural significance, people and animals			
	– Fly rock - Within Fly Rock Range and possible Damage, fatality or injury to people or animals to sites 3, 28 – 46 (as per the Blasting Impact Assessment report).	Existing infrastructure, potential sites of cultural significance, people and animals			
Decommissioning Phase					
Decommissioning activities	Decommissioning activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air quality	The mitigation measures provided in the construction phase will also be relevant during the decommissioning phase.	National Environment Management: Air Quality Act (NEMAQA) Act 39 of 2004 Dust Control Regulations	Continuous during decommissioning phase
Noise generating construction and closure activities including traffic, earthworks, mobile construction equipment, metal and concrete works and demolition.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	Refer to the mitigation measures provided in the construction phase.	Noise Regulations South African National Standard (SANS) 10103:2008 Occupational Health and Safety Act (OHSA), Act 85 of 1993	Continuous during decommissioning phase
Removal of the infrastructure	Compaction and contamination of areas through heavy machinery movement and hydrocarbon spills.	Soil Agricultural Potential	<u>Minimise and manage:</u> – The rehabilitated area must be assessed once a year for compaction, fertility, and erosion;	NEMA Duty of Care	Continuous during decommissioning phase

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
Rehabilitation of excavated areas as well as disturbed footprint areas.	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	– The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations can be implemented before the start of the wet season) as to correct any nutrient deficiencies; – Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated; – If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place; – If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion; – Only the designated access routes are to be used to reduce any unnecessary compaction; and – Areas of subsidence must be reported and remediated as soon as possible with the best practices at the time of occurrence.	<i>Conservation of Agricultural Resources Act (CARA), No. 43 of 1983</i>	
Rehabilitation finalisation	Re-establishment of semi-natural conditions to provide a sustainable non-degrading disturbance footprint area.	Soil Agricultural Potential	No mitigation proposed due to the impact being positive.		
Decommissioning of the Mine and Repurposing of Support Infrastructure	– Decrease erosion potential; Increase biodiversity; – Remove all potential contaminants – Reinstated natural topography.	Wetlands	No mitigation proposed due to the impact being positive.	<i>National Water Act (NWA) (Act 36 of 1998) as amended</i> NEMA Duty of Care NEMA Polluter Pays Principle DWS Best Practice Guidelines	Continuous during decommissioning phase
Infiltration of groundwater into underground workings	Groundwater pollution plume (AD/ND/SD) is generated by the underground workings.	Geohydrology	<u>Minimise and manage:</u> – The underground workings must be allowed to flood to prevent the oxidation of minerals. – The adit should be plugged. – Ensure routine updates of the numerical flow and transport models to confirm closure objectives.		
Decant or seepage	Contaminated decant might flow into neighbouring streams or seep back into the aquifer. Decant is likely at the adit, and poor quality seepage is likely at several positions where the topography is <30m from the coal floor (i.e., if the system is under pressure diffuse seepage, may occur).	Geohydrology	<u>Minimise and manage:</u> – Plug the adits at closure. – Ensure that all boreholes drilled into the mine works are decommissioned. – Ensure routine updates of the numerical flow and transport models to confirm closure objectives. – Potential seepage stemming from the discard facility should be monitored.		
Cessation of mining	Recovery of groundwater levels after cessation of mining.	Geohydrology	Impact is positive. No mitigation required.		
Decommissioning of non-essential infrastructure to rehabilitate and close the Adit and associated infrastructure	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs).	Soil interflow processes, soil structure and land capability and soil quality.	No mitigation is required. Rehabilitation will likely improve the impact of the development on the hydrogeology assessment. General risks associated with the construction phase will likely exist during earthworks and rehabilitation activities.		
Re-Disturbing vadose zone during soil excavations/infilling activities	– Alteration to natural hydrogeological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydrogeological processes supporting the watercourses.	Soil interflow processes, soil structure and land capability and soil quality.			
Re-vegetation and rehabilitation	– Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of	Soil interflow processes, soil structure and land capability and soil quality.			

Activity	Potential impact	Aspects affected	Mitigation type and measure	Compliance with standards	Time period for implementation
	the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss. – Soil compaction; and – Soil erosion. – Soil quality: – Natural nutrient content decreases due to soil exposure. – Loss of natural bio-organisms essential to soil processes.				
Site activities	The presence of the Adit will have long-term implications in terms of altering the natural hydroopedological flow drivers of the subsoils, on which the facility is situated This applies to the proposed PCDs as well.	Soil interflow processes, soil structure and land capability and soil quality.	<u>Minimise and control:</u> – Revegetate areas (with vegetation growing at the site) where heavy machinery movement takes place to prevent erosion. – Ensure that clean stormwater is attenuated back to the natural environment, directly downstream of the development. The release of stormwater will offset the rainfall infiltration reduction impacts on soil interflow and may benefit downstream watercourses and wetland units.		

28. IMPACT MANAGEMENT OUTCOMES

Table 59 in Section 15 of Part A details the impact management outcomes and actions that are to be implemented in all phases of the project (construction, operational and decommissioning phases) to reduce negative impacts on the environment and surrounding communities. These are therefore not repeated here.

29. IMPACT MANAGEMENT ACTIONS AND MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING THEREON

A monitoring programme for each aspect impacted upon by the Project must be in place not only to ensure compliance with the EMPr throughout the construction and operational phase, but also to monitor any environmental issues and impacts during the rehabilitation phase. The mechanisms for monitoring compliance and reporting are shown in Table 66 below.

Table 66: Management Actions, Mechanisms for Monitoring Compliance and Reporting

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Construction phase						
Construction activities	Construction activities will generate dust that may result in ambient PM concentrations and dustfall rates in exceedance of NAAQS and NDCR if unmitigated.	Air Quality	Implement an air quality monitoring programme.	Before commencing and during each subsequent phase	ECO Air Quality specialist	– Daily visual inspection of site operations and corrective action should dust, or smoke emissions be observed. – Quarterly inspection and reporting of dust and smoke emissions and in response to complaints – Fit for purpose sampling of dustfall, PM₁₀, PM_{2.5}, and NO₂. ○ PM₁₀ and PM_{2.5} is typically sampled using gravimetric or light-scatter methods. Wind direction and speed should preferably be measured at the same location and period. ○ Dustfall sampling as per the requirements of the NDCR at the following intervals: ▪ All: one 1-month campaign before the commencement the construction, to establish a site-specific baseline. ▪ NO₂, PM₁₀, and PM_{2.5}: one 3-month campaign upon the commencement of each phase of the project. Thereafter as, and when needed in support of resolving complaints. ▪ Dustfall sampling should commence prior to the construction phase and continue throughout the life of the project.
Operation of Umgala mining infrastructure		Climate Change (GHG)	GHG inventory to be calculated on an annual basis.	Annual	ECO Climate Change Specialist	Annually.
Noise generating construction activities including traffic, earthworks, mobile construction equipment, metal and concrete works.	Increase in ambient noise levels	Ambient noise levels, residential, community, and agricultural receptors	Implementation of noise monitoring programme	One campaign upon commencement of operations of various project components. Locations to be selected by specialist in consultation with project proponent and will depend on active areas and closest receptors to that activity. Also, if required, as part of resolving complaints.	Noise Monitoring specialist Application ECO	Upon commencement.

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Construction of the adit for underground mining works	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	Bush clearing of all indigenous bushes and trees taller than one meter	This activity should be finished at least a week prior to any stripping of topsoil.	Applicant Contractor	- Contractors/ Environmental Officer (EO) (Daily) - Mine EO (Weekly) - Environmental Control Officer (ECO) (Monthly)
Clearing of areas and construction for mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	Assign all access routes so that only designated routes are used to minimise additional impact areas.	This activity should be finished at least two weeks prior to commencement of any mining activities.	Applicant ECO	- Contractors/ Environmental Officer (EO) (Daily) - Mine EO (Weekly) - Environmental Control Officer (ECO) (Monthly)
Stockpiling of soil	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	Stripping of topsoil.	During the first month.	Applicant ECO Contractor	- Contractors/ Environmental Officer (EO) (Daily) - Mine EO (Weekly) - Environmental Control Officer (ECO) (Monthly)
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Agricultural Resources and Infrastructure	Soil Agricultural Potential	Stockpile the stripped soils in designated stockpile areas	During and after the soil stripping process.	Applicant ECO Contractor	- Contractors/ Environmental Officer (EO) (Daily) - Mine EO (Weekly) - Environmental Control Officer (ECO) (Monthly)
Clearing of areas and construction for mining infrastructure & Stockpiling of soil	Loss of Land Capability	Soil Agricultural Potential	Vegetate these stockpiles	During and after the completion of the stockpiles.	Applicant Contractor	- Contractors/ Environmental Officer (EO) (Daily) - Mine EO (Weekly) - Environmental Control Officer (ECO) (Monthly)
Vegetation Clearance and Earthworks, including excavation and infilling	Clearance of vegetation during site preparation, excavation, infilling and shaping of landscape. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may result in the temporary disturbance of Wetlands.	Wetlands	- Implement the Stormwater Management Plan - Implement the Alien and Invasive Species Management Programme - Implement monitoring requirements of the Water Use Licence (once issued) - Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	- Environmental Control Officer (ECO) (Monthly) - As per offset programme (once developed)
Vegetation clearance, construction vehicle traffic and earthworks	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation by construction vehicle traffic. During the construction phase, the clearance of vegetation and compaction of soil may result in increased run-off and erosion, altering hydrological and geomorphological processes.	Wetlands	- Implement the Stormwater Management Plan - Implement the Alien and Invasive Species Management Programme - Implement monitoring requirements of the Water Use Licence (once issued) - Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	- Environmental Control Officer (ECO) (Monthly) - As per offset programme (once developed)
Clearance of vegetation and compaction of soil	Clearance of vegetation during site preparation. Excavation, infilling and shaping of landscape. Disturbance of vegetation and soil by construction vehicle traffic. During the construction phase, vegetation clearance, construction vehicle traffic and earthworks may reduce ecological	Wetlands	- Implement the Stormwater Management Plan - Implement the Alien and Invasive Species Management Programme - Implement monitoring requirements of the Water Use Licence (once issued)	Before construction commences and during all subsequent phases	Applicant ECO	- Environmental Control Officer (ECO) (Monthly) - As per offset programme (once developed)

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
	connectivity and disturb the watercourse/terrestrial edge.		– Implementation of the wetland offset programme (once developed)			
Preparation, storage and transportation of construction materials. Potential oil leaks from construction vehicles and equipment	Accidental spillages of wet concrete and chemical / hazardous substances. During the construction phase, accidental spillages of wet concrete and chemical /hazardous substances may result in soil and groundwater contamination, adversely affecting the aquatic ecosystems in the broader area.	Wetlands	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Demarcation of buffer zones and no-go areas and the creation of spoil sites (topsoil separate from subsoil)	Input of droppers for demarcation Tape and Erection of silt fencing around all spoil sites (including coverage), Dumping of spoil at the designated sites using haulage routes. Disruption of the soil profile and thus creation of excess sediment; Potential disturbance to native and/or indigenous plant species; Aesthetic and potentially noise disturbance within the area.	Wetlands	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Construction of Mine Support Infrastructure (Buildings, Conveyor Belts, Dirt Roads and Fences)	Permanent change in the surface hydrology from hardened surfaces. Reduced infiltration rates and increased risk of erosion from permanent change in the surface hydrology from hardened surfaces.	Wetlands	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Establishment Mining Area Footprint	Open cast mine establishment through excavation, blasting and stabilisation activities within/close proximity to watercourses. Complete removal of vegetation, topsoil, sub-soils and parent material. Complete loss of hydrological, geomorphic and vegetation functions of wetland systems.	Wetlands	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Land and riparian clearing activity	Water quality deterioration	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Construction activities	Building materials & solid waste (plastics, polystyrene, etc.) entering / disposed of in wetlands	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Construction activities	Contamination (oils, fuels, chemicals) - Surface water pollution	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Construction activities	Soil contamination from chemicals	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) As per offset programme (once developed)
Construction activities	Human waste - Surface water pollution	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) As per offset programme (once developed)

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
			– Implementation of the wetland offset programme (once developed)			
Construction activities	Increased turbidity - Surface water pollution	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) As per offset programme (once developed)
Construction activities	Increased turbidity - Wetland geomorphological alteration	Aquatic	– Implement the Stormwater Management Plan – Implement the Alien and Invasive Species Management Programme – Implement monitoring requirements of the Water Use Licence (once issued) – Implementation of the wetland offset programme (once developed)	Before construction commences and during all subsequent phases	Applicant ECO	– Environmental Control Officer (ECO) (Monthly) – As per offset programme (once developed)
Project planning, site preparation and land clearance, construction activities, operational activities	Unmitigated and uncontrolled loss of habitat types of elevated sensitivity and conservation importance on a local and regional scale	Terrestrial biodiversity theme	– Highlight and identify areas of elevated ecological importance and sensitivity. these areas should be excluded from the development footprint during the planning phase, also considering an additional buffer to allow ecological functionality and integrity.	EIA Phase, submission of application, authority review, and Environmental Authorisation	– Developer – Ecological specialists – Project planners – EAP – authorities	– Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions.
		Terrestrial biodiversity theme	– All activities that will cause/ result in destruction of natural habitat must be contained within the authorised footprint and not allowed to spread beyond the boundaries of the site, specifically into areas of elevated ecological importance and sensitivity that are in proximity to the development footprint. Site should be clearly demarcated, and all vehicle and personnel movement strictly controlled.	Site preparation, land clearance activities, construction and operational activities	– Developer, Ecological specialists, Construction operators, – Contractors, Environmental Team, Environmental Control Officer, Personnel	– Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions.

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Uncontrolled construction and operational activities that are not effectively contained in authorised footprint, uncontrolled movement of vehicles and personnel, unauthorised utilisation of natural resources outside the development footprint, unmitigated erosion and pollution events, unplanned fire events	Deterioration and alteration of present ecological status of natural and sensitive habitat types that are in proximity to the development footprint (not part of the authorised footprint), that will cause secondary impacts such as disruption of ecological integrity and functionality on a local and landscape scale.	Terrestrial biodiversity theme	Highlight and identify areas of elevated ecological importance and sensitivity. These areas should be excluded from the development footprint during the planning phase, also considering an additional buffer to allow ecological functionality and integrity.	EIA Phase, submission of application, authority review, and Environmental Authorisation	- Developer, - Ecological specialists, - Project planners, - EAP, - authorities	Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions. Monitoring programme should also evaluate the status of the surrounding environment
		Terrestrial biodiversity theme	Provide for immediate demarcation of the authorised development footprint, preferably permanent, semipermeable fencing, to prevent the unauthorised movement of vehicles and personnel outside the development footprint.	Site preparation and land clearance, Construction Phase, Operational Phase	- Developer, - Project planners, - Contractors, - Environmental Team, - Environmental Control Officer, - Personnel	Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions. Monitoring programme should also evaluate the status of the surrounding environment
		Terrestrial biodiversity theme	Implement awareness programmes for all contractors and workers on site, areas outside the authorised footprint should not be accessible, utilisation of natural resources that cause deterioration of natural environment is not allowed.	Site preparation and land clearance, Construction Phase, Operational Phase	- Environmental Team, - Environmental Control Officer, - Personnel	Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions. Monitoring programme should also evaluate the status of the surrounding environment
		Terrestrial biodiversity theme	Develop and implement an Environmental Monitoring Programme that monitors/ advise on observed impacts. Develop and implement Standard Operating Procedures to deal with events such as erosion management, fires, etc.	Site preparation and land clearance, Construction Phase, Operational Phase	Environmental Team, Environmental Control Officer, Personnel	Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions. Monitoring programme should also evaluate the status of the surrounding environment
Project planning, site preparation and land clearance, construction activities	Unmitigated and uncontrolled loss of natural vegetation and habitat types of elevated floristic sensitivity, uncontrolled loss of plant SCC and other protected plant taxa	Plant species theme	Conduct a 'final walkthrough' to establish the localities, number and diversity of protected plant taxa within the authorised development footprint.	Environmental Authorisation, prior to land clearance and construction activities	Botanical specialist Developer EAP	Provide for an annual performance monitoring programme that will advise on status of vegetation/ environment. Constant monitoring by ECO is advised during land clearance operations
		Plant species theme	Obtain relevant permits from EKZN and DFFE to allow the destruction or relocation of protected plant species within the authorised development footprint. Adhere to all permit conditions	Environmental Authorisation, prior to land clearance and construction activities	Botanical specialist Developer EAP	Provide for an annual performance monitoring programme that will advise on status of vegetation/ environment. Constant monitoring by ECO is advised during land clearance operations

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
		Plant species theme	Execute a relocation programme for certain plant individuals/ species to allow for the preservation of species as part of environmental governance	Environmental Authorisation, prior to land clearance and construction activities	Botanical specialist Developer EAP	Provide for an annual performance monitoring programme that will advise on status of vegetation/ environment. Constant monitoring by ECO is advised during land clearance operations
		Plant species theme	Highlight and identify areas of elevated floristic importance and sensitivity. These areas should be excluded from the development footprint during the planning phase, also considering an additional buffer to allow ecological functionality and integrity	EIA Phase, submission of application, authority review, and Environmental Authorisation	Developer Ecological specialists Project planners EAP Authorities	Provide for an annual performance monitoring programme that will advise on status of vegetation/ environment. Constant monitoring by ECO is advised during land clearance operations
Uncontrolled construction and operational activities that are not effectively contained in authorised footprint, uncontrolled movement of vehicles and personnel, unauthorised utilisation of natural resources outside the development footprint, unmitigated erosion and pollution events, unplanned fire events.	Deterioration and alteration of present ecological status of natural and sensitive habitat types that are in proximity to the development footprint (not part of the authorised footprint), that will cause secondary impacts such as disruption of ecological integrity and functionality on a local and landscape scale. Uncontrolled and unauthorised losses of plant SSC and other protected plant taxa. Uncontrolled harvesting and collection by personnel.	Plant species theme	Highlight and identify areas of elevated ecological importance and sensitivity. These areas should be excluded from the development footprint during the planning phase, also considering an additional buffer to allow ecological functionality and integrity. If the authority approves the development, offset will be required.	EIA Phase, submission of application, authority review, and Environmental Authorisation	Developer Botanical specialists, Project planners, EAP authorities	Provide for an annual performance monitoring programme that will advise on observed impacts and suggested improvement actions. Monitoring programme should also evaluate the status of the surrounding environment.
		Plant species theme	Provide for immediate and effective demarcation of the authorised development footprint, preferably permanent, semi-permeable fencing, to prevent the unauthorised movement of vehicles and personnel outside the development footprint	Site preparation and land clearance, Construction Phase, Operational Phase	Developer, Project planners, Contractors, Environmental Team, Environmental Control Officer, Personnel	Site preparation and land clearance, Construction Phase, Operational Phase
		Plant species theme	Implement awareness programmes for all contractors and workers on site. Areas outside the authorised footprint should not be accessible, utilisation of natural resources is not allowed.	Site preparation and land clearance, Construction Phase, Operational Phase	Environmental Team, Environmental Control Officer, Personnel	Site preparation and land clearance, Construction Phase, Operational Phase
		Plant species theme	Develop and implement an Environmental Monitoring Programme that has the objective to monitor and advise on observed impacts	Site preparation and land clearance, Construction Phase, Operational Phase	Environmental Team, Environmental Control Officer, Personnel, Ecological specialist	Site preparation and land clearance, Construction Phase, Operational Phase

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Site preparation, construction activities, operational activities/ environmental management, movement of personnel and vehicles	Displacement of natural vegetation by alien and invasive plants, displacement of natural vegetation by locally endemic encroacher species. Spread of AIP species via nearby riparian habitat toward other areas of elevated sensitivity and importance, e.g., Olifants River	Plant species theme	Develop and implement an AIP Management Plan at the onset of the project	Site preparation, Construction Phase, Operational Phase	Developer, EAP, Botanical specialist, Environmental Team, Environmental Control Officer	Annual monitoring of the presence and abundance of AIPs within the authorised site and surrounding areas.
Project planning, site preparation and land clearance, construction activities	Unmitigated and uncontrolled loss of natural habitat types of elevated fauna sensitivity (very high SEI), uncontrolled loss of invertebrate SCC and other protected fauna taxa	Animal species theme	Conduct a 'final walkthrough' to establish the EOO of animal SCC taxa within the authorised development footprint	Environmental Authorisation, prior to land clearance and construction activities	Mammologist, entomologist and avifauna specialist, Developer, EAP	- Implement management programme to assess the efficacy of applied mitigation measures and consult or change measures to reduce fauna mortalities when detected. Additional mitigation measures should be tested or applied, especially if mortalities include species of conservation concern. - Implement wildlife management and rescue plan during construction. - Implement a biodiversity management plan for adjacent habitat (e.g. habitat with high ecological connectivity to the development area during operation, including drainage lines, wetlands and outcrops) as well as open space systems and corridors with the objective to manage untransformed habitat. - Implement general yearly or bi-annual monitoring of bird associations and invertebrate species of conservation concern based on fixed sampling sites.
		Animal species theme	Implement a biodiversity management plan for adjacent or natural unmined habitat (e.g. habitat with high ecological connectivity) as well as open space systems and corridors with the objective to manage untransformed habitat through conservative and rotational grazing, fire management and continual eradication of alien plant species	Operation (on-going)	Ecologist, Developer, EAP	
		Animal species theme	Draft a wildlife management and rescue plan for priority animal species (e.g. protected species or less mobile taxa including snakes and certain invertebrates), which will entail the ongoing screening of the development footprint for any animal individuals, the documentation and safe release thereof (within 50 km of the development area). The plan should be compiled with the input obtained from the local authorities (e.g. acquiring permits for protected and threatened species).	Construction phase	Ecologist/Zoologist, KZN Wildlife, Developer, EAP	
		Animal species theme	Environmental awareness training on the biodiversity importance of the area for staff	EIA Phase, submission of application, authority review, and Environmental Authorisation	ECO	
		Animal species theme	Monitoring of the project area for poaching/squatting, especially areas of adjacent natural habitat where active operational/ construction	Weekly during construction. On-going during operations (monthly)	ECO, Developer	

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
			activities are absent. It is advised to identify and rectify areas where illegal settlement or poaching may occur (removal of snares).			
		Animal species theme	Compile management programme to assess efficacy of mitigation strategies and on-going research/trials during rehabilitation.	Operation (on-going)	ECO, Developer, Ecologist	
		Animal species theme	Implement additional surveys for invertebrate taxa of conservation concern to determine the ecological requirements and habitat preference of these taxa	Operation (on-going)	ECO, Developer, Entomologist	
Dewatering	Lowering of water levels due to dewatering of excavations for construction.	Geohydrology	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Blasting	Increased fracturing and altering of flow patterns due to blasting.	Geohydrology	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Construction	Potential groundwater contamination is caused by spillages, accidents, poor waste management and sanitation practices.	Geohydrology	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Construction and vegetation clearing	Increased runoff from the site as a result of vegetation clearing and construction activities.	Geohydrology	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Earthworks and Development	Disturbing vadose zone soils during excavations/construction activities.	Vadose zone soils and subsequent aquifer (groundwater table)	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Earthworks and Development	Poor quality seepage from machinery used to excavate soils. Oil, grease and fuel leaks could lead to hydrocarbon contamination of the vadose zone which could percolate into the shallow aquifer.	Vadose zone soils and subsequent aquifer (groundwater table)	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Earthworks and Development	Surface water contamination and sedimentation from the following activities: – Erosion and sedimentation of watercourses due to unforeseen circumstances (i.e. bad weather, heavy rainfall events). – Contaminant transport in runoff – To date, no sedimentation has taken place (i.e. no evidence observed during the site walkover assessment)	Primary Surface Water Receivers – Non-perennial streams – Perennial Streams	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Earthworks and Development	– Poor quality seepage from machinery used to excavate soils. – Oil, grease, and fuel leaks could lead to hydrocarbon contamination of the vadose zone - which could percolate into the shallow aquifer.	Groundwater aquifer	Implement the groundwater monitoring programme	Continuous from commencement of Project	Applicant ECO	Quarterly
Site preparation, including placement of contractor laydown areas and storage (i.e. temporary stockpiles, bunded areas etc.) facilities.	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: – Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. – Vegetation loss. – Soil compaction; and – Soil erosion. Soil quality: – Natural nutrient content decreases due to soil exposure. – Loss of natural bio-organisms essential to soil processes.	Soil quality, soil structure and land capability and soil interflow processes	Inspections/ observations to avoid, manage or mitigate.	Continuous during all phases.	Contractor Applicant ECO	– Routine weekly visual inspections of infrastructure and parking areas for signs of soil contamination. – Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.
Disturbing vadose zone during soil excavations/infilling activities	Soil interflow processes: – Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). – Alteration to natural hydropedological flow paths. – Impacts on the macro-soil structure. – Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability:	Soil quality, soil structure and land capability and soil interflow processes	Inspections/ observations to avoid, manage or mitigate.	Continuous during all phases.	Contractor Applicant ECO	– Routine weekly visual inspections of infrastructure and parking areas for signs of soil contamination. – Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
	- Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. - Vegetation loss. - Soil compaction; and - Soil erosion. Soil quality: - Natural nutrient content decreases due to soil exposure. - Loss of natural bio-organisms essential to soil processes.					
Vegetation clearing & soil stockpiling.	Soil interflow processes: - Infilling of wetlands and watercourses inducing alternative flow paths (if infilling occurs). - Alteration to natural hydropedological flow paths. - Impacts on the macro-soil structure. - Impacts on the hydropedological processes supporting the watercourses. Soil structure & land capability: - Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses, thus increasing the potential for sedimentation of the watercourses. - Vegetation loss. - Soil compaction; and - Soil erosion. Soil quality: - Natural nutrient content decreases due to soil exposure. - Loss of natural bio-organisms essential to soil processes.	Soil quality, soil structure and land capability and soil interflow processes	Inspections/ observations to avoid, manage or mitigate.	Continuous during all phases.	Contractor Applicant ECO	- Routine weekly visual inspections of infrastructure and parking areas for signs of soil contamination. - Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.
Earthworks	Oil & fuel spills from vehicles parked at the site may compromise soil quality. Prolonged pollution may migrate to the nearby watercourse and/or percolate into the groundwater table.	Soil quality	Inspections/ observations to avoid, manage or mitigate.	Continuous during all phases.	Contractor Applicant ECO	- Routine weekly visual inspections of infrastructure and parking areas for signs of soil contamination. - Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Earthworks	Temporary dewatering of perched groundwater (only expected during intense storm events and shortly thereafter).	Perched Water Table Dewatering	Inspections/ observations to avoid, manage or mitigate.	Continuous during all phases.	Contractor Applicant ECO	– Routine weekly visual inspections of infrastructure and parking areas for signs of soil contamination. – Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.
Earthworks	The presence of shallow soils will and sodic soils will be prone to cause erosion. It is evident from ephemeral drainage areas are the site, that soil erosion and sedimentation will take place.	Soil	Inspections/ observations to avoid, manage or mitigate.	Continuous during all phases.	Contractor Applicant ECO	– Routine weekly visual inspections of infrastructure and parking areas for signs of soil contamination. – Soil quality monitoring & visual assessments – monthly basis. If obvious pollution is noted (visually) then it is advised that soil screening be undertaken.
Removal of vegetation for site clearing / preparation for all proposed infrastructure Movement of construction vehicles and heavy machinery for site clearance	– Negative impacts on aesthetics – Negative impact on visibility from sensitive receptors/Viewpoints – Change of visual character from a natural landscape to a built landscape – Landscape visual change	Visual and landscape character	Reduce and control by implementing the mitigation measures. Address complaints related to visual impacts.	Continuous during all phases	Contractor Applicant ECO	– Report on complaints (if any) in monthly ECO reports.
Construction activities	The construction phase of the proposed mines will generate additional traffic on the surrounding road network within the study area	Surrounding road network	Avoid accidents, congestion and address grievances. Continuous during all phases	ECO	Social consultant / community liaison officer	– Report on complaints (if any) in monthly ECO reports.
Construction and operation of the mining operations	Impact on community due to employment creation and income generation	Local communities	Avoid accidents, congestion and address grievances. Continuous during all phases	ECO	Social consultant / community liaison officer	– Report on complaints (if any) in monthly ECO reports.
Construction and operation of the mining operations	– Possibility of political interference, corruption, and fraud. – Blasting impacting on housing stability – Increased demand on already strained electricity supply – Increase in health & safety – Incidents on the mine – Increased traffic – Impact on livestock and agriculture – Stability of land because of underground mining and blasting operations – Limitations on development expansions of the municipality – Loss of grazing land (subsistence) – Leadership conflict – Increased tension due to influx of non-residents	Local communities	Avoid accidents, congestion and address grievances. Continuous during all phases	ECO	Social consultant / community liaison officer	– Report on complaints (if any) in monthly ECO reports.

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
Operational Phase						
Operation of underground mine workings	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential	– Continuously monitor erosion on site – Monitor compaction on site	During the timeframe assigned for the Life of Mine (LOM).	– Applicant – Contractor – ECO	– Contractors EO (Daily) – Mine EO (Weekly) – ECO (Monthly)
Operation of mining infrastructure	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination.	Soil Agricultural Potential				
Operation of PCD, Discard dump, , and ROM areas	Contamination of soil resources below these facilities as well as adjacent to these facilities due to contaminated runoff.	Soil Agricultural Potential				
Dust suppression of haul roads	Often waste water is used as dust suppression water spray. These could lead to the build-up of contaminants in the road surface as well as adjacent to the road in areas of concentrated runoff.	Soil Agricultural Potential				
Decommissioning phase						
Removal of the infrastructure	Compaction and contamination of areas through heavy machinery movement and hydrocarbon spills.	Soil Agricultural Potential	– Assign proper storm water management plans	This activity would be part of the engineering layout during the construction phase. A site-based assessment should be carried out two months prior to the decommissioning phase to ensure that all storm water management plans are adequate.	– Applicant – ECO	– Contractors EO (Daily) – Mine EO (Weekly) – ECO (Monthly)
Rehabilitation of excavated areas as well as disturbed footprint areas.	Loss of Soil as a Valuable Resource through erosion, compaction, and contamination	Soil Agricultural Potential	After the completion of the project the area is to be cleared of all infrastructure;	Within the first two months after the completion of the project.	– Applicant – ECO – Contractor	– Contractors EO (Daily) – Mine EO (Weekly) – ECO (Monthly)
Rehabilitation finalisation	Re-establishment of semi-natural conditions to provide a sustainable non-degrading disturbance footprint area.	Soil Agricultural Potential	Topsoil to be replaced for rehabilitation purposes;	After the completion of the foundation removal.	– Applicant – Soil Specialist – ECO	– ECO (Yearly) – Soil Specialist (Yearly) (To conduct a post-Mining land capability assessment until the agreed targets are reached)
		Soil Agricultural Potential	All rehabilitated areas should be assessed for signs of compaction, fertility, and erosion.	Within the first month after the successful decommissioning of the area.		

Activity	Potential impact	Aspects affected	Management actions	Time period for implementation	Roles and Responsibilities	Monitoring and reporting frequency
		Soil Agricultural Potential	The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations can be implemented before the start of the wet season) as to correct any nutrient deficiencies;	Within the first month after successful rehabilitation as well as yearly for the next 5 years to ensure that a sustainable soil resource is established.		
		Soil Agricultural Potential	Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated;	Monitoring compaction should take place every six months. In cases where compaction is identified, ripping should take place within the next month after detection.		
		Soil Agricultural Potential	If erosion occurs, corrective actions (erosion berms) must be taken to minimize any further erosion from taking place;	Monitoring erosion should take place every six months whilst monitoring for compaction. In cases where erosion is identified, relevant mitigation measures should take place within the next month after detection.		

29.1. FUNCTIONAL REQUIREMENTS FOR MONITORING PROGRAMMES

The functional requirements for monitoring programmes ensure that environmental commitments are effectively implemented and that any adverse effects are promptly identified and mitigated. As part of this EMPr for this Project, the following are functional requirements were identified and subsequently incorporated in Table 66 above:

- Compliance monitoring: Assessing the Project activities to ensure adherence to environmental regulations and standards, including routine chemical analyses of effluent discharges and periodic toxicity tests.
- Mitigation measures implementation: Ensure that all proposed mitigation strategies are executed effectively, such as installing noise barriers or implementing erosion control measures, and monitor their efficacy over time.
- Reporting and documentation: Maintain detailed records of monitoring activities, findings, and any incidents, and submit regular reports to relevant authorities to demonstrate compliance and transparency.

Additional details to specific monitoring requirements provided in certain specialist reports are provided below.

29.1.1. Groundwater monitoring programme

The Umgala Coal Mine has existing groundwater and surface water monitoring protocols and systems in place, which involve the following:

29.1.1.1. Groundwater Monitoring – Old Discard Dump and RWD

Two boreholes (GCSU1 and GCSU2), located in the vicinity of the old return water dam (RWD) and old discard dump, are sampled on a quarterly basis by GCS. The purpose is to identify whether any seepage or runoff from the RWD or Dump could be contaminating any groundwater resources.

The samples are analysed for pH, EC, TDS, ammonia, nitrate, nitrite, chloride, sulphate, sodium, potassium, calcium, magnesium, aluminium, iron, fluoride and manganese.

29.1.1.2. Surface Water Monitoring - RWD

One point (RWD) is sampled on a quarterly basis by GCS. The purpose is to identify whether any seepage or overflow from the RWD could be contaminating any ground/ surface water resources.

The sample is analysed for pH, EC, TDS, ammonia, nitrate, nitrite, chloride, sulphate, sodium, potassium, calcium, magnesium, aluminium, iron, fluoride and manganese.

29.1.1.3. Groundwater Monitoring – Old Underground Workings

Two boreholes (GCSU11 and GCSU12), located in the vicinity of the old underground workings, are sampled on a quarterly basis by GCS; borehole GCSU12 is blocked. The purpose is to identify whether any seepage or decant from the underground workings could be contaminating any groundwater resources.

The samples are analysed for pH, EC, TDS, ammonia, nitrate, nitrite, chloride, sulphate, sodium, potassium, calcium, magnesium, aluminium, iron, fluoride and manganese.

29.1.1.4. Surface Water Monitoring – Sandspruit and Dorpspruit

Two points (GCSS2 and Weir 7B), located along the Sandspruit to the west of the old mine area, and one point (Mpongosa), located along a river to the east of the old mine area, are sampled on a quarterly basis by GCS. The purpose is to identify whether any seepage or runoff could be contaminating any surface water resources.

The samples are analysed for pH, EC, TDS, ammonia, nitrate, nitrite, chloride, sulphate, sodium, potassium, calcium, magnesium, aluminium, iron, fluoride and manganese.

29.1.1.5. Proposed monitoring improvements

Based on the new mine plan, the monitoring protocols incorporated by the mine and from a geohydrological perspective, it is proposed that the current groundwater and surface water monitoring network be expanded to more effectively monitor the site. The proposed sample positions are listed in Table 67 and shown in Figure 95.

Table 67: Summary of proposed monitoring network

Site	Type	Status	Latitude (WGS84)	Longitude (WGS84)
UMBH3	Groundwater	Existing, Private	-27.704659	30.365049
UMBH7	Groundwater	Existing, Private	-27.732496	30.341654
UMBH9	Groundwater	Existing, Monitoring	-27.726473	30.289841
UMBH10	Groundwater	Existing, Exploration	-27.73928	30.279723
UMBH11	Groundwater	Existing, Abandoned	-27.746048	30.288106
Umgala BH1	Groundwater	Existing, Monitoring	-27.729708	30.341008
Umgala BH2	Groundwater	Existing, Monitoring	-27.732939	30.353392

Site	Type	Status	Latitude (WGS84)	Longitude (WGS84)
Umgala Handpump	Groundwater	Existing, Monitoring	-27.7093	30.357358
GCSU1	Groundwater	Existing, Monitoring	-27.68209	30.32451
GCSU2	Groundwater	Existing, Monitoring	-27.68364	30.32904
GCSU11	Groundwater	Existing, Monitoring	-27.71511	30.29997
F1	Spring	Existing	-27.721823	30.324473
F2	Spring	Existing	-27.69694	30.304035
F3	Spring	Existing	-27.701203	30.310347
F4	Spring	Existing	-27.703282	30.336056
GCSS 2	Surface water	Existing, Monitoring	-27.70078	30.28895
RWD	Surface water	Existing, Monitoring	-27.68283	30.32451
Weir 7B	Surface water	Existing, Monitoring	-27.70068	30.28896
Mpongosa	Surface water	Existing, Monitoring	-27.67052	30.32693
UM U/S	Surface water	Proposed, Monitoring	-27.709898	30.366187
UM D/S 1	Surface water	Proposed, Monitoring	-27.739072	30.319789
UM D/S 2	Surface water	Proposed, Monitoring	-27.759310	30.326774
PCD1	Surface water	Proposed, Monitoring	-27.714245	30.348446
PCD2	Surface water	Proposed, Monitoring	-27.716208	30.346501

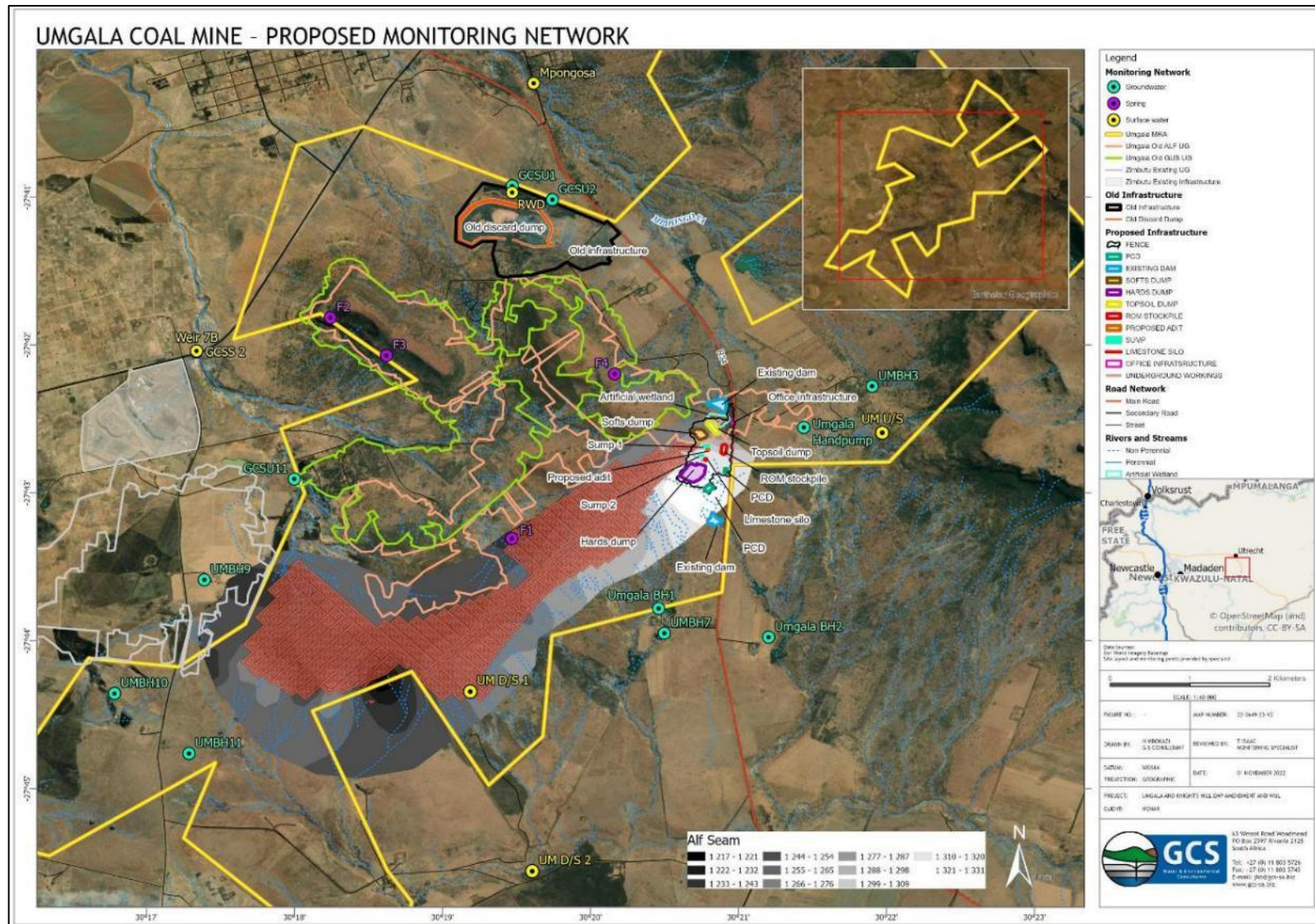


Figure 95: Proposed water monitoring points

29.1.2. Air quality monitoring programme

- Daily visual inspection of site operations and corrective action should dust, or smoke emissions be observed.
- Quarterly inspection and reporting of dust and smoke emissions and in response to complaints. Photographic records can be useful.
- Fit for purpose sampling of dustfall, PM₁₀, PM_{2.5}, and NO₂.
 - PM₁₀ and PM_{2.5} are typically sampled using gravimetric or light-scatter methods. Wind direction and speed should preferably be measured at the same location and period.
 - Dustfall sampling as per the requirements of the NDCR
 - At the following intervals:
 - All: one 1-month campaign before the commencement the construction, to establish a site-specific baseline.
 - NO₂, PM₁₀, and PM_{2.5}: one 3-month campaign upon the commencement of each phase of the project. Thereafter as, and when needed in support of resolving complaints.
 - Dustfall sampling should commence prior to the construction phase and continue throughout the life of the project.

Refer to Table 68 for more detail.

Table 68: Proposed ambient air quality sampling locations (preliminary)

#	Description	Pollutant
3	North-west of the Umgala coal processing plant and discard dump	Dustfall, PM ₁₀ , PM _{2.5} , NO ₂
4	Along haul route between the Umgala adit and coal processing plant	Dustfall
5	North of the Umgala adit	Dustfall
6	South of the Umgala adit	Dustfall
7	East of the Umgala adit preferably at the receptor east of the R34	Dustfall, PM ₁₀ , PM _{2.5} , NO ₂

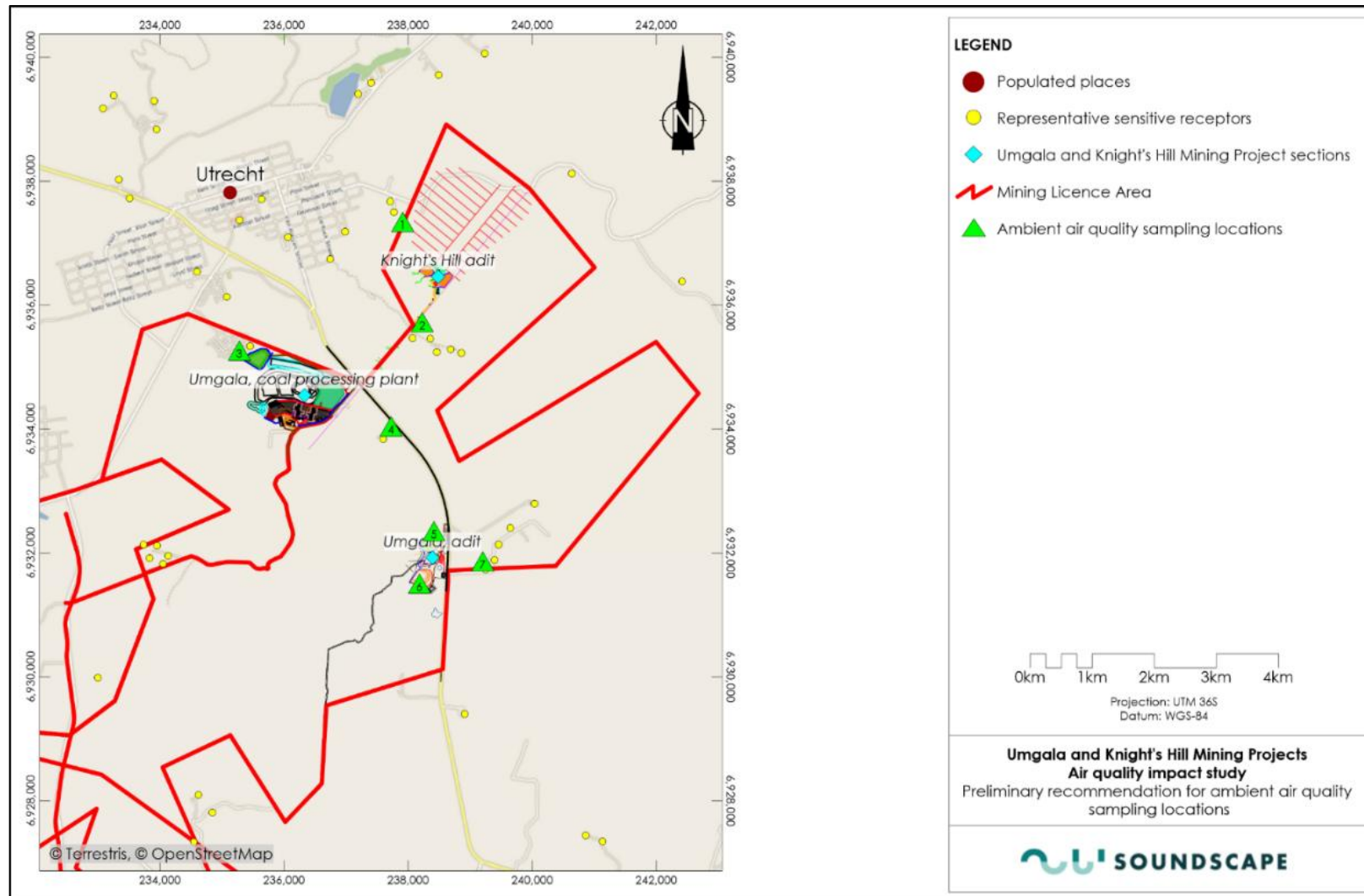


Figure 96: Proposed ambient air quality sampling locations (preliminary)(Soundscape, 2024) Note that monitoring locations #1 and #2 are associated with Knights Hill and therefore excluded from the programme)

29.1.3. Biodiversity Monitoring Programme

As part of the proposed (annual) Monitoring Programme, the following aspects will be executed:

- Selection of a suitable number of sampling points that is representative of the development and associated activities within a natural, receiving environment, with specific reference to sensitive habitat types and species of conservation concern;
- Annual monitoring of vegetation aspects during the development and operational phases, including aspects of diversity, compositional and structural attributes as well as accumulation of impacts within nearby habitat;
- Prevalence and continued persistence of plants of conservation concern;
- Prevalence and continued persistence of plants with ethno-botanical properties;
- Prevalence and management of alien and invasive plant species; and
- Land change/ habitat loss and transformation.

Through implementation and execution of a botanical monitoring programme, the anticipated and actual impacts of the proposed activities within the floristic environment can be established and monitored. Collated information data and results will contribute towards a responsive management approach to minimize the impact footprints and associated spheres of influence.

- Frequency: annual
- Responsibilities client, operator, Environmental Manager, appointed specialist(s)

The following phases are relevant:

1. Pre- construction environment – the baseline ecological report will suffice in highlighting existing conditions and terrestrial botanical attributes;
2. Construction phase – implementation of the botanical monitoring protocol at a frequency of at least annually, taking cognisance of seasonal variations; and
3. Post-construction environment – execution of the botanical monitoring protocol annually until such time that closure has been granted by the authorities.

While the details of a monitoring plan is subject to negotiations prior to appointment, the following aspects (inter alia) should form part of the monitoring protocol, as a minimum:

- Fixed point monitoring should be applied as the preferred method of monitoring. The selection of monitoring points should consider the spatial layout of mining activities and infrastructure in relation to sensitive environments, also taking note of control points to provide a comparative assessment;
- All data gathered should be measurable (qualitative and quantitative) – attention should be provided to species diversity and abundance;
- Monitoring report should be repeatable and temporally and spatially comparable, with specific reference to seasonal variation;
- Data, when compared to previous sets, should show spatial and temporal trends; and
- General habitat unit overviews should also be undertaken to augment quantitative data. The recommended terrestrial biodiversity monitoring protocol will comprise the following aspects, or a variation thereof:

1. Alien and Invasive plant species monitoring; and
2. Vegetation/ ecological monitoring.

These aspects should ideally be executed during a seasonally appropriate period of the year. Ultimately, the objectives are to demonstrate the stability of the surrounding environment and sensitive receptors, monitoring results should therefore ideally be repeated during the same time of year. The responsibility of the implementation and auditing of monitoring performance would remain with the client, notably the Environmental Manager.

Requirements for the appointed specialists should conform to the guidelines of the South African Council for Natural Scientific Professions Act (2019), and specifically adhere to regulations pertaining to the minimum requirements as per the National Environmental Management Act, 1998 (Act No. 107 of 1998).

29.1.4. Alien and invasive plant management and monitoring

Conduct a brief assessment of the legal framework pertaining to the management, responsibilities and requirements of the landowner pertaining to the occurrence of alien and invasive plants on the property and immediate surrounds;

- Undertake a site assessment/ ground-truth to identify and record alien invasive vegetation, identify threats to the ecology of the area, etc.;
- Compile GIS spatial maps to support the Control Compilation of an AIS Plan as per the requirements of the AIS Regulations, 2015 and Invasive Species List, 2016;
- Spatially map the parcels of land within the immediate surrounds of the mining footprint, with reference to land use activities;
- Compile a working inventory of Invasive Species for each management unit compartment;
- Describe the prioritization of the land parcels in the management unit compartments in accordance with the categories as per the Alien and Invasive Listing, 2016;
- Provide targets and timelines for the Control Plan;
- Provide responsibilities and reporting requirements of the Control Plan;
- Provide control and/or eradication methods for identified invasive species in the Control Plan;
- Indicate how the Control Plan will be monitored and evaluated as part of the vegetation monitoring plan;
- Provide a suitable report for implementation as part of the EMP for the development; and
- Execute the AIP monitoring protocol on an annual basis.

Monitoring of the presence, abundance, and diversity of alien and invasive plants on the site, while forming an integral part of the terrestrial monitoring programme, is partly the responsibility of the following persons:

- Environmental Manager (Project);
- Subcontractor responsible for alien and invasive plant control; and
- Vegetation/ Ecology Monitoring Programme subcontractor.

29.1.5. Faunal Monitoring

The following general monitoring guidelines should be included in the faunal monitoring program (inter alia):

- Fixed point and transect sampling (annually at the sample geographical points/transects) of invertebrate SCC (as identified in this document);
- Ad hoc, random sampling of all mammal taxa during the same time of year (austral summer, after the first spring rains, preferably from late November onwards);
- Specific sampling aimed at determining the presence/absence and ecology of conservation important species;
- Identify any alien and invasive animals that might establish on site or close by;
- Include any observational and ad hoc data as gathered by personnel on site during the period between monitoring bouts. Develop a sighting and register log for observations pertaining to the presence/ abundance and occurrence of animals on site; and
- Relevant photographic evidence of occurrences of animals wherever possible.

29.1.6. Avian Monitoring

The proposed monitoring protocol is therefore adapted according to guidelines in a similar fashion as presented by Jenkins et al. (2017):

- Annual monitoring surveys are recommended, consisting of a minimum of 4-5 full days and should coincide with the peak wet season when most of the drainage lines and wetland features are inundated. This will enable the observer to obtain quantified data on bird richness abundance, which will contribute towards our understanding of impacts related to birds.

Monitoring will comprise the following items:

- Mapping of spatial localities (breeding, foraging and roosting habitat) of priority bird species (SCC, endemics, specialists).
- Estimating relative densities of passerine bird species by means of point counts.
- Detecting major flight routes of waterbird and priority species.
- Detecting relative population trends and movements of bird species at and near the development site.
- Recommendations regarding the development and the set-up of a post-construction monitoring protocol (where relevant).

29.1.7. Blasting

A monitoring programme for recording blasting operations is recommended. The following elements should be part of such a monitoring program:

- Ground vibration and air blast results
- Blast Information summary
- Meteorological information at the time of the blast

- Video Recording of the blast
- Fly rock observations.

Ground vibration and air blast monitoring require identified locations for monitoring. Monitoring of ground vibration and air blast is done to ensure that the generated levels of ground vibration and air blast comply with recommendations. Monitoring of ground vibration and air blast must be done for every blast conducted.

Three monitoring positions were identified as possible locations that will need to be considered. Two positions are for the duration of the Adit blasting, and the third position is for the underground mining when the operation moves closer to the power lines/pylons. Monitoring positions are indicated in Figure 97 and Figure 98 and Table 69 lists the positions with coordinates. These points will need to be redefined after the first blasts are done and the monitoring programme is defined.



Figure 97: Suggested monitoring positions – Adit area

Table 69: List of possible monitoring positions

Tag	Description	Y	X
Adit area			
27	R34 Road	64172.07	3066740.11
37	Buildings/Structures	63588.22	3066855.06
Underground area			
42	Power Line/Pylon	69372.19	3069037.38

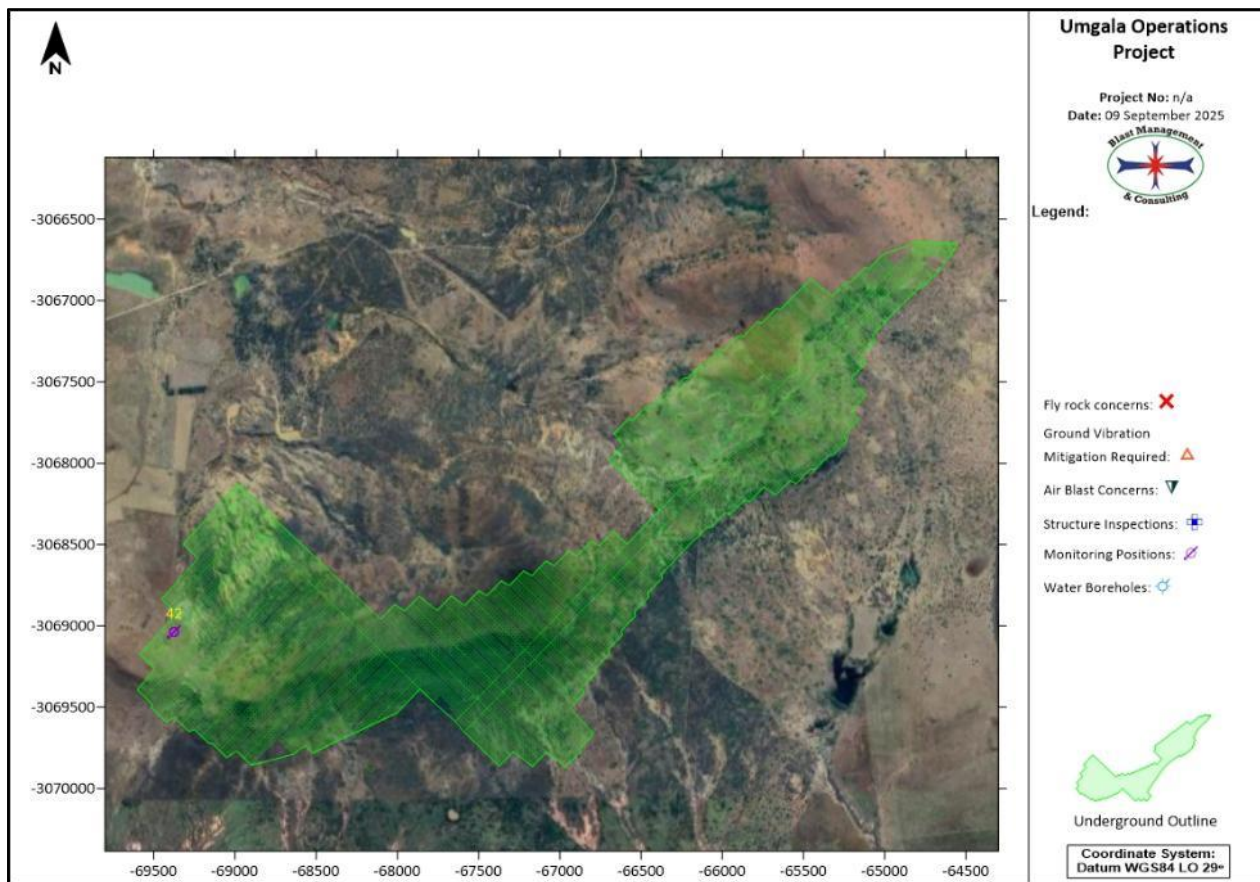


Figure 98: Suggested monitoring positions – Underground area

29.2. ROLE AND RESPONSIBILITIES FOR THE EXECUTION OF MONITORING PROGRAMMES

The roles and responsibilities for every aspect remain the responsibility of the Mining Right holder to hire a suitably qualified contractor or ECO to execute the EMPr monitoring requirements as specified.

29.3. INDICATE THE FREQUENCY OF THE SUBMISSION OF THE PERFORMANCE ASSESSMENT/ ENVIRONMENTAL AUDIT REPORT

A Performance Assessment Review of the EMPr should be conducted annually and the environmental audit report will be submitted annually.

30. PENALTIES AND FINES FOR NON-COMPLIANCE OR MISCONDUCT

This EMPr forms part of the contract agreement between the Applicant and the Principal contractor. As such, non-compliance with conditions of the EMPr will amount to a breach of contract. Penalties will be issued directly to the contractor by the applicant in the event of non-compliance to the EMPr specifications. The issuing of a penalty will be preceded by a verbal warning by the applicant, as well as strict instruction in at least one monthly Environmental Control Officer (ECO) report to rectify the situation. The ECO and the Applicant will communicate with regards to realistic time-frames for

possible rectification of the contravention, and possible consequences of continued non-compliance to the EMPr.

Penalties incurred do not preclude prosecution under any other law. Cost of rehabilitation and/or repair of environmental resources that were harmed by the actions of the contractor, if such actions were in contravention of the specifications of the EMPr will be borne by the contractor themselves. Penalties may be issued over and above such costs. The repair or rehabilitation of any environmental damage caused by non-compliance with the EMP cannot be claimed in the Contract Bill, nor can any extension of time be claimed for such works. Penalty amounts shall be deducted from Certificate payments made to the Contractor.

The following categories of non-compliance are an indication of the severity of the contravention, and the fine or penalty amounts may be adjusted depending on the seriousness of the infringement:

- Category One: Acts of non-compliance that are unsightly, a nuisance or disruptive to adjacent landowners, existing communities, tourists or persons passing through the area
- Category Two: Acts of non-compliance that cause minor environmental impact or localised disturbance
- Category Three: Acts of non-compliance that affect significant environmental impact extending beyond point source, and
- Category Four: Acts of non-compliance that result in major environmental impact affecting large areas, site character, protected species or conservation areas

31. ENVIRONMENTAL AWARENESS PLAN

31.1. MANNER IN WHICH THE APPLICANT INTENDS TO INFORM HIS OR HER EMPLOYEES OF ANY ENVIRONMENTAL RISK WHICH MAY RESULT FROM THEIR WORK

The Applicant will inform their employees of any risk daily should any such a risk be identified. This will include Health and Safety as well as Environmental Risks. The Applicant must ensure that the environmental awareness plan includes the following:

- Induction of all staff and workers
- Monthly 'toolbox' talks (awareness talks), and
- Risk assessments for specific tasks with supervisors and staff involved in the task daily, or as often as the task is taking place.

The following principles and training must be applied to the Environmental Awareness Plan (safety, health and environmental (SHE) training and the Environmental Management System (EMS) training):

- All personnel, including contractors will as a minimum undergo general, SHE induction and awareness training

- The Safety, Health, Environmental and Quality (SHEQ) Manager will identify the SHE is training requirements for all personnel and contractors. The training requirements will be recorded in a training needs matrix indicating particular training that must be undertaken by identified personnel and contractors. The training matrix will be administered by the Training Department; and Development of the Training Programme, which will include:
 - Job specific training – training for personnel performing tasks which could cause potentially significant environmental impacts
 - Assessment of extent to which personnel are equipped to manage environmental impacts
 - Basic environmental training
 - EMS training
 - Comprehensive training – on emergency response, spill management, etc
 - Training verification and record keeping, and
 - Periodic re-assessment of training needs, with specific reference to new developments, newly identified issues and impacts and associated mitigation measures.

General Awareness Training

- The Human Resources Manager, together with the Health and Safety Manager and Environmental Superintendent, will be responsible for facilitating the development of, the required general SHE induction and awareness training. The general awareness training must include the Environmental Policy, a description of the environmental impacts and aspects and the importance of conformance to requirements, general responsibilities of personnel and contractors with regard to the environmental requirements and a review of the emergency procedures and corrective actions, and
- A Training Practitioner will conduct the general awareness training. The training presenter will keep a record of the details of all persons attending general awareness training. Such attendance registers shall indicate the names of attendants and their organisations, the date and the type of training received

Specific Environmental Training

- Specific environmental training will be in line with the requirements identified in the training matrix, and
- Personnel whose work tasks can impact on the environment will be made aware of the requirements of appropriate procedures/work instructions. The Health and Safety Manager and Environmental Superintendent will communicate training requirements to responsible supervisors to ensure that personnel and contractors are trained accordingly

Training Evaluation and Re-training

- Effectiveness of the environmental training will be reflected by the degree of conformance to EMPr requirements, the result of internal audits and the general environmental performance achieved

- Incidents and non-conformances will be assessed through the Internal Incident Investigation and Reporting System, to determine the root cause, including the possible lack of awareness/training
- Should it be evident that re-training is required, the Health and Safety Manager and Environmental Superintendent will inform the managers of the need and take the appropriate actions
- General awareness training of all personnel shall be repeated every year, and
- The re-induction shall take into consideration changes made in the EMPr, changes in legislation, current levels of environmental performance and areas of improvement.

Emergency Procedures

- Emergency procedures, as relevant to this project, shall be implemented
- The Health and Safety Manager shall define emergency reporting procedures for the project
- All personnel shall be made aware of emergency reporting procedures and their responsibilities
- Any spills will be cleaned up immediately in accordance with relevant legislation, and
- Telephone numbers of emergency services, including the local firefighting service, shall be conspicuously displayed.

31.2. MANNER IN WHICH RISKS WILL BE DEALT WITH IN ORDER TO AVOID POLLUTION OR THE DEGRADATION OF THE ENVIRONMENT

Refer to Section 12.7 in Part A for the recommended mitigation measures to limit environmental impacts. The EMPr must comply with all Standard Operational Procedures (SOPs). The system or platform for I&APs to submit any grievances to the mine and communication with internal and external stakeholders must continue to be implemented by the mine.

32. DEFINING AN ENVIRONMENTAL EMERGENCY RESPONSE PLAN

Environmental emergencies occur and require an immediate response. The Environmental Emergency Response Plan should be disseminated to all employees and contractors and in the event of an emergency, it should be consulted. This plan should be used together with the Emergency Preparedness Plan placed on the site where it will be easily viewed. The Emergency Response Plan should contain a list of procedures, evacuation routes and a list of emergency contact numbers. If the environmental emergency has the potential to affect surrounding communities, they should be alerted via alarm signals or contacted in person. The surrounding community will be informed, prior to construction taking place, of the potential dangers and emergencies that exist, and the actions to be taken in such emergencies. Communication is vital in an emergency and thus communication devices, such as mobile phones, pagers or telephones, must be placed on site. A checklist of emergency response units must be consulted and the relevant units notified.

The checklist includes:

- Fire department

- Police
- Emergency health services such as ambulances, paramedic teams, poisons centres
- Hospitals, both local and further afield, for specialist care
- Public health authorities
- Environmental agencies, especially those responsible for air, water and waste issues
- Other industrial facilities in the vicinity with emergency response facilities, and
- Public information authorities and media organisations

33. MOST LIKELY POTENTIAL ENVIRONMENTAL EMERGENCIES

The following are the most likely potential environmental emergencies:

- Accidents
- Fires
- A major hydrocarbon spill or leak
- A major spill or leak of wastewater
- Flooding (along the Olifants River)
- Building collapse, and
- Explosions.

34. ACCIDENTS

In the case of a medical accident or problem, refer to the Emergency Preparedness Plan.

35. COMPLAINTS / GRIEVANCE REGISTER

A complaints/grievance register must be kept at the office of the community liaison or environmental manager. The complaints form must also be electronically available and the environmental manager's contact details provided should a complaint submission be required or if minor problems are raised that can be easily rectified. The complaints register must provide the means for any environmentally related complaint to be registered. A registered complaint needs to be investigated and resolved through formal complaints system where the complainant can enquire on the status of the complaint. Complaints should be investigated with one month of being lodged or communication on reasons for extension be submitted to the complainant. Should complaints not be resolved to the satisfaction of the complainant it need to be escalated to the Department of Mineral Resources and Energy for mediation.

36. CONCLUSION

The EMPr may need to be modified during the various project phases. All proposed changes to EMPr must be reviewed by the ECO before being issued as formal changes, as documented in the audit report. Copies of any modifications will be issued to recipients of this report and forwarded to DMRE. The Project has the potential to pose various risks to the environment as well as to the residents in the surrounding area. However, based on the findings of the specialist studies documented in this report, most impacts can be mitigated to between medium and very low levels as shown through the

impact assessment. Some impacts remain high and additional studies as well as potential offset requirements apply. The Project also has the potential to provide positive socio-economic benefits to the local and regional communities.

It is therefore the opinion of the EAP that the Project be authorised provided that additional surveys to determine the population and significance of the *Peringueyella zulu* be undertaken prior to the commencement of any construction activities. In addition, it should only be authorised provided that the necessary mitigation measures, monitoring programmes, and offset programmes be implemented as per these additional studies.

37. UNDERTAKINGS BY EAP (TO BE INCLUDED IN FINAL EIA AND EMPr TO BE SUBMITTED TO DMRE)

The EAP, ..., herewith confirms

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

Signed at.....on this..... day.....

Signature of EAP:

Designation: Elemental Sustainability Proprietary Limited – EAP

38. UNDERTAKINGS BY APPLICANT (TO BE INCLUDED IN FINAL EIA AND EMPr TO BE SUBMITTED TO DMRE)

COMMITMENT/UNDERTAKING BY THE APPLICANT

I, ..., the undersigned and duly authorised thereto by Welgedacht Exploration Co Proprietary Limited undertake to adhere to the requirements and to the conditions as set out in the Final EIA Report and EMPr submitted to the DMRE and approved on.....

.....

Signed at.....on this..... day

Signature of applicant:

Designation:

39. REFERENCES

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40. APPENDICES

Appendix I: Qualifications and Resume of EAP

Appendix II: Layout Plans and Sensitivity Map

Appendix III: Screening Tool Report

Appendix IV: Specialist Reports

Appendix V: Detailed Impact Assessment