

EIA FOR SURFACE INFRASTRUCTURE CHANGES AT THE UMK MINE

Prepared for: United Manganese of Kalahari (Pty) Ltd

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REPORT SIGN OFF AND APPROVALS



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(Project Manager)



Ed Perry
(Reviewer)

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EXECUTIVE SUMMARY

PROJECT BACKGROUND

United Manganese of Kalahari (Pty) Ltd (UMK) is applying for an Environmental Authorisation for new listed activities on the farm Botha 313, the RE of the farm Smartt 314, and portions 1, 2 and 3 (a portion of the RE) of the farm Rissik 330. The UMK Mine is an opencast manganese mine located approximately 13 km to the south of the town of Hotazel in the Joe Morolong Local Municipality and the John Taolo Gaetsewe District Municipality in the Northern Cape Province.

The manganese mine lies directly adjacent and to the west of the R380 provincial road. Refer to Figure 1-1 and Figure 1-2 for the regional and local settings respectively.

UMK currently holds the following authorisations:

- A mining right (30/5/1/2/3/2/1(113) MR) issued by the Department of Mineral Resources and Energy (DMRE);
- An Environmental Management Programme report (EMPr) approved by DMRE (previously DMR);
- Environmental Authorisations (NC/KGA/HOT7/15/2006 & NC 30/5/1/2/2/113 MR) issued by the Department of Environment and Nature Conservation (DENC) and the Department of Mineral Resources and Energy (DMRE) respectively; and
- A Water Use License (IWUL) (10/D41K/ABEGJ/2814) issued by the Department of Water and Sanitation (DWS) now known as the Department of Human Settlements, Water and Sanitation (DHSWS).

The mine consists of open pit mining sections, run of mine stockpiles, crushing, and screening operations, product stockpiles, waste rock dumps, and associated support and administrative infrastructure.

SCOPE OF THE PROJECT

UMK is making an application proposing to change the approved surface layout for the mine to optimize their mining operations. The proposed changes to the approved layout are discussed in detail below:

New Infrastructure to be established on site in support of the current mining operations.

- New parking area (0.52 ha);
- Solar equipped boreholes and associated storage tanks;
- Tyre fitting bay, workshop/ tyre centre and oil storage (7 ha);
- Waste rock and sand stockpiles;
 - Central West Waste Rock Dump (WRD) (84 ha);
 - Central West Sand Stockpile (40.9 ha);
 - J Block West WRD (133 Ha);
 - J Block West Sand Stockpile (46.5 ha);
 - J Block East WRD (63.5 ha);
 - J Block East Sand Stockpile (16.5 ha);

-
- Powerline West WRD (196 ha);
 - Powerline West Sand Stockpile (35.9 ha); en
 - A Block West WRD (145 ha)
 - Product stockpile area within the approved sinter plant area (21.4 ha);
 - TUP stockpile (12.4 ha);
 - Truck staging area (20.4 ha);
 - Hard Park areas (Phase 1 and 3) (14.3 ha);
 - Barlow's Store (1 ha);
 - Explosive depo and associated service road (13.1 ha); and
 - Engineering salvage yard (temporal and permanent) (2.43 ha).

Upgrade of existing approved infrastructure:

- Prentec Sewage Plant; and
- Existing weigh bridge and associated access road.

Expansion of existing approved infrastructure

- Open pit (458,7 ha);
- Product stockpile (53.6 ha);
- Modular crushing plant (34.6 ha);
- Fuel storage farm (0.45 ha);
- EME workshop for major repair and maintenance (3.6 ha);
- Road truck staging area (1.6 ha); and
- Offices (19.1 ha).

Relocation of the following surface infrastructure at the mine:

- Approved dirty water dams/pollution control ponds; and
- 132 KV powerline from current location to its old location.

SLR Consulting (Africa) (Pty) Ltd (SLR), an independent firm of Environmental Assessment Practitioners (EAPs), has been appointed by UMK to manage the S&EIA process required to inform the integrated Environmental Authorisation and Environmental Management Programme (EMPr) amendment applications. In this regard, the EIA Report and the EMPr for the proposed project is being submitted to the DMRE for decision making.

SUMMARY OF AUTHORISATION REQUIREMENTS

Prior to the commencement of the proposed project, the following is required:

- An amended EMPr from the Department of Mineral Resources and Energy (DMRE) (previously the DMR) in terms of Section 102 of the Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA), as amended;
- An integrated environmental authorisation and waste management license from the Northern Cape DMRE in terms of Section 24 of National Environmental Management Act, No. 107 of 1998 (NEMA), as amended and Section 45 of National Environmental Management: Waste Act (No. 59 of 2008, as amended) (NEM:WA) must be applied for and obtained. The EIA Regulations being followed are Government Notice Regulation (GNR) 982 of 4 December 2014, as amended; and
- An amendment of the water use license from the Department of Human Settlement, Water and Sanitation (DHSWS) for specific water uses under Section 21 of the NWA.

STAKEHOLDER ENGAGEMENT

The stakeholder engagement process commenced prior to the submission of the EIA report and has continued throughout the environmental assessment process. As part of this process, the following activities were undertaken:

- Focussed meetings were held with the Department of Mineral Resources and Energy (DMRE) in Kimberly;
- Distribution of public participation material (advertisements, site notices, Background Information Document (BID)) to inform commenting authorities and Interested and Affected Parties (I&APs) of the proposed project;
- The electronic review of the BID by Interested and I&APs;
- The electronic review of the Draft Scoping Report by I&APs; and
- Commenting authorities and I&APs were given the opportunity to review the EIA Report and EMPr. All comments submitted to date by the commenting authorities and I&APs have been included and addressed in this EIA Report and EMPr.

OPPORTUNITY TO COMMENT

This EIA Report was distributed for a 30-day period from **25 March to 25 April 2022** in order to provide I&APs with an opportunity to comment on any aspect of the proposed project and the findings of the EIA process. Copies of the full report were made available on the SLR website (at <https://slrconsulting.com/public-documents>) and the SLR data free website (at <https://slrpublicdocs.datafree.co/public-documents>). Hard copies of the report were placed at the following locations:

- Kathu Library;
- Hotazel Post Office; and
- UMK Mine

Electronic copies (compact disk) of the report were available on request from SLR at the contact details provided below. All comments received during the review process have been addressed in this EIA report. Issues and concerns raised to-date, including responses, are provided in Section 7.3.

SLR Consulting (South Africa) (Pty) Ltd

Attention: Reinett Mogotshi

PO Box 1596, Cramerview 2060 (if using post please call SLR to notify us of your submission)

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IMPACTS AND MANAGEMENT ACTIONS

This section provides a summary of the assessment of the potential impacts of the proposed project and provides measures to prevent or mitigate the impacts. The potential impacts associated with the mine activities and infrastructure can be categorised into those that have low, medium, high and/or insignificant significance in the unmitigated scenario. Impacts with a low, medium and/or high category require a measure of management actions which, if successfully implemented will reduce the significance of the impacts. Cumulative impacts (in the context of existing operations), where applicable are also summarised in the table below. The table below provides a summary of the potential impacts in no particular order of importance.

Table A: Summary of potential impacts

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|------------|---|--|---------------|-----------|
| | | | Unmitigated | Mitigated |
| Geology | Loss and sterilisation of mineral resources | <p>Impact</p> <ul style="list-style-type: none"> Mineral resources can be sterilized and/or lost in the event that UMK disposes feasible mineral resources onto the proposed waste disposal facilities such as waste rock dumps. Sterilisation of mineral resources can also occur through placement of project infrastructure above the mineable resources. However, the approved EMPr assessed that placement of infrastructure would not sterilise any mineral resources as it may be feasible for these resources to be mined in the future. <p>Mitigation measures</p> <ul style="list-style-type: none"> Both the approved mine plan and infrastructure layout prevent sterilisation of third-party minerals. This issue will be considered by the mine geologist, environmental manager and mine manager in the pre-feasibility/planning stage of any proposed changes to the mine plan and infrastructure layout. | Medium | Low |
| Topography | Altering topography | <p>Impact</p> <ul style="list-style-type: none"> Hazardous excavations and infrastructure include all structures into or off which third parties and animals can fall and be harmed. The existing mining related activities have altered the natural topography and in turn creates the potential risk of injury and/or death to both third parties and animals The proposed project is located within an existing mining footprint and does not present any new infrastructure or activities that differ from those already approved. Further to this, the footprint of the proposed project is within a restricted area with enforced health and safety policies. <p>Mitigation measures</p> <ul style="list-style-type: none"> Not applicable. | Insignificant | |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|--------------------------|------------------|--|--------------|-----------|
| | | | Unmitigated | Mitigated |
| Soil and land capability | Soil Erosion | <p>Impact</p> <ul style="list-style-type: none"> Soil is a valuable resource that supports a variety of ecological functions. Soil is the key to re-establishing post closure land capability. Soil resources can be lost through physical disturbance such as soil erosion. This in turn can result in a loss of soils as an ecological driver because it can create a toxic environment for vegetation and ecosystems that rely on the soil. The proposed project will require clearance of an area of approximately 951 ha and is located on several farm portions, the majority of which is located within disturbed areas (existing mining operations) but also on undisturbed areas. Soil erosion is a measurable deterioration that will occur through vegetation removal from the soil surface. <p>Mitigation measures</p> <ul style="list-style-type: none"> Limit vegetation clearance to only the areas where the surface infrastructure will be constructed. Avoid parking of vehicles and equipment outside of designated parking areas. Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring). Design and implement a Stormwater Management System where run-off from surfaced areas is expected. Reduce the slope gradients along haul roads and other disturbed areas to gradients at or below the angle of repose. Re-establish vegetation along the proposed surface infrastructure to reduce the impact of run-off. Regularly check all stockpiles and bare surfaces around infrastructure areas, for signs of soil erosion. In the case of any onset of soil erosion being detected, | High | Medium |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|--------|---------------------------------------|--|---|---|
| | | | Unmitigated | Mitigated |
| | | the surfaces must be rehabilitated through the use of geotextiles accompanied by seeding of indigenous vegetation. | | |
| | Disturbance of original soil profiles | <p>Impact</p> <ul style="list-style-type: none"> The disturbance of original soil profiles and horizon sequences of these profiles during earthworks (stripping of topsoil) is a measurable deterioration. Once rehabilitation of the pit area has commenced, the rehabilitated soil profiles will be a new soil with properties that may resemble some of the original soil properties but that may also be altered because of the mixing of soil horizons. The “new” soil can still be used for re-vegetation and successful rehabilitation practices will be able to restore the grazing capacity of the land over a period of time <p>Mitigation measures</p> <ul style="list-style-type: none"> Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint. Unnecessary land clearance must be avoided. Level any remaining topsoil that were removed from the railway area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | High | Medium |
| | Chemical pollution of soils | <p>Impact</p> <ul style="list-style-type: none"> Soil is a valuable resource that supports a variety of ecological functions. Soil is the key to re-establishing post closure land capability. Soil resources can be lost through contamination. This in turn can result in a loss of soils as an ecological driver because it can create a toxic environment for vegetation and ecosystems that rely on the soil. The proposed project presents the potential for soil chemical pollution because of potential oil and fuel spillages from vehicles in both operation and construction phases. | Medium (Construction) High (Operation) | Very Low (Construction) Very Low (Operation) |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|--------|----------------------------|---|--------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <ul style="list-style-type: none"> The pollution of soils is considered to be a low deterioration of the soil resource Mitigation measures <ul style="list-style-type: none"> Use drip trays with plastic sheeting filled with absorbent material to contain fuel and lubricants losses from the oil sumps and steering racks of vehicles and equipment. Use biodegradable hydraulic fluids and lined sumps for collection of hydraulic fluids. Contaminated soils should be recovered, stored and treated off-site; Avoiding waste disposal at the site wherever possible through segregating, trucking out, and recycling waste. Cleaning up areas of spillage of potentially contaminating liquids and solids | | |
| | Soil compaction | Impact <ul style="list-style-type: none"> Soil is a valuable resource that supports a variety of ecological functions. Soil is the key to re-establishing post closure land capability. Soil resources can be lost through physical disturbance such as soil compaction. This in turn can result in a loss of soils as an ecological driver because it can create a toxic environment for vegetation and ecosystems that rely on the soil. Soil compaction during construction will occur as a result of the heavy vehicles and equipment moving over the soil surface in areas where infrastructure will be constructed. sewer Mitigation measures <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout. | High | Medium |
| | Loss of grazing capability | Impact <ul style="list-style-type: none"> Soil is a valuable resource that supports a variety of ecological functions. Soil is the key to re-establishing post closure land capability. Soil resources can be | High | Medium |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|--------------|--|--|--------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <p>lost through contamination and through physical disturbance. This in turn can result in a loss of soils as an ecological driver because it can create a toxic environment for vegetation and ecosystems that rely on the soil.</p> <ul style="list-style-type: none"> The proposed project will result in loss of grazing capability at the UMK mine. <p>Mitigation measures</p> <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the proposed surface infrastructure layout. | | |
| Biodiversity | Physical destruction and general disturbance of biodiversity | <p>Impact</p> <ul style="list-style-type: none"> Areas of ecological sensitivity include functioning biodiversity areas with species diversity and associated intrinsic value. Linkages between these areas have value because of the role they play in allowing the migration or movement of flora and fauna between the areas, which is a key function for a broader ecosystem. The transformation of land for any purpose increases the destruction of the site-specific biodiversity, the fragmentation of habitats, reduces its intrinsic functionality and reduces the linkage role that undeveloped land fulfils between different areas of biodiversity importance. Parts of the project area has been transformed to support the establishment of the UMK mine. The proposed infrastructural changes can destroy biodiversity through additional loss of natural vegetation, additional loss of protected flora and faunal species of conservation concern and Intentional/accidental killing of fauna. <p>Mitigation measures</p> <ul style="list-style-type: none"> Implement a comprehensive rehabilitation plan to revegetate the area. The re-vegetation plan must include the establishment of protected trees within the rehabilitated areas. The progress of tree growth and recruitment must be monitored and actively managed to ensure that the rehabilitated | High | Medium |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|---------------|--|---|--------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <p>areas reflect the surrounding vegetation in terms of structure and composition.</p> <ul style="list-style-type: none"> Where protected trees occur within the planned infrastructure areas, losses can be lessened by re-designing the infrastructure which will minimize the impact to individual trees. | | |
| Surface water | Alteration of natural drainage patterns | <p>Impact</p> <ul style="list-style-type: none"> There are a number of catchment reduction sources in all project phases that have the potential to impact surface water flows, particularly in the unmitigated scenario. In the construction, decommissioning and closure phases these potential decreases in catchment runoff are temporary in nature. The operational phase will present more long-term potential catchment runoff loss depending on whether the nature of the modified catchment is clean or dirty. Without considering any mitigation measures or water management measures, the collection of stormwater, physical alteration of drainage lines will reduce catchment runoff flows and flood flows to the watercourses <p>Mitigation measures</p> <ul style="list-style-type: none"> Implementation of the stormwater management measures. | High | Medium |
| | Contamination of surface water resources | <p>Impact</p> <ul style="list-style-type: none"> There are a number of pollution sources in all project phases that have the potential to pollute surface water, particularly in the unmitigated scenario. In the construction, decommissioning and closure phases these potential pollution sources are temporary in nature. Although these sources may be temporary, the potential pollution may be long term. The operational phase will present more long-term potential sources. <p>Mitigation measures</p> | High | Very Low |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|-------------|--|--|--------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <ul style="list-style-type: none"> Implementation of the stormwater management measures. | | |
| Groundwater | Contamination of groundwater resources | <p>Impact</p> <ul style="list-style-type: none"> Groundwater is a valuable resource and is defined as water which is located beneath the ground surface in soil/rock pore spaces and in the fractures of lithological formations. Activities such as the handling and storage of general and hazardous wastes have the potential to result in the loss of groundwater resources, both to the environment and third-party users, through pollution. <p>Mitigation measures</p> <ul style="list-style-type: none"> Update the hydrocensus to check for any new third-party water uses prior to initiating activities associated with the proposed surface infrastructural changes. Continue groundwater monitoring per existing monitoring protocols for the existing monitoring network, taking note of recommendation made in the Groundwater Monitoring Report. All potentially affected boreholes will be included in the water monitoring programme for boreholes located both on and off the mine site. If any mine related loss of water supply through a reduction in quality is experienced by third party borehole users, UMK will provide compensation which could include an alternative water supply of equivalent water quality. Should any off-site contamination be detected, the mine will immediately notify DWS. The mine, in consultation with DWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and the long term) and then implement these measures. | Medium | Low |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|-------------|-------------------------------------|---|---------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <ul style="list-style-type: none"> At decommissioning, the potential pollution sources (residual waste rock left on surface) will either be removed or rehabilitated to manage rainfall and seepage. The environmental manager is responsible for implementing these actions from prior to construction through to closure. | | |
| Air quality | Decrease in ambient air quality | <p>Impact</p> <ul style="list-style-type: none"> Mining projects present a number of air pollution sources that can have a negative impact on ambient air quality and surrounding land uses in all phases. Pollution sources include land clearing activities, materials handling, wind erosion from stockpiles, wind erosion of disturbed areas, vehicle movement along unpaved roads, dust generation from crushing and screening plants and gas emissions mainly from vehicles and generators. From construction and operation perspective, the proposed project could present additional dust generation sources. <p>Mitigation measures</p> <ul style="list-style-type: none"> Continued implementation of the air quality monitoring programme and dust control measures. | Medium | Low |
| Noise | Increase in disturbing noise levels | <p>Impact</p> <ul style="list-style-type: none"> Mining activities and infrastructure have the potential to cause an increase in ambient noise levels that may cause a disturbance to nearby sensitive receptors during all phases prior to closure. The current ambient noise levels at the UMK mine are related to mining activities at UMK Mine (and neighbouring mines), handling and processing of mineral resources, traffic on mine roads. | Insignificant | |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|---------|-------------------------------------|---|---------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <ul style="list-style-type: none"> The establishment of additional surface infrastructure and waste rock dumps will not result in significant changes to the noise emission sources within the UMK mine. Mitigation measures <ul style="list-style-type: none"> Not applicable. | | |
| Visual | Negative visual views | Impact <ul style="list-style-type: none"> Mining infrastructure has the potential to alter the landscape character of an area through the establishment of infrastructure. It is however important to note, that the establishment of infrastructure as a result of the proposed surface infrastructural changes will be absorbed by the existing mining infrastructure on site. The establishment of additional surface infrastructure dumps will not result in significant changes to the visual impacts of the UMK mine during construction and operation. Mitigation measures <ul style="list-style-type: none"> Not applicable. | Insignificant | |
| Traffic | Road disturbance and traffic safety | Impact <ul style="list-style-type: none"> An increase in traffic as well as the use of these roads by heavy vehicles may result in a decrease in road service and safety levels. Traffic impacts are expected from construction through to the end of the decommissioning phase when trucks, buses, and private vehicles make use of the public transport network surrounding the project area. The key potential traffic related impacts are on road capacity and public safety when additional traffic is added to the existing transport network. During the construction, operation, and decommissioning phases of the project there could be a slight increase in traffic from delivery of construction | Insignificant | |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|---|---|--|--------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <p>materials, private vehicles making use of the public roads and contractors to the site.</p> <ul style="list-style-type: none"> The volumes, frequency and duration of construction and decommissioning traffic is likely to be immaterial as compared to the current baseline and any impact would be negligible. <p>Mitigation measures</p> <ul style="list-style-type: none"> Not applicable. | | |
| Heritage/ cultural and palaeontologic al resources | Loss of heritage/ cultural and Palaeontolog ical resources | <p>Impact</p> <ul style="list-style-type: none"> In general, the proposed project is located in an arid area characterized by wind-blown aeolian sands and historically very limited human occupation. The immediate project area has been subjected to extensive mining activities in the last two decades. The palaeontological studies conducted indicated that the proposed project is located on the north-eastern margin of the Griqualand West Sequence of Neoarchaeal intrusive rocks, in the Prieska Subbasin of the Transvaal Basin that is filled with the sequence of the Transvaal Supergroup. In the event of a chance find where undisturbed areas will be cleared as part of the establishment of additional facilities and activities there is a potential to damage heritage/ cultural and palaeontological resources (if present), either directly or indirectly, and result in the loss of the resource for future generations. <p>Mitigation measures</p> <ul style="list-style-type: none"> Implement the chance find procedures. Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist or by an Environmental Officer trained by an archaeologist. | Low | Low |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|----------------|------------------|---|----------------|-------------------|
| | | | Unmitigated | Mitigated |
| | | <ul style="list-style-type: none"> Railway infrastructure outside of disturbed areas must be subjected to a heritage walkdown prior to development | | |
| Socio-economic | Inward migration | <p>Impact</p> <ul style="list-style-type: none"> Mines tend to bring with them an expectation of employment in all proposed project phases prior to closure. This expectation can lead to the influx of job seekers to an area which in turn increases pressure on existing communities, housing, basic service delivery and raises concerns around safety and security. The proposed project is located within an existing mining operation and will result in limited short-term employment opportunities during construction, therefore negative project-related socio-economic impacts including inward migration, which could place additional pressure on housing and municipal services, are not expected to occur <p>Mitigation measures:</p> <ul style="list-style-type: none"> Not applicable. | Insignificant | |
| | Economic impact | <p>Impact</p> <ul style="list-style-type: none"> Mining activities contribute towards a positive economic impact. The proposed project will allow for the creation of limited short-term employment during the construction phase primarily. During the operation, decommission and closure phases, the proposed project allows for the continuation of the current employment opportunities which will continue to support UMK's contribution to the positive net economic impact on the national, local, and regional economy The Proposed project will allow continuation of the current employment opportunities during operation, decommission and closure. <p>Mitigation measures</p> | Low (Positive) | Medium (Positive) |

| Aspect | Potential impact | Impact discussion and reference to mitigation measures | Significance | |
|----------|--------------------|--|---------------|-----------|
| | | | Unmitigated | Mitigated |
| | | <ul style="list-style-type: none"> Continued implementation of the existing UMK management actions pertaining to the procurement of local people (where possible) and procurement of local goods. | | |
| Land use | Change in land use | <p>Impact</p> <ul style="list-style-type: none"> Mining and project related activities and infrastructure may have an impact on land uses within and surrounding the project area in all phases. Land use within UMK Mine includes existing mining activities and associated infrastructure. The surrounding land uses includes mining operations, agriculture, isolated farmsteads, infrastructure, and solar plant. Given that the land use within the proposed project is limited to mining as a result of the existing mining operations, the proposed project will not result in changes to the current land use. <p>Mitigation measures</p> <ul style="list-style-type: none"> Not applicable. | Insignificant | |

ENVIRONMENTAL STATEMENT

The assessment of the proposed project presents the potential for negative impacts to occur (particularly in the unmitigated scenario in particular) on the biophysical, cultural and socio-economic environments both on the proposed project site and in the surrounding area. With management actions these potential impacts can be prevented or reduced to acceptable levels. It follows that provided the EMP is effectively implemented there is no biophysical, social or economic reason why the proposed project should not proceed.

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ACRONYMS AND ABBREVIATIONS

| Acronym / Abbreviation | Definition |
|------------------------|---|
| AEL | Atmospheric Emission Licence |
| BIF | Banded Iron Formation |
| CAD | Computer-aided design |
| CARA | The Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983) |
| DAFF | Department of Agriculture, Forestry and Fisheries |
| DEFF | Department of Environment, Forestry and Fisheries |
| DENC | Department of Environment and Nature Conservation |
| DMRE | Department of Mineral Resources and Energy |
| DWS | Department of Water and Sanitation |
| EAP | Environmental Assessment Practitioner |
| EIA | Environmental Impact Assessment |
| EMF | Environmental Management Frameworks |
| EMPA | Environmental Management Planning and Approvals |
| EMPr | Environmental Management Programme |
| GNR | Government Notice Regulation |
| GW | Groundwater |
| GWC | Griqualand West Centre |
| IBAs | Important Bird and Biodiversity Areas |
| IDP | Integrated Development Plans |
| IFC | International Finance Corporation |
| IWUL | Integrated Water Use License |
| LC | Leachable concentration |
| MFT | Managed File Transfer |
| MPRDA | Mineral and Petroleum Resources Development Act, 2002 (No. 8 of 2002) |
| NCNCA | Northern Cape Nature Conservation Act, 2009 (No. 9 of 2009) |
| NCPGDS | Northern Cape Provincial Growth and Development Strategy |
| NCSPSF | Northern Cape Provincial Spatial Development Framework |
| NDP | National Development Plan 2030 |
| NEM:AQA | National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) |

| Acronym / Abbreviation | Definition |
|------------------------|--|
| NEM:BA | National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004) |
| NEM:WA | National Environmental Management: Waste Act (No 59 of 2008) |
| NEMA | National Environmental Management Act, 1998 (No. 107 of 1998), |
| NFEPA | National Freshwater Ecosystem Priority Areas |
| NGP | New Growth Path |
| NHRA | National Heritage Resources Act, 1999 (No. 25 of 1999) |
| NPAES | National Protected Areas Expansion Strategy |
| NSSD | National Strategy for Sustainable Development and Action Plan 2011 - 2014 |
| NWA | National Water Act, 1998 (No. 36 of 1998) |
| PMP | Probable maximum precipitation |
| PPP | Public Participation Process |
| PSDF | Northern Cape Provincial Spatial Development Framework |
| RE | Remaining extent |
| RoM | Run-of-Mine |
| S&EIA | Scoping and Environmental Impact Assessment |
| SACAD | South Africa Conservation Areas Database |
| SAHRA | South African Heritage Resources Association |
| SANBI | South African National Botanical Institute (SANBI) |
| SANS | South Africa National Standard |
| SAPAD | South Africa Protected Area Database |
| SDF | Spatial Development Frameworks |
| SLP | Social and Labour Plan |
| SLR | SLR Consulting (South Africa) (Pty) Ltd |
| SPLUMA | Spatial Planning and Land Use Management Act, 2013 (No. 6 of 2013) |
| TC | Total concentration |
| UMK | United Manganese of Kalahari (Pty) Ltd |
| WHO | World Health Organisation |
| WRD | Waste Rock Dump |

PART A - SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EIA for Surface Infrastructure Changes at the UMK Mine

1. INTRODUCTION

This chapter describes the purpose of this report, provides a brief description of the project background, summarises the legislative authorisation requirements, provides the study terms of reference, describes the structure of the report, and outlines the opportunity for comment.

1.1 PROJECT BACKGROUND

United Manganese of Kalahari (Pty) Ltd (UMK) is applying for an Environmental Authorisation for new listed activities on the farm Botha 313, the RE of the farm Smartt 314, and portions 1, 2 and 3 (a portion of the RE) of the farm Rissik 330. The UMK Mine is an opencast manganese mine located approximately 13 km to the south of the town of Hotazel in the Joe Morolong Local Municipality and the John Taolo Gaetsewe District Municipality in the Northern Cape Province.

The manganese mine lies directly adjacent and to the west of the R380 provincial road. Refer to Figure 1-1 and Figure 1-2 for the regional and local settings respectively.

UMK currently holds the following authorisations:

- A mining right (30/5/1/2/3/2/1(113) MR) issued by the Department of Mineral Resources and Energy (DMRE);
- An Environmental Management Programme report (EMPr) approved by DMRE (previously DMR);
- Environmental Authorisations (NC/KGA/HOT7/15/2006 & NC 30/5/1/2/2/113 MR) issued by the Department of Environment and Nature Conservation (DENC) and the Department of Mineral Resources and Energy (DMRE) respectively; and
- A Water Use License (IWUL) (10/D41K/ABEGJ/2814) issued by the Department of Water and Sanitation (DWS).

The mine consists of open pit mining sections, run of mine stockpiles, crushing, and screening operations, product stockpiles, waste rock dumps, and associated support and administrative infrastructure.

1.2 SCOPE OF THE PROJECT

UMK is making an application proposing to change the approved surface layout for the mine to optimize their mining operations. The proposed changes to the approved layout are discussed in detail below:

1.2.1 New Infrastructure to be established on site in support of the current mining operations.

- New parking area (0.52 ha);
- Solar equipped boreholes and associated storage tanks;
- Tyre fitting bay, workshop/ tyre centre and oil storage (7 ha);
- Waste rock and sand stockpiles;
- Central West Waste Rock Dump (WRD) (84 ha),
- Central West Sand Stockpile (40.9 ha),

-
- J Block West WRD (133 Ha),
 - J Block West Sand Stockpile (46.5 ha),
 - J Block East WRD (63.5 ha),
 - J Block East Sand Stockpile (16.5 ha),
 - Powerline West WRD (196 ha),
 - Powerline West Sand Stockpile (35.9 ha),
 - A Block West WRD (145 ha),
 - Product stockpile area within the approved sinter plant area (21.4 ha);
 - TUP stockpile (12.4 ha);
 - Truck staging area (20.4 ha);
 - Hard Park areas (Phase 1 and 3) (14.3 ha);
 - Barlow's Store (1 ha);
 - Explosive depo and associated service road (13.1 ha); and
 - Engineering salvage yard (temporal and permanent) (2.43 ha).

1.2.2 Upgrade of existing approved infrastructure:

- Prentec Sewage Plant; and
- Existing weigh bridge and associated access road.

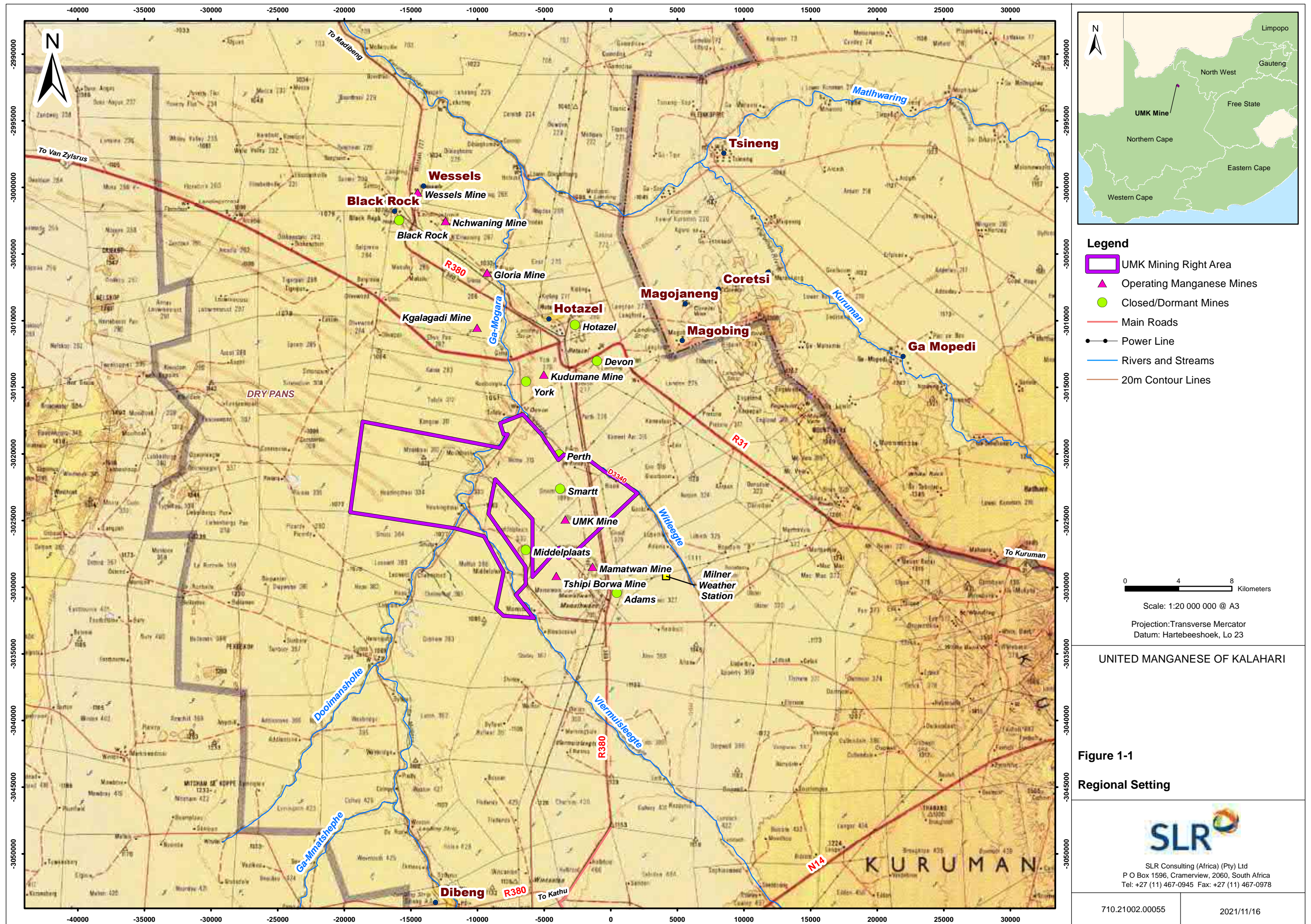
1.2.3 Expansion of existing approved infrastructure

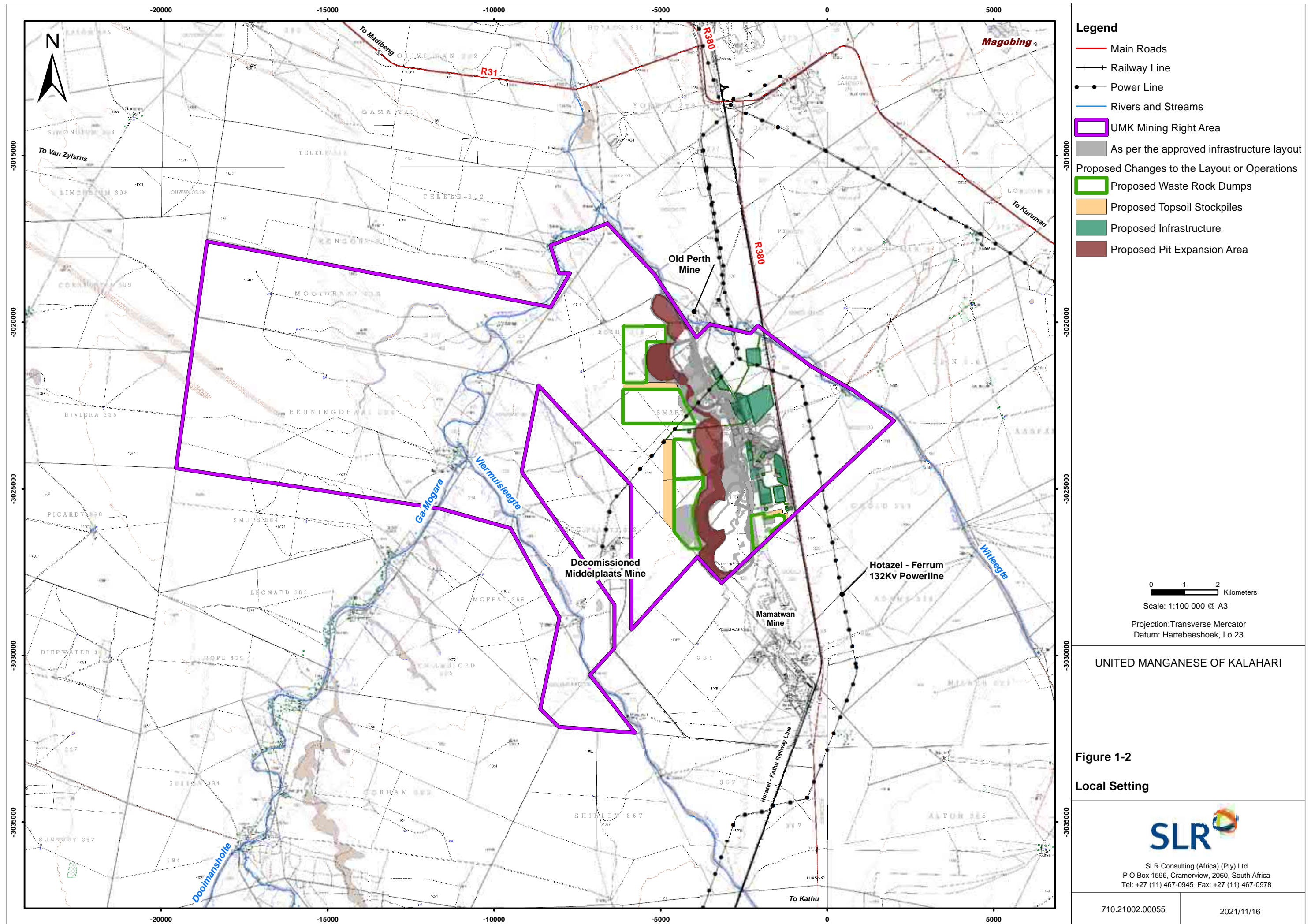
- Open pit (458,7 ha);
- Product stockpile (53.6 ha);
- Modular crushing plant (34.6 ha);
- Fuel storage farm (0.45 ha);
- EME workshop for major repair and maintenance (3.6 ha);
- Road truck staging area (1.6 ha);
- Offices (19.1 ha); and
- Pollution Control Dam (MN3) (0,95 ha).

1.2.4 Relocation of the following surface infrastructure at the mine:

- Approved dirty water dams/pollution control ponds; and
- 132 KV powerline from current location to its old location.

SLR Consulting (South Africa) (Pty) Ltd (SLR), an independent firm of environmental assessment practitioners that has been appointed by UMK to manage the S&EIA process required to inform the integrated Environmental Authorisation and EMPr amendment applications.





1.3 SUMMARY OF AUTHORISATION REQUIREMENTS

The proposed project will require an amendment of UMK's EMPr. In terms of the Mineral and Petroleum Resources Development Act, 2002 (No. 8 of 2002, as amended) (MPRDA), an EMPr may not be amended or varied without the written consent of the Minister of Minerals and Energy.

The proposed project includes activities listed under the NEMA and waste management activities listed under the National Environmental Management: Waste Act (No. 59 of 2008, as amended) (NEM:WA). Prior to the commencement of the proposed project, an integrated environmental authorisation and waste management license from the Northern Cape DMRE in terms of Section 24 of NEMA and Section 45 of NEM:WA must be applied for and obtained. Listed activities are prohibited from commencing until written authorisation is obtained from the competent authority, which in this case is the Northern Cape DMRE. The activities that are triggered require a Scoping and EIA process in terms of the EIA Regulations 2014 (as amended). The EIA Regulations being followed are Government Notice Regulation (GNR) 982 of 4 December 2014, as amended. The EIA process is used to inform the environmental authorisation application. Further detail is included in Section 5.1.

In addition, the proposed project may require an amendment of the water use license from the Department of Water and Sanitation for specific water uses under Section 21 of the NWA. This process will be initiated by UMK.

This S&EIA process does not cover occupational health and safety legislation requirements.

1.4 INTRODUCTION TO THE ENVIRONMENTAL ASSESSMENT PROCESS

An EIA is conducted in two phases. The first is the Scoping phase and the second is the EIA phase. The final Scoping Report was submitted to the DMRE on 14 June 2021 and was accepted on 12 October 2021. The objectives of the Scoping Phase were in line with Chapter 4, Part 3 of the EIA Regulations. The terms of reference as identified in the Scoping Report for further assessment during the EIA phase enables the meaningful assessment of all relevant biophysical and socioeconomic issues.

This EIA and Environmental Management Programme (EMPr) provides a description of the proposed project and the affected environment; summarises the EIA process followed to date; identifies and assesses the key project impacts and presents management and mitigation measures that are recommended to enhance positive and limit negative impacts.

1.5 TERMS OF REFERENCE

SLR, as the independent EAP, is responsible for undertaking the required environmental regulatory process and conducting the public participation process. The terms of reference for this integrated regulatory environmental process were to:

- Make an application for the Environmental Authorisation (EA) of the proposed project in terms of NEMA;
- Ensure the EIA process is undertaken in accordance with the requirements of NEMA, EIA Regulations 2014 (as amended in 2016, 2017, 2018 and 2020);
- Ensure the EIA process is undertaken in an open, participatory manner to ensure that all potential impacts are identified;

- Undertake a formal public participation process, which includes the distribution of information to I&APs and provides the opportunity for I&APs to raise any concerns/issues, as well as an opportunity to comment on all documentation; and
- Integrate all the information, including the findings of the specialist studies (where relevant) and other relevant information, into an EMPr report to allow an informed decision to be taken by the competent authority.

Further to this and in accordance with Appendix 3 of the EIA Regulations 2014 and the DMRE reporting requirements, the key objectives of the Environmental Assessment process are to:

- Determine the policies and legislation relevant to the activity and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity in the context of the development footprint on the preferred site as contemplated in the accepted Scoping Report;
- Identify feasible alternatives related to the project proposal;
- Ensure that all potential key environmental issues and impacts that will result from the proposed project are identified;
- Assess potential impacts of the proposed project alternatives during the different phases of project development;
- Identify the best location of the activity within the development footprint of the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Present appropriate mitigation or optimisation measures to avoid, manage or mitigate potential impacts or enhance potential benefits, respectively; and
- Identify any residual risks that need to be managed and monitored.

1.6 MPRDA SECTION 102

The activities applied for within this EIA process are for the expansion of existing surface infrastructure and the construction of additional surface infrastructure. This requires an amendment to the EMPR for the UMK Manganese Mine in terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002): A reconnaissance permission, prospecting right, mining right, mining permit, retention permit, technical corporation permit, reconnaissance permit, exploration right, production right, prospecting work programme, exploration work programme, production work programme, mining work programme environmental management programme or an environmental authorisation issued in terms of the National Environmental Management Act, 1998, as the case may be, may not be amended or varied without the written consent of the Minister.

This EIA Report aims to address requirements of both the MPRDA Section 102 as well as the NEMA Regulations requirements to facilitate informed decision making by the competent authority, the Department of Mineral Resources and Energy (DMRE). Due to the localised nature of the activity, a stand-alone EMPr has been compiled for ease of management of this activity. The stand-alone EMPr will be appended to the broader mining EMPR.

1.7 STRUCTURE OF THE REPORT

This document has been prepared in accordance with the DMRE EMPr Report template format, in accordance with the requirements of the MPRDA. This report also complies with the requirements of the NEMA and Appendix 3 and Appendix 4 of EIA Regulations 2014 (as amended). Table 1-1 provides a summary of the requirements, with cross references to the report sections where these requirements have been addressed.

Table 1-1 Structure of the EIA Report

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|---|--|-------------------------|
| Part A of DMRE report template | Appendix 3 of the NEMA regulations | Section/Appendix |
| The EAP who prepared the report | Details of the EAP who prepared the report | Section 2.1 |
| Expertise of the EAP | Details of the expertise of the EAP, including curriculum vitae | Section 2.2 |
| Description of the property | The location of the activity, including - the 21-digit Surveyor General code of each cadastral land parcel. Where available the physical address and farm name. Where the required information is not available, the coordinates of the boundary of the property or properties | Section 3.1 |
| Locality plan | A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken or on land where the property has not been defined, the coordinates within which the activity is to be undertaken | Section 3.2 |
| Description of the scope of the proposed overall activity | A description of the scope of the proposed activity, including all listed and specified activities triggered | Section 4 |
| Description of the activities to be undertaken | A description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for and a description of the associated | Section 4.2 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|---|---|-------------------------|
| | structure and infrastructure related to the development | |
| Policy and legislative context | A description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context | Section 5 |
| Need and desirability of the proposed activity | A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location | Section 6 |
| Motivation for the preferred development footprint within the approved site including | A motivation of the preferred development footprint within the approved site including | Section 7 |
| A full description of the process followed to reach the proposed development footprint within the approved site | A full description of the process followed to reach the proposed development footprint within the approved site | Section 8 |
| Details of the development footprint alternatives considered | Details of all the alternatives considered | Section 8.3 |
| Details of the public participation process followed | Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs | Section 8.4 |
| Summary of issues raised by I&APs | 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 | Section 8.5 |
| Environmental attributes associated with the development footprint alternatives | The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects | Section 8.6 |
| Impacts and risks identified including the nature, significance, consequence, | The impacts and risks identified, including the nature, significance, consequence, | Section 8.7 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|---|---|-------------------------|
| extent, duration and probability of the impacts including the degree of the impacts | extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed and mitigated | |
| Methodology used in determining the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks | The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks | Section 8.7.1 |
| The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternative will have on the environment and the community that may be affected | Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects | Section 8.7.2 |
| The possible management actions that could be applied and the level of risk | The possible management actions that could be applied and level of residual risk | Section 8.7.3 |
| Motivation where no alternative sites were considered | If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such | Section 8.7.4 |
| Statement motivating the alternative development location within the overall site | A concluding statement indicating the preferred alternatives, including preferred location within the approved site | Section 8.7.5 |
| 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) through the life of the activity | A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structure and infrastructure will impose on the preferred location through the life of the activity including a description of all environmental issues and risks that were identified during the environmental impact assessment process and an assessment of the significance of each issue and risk and an indication of the extent to which the issue | Section 0 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|--|--|-------------------------|
| | and risk could be avoided or addressed by the adoption of management actions | |
| Assessment of each identified potentially significant impact and risk | An assessment of each identified potentially significant impact and risk including cumulative impacts, the nature, significant and consequence of the impact and risk, the extent and duration of the impact and risk, the probability of the impact and risk occurring, the degree to which the impact can be reversed, the degree to which the impact and risk may cause irreplaceable loss of a resources and the degree to which the impact and risk can be mitigated. | Section 10 |
| Summary of specialist reports | Where applicable the summary of the findings and recommendations of any specialist report complying with Appendix 6 of these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report | Section 11 |
| Environmental impact statement | An environmental impact statement which contains a summary of the key findings of the environmental impact assessment, a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives | Section 12 |
| Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr | Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr | Section 13 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|---|--|-------------------------|
| | as well as for inclusion as conditions of authorisation | |
| Final proposed alternatives | The final proposed alternatives which respond to the impact management actions, avoidance, and management actions identified through the assessment | Section 14 |
| Aspects for inclusion as conditions of authorisation | Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation | Section 0 |
| Description of any assumptions, uncertainties and gaps in knowledge | A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and management actions proposed | Section 16 |
| Reasoned opinion as to whether the proposed activity should or should not be authorised | Reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation | Section 17 |
| Period for which environmental authorisation is required | Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised | Section 18 |
| Undertaking | An undertaking under oath or affirmation by the EAP in relation to the correctness of the information provided in the reports, the inclusion of comments and inputs from stakeholders and I&APs, the inclusion of inputs and recommendations from the specialist reports where relevant and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or | Section 19 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|---|--|-------------------------|
| | inputs made by interested or affected parties | |
| Financial provision | Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts | Section 20 |
| Deviation from the approved scoping report and plan of study | An indication of any deviation from the approved scoping report, including the plan of study, including any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and a motivation for the deviation | Section 21 |
| Other information required by the competent authority | Any specific information required by the competent authority. | Section 22 |
| Other matter required in terms of section 24(4)(a) and (b) of the Act | Any other matter required in terms of section 24(4)(a) and (b) of the Act | Section 23 |
| Part B of DMRE report template | Appendix 4 of the NEMA regulations | Section/Appendix |
| Details of EAP | Details of the EAP who prepared the EMPr and the expertise of that EAP to prepare the EMPr, including a curriculum vitae | Section 24.1 |
| Description of the aspects of the activity | A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description | Section 25 |
| Composite map | A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers | Section 26 |
| Description of impact management objectives including management statements | A description of the impact management objectives, including management statements, identifying the impacts and | Section 27 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|--|--|-------------------------|
| The determination of closure objectives | risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including planning and design, pre-construction activities, construction activities, rehabilitation of the environment after construction and where applicable post closure; and where relevant, operation activities | Section 27.1 |
| The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity | - | Section 27.2 |
| Potential acid mine drainage | - | Not applicable |
| Steps taken to investigate, assess and evaluate the impact of acid mine drainage | - | Not applicable |
| Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage | - | Not applicable |
| Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage | - | Not applicable |
| Volumes and rate of water use required for the mining | - | Section 27.3 |
| Has a water use licence been applied for? | - | Section 27.3 |
| Impacts to be mitigated in their respective phases | - | Section 27.5 |
| Impact management outcomes | A description and identification of impact management outcomes required for the aspects contemplated in paragraph f of | Section 0 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|--|---|-------------------------|
| | Appendix 4 of GNR 932 of 2014 EIA regulations. | |
| Impact management actions | A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes be achieved, and must, where applicable, include actions to avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; comply with any prescribed environmental management standards or practices; comply with any applicable provisions of the Act regarding closure, where applicable comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable | Section 0 |
| Financial provision | | Section 30 |
| Mechanism for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon | The method of monitoring the implementation of the impact management actions | Section 31 |
| | The frequency of monitoring the implementation of the impact management actions | |
| | An indication of the persons who will be responsible for the implementation of the impact management actions | |
| | The time periods within which the impact management actions must be implemented | |
| | The mechanism for monitoring compliance with the impact management actions | |
| | A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations | |
| Environmental Awareness Plan | An environmental awareness plan describing the manner in which the applicant intends to inform his or her | Section 32 |

| EMPr report requirement as per the DMRE template | EMPr report requirements as per the 2014 NEMA regulations (as amended) | Reference in the report |
|--|--|-------------------------|
| | employees of any environmental risk which may result from their work; and risks must be dealt with in order to avoid pollution or the degradation of the environment | |
| Specific information required by the competent authority | Any specific information that may be required by the competent authority | Section 33 |
| Undertaking | - | Section 34 |

1.8 OPPORTUNITY TO COMMENT

This EIA Report was made available for a 30-day comment period from **25 March to 25 April 2022** in order to provide I&APs with an opportunity to comment on any aspect of the project and the findings of the S&EIA process to date. A copy of the full report was made available on the SLR website (at <https://slrconsulting.com/public-documents>) and the SLR data free website (at <https://slrpublicdocs.datafree.co/public-documents>). Electronic copies (compact disk) of the report were also available from SLR at the contact details provided below.

All comments received during the review process have been included in this EIA Report.

SLR Consulting (South Africa) (Pty) Ltd
Attention: Reinett Mogotshi
PO Box 1596, Cramerview 2060 (if using post please call SLR to notify us of your submission)
Tel: (011) 467 0945
E-mail: rmogotshi@slrconsulting.com

2. DETAILS OF THE EAP

This chapter provides the details, qualifications and experience of the environmental assessment practitioner undertaking the S&EIA.

2.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

SLR has been appointed as the independent EAP to undertake the S&EIA for the proposed project in line with Part 2, Regulation 12 and 13 of the EIA Regulations (2014), as amended. The details of the EAP project team that were involved in the preparation of this EIA Report are provided in Table 2-1 below.

Table 2-1 Details of the EAP

| Details | Project Manager | Project Consultant | Reviewer |
|--------------------------|--|--|--------------|
| Name of the practitioner | Sharon Meyer | Reinett Mogotshi | Edward Perry |
| Tel No.: | 011 467 0945 | 011 467 0945 | 011 467 0945 |
| Fax No.: | 011 467 0978 | 011 467 0978 | 011 467 0978 |
| E-mail address | smeyer@slrconsulting.com | rmogotshi@slrconsulting.com | - |

Neither SLR nor any of the specialists involved in the S&EIA process have any interest in the project other than contractually agreed payment for consulting services rendered as part of the EIA process. An undertaking by SLR is provided in Section 19.

2.2 EXPERTISE OF THE EAP

Sharon Meyer has an MSc in Environmental Science and Biological Control. Sharon has over 20 years of experience as an environmental scientist and project manager. She has managed complex projects within the mining and power generation sectors, with a focus on industrial waste management. Sharon has managed multi-national and multi-disciplinary teams on authorisation processes and social due diligence mining projects in Africa. Sharon has worked on a variety of mining projects including diamond, coal, gold, vanadium, and tailings reclamation projects. Sharon is registered as an Environmental Assessment Practitioner with EAPASA.

3. LOCATION OF ACTIVITY

This chapter provides details of the project location and properties.

3.1 LOCATION OF THE OVERALL ACTIVITY

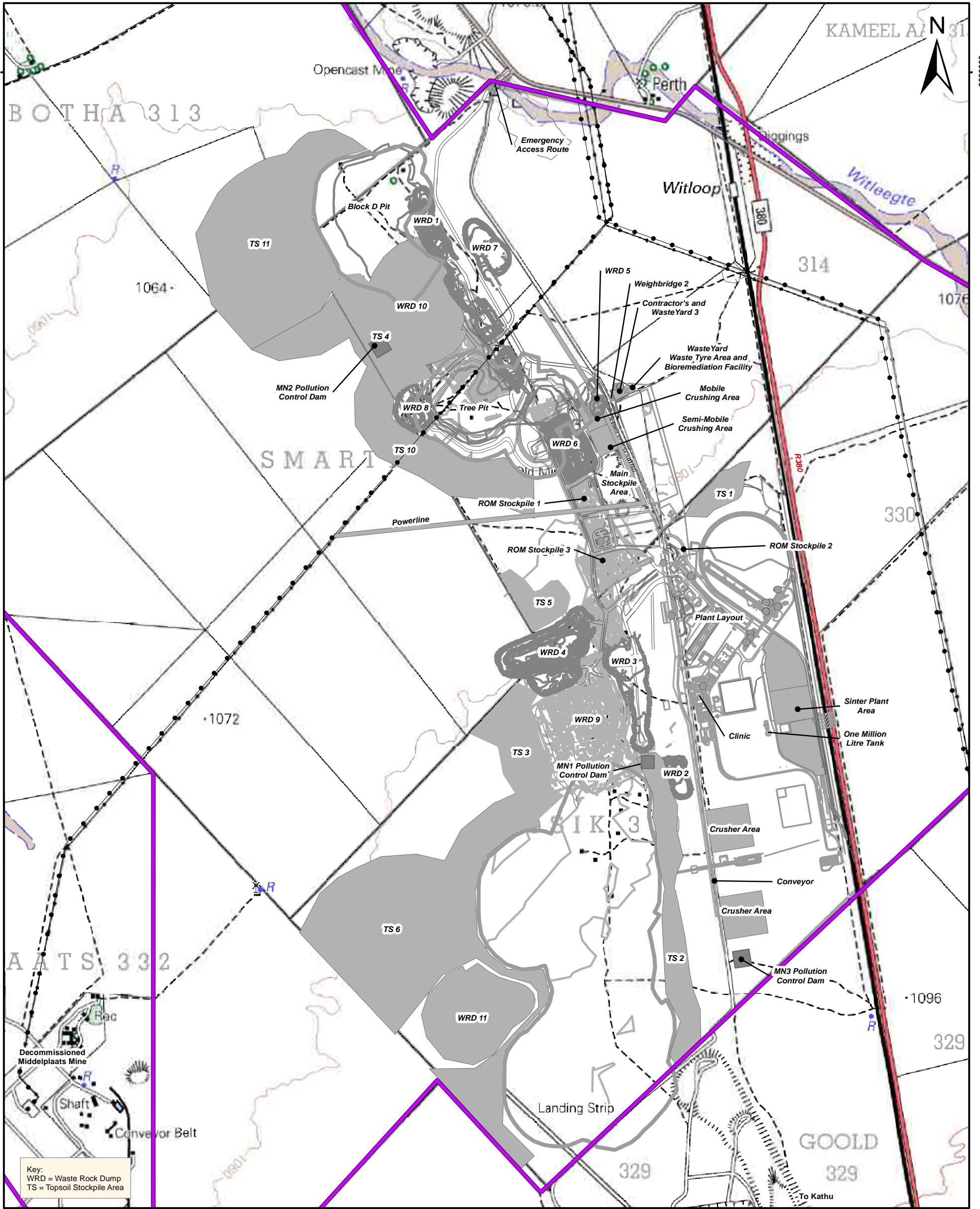
A description of the properties on which the UMK Mine and proposed project are located is provided in Table 3-1.

Table 3-1: Description of the Property

| Description | Detail | | | | | | | | | | | | |
|--|---|---------------|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---------------|----------------------|-----------|
| Farm name | Rissik 330 Portion 3 (3 (a portion of the remaining extent) Rissik 330 Portion 1 Rissik 330 Portion 2 Smartt 314 RE Smartt 314 Portion 1 Botha 313 Portion 1 Botha 313 | | | | | | | | | | | | |
| Application area (ha) | A surface disturbance area of approximately 951 ha | | | | | | | | | | | | |
| Magisterial district | Kuruman Magisterial District | | | | | | | | | | | | |
| Distance and direction from nearest town | The UMK Mine is located approximately 13 kilometres south of Hotazel, 21 km southeast of Black Rock, 42 km north of Kathu and 80 km northwest of Kuruman. | | | | | | | | | | | | |
| 21-digit Surveyor General code for each farm portion | <table> <tr> <th>21 DIGIT CODE</th><th>FARM PORTION</th></tr> <tr> <td>C0410000000033000001</td><td>Rissik 330 portion 1</td></tr> <tr> <td>C0410000000033000002</td><td>Rissik 330 portion 2</td></tr> <tr> <td>C0410000000033000003</td><td>Rissik 330 portion 3</td></tr> <tr> <td>C0410000000031400000</td><td>Smartt 314 RE</td></tr> <tr> <td>C0410000000031300000</td><td>Botha 313</td></tr> </table> | 21 DIGIT CODE | FARM PORTION | C0410000000033000001 | Rissik 330 portion 1 | C0410000000033000002 | Rissik 330 portion 2 | C0410000000033000003 | Rissik 330 portion 3 | C0410000000031400000 | Smartt 314 RE | C0410000000031300000 | Botha 313 |
| 21 DIGIT CODE | FARM PORTION | | | | | | | | | | | | |
| C0410000000033000001 | Rissik 330 portion 1 | | | | | | | | | | | | |
| C0410000000033000002 | Rissik 330 portion 2 | | | | | | | | | | | | |
| C0410000000033000003 | Rissik 330 portion 3 | | | | | | | | | | | | |
| C0410000000031400000 | Smartt 314 RE | | | | | | | | | | | | |
| C0410000000031300000 | Botha 313 | | | | | | | | | | | | |

3.2 LOCALITY MAP

The regional and local settings of the UMK Mine are illustrated in Figure 1-1 and Figure 1-2 respectively. The current layout of the UMK Mine is illustrated in Figure 3-1 The location and layout of the project components are illustrated in Figures in Section 5.



Legend

- UMK Mining Right Area
- As per the approved infrastructure/facilities layout

UNITED MANGANESE OF KALAHARI

Figure 3-1

Current Infrastructure



SLR Consulting (Africa) (Pty) Ltd
P O Box 1596, Cramerville, 2060, South Africa
Tel: +27 (11) 467-0945 Fax: +27 (11) 467-0978

0 500 1 000
Meters

Scale: 1:24 000 @ A3
Projection: Transverse Mercator
Datum: WGS1984, Lo23

710.21002.00055

2021/11/16

4. DESCRIPTION OF THE SCOPE OF THE PROPOSED OVERALL ACTIVITY

This chapter provides details of the scope of the proposed overall activity

4.1 LISTED AND SPECIFIED ACTIVITY AND DESCRIPTION OF ACTIVITY

The proposed project triggers various activities for which authorisation is required in terms of the NEMA, NEM:WA and NWA. The associated listed or specified activities are summarised below.

4.1.1 NEMA and the EIA Regulations

The main project activities are included in Section 4. The associated listed or specified activities are also included in Table 4-1.

The latest Listing Notices 1 (GNR 983), 2 (GNR 984), and 3 (GNR 985) were published on the 4 December 2014 in conjunction with the Environmental Impact Assessment Regulations (Gazette 38282). These Regulations and Listing Notices have since been amended. The latest amendment to the Listing Notices was through GNR 324, 325 and 327 published on the 7 April 2017, which amended Listing Notices 3, 2, and 1 respectively. When referring to the Listing Notices below the number of the original Government Notice is referred to e.g., GNR 983 but this considers subsequent amendments.

This table does not include decommissioning activities approved in previous EMPs.

Table 4-1 Project Activities and Associated Listed Activities

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|---|------------------------------------|----------------------------------|---|
| Establishment of the following Infrastructure on site | | | |
| <p>Mineralised waste management:</p> <ul style="list-style-type: none"> Central West Waste Rock Dump (WRD) (84 ha) Central West Sand Stockpile (40.9 ha) J Block West WRD (133 ha) J Block West Sand Stockpile (46.5 ha) J Block East WRD (80.2 ha) J Block East Sand Stockpile (16.5 ha) Powerline West WRD (196 ha) Powerline West Sand Stockpile (35,9 ha) | 799 ha | X | <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, Activity 34: The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial legislation governing the release of emissions, effluent or pollution, excluding -</p> <p>(i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies;</p> <p>(ii) the expansion of existing facilities or infrastructure for the treatment of effluent, wastewater, polluted water, or sewage where the capacity will be increased by less than 15 000 cubic metres per day; or</p> <p>(iii) the expansion is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will be increased by 50 cubic meters or less per day.</p> |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|--|------------------------------------|----------------------------------|--|
| <ul style="list-style-type: none"> A Block West WRD (145 ha) Product stockpile area (21.4 ha) TUP Stockpile (12.4 ha) | | | <p>RELEVANCE: The expansion of WRDs capacity will require an amendment to the existing IWUL.</p> |
| | | | <p>NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, 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, excluding - (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.</p> <p>RELEVANCE: The establishment of additional WRD will require an amendment to the existing IWUL and a new Waste Management License.</p> |
| | | | <p>NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, Activity 15: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous</p> |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|---|------------------------------------|----------------------------------|--|
| | | | <p>vegetation is required for - (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>RELEVANCE: The establishment of WRDs will clear an area of more than 20 ha of indigenous vegetation.</p> |
| Engineering salvage yard (temporal and permanent) | 2.43 ha | X | <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except 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.</p> <p>RELEVANCE: The establishment of the Engineering salvage yard (temporal and permanent) will clear an area of more than 1 ha but less than 20 ha of indigenous vegetation.</p> |
| Water supply, use and management: Solar equipped boreholes and associated storage tanks with a | Not applicable | Not applicable | - |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|---|------------------------------------|----------------------------------|--|
| combined storage capacity of 755 m ³ | | | |
| Support infrastructure or services: <ul style="list-style-type: none"> • Parking area (0.52 ha) • Tyre fitting bay, workshop/ tyre centre and oil storage (10.3 ha) • Explosive depo and associated service road (13.1 ha) • Hard Park areas (Phase 1 and 3) (14.3 ha) • Barlow's Store (1 ha) | 39.22 ha | X | <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except 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.</p> <p>RELEVANCE: The establishment of tyre fitting bay, workshop/ tyre centre, oil storage and explosive depo will clear an area of more than 1 ha but less than 20 ha of indigenous vegetation.</p> <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, 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.</p> <p>RELEVANCE: Storage of dangerous goods with a combined capacity of 325 cubic metres.</p> |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|---|------------------------------------|----------------------------------|---|
| Transportation: Truck staging area | 20.4 ha | X | NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, 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. RELEVANCE: The establishment of truck staging area will clear an area of more than 20 ha of indigenous vegetation. |
| Upgrade of the following existing approved infrastructure | | | |
| Pretec Sewage Plant, with an increased capacity of 50 M ³ within the approved footprint. | Within the approved footprint | Not applicable | - |
| Existing weighbridge and associated access road | Not applicable | Not applicable | - |
| Expansion of the following existing approved infrastructure on site | | | |
| Open pit | 458.7 ha | X | NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, 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) |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|--|------------------------------------|----------------------------------|--|
| | | | <p>maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>RELEVANCE: The expansion of the open pit will clear an area of more than 20 ha of indigenous vegetation.</p> |
| Mineralised waste management: Product stockpile | 53.6 ha | X | <p>NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, 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.</p> <p>RELEVANCE: The establishment of product stockpile will clear an area of more than 20 ha of indigenous vegetation.</p> |
| Processing Plant: Modular crushing plant | 54.3 ha | X | <p>NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, 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.</p> <p>RELEVANCE: The establishment of Modular crushing plant will clear an area of more than 20 ha of indigenous vegetation.</p> |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|---|------------------------------------|----------------------------------|--|
| | | | <p>NEMA (GNR 984 of 2014) as amended by GNR.325 of 2017 (G.G. 40772 of 07/04/2017): Listing Notice 2, Activity 17: Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including -(a) associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies.</p> <p>RELEVANCE: Modular crushing plant is classified as primary processing of minerals.</p> |
| <p>Support infrastructure/services:</p> <ul style="list-style-type: none"> Fuel storage farm (above ground fuel storage facilities with a combined capacity of 300 m³) (0.45 ha) Offices including training centre, additional management offices, vehicles parking, taxis, and buses parking; and | 25 ha | X | <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, 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.</p> <p>RELEVANCE: The above ground fuel storage facilities will have a combined capacity of 300 m³.</p> <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1,</p> |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|--|--|----------------------------------|--|
| <p>permanent GPS station (19.1 ha)</p> <ul style="list-style-type: none"> • EME workshop for major repair and maintenance (3.6 ha); and • Road truck staging area (1.6 Ha) | | | <p>Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except 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.</p> <p>RELEVANCE: The establishment of offices will clear an area of more than 1 ha but less than 20 ha of indigenous vegetation.</p> |
| <p>Transportation:</p> <p>Road truck staging area</p> | 1.6 ha | X | <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except 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.</p> <p>RELEVANCE: The expansion of the road truck staging area will clear an area of more than 1 ha but less than 20 ha of indigenous vegetation.</p> |
| Relocation of the following existing approved infrastructure | | | |
| Dirty water dams/pollution control ponds: | MN1 (~ 0.2ha and 2 900 m ³); | X | NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, |

| Main project activity | Aerial extent of the activity (ha) | Listed activity (mark with an x) | Listed activity number, applicable listing notice |
|---|------------------------------------|----------------------------------|--|
| | | | <p>Activity 27: The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except 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.</p> <p>RELEVANCE: The relocation of the approved dirty water dam/ pollution control pond will clear an area of more than 1 ha but less than 20 ha of indigenous vegetation.</p> |
| 132 KV powerline from the current position to its original position following complete backfilling of the pit | 7.75 ha | X | <p>NEMA (GNR 983 of 2014) as amended by GNR.327 of 2017 (G.G. 40772 of 07/04/2017) and GNR.706 of 2018 (G.G. 41766 of 13/07/2018: Listing Notice 1, 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; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is - (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.</p> <p>RELEVANCE: The capacity of the powerline is 132 kilovolts outside an urban area.</p> |

4.1.2 NEM: WA

GNR 921 (as amended). Activities above certain thresholds are subject to a process of impact assessment and licensing. NEM:WA also provides for the setting of norms and standards for the storage and disposal of waste. The proposed project triggers waste management activities in Category B as shown in Table 4-2.

Table 4-2: Waste Management Activities In Terms of the NEM:WA

| Description of project activity | Aerial extent of the activity (ha) | Listed activity number, applicable listing notice and activity description |
|---|------------------------------------|--|
| <p>Mineralised waste management:</p> <ul style="list-style-type: none"> Central West Waste Rock Dump (WRD) (84 ha) Central West Sand Stockpile (40.9 ha) J Block West WRD (133 Ha) J Block West Sand Stockpile (46.5 ha) J Block East WRD (80.2 Ha) J Block East Sand Stockpile (16.5 ha) Powerline West WRD (196 ha) Powerline West Sand Stockpile (35,9 ha) A Block West WRD (145 ha) Product stockpile area (21.4 ha) TUP Stockpile (12.4 ha) | 799 Ha | <p>NEM:WA (GNR 921 of 2013) as amended by GNR.332 of 2014 (G.G. 37604 of 02/05/2014), GNR.633 of 2015 (G.G. 39020 of 24/07/2015) and GNR.1094 of 2017 (G.G. 41175 of 11/10/2017): 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).</p> <p>NEM:WA (GNR 921 of 2013) as amended by GNR.332 of 2014 (G.G. 37604 of 02/05/2014), GNR.633 of 2015 (G.G. 39020 of 24/07/2015) and GNR.1094 of 2017 (G.G. 41175 of 11/10/2017): 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 MPRDA.</p> |

4.2 DESCRIPTION OF ACTIVITIES

UMK is proposing to amend the approved mine layout to optimize their mining operations to make provision for proposed activity/infrastructure changes. In this regard, a layout illustrating the approved layout versus the layout changes is provided in Figure 4-1. The key elements listed above are discussed in detail below.

4.2.1 New Infrastructure to be established on site in support of the current mining operations.

4.2.1.1 Mineralised waste management

UMK is proposing to establish additional waste rock dumps, sand stockpile and product stockpiles to accommodate additional waste rock and product tonnages. These include:

- Central West Waste Rock Dump (WRD) (84 ha);
- Central West Sand Stockpile (40.9 ha);
- J Block West WRD (133 ha);
- J Block West Sand Stockpile (46.5 ha);
- J Block East WRD (80.2 ha);
- J Block East Sand Stockpile (16.5 ha);
- Powerline West WRD (196 ha);
- Powerline West Sand Stockpile (35.9 ha);
- A Block West WRD (145 ha);
- TUP Stockpile (12.4 Ha); and
- Product stockpile area (21.4 ha).

Table 4-3 Waste Rock Dumps And Sand Stockpiles Design Criteria

| Item | Central West WRD | Central West Sand | Block J West WRD | Block J West Sand | Block J East WRD | Block J East Sand | Power Line West WRD | Power Line West Sand | A Block West WRD |
|---------------------------------------|------------------|-------------------|------------------|-------------------|------------------|-------------------|---------------------|----------------------|------------------|
| Available airspace (Mm ³) | 67 | 34 | 34 | 38 | 51 | 13 | 157 | 29 | 115 |
| WRD dump height (m) | Up to 90 m | | | | | | | | |
| Footprint (ha) | 84 | 40.9 | 133 | 46.5 | 80.2 | 16.5 | 196 | 35.9 | 145 |
| WRD Volume | 35 | 6 | 18 | 7 | 27 | 2 | 82 | 5 | 60 |

| Item | Central West WRD | Central West Sand | Block J West WRD | Block J West Sand | Block J East WRD | Block J East Sand | Power Line West WRD | Power Line West Sand | A Block West WRD |
|------------------------------------|--|-------------------|----------------------------|-------------------|----------------------------|-------------------|----------------------------|----------------------|----------------------------|
| (LCM million) | | | | | | | | | |
| WRD Material Quality | Predominantly weak to very strong rocks of low to high durability / greater than about 25% fines and overburden comprising clay, calcrete and sand | | | | | | | | |
| WRD method of construction | 15m lifts with 10m benches | 20m lifts | 15m lifts with 10m benches | 20m lifts | 15m lifts with 10m benches | 20m lifts | 15m lifts with 10m benches | 20m lifts | 15m lifts with 10m benches |
| Lift Height (m) | 15 | 20 | 15 | 20 | 15 | 20 | 15 | 20 | 15 |
| Lift Side Slope Angle (degrees) | 33.7° | 33.7° | 33.7° | 33.7° | 33.7° | 33.7° | 33.7° | 33.7° | 33.7° |
| Overall Side Slope Angle (degrees) | 24.8° | 24.8° | 24.8° | 24.8° | 24.8° | 24.8° | 24.8° | 24.8° | 24.8° |
| Bench Width (m) | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |

The dimensions of the proposed product stockpile are included below:

Table 4-4 Design Criteria For The Product Stockpile

| Product Stockpile | Dimension |
|-------------------|----------------------------|
| Length (m) | 80 |
| Height (m) | 3 |
| Width | 8 |
| Footprint (ha) | 21.4 |
| Volume | Approximately 1 700 tonnes |

4.2.1.2 Engineering salvage yard (temporal and permanent)

UMK proposes to establish an engineering salvage yard that will be used primarily for the storage of equipment and materials that will be utilised at the UMK mine during operation. The estimated footprint of the engineering salvage yard is 2.43 Ha. Waste generated from the UMK mining operations will not be stored within the proposed salvage yard.

4.2.1.3 Solar equipped boreholes and associated storage tanks

UMK proposes to establish solar equipped boreholes for abstraction of groundwater. This activity will consist of two systems which consist of PV source, battery backup, three borehole pumps which feeds into two zinc steel tanks with a pumping rate of 5 L/s and 10 L/s. The capacity of zinc steel tanks is 543 m³ and 210 m³ respectively.

4.2.1.4 Support infrastructure or services

UMK proposes to establish support infrastructure to optimise their mining operations. These include parking area (0,52 ha), tyre fitting bay, workshop and oil storage (10.3 ha) and explosive depo and associated service roads (13,1 ha) at several areas around the mining right boundary. The total footprint of disturbance is 24 ha.

4.2.1.5 Truck staging area

UMK proposes to establish a truck staging area and associated road north of the mine in support of the current mining operations. The total footprint of disturbance is approximately (20.4 ha).

4.2.2 Upgrade of existing approved infrastructure

4.2.2.1 Prentec Sewage Plant

Sewage effluent is collected from the main admin block, admin block change house, engineering building and store building. The sewage effluent is pumped from these designated conservancy tanks for storage in two inlet buffer tanks prior to being sent to the sewage plant for treatment. Raw sewage stored in the inlet buffer tanks is pumped to the anoxic tank for anaerobic treatment. Treated sewage effluent is collected in a lined stormwater dam and allowed to evaporate. The approved footprint for the sewage plant is approximately 0.3 ha with a 50 m³ capacity.

UMK is proposing to increase the capacity of the sewage plant by 50 m³, the increase in capacity would be undertaken within the approved project footprint and would not require the clearance of any additional land.

4.2.2.2 Existing weigh bridge and associated access road

UMK currently has two weighbridges located on site, the two weighbridges are used to weigh road vehicles and their contents. UMK proposes to upgrade the existing weighbridge and access road north of the mine to support the current and future mining operations. The upgrade of the existing weighbridge will not result in clearance of additional land.

4.2.3 Expansion of existing approved infrastructure

4.2.3.1 Open Pit

The mining of the open pit commenced in the central section and is progressing to the north and south. The depth of the manganese seam at the start of mining was approximately 50m below the surface and the deepest point will be approximately 105m below surface.

UMK proposes to expand the open pit area by 458.7 ha to support the current mining operations.

4.2.3.2 Mineralised waste management

The approved EMPr made provision for a primary and final ore product stockpile. UMK has established eight product stockpile areas (finished product stockpile; -6mm product stockpile; kidney product stockpile; mobile crusher stockpiles No. 1 and No. 2; and product stockpiles No. 3, 4 and 5). These product stockpiles receive product from both the primary and secondary crushing and screening circuits prior to being sent-off site via road truck and trains for sale to third parties.

UMK proposes to expand the mobile crusher product stockpile area east of the mine by 53.6 ha to support the current mining operations. The dimensions of the product stockpiles are provided in Table 4-5 below.

Table 4-5 Design Criteria for the Expansion of the Mobile Crusher Product Stockpile

| Product Stockpile | Dimension |
|-------------------|----------------------------|
| Length (m) | 80 |
| Height (m) | 3 |
| Width | 8 |
| Footprint (ha) | 53.6 |
| Volume | Approximately 1 700 tonnes |

4.2.3.3 Processing Plant

Currently, the ore from the ROM stockpile is being transported via front end loaders/ articulated trucks/ conveyor to the crushing section (consisting of a primary feed bin, vibrating grizzly, jaw crusher, conveyor, secondary cone crusher and a conveyor to stockpile areas) in order to reduce the ROM material to a size required by the downstream processes. The crushed material from the stockpile area is being transported via conveyor to a surge bin that in turn supply the triple deck screen in order to screen out the required product specifications. The crushed material is then recirculated back to the screening plant.

Correctly sized material will be fed to the final product stockpiles.

The approved processing plant consist of the following areas:

- Primary crushing area (~ 0.1 ha);
- Secondary crushing area (~ 0.1 ha);
- Semi mobile crushing area (~ 2.7 ha);
- Block J pit extended crushing area (~ 18 ha); and
- Mobile crushing area (~ 2.6 ha).

UMK proposes to expand the footprint of the mobile crusher by 53.4 Ha. The new processing plant will be known as the Modular Crusher Plant and will optimise mining operations within the UMK Mine.

4.2.4 Relocation of approved surface infrastructure

4.2.4.1 Approved dirty water dams/pollution control ponds:

The following dirty water containment facilities have been approved:

- Mine Pit Water Supply Pollution Control Pond (MN1) (~ 0.2ha and 2 900 m³) will receive dirty water run-off from the opencast Block J pit. Water from the pit will be pumped into a silt trap from where it will be collected in MN1. This water will be re-used for dust suppression. The MN1 will be lined with an HDPE liner.

UMK proposes relocation of NM1 approved dirty water containment facility to optimise their mining operations.

4.2.4.2 132 KV powerline from the current location to its old location

Power at the UMK Mine is sourced from Eskom by means of an existing substation/transformer connection of 10 MVA at 132/11 kV. The external power line size is 132 kV, with internal reticulation of power from the substation/transformer by means of 11 kV power lines. The powerline that transverse the site to the west of the block J Pit on a north to southern direction was relocated to its current location when the Powerline open pit mining activities commenced. It should be noted that this powerline does not supply UMK with electricity.

UMK proposes the relocation of the powerline to its old route once the powerline open pit is backfilled.

5. POLICY AND LEGISLATIVE CONTEXT

This chapter outlines the key legislative context applicable to the proposed project and outlines the guidelines, policies and plans that have been considered during the scoping phase of the S&EIA process.

5.1 LEGISLATIVE CONSIDERATION IN THE PREPARATION OF THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

In accordance with the EIA Regulations 2014 (as amended), all legislation and guidelines that have been considered in the S&EIA process must be documented. A summary of the applicable legal framework that has been taken into account and will be considered in the assessment process is provided in Table 5-1 Legal Framework. The Acts and Regulations listed below include all subsequent amendments.

Table 5-1: Legal Framework

| Applicable legislation | Reference where applied | Applicability to the project |
|--|--------------------------------|---|
| The South African Constitution, 1996 | All | The UMK mine and proposed activity/layout changes must comply with South African constitutional and common law by conducting its construction and operational activities with due diligence and care for the rights of others. Section 24 (a) of the South African Constitution states that everyone has the right to an environment that is not harmful to their health and well-being. This provision supersedes all other legislation. |
| Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) and associated regulations. | Introduction and Section 5.1.1 | Any changes to the mine's approved documents (i.e. right, work programme, environmental authorisation and EMPr) require consent from the Minister of Mineral Resources. A Section 102 Amendment will be applied for in terms of the MPRDA. |
| National Environmental Management Act, 1998 (No. 107 of 1998) and EIA Regulations 2014. | Introduction, Section 0 | The project and operations at UMK mine will need to comply with the principles of NEMA. The project triggers activities listed under NEMA and requires Environmental Authorisation before commencement. The EIA Regulations 2014 set out the process required to inform an Environmental Authorisation decision. |
| National Environmental Management Waste Act, 2008 | Introduction, Section 0 | The project will require the disposal and reclamation of mine residue and therefore triggers listed waste management activities. The project requires a |

| Applicable legislation | Reference where applied | Applicability to the project |
|--|-------------------------|--|
| (No. 59 of 2008) and associated regulations. | | Waste Management Licence in terms of the NEM:WA. The EIA Regulations 2014 set out the process required to inform a WML decision. |
| National Water Act, 1998 (No. 36 of 1998) and water use licensing regulations. | Section 0 | The project will need to comply with the principles of NWA. The project includes water uses requiring authorisation. |
| National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) (NEM:AQA). | Section 0 | The project will need to comply with the principles of NEM:AQA. The project does not include emissions activities requiring authorisation. |
| National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004) (NEM:BA) | Section 5.1.6 | Biodiversity was considered as part of project planning and in the assessment of potential impacts. |
| National Heritage Resources Act, 1999 | Section 0 | Heritage/cultural and palaeontological resources were considered as part of project planning and in the assessment of potential impacts. Where new land is disturbed by the project, the provisions of the Act will be considered. |

5.1.1 Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (MPRDA), as amended

The MPRDA (No. 28 of 2002), as amended governs the acquisition, use and disposal of mineral and petroleum resources in South Africa. The MPRDA promotes equitable access to the nation's mineral and petroleum resources. The objectives of the act, amongst others, are to promote economic growth and mineral and petroleum resources development in the Republic, particularly development of downstream industries through provision of feedstock and development of mining and petroleum inputs industries and also to promote employment and advance the social and economic welfare of all South Africans.

Chapter 4 of the Mineral and Environmental Regulation provides a framework to regulate the application for mining, prospecting, and closure rights. In addition, Section 102 of the MPRDA governs the amendment of rights, permits, work programmes and environmental authorisations and management programmes and ministerial consent is required.

With the establishment of the “One Environmental System” in 2014, the DMRE must apply the range of environmental principles included in Section 2 of NEMA when taking decisions that significantly affect the environment. To give effect to the general objectives of Integrated Environmental Management, the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed, and

reported on to the competent authority. Section 24(4) of NEMA provides the minimum requirements for procedures for the investigation, assessment, management, and communication of the potential impacts.

5.1.1.1 MPRDA Regulations, 2004

The Mineral and Petroleum Resources Development Regulations, 2004 (as amended by GN No. 420 of 27 March 2020), promulgated in terms of Section 107 of the MPRDA, provide for a range of matters relating to the administration of the Act. Part 1 details regulations for the lodgement of applications, Part 2 deals with Social and Labour plans while Part 3 set out environmental regulations for mineral development. The recent amendment in March 2020 removed the great majority of the environmental provisions from the Regulations. These regulations had not been practicably implementable since the December 2014 introduction of the “One Environmental System” and the amendment of the overriding legislation (MPRDA and NEMA).

5.1.2 National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as amended

The National Environmental Management Act, 1998 (No. 107 of 1998), as amended, establishes principles, and provides a regulatory framework for decision-making on matters affecting the environment. All organs of state must apply the range of environmental principles included in Section 2 of NEMA when taking decisions that significantly affect the environment. Included amongst the key principles is that all development must be socially, economically, and environmentally sustainable and that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. The participation of I&APs is stipulated, as is that decisions must consider the interests, needs and values of all I&APs.

Chapter 5 of NEMA provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for granting of environmental authorisations. To give effect to the general objectives of Integrated Environmental Management (IEM), the potential impacts on the environment of listed or specified activities must be considered, investigated, assessed, and reported on to the competent authority. Section 24(4) provides the minimum requirements for procedures for the investigation, assessment, management, and communication of the potential impacts. In terms of the management of impacts on the environment, Section 24N details the requirements for an Environmental Management Programme (EMPr).

5.1.2.1 NEMA EIA Regulations 2014

The EIA Regulations, 2014 (as amended by GN No. 326 of 7 April 2017) promulgated in terms of Chapter 5 of NEMA provide for control over certain listed activities. These listed activities are detailed in Listing Notice 1 (as amended by GN No. 327 of 7 April 2017), Listing Notice 2 (as amended by GN No. 325 of 7 April 2017) and Listing Notice 3 (as amended by GN No. 324 of 7 April 2017). The undertaking of activities specified in the Listing Notices is prohibited until Environmental Authorisation has been obtained from the competent authority. Such Environmental Authorisation, which may be granted subject to conditions, will only be considered once there has been compliance with the EIA Regulations, 2014.

The EIA Regulations, 2014 (as amended) set out the procedures and documentation that need to be complied with when applying for Environmental Authorisation. A Basic Assessment process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notices 1 and/or 3 and a Scoping and EIA process must be applied to an application if the authorisation applied for is in respect of an activity or activities listed in Listing Notice 2.

The proposed project would trigger activities specified in Listing Notice 2 (see Section 4.1) and therefore a S&EIA process is required in order for the DMRE to consider the application in terms of NEMA.

As the DMRE are the competent authority for the NEMA and NEM:WA activities, UMK will apply for an integrated Environmental Authorisation, as provided for in section 24L of the NEMA.

5.1.2.2 Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations, 2015

The purpose of the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GN R 1147 of 2015) is to regulate the determination and making of financial provision as contemplated in the Act for the costs associated with the undertaking of management, rehabilitation and remediation of environmental impacts from prospecting, exploration, mining or production operations through the lifespan of such operations and latent or residual environmental impacts that may become known in the future.

5.1.2.3 National Guideline on minimum information requirements for preparing Environmental Impact Assessments for mining activities that require environmental authorisation, 2018

The Minister of Environmental Affairs gave a notice (GN 86 of 2018) of intent to publish National Guideline on minimum information requirements for preparing Environmental Impact Assessments for mining activities that require environmental authorisation. The purpose of the guideline is to allow for a more standardised approach during the compilation of EIA for mining activities. This guideline remains in draft format.

5.1.3 National Environmental Management: Waste Act, 2008 (No. 59 of 2008) (NEM:WA)

The National Environmental Management: Waste Act, 2008 (No. 59 of 2008) regulates all aspects of waste management and has an emphasis on waste avoidance and minimisation. NEM:WA creates a system for listing and licensing waste management activities which may have a detrimental effect on the environment. A waste management activity identified in terms of the NEM:WA may not commence, be undertaken or conducted except in accordance with published standards or a Waste Management Licence.

5.1.3.1 Listed Waste Management Activities

Listed waste management activities are included in GN R 921 of November 2013. Category A and Category B listed waste management activities above certain thresholds are subject to a process of impact assessment and licensing. Category C listed waste management activities do not require a waste management license but are subject to the provisions of National Norms and Standards (GN R 926, November 2013). The assessment and reporting process in support of a Waste Management Licence application must be undertaken in accordance with the EIA Regulations, 2014. These Regulations define the requirements for the submission; processing, consideration, and decision of applications authorisation of listed activities (refer to Section 6.1.2). Activities listed in Category A require a Basic Assessment process, while activities listed in Category B require a Scoping and EIA process in order for authorities to consider an application in terms of NEM:WA.

The UMK project activities will trigger waste management listed activities under Category B activity (Table 4-2), requiring a waste management licence. As the DMRE are the competent authority for the NEMA and NEM:WA activities, UMK will apply for an integrated Environmental Authorisation, as provided for in section 24L of the NEMA.

5.1.3.2 Waste Classification and Management Regulations, 2013

The purpose of the Waste Classification and Management Regulations (GNR 634 of 23 August 2013) is to ensure adequate and safe storage and handling of hazardous waste, and to inform the consideration of suitable waste management options. These regulate the classification of waste in terms of South Africa National Standard (SANS) 10234; prescribe requirements for the assessment of waste destined for disposal (GN R 635); require that disposal of waste to landfill take place in terms of GN R 636; prescribe requirements and timeframes for the management of certain wastes and prescribe the general duties of waste generators, transporters and managers. They also include communication elements for labelling and information required for Safety Data Sheets.

Although the Norms and Standards primarily refer to landfills, the definition of waste in South Africa includes mine residues such as waste rock and therefore the Norms and Standards apply to mine residue classification.

5.1.3.3 Regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits, 2015

The purpose of these Regulations (GN R 632) is to regulate the planning and management of residue stockpiles and residue deposits from a prospecting, mining, exploration, or production operation. The management of residue stockpiles and deposits must be undertaken in accordance with the Regulations, as well as the complimentary Norms and Standards and other Regulations published under the NEM:WA.

5.1.3.4 National Norms and Standards for the Assessment of Waste for Landfill Disposal, 2013 and National Norms and Standards for Disposal of Waste to Landfill, 2013

This (GN R 635) prescribes the requirements for the assessment of waste prior to disposal to landfill. Waste generators must ensure their waste is assessed in terms of the standard prior to disposal. The assessment is based on the total concentration (TC) and leachable concentration (LC) of certain elements and chemical substances in the waste compared against concentrations specified in the standard. Following laboratory analysis, the TC and LC are compared with specific TC and LC threshold values in the standard, which then determines the particular type of waste (Type 0, 1, 2, 3 and 4) for disposal.

5.1.3.5 National Norms and Standards for Disposal of Waste to Landfill, 2013

This (GN R 636) determines the requirements for the disposal of waste to landfill; define landfill classification and containment barrier designs, waste acceptance criteria for landfills and certain restrictions on waste disposal. Four classes of landfill (Class A, B, C or D) are prescribed in the standard, each with a particular barrier (liner) design. The new landfill classes do not make a distinction between sites for the disposal of general or hazardous waste. The standard stipulates which types of waste are allowed to be disposed at a particular class of landfill. Waste disposal prohibitions, aimed at eliminating the disposal of certain wastes within set periods of time include certain hazardous wastes, recoverable materials such as used oils and solvents, liquid wastes, and brines, as well as high calorific value wastes.

5.1.4 National Water Act (NWA), 1998

The National Water Act, 1998 (No. 36 of 1998) (NWA) provides a legal framework for the effective and sustainable management of water resources in South Africa. It serves to protect, use, develop, conserve, manage and control water resources as a whole, promoting the integrated management of water resources with the participation of all stakeholders. This Act also provides national norms and standards, and the requirement for

authorisation (either a Water Use Licence or General Authorisation) of water uses listed in Section 21 of the Act. The competent authority is the Department of Water and Sanitation (DWS).

5.1.4.1 Section 21 water uses

The existing IWUL caters for numerous water uses at the UMK Mine. The project includes water uses identified in terms of Section 21 of the NWA. The existing IWUL will be updated by UMK mine to cater for the establishment of additional waste rock dumps.

5.1.4.2 Regulations Regarding the Procedural Requirements for Water Use Licence Applications and Appeals, 2017

These Regulations, published in terms of the NWA (GN R 267), prescribe the procedure and requirements for water use licence applications as contemplated in sections 41 of the NWA; as well as an appeal in terms of section 41(6) of the NWA.

5.1.5 National Environmental Management: Air Quality Act, 2004

The National Environmental Management: Air Quality Act, 2004 (No. 39 of 2004) (NEM:AQA) regulates all aspects of air quality, including: prevention of pollution and environmental degradation; providing for national norms and standards (through a National Framework for Air Quality Management) regulating air quality monitoring, management and control; and licencing of activities that result in atmospheric emissions and have or may have a significant detrimental effect on the environment.

5.1.5.1 Listed activities and Minimum Emission Standards

In terms of Section 22 of NEM:AQA no person may conduct an activity releasing emissions (GN No. 893, 22 November 2013) without an Atmospheric Emission Licence (AEL). The proposed project does not trigger any activity set out in the notice and thus there is no requirement for an amendment to the AEL.

5.1.5.2 National Atmospheric Emission Reporting Regulations, 2015

UMK Mine is required by the AEL to report in terms of the National Atmospheric Emission Reporting Regulations (GN 283).

5.1.5.3 Greenhouse Gas Reporting Regulations, 2017

UMK Mine is required by the AEL to report annually in terms of the Greenhouse Gas Reporting Regulations (GN 275).

5.1.6 National Environmental Management: Biodiversity Act, 2004

The National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004) (NEM:BA) provides for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection. NEM:BA regulates the carrying out of restricted activities, without a permit, that may harm listed threatened or protected species or activities that encourage the spread of alien or invasive species and makes provision for the publication of bioregional plans and the listing of ecosystems and species that are threatened or in need of protection. Bioregional plans should be considered by competent authorities in their decision-making regarding an application for Environmental Authorisation.

5.1.6.1 Alien and Invasive Species Regulations, 2014 and Lists

Alien and Invasive Species Regulations (GN R 598 of 2014) as well as the Alien and Invasive Species List (GN R 864 of 2016) have been published to regulate the monitoring, control, and eradication of listed invasive species. All landowners on whose land alien and invasive species occur must make the necessary arrangements to be compliant with these Regulations. These will guide the EMP for the project.

5.1.7 National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA)

The National Heritage Resources Act, 1999 (No. 25 of 1999) (NHRA) provides for the identification, assessment, and management of the heritage resources of South Africa. The Act lists development activities that would require authorisation by the responsible heritage resources authority. The Act requires that a person who intends to undertake a listed activity notify the relevant provincial heritage authority at the earliest stages of initiating such a development. The relevant provincial heritage authority would then in turn, notify the person whether a Heritage Impact Assessment (HIA) should be submitted. However, according to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act (No. 73 of 1989) (now replaced by NEMA) or any other applicable legislation. The decision-making authority should, however, ensure that the heritage evaluation fulfils the requirements of the NHRA and consider in its decision-making any comments and recommendations made by the relevant heritage resources authority.

Where new land is disturbed by the project, the provisions of the NHRA will be considered. The BID for the original project was uploaded to the South African Heritage Resources Association (SAHRA) website (SAHRA Case No. 15370).

It should be noted that an updated project description in support of the amendment application will be uploaded on SAHRA website for comments.

5.1.8 Other Legislation

5.1.8.1 Conservation of Agricultural Resources Act, 1983

The Conservation of Agricultural Resources Act, 1983 (No. 43 of 1983) (CARA) and the associated Regulations, 1984 (GN No. 1048) provide for control over the utilization of the natural agricultural resources in order to promote the conservation of the soil, water sources, vegetation and the combating of weeds and invader plants.

Landowners on whose land declared weed species occur must make the necessary arrangements to be compliant with the CARA Regulations.

5.1.8.2 The Spatial Planning and Land Use Management Act, 2013

The Spatial Planning and Land Use Management Act, 2013 (No. 6 of 2013) (SPLUMA) aims to develop a new framework to govern planning permissions and approvals, sets parameters for new developments and provides for different lawful land uses in South Africa. SPLUMA is a framework law, which means that the law provides broad principles for a set of provincial laws that will regulate planning. SPLUMA also provides clarity on how planning law interacts with other laws and policies. SPLUMA requirements are not considered in the S&EIA process.

5.1.8.3 Northern Cape Nature Conservation Act, 2009

In terms of the Northern Cape Nature Conservation Act, 2009 (No. 9 of 2009) (NCNCA) no protected plants may be removed, damaged, disturbed or relocated without a valid permit. Similarly, no active bird nests may be disturbed without a permit. Protected plant species such as *Olea europaea* and *Boscia albitrunca* was recorded on site, with high potential occurrence of species such as *Harpagophytum procumbens*, *Moraea pallida* and *Boophone Disticha*. The integrated permit application for removal and translocation of protected species will be lodged with the DENC.

5.1.8.4 National Forests Act, 1998

The National Forests Act provides for the protection of forests as well as specific tree species, quoting directly from the Act: “no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated”. A permit is required for the destruction or transplant or transport of *Vachellia erioloba* and *Vachellia haematoxylon* protected tree species.

5.2 GUIDELINES, POLICIES, PLANS, STANDARDS AND FRAMEWORKS

The guidelines, policies and plans listed in have been considered during the scoping phase of the EIA process. have been considered during the scoping phase of the EIA process.

Table 5-2: Guideline and Policy Framework

| Guideline | Governing body | Relevance |
|---|-------------------------------------|--|
| Public participation guideline in terms of NEMA (2012, updated in 2017) | Department of Environmental Affairs | The purpose of this guideline is to ensure that an adequate public participation process is undertaken during the Scoping and EIA process. |
| Guideline on need and desirability (2014, updated in 2017) | Department of Environmental Affairs | This guideline informs the consideration of the need and desirability aspects of the proposed project. |
| National Development Plan 2030 | National Planning Commission | The National Development Plan 2030 (NDP) is the overarching development planning policy for the country, to which all other development planning, in particular spatial planning, must be aligned. The NDP outline South Africa’s Vision and provides the Framework for eliminating poverty and reducing inequality by 2030. |
| Northern Cape Provincial Spatial Development | Department of Rural Development | The NCPSPDF is needed for coherent prioritisation of projects within a spatial economic framework that takes cognises of environmental realities and the imperative to create a |

| Guideline | Governing body | Relevance |
|---|-----------------------------------|---|
| Framework (NCPSPF, 2012) | and Land Reform | developmental state. The NCPSDF was designed as an integrated planning and management tool to facilitate on-going sustainable development through the province. The Northern Cape PSDF recognises the importance of the mining sector in the province's economic growth. However, it also aims to manage any direct detrimental impacts of resource use and promote positive socio-economic conditions once the resource use has reached its productive life cycle. |
| Joe Morolong Local Municipal Integrated Development Plan 2016 | Joe Morolong Local Municipality | The Joe Morolong Local Municipality Integrated Development Plan is the principle strategic instrument guiding all planning, management, investment, and development within the province in order to provide best solutions towards sustainable development. |
| SANS 10103 (2008) | South African Bureau of Standards | These local and international standards provide best practice for the prediction, prevention, and management of mine drainage. These standards will be considered during the Geochemical study. |
| World Health Organisation (WHO) Standard for drinking water | WHO | |
| International Finance Corporation (IFC) Mining Effluent (2007) | IFC | |
| Quality of Domestic Water Supplies Volume 1: Assessment Guide, Second Edition, (1998) | DWS | Groundwater quality at UMK Mine is compared against these guidelines and standards. |
| South African Water Quality Guidelines – Volume 1 Domestic Use (1993 and 1996) | DWS | |
| SANS for drinking water (SANS 241:2015) | South African Bureau of Standards | |

| Guideline | Governing body | Relevance |
|---|--|---|
| National Freshwater Ecosystem Priority Areas 2011 (NFEPA) | DWS | Biodiversity was considered as part of project planning and in the assessment of potential impacts. Reference was made to various national and provincial databases to determine potential presence and conservation sensitivity. |
| Northern Cape Critical Biodiversity Areas (2016) | South African National Botanical Institute (SANBI) | |
| South Africa Conservation Areas Database (SACAD, 2017) | | |
| South Africa Protected Area Database (SAPAD, 2017) | | |
| Mining and Biodiversity Guideline (2013) | | |
| Important Bird and Biodiversity Areas (IBAs) | Birdlife International | |
| National Biodiversity Assessment | Department of Environment, Forestry and Fisheries (DEFF) | |
| National Protected Areas Expansion Strategy 2008 (NPAES) | | |
| National Threatened Ecosystems (2011) | | |

6. NEED AND DESIRABILITY

This Chapter aims to provide an overview of the need and desirability of the proposed project with the strategic context of national development policy and planning, broader societal needs, and regional and local planning, as well as the NEMA principles and sustainable development.

The DEA guideline on need and desirability (GN R891, 20 October 2014) notes that while addressing the growth of the national economy through the implementation of various national policies and strategies, it is also essential that these policies take cognisance of strategic concerns such as climate change, food security, as well as the sustainability in supply of natural resources and the status of our ecosystem services. In 2017, the DEA published an updated guideline, although this is yet to be formally gazetted. The 2017 guideline on need and desirability provides that addressing the need and desirability of a development is a way of ensuring sustainable development – in other words, that a development is ecologically sustainable and socially and economically justifiable – ensuring the simultaneous achievement of the triple bottom-line.

When considering how the development may affect or promote justifiable economic and social development, the relevant spatial plans must be considered, including Municipal Integrated Development Plans (IDP), Spatial Development Frameworks (SDF) and Environmental Management Frameworks (EMF). The assessment reports need to provide information as to how the development will address the socio-economic impacts of the development, and whether there would be any socio-economic impact resulting from the development on people's environmental rights. Considering the need and desirability of a development entails the balancing of these factors. Consistent with the aim and purpose of the EIA, the concept of "need and desirability" relates to, amongst others, the nature, scale, and location of the development being proposed, as well as the wise use of land and natural resources.

6.1 NATIONAL POLICY AND PLANNING FRAMEWORK

This section aims to provide an overview of the national and regional policy and planning context relating to the mining sector within South Africa and Northern Cape.

6.1.1 National Development Plan 2030

The National Development Plan (NDP) aims to ensure that all South Africans attain a decent standard of living through the elimination of poverty and reduction of inequality by 2030. The core elements of a decent standard of living identified in the plan are:

- Housing, water, electricity, and sanitation;
- Safe and reliable public transport;
- Quality education and skills development;
- Safety and security;
- Quality health care;
- Social protection;
- Employment;

- Recreation and leisure;
- Clean environment; and
- Adequate nutrition.

The NDP provides the context for all growth in South Africa, with the overarching aim of eradicating poverty and inequality between people in South Africa through the promotion of development. The NDP provides a broad strategic framework, setting out an overarching approach to confronting poverty and inequality based on six focused and interlinked priorities.

One of the key priorities is “faster and more inclusive economic growth”. In order to transform the economy and create sustainable expansion for job creation, an average economic growth exceeding 5% per annum is required. The NDP sets out that transforming the economy also requires changing patterns of ownership and control.

It is also acknowledged that environmental challenges are in conflict with some of these development initiatives. As such, it is emphasised that there is also a need to:

- Protect the natural environment;
- Enhance the resilience of people and the economy to climate change;
- Reduce carbon emissions in line with international commitments;
- Make significant strides toward becoming a zero-waste economy; and
- Reduce greenhouse gas emissions and improve energy efficiency.

6.1.2 New Growth Path 2010

South Africa has embarked on a new economic growth path in a bid to create 5 million jobs and reduce unemployment from 25% to 15% over the next ten (10) years. The plan aims to address unemployment, inequality, and poverty by unlocking employment opportunities in South Africa's private sector and identifies seven job drivers. These job drivers have the responsibility to create jobs on a large scale. The seven key economic sectors or “job drivers” for job creation are listed below:

- Infrastructure development and extension: Public works and housing projects;
- Agricultural development with a focus on rural development and specifically:
 - “Agro-Processing”;
- Mining value chains;
- Manufacturing and industrial development (IPAP);
- Knowledge and green economy;
- Tourism and services; and
- Informal sector of economy.

The New Growth Path reflects the commitment of Government to prioritise employment creation in all economic policies and sets out the key drivers and sectors for employment which will be the focus of Government. Mining is identified as a key sector for prioritisation in order to drive economic growth and create jobs.

6.1.3 National Strategy for Sustainable Development and Action Plan

The National Strategy for Sustainable Development and Action Plan 2011 - 2014 (NSSD 1) (2011) states the following:

- In the first instance, it recognises that the maintenance of healthy ecosystems and natural resources are preconditions for human wellbeing. In the second instance, it recognises that there are limits to the goods and services that can be provided. In other words, ecological sustainability acknowledges that human beings are part of nature and not a separate entity.
- What is needed and desired for a specific area should primarily be strategically and democratically determined beyond the spatial extent of individual EIAs. The strategic context for informing need and desirability may therefore firstly be addressed and determined during the formulation of the sustainable development vision, goals and objectives of Municipal IDPs and SDFs during which collaborative and participative processes play an integral part, and are given effect to, in the democratic processes at local government level.
- When formulating project proposals and when evaluating project specific applications, the strategic context of such applications and the broader societal needs and the public interest should be considered. In an effort to better address these considerations and their associated cumulative impacts, the NEMA also provides for the compilation of information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account. Whether a proposed activity will be in line with or deviate from the plan, framework, or strategy per se is not the issue, but rather the ecological, social, and economic impacts that will result because of the alignment or deviation. As such, the EIA must specifically provide information on these impacts in order to be able to consider the merits of the specific application. Where a proposed activity deviates from a plan, framework or strategy, the burden of proof falls on the applicant (and the EAP) to show why the impacts associated with the deviation might be justifiable. The need and desirability of the development must be measured against the abovementioned contents of the IDP, SDF and EMF for the area, and the sustainable development vision, goals and objectives formulated in, and the desired spatial form and pattern of land use reflected in, the area's IDP and SDF. While project-level EIA decision-making therefore must help us stay on course by finding the alternative that will take us closer to the desired aim/goal, it is through Integrated Development Planning (and the SDF process) that the desired destination is firstly to be considered and the map drawn of how to get there.

6.2 REGIONAL AND LOCAL POLICY AND PLANNING FRAMEWORK

This section aims to provide an overview of the regional and local policy and planning context relating to the proposed project.

6.2.1 Northern Cape Provincial Spatial Development Framework 2018

The Reviewed Northern Cape Provincial Spatial Development Framework (PSDF) 2018 identifies the PSDF as an enabling mechanism to comply with the National Spatial Development framework. The PSDF functions as an innovative strategy that will apply sustainability principles to all spheres of land use management throughout the Northern Cape and which is to facilitate practical results, as it relates to the eradication of poverty and inequality and the protection of the integrity of the environment. In short, the PSDF is to serve as a mechanism towards enhancing the future of the Northern Cape and its people.

Five growth and development strategies are proposed to assist the province and municipalities in managing future growth of settlements. These strategies are listed below:

- Strategy 1: A Diversification and Maintenance Strategy for settlements with a Low Social Need and High Development Potential (60% of the provincial population);
- Strategy 2: A Growth Management Strategy for settlements with a High Social Need and High Development Potential. (20% of the provincial population);
- Strategy 3: A Migration and Maintenance Strategy for settlements with a High Social Need and Low Development Potential. (10% of the provincial population);
- Strategy 4: A Sustainable Livelihood Strategy for settlements with Low Social Need and Low Development Potential (10% of the provincial population); and
- Strategy 5: Mining development management strategy.

In addition, The PSDF identifies five zones of development in the province, these zones are listed below:

- Manufacturing;
- Agriculture;
- Administrative;
- Transportation; and
- Logistics.

The proposed project will optimize the mining related activities at UMK and provide economic opportunities derived from wages, taxes, and profits. Indirect economic benefits associated with the project are derived from the procurement of goods and services and the spending power of employees.

6.2.2 The Northern Cape Provincial Growth and Development Strategy 2009 – 2014

The primary purpose of the Northern Cape Provincial Growth and Development Strategy (NCPGDS) is to provide a collaborative framework within which to drive and ensure effective and coordinated delivery and implementation in the province.

It provides the public and private sector and parastatals, as well as labour and civil society, with a strategic focus derived through consensus, to harness their collective efforts in promoting economic growth and social development. The vision of the NCPGDS is to build a prosperous, sustainable growing provincial economy to reduce poverty and improve social development for a caring society by promoting growth, diversification, and diversification of local economy as well as eradication of poverty through social development.

The proposed project will continue to contribute to poverty eradication by provide economic opportunities in the broader area.

6.2.3 John Taolo Gaetsewe District Spatial Development Framework 2012

The John Taolo Gaetsewe District Spatial Development Framework (SDF) is a mid to higher level strategic spatial framework that provides the municipality sphere with objectives as set out in the national and provincial spheres regarding sustainable development, natural resources management, regional economic investment, job creation and eradication of poverty. This SDF also provide an indicative framework informed by provincial and national analyses within which the more detailed spatial development planning of local municipalities can be located for the following:

- Infrastructure investment and development spending in regionally significant nodes and corridors;
- Integrated rural development;
- Economic sectors to be targeted; and
- Environmental management.

The project will boost economic development by generating direct and indirect economic opportunities thus aligning with the objectives of the SDF.

6.2.4 John Taolo Gaetsewe Environmental Management Framework (2019-2020).

The Joe Morolong Integrated Development Plan (IDP) outlines 5 development objectives for the municipality including expansion of mining activities to benefit communities while also minimising its negative environmental impacts, development of economic centres around current small towns, development of human development hubs in high density areas, introduction of agricultural growth and development (including afro-processing) high density rural areas and retention of tourism initiatives (game farming) around low density rural areas. The Provincial SDF identifies eco-tourism, agriculture, mining, and community services as main economic sectors within the Joe Morolong Municipality.

The project will boost economic development by generating direct and indirect economic opportunities thus aligning with the objectives of the IDP.

6.3 CONSISTENCY WITH POLICY AND PLANNING CONTEXT

The previous sections have considered the policy and planning context at national, regional, and local level, which are relevant to the UMK Mine. As highlighted above, there is a drive from national and provincial Governments to stimulate development and grow the economy of South Africa with a strong focus on job creation in all sectors. Mining and the mining value chain have been identified as drivers of economic growth and job creation and are considered important in the Northern Cape provincial and local economy.

The proposed project is considered to be consistent with and in support of the broad national policy framework for the development of mining in South Africa. At the regional level, it is deemed consistent with the Northern Cape PSDF and the SDF of the John Taolo Gaetsewe and Joe Morolong. The priorities of the Joe Morolong Local Municipality's IDP and the John Taolo Gaetsewe District Municipality's SDF which are mainly focused on the reduction of unemployment and halving poverty by investing in key sectors. One of the ways of achieving this, according to the SDF, is to discourage urban sprawl, and to promote more compact and efficient cities. In order to achieve this, development must be channelled into specific nodes and corridors. One of the Key Focus Areas for economic growth is the Gamagara Development Corridor, within which the mine is located.

The proposed project will boost economic development by generating direct and indirect economic opportunities thus contributing to unemployment and poverty reduction in the Northern Cape.

6.3.1 Consistency with NEMA principles

The national environmental management principles contained in NEMA serve as a guide for the interpretation, administration, and implementation of NEMA and the EIA Regulations. In order to demonstrate consistency with the NEMA principles, a discussion of how these principles are taken into account during the Scoping and EIA process is provided in Table 6-1 below.

Table 6-1 Consideration Of Nema Principles In Relation To The Proposed Project

| National Environmental Management Principles | Comment |
|---|---|
| (2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural, and social interests equitably. | Mining has long been one of the key drivers of economic growth and employment in South Africa. The proposed project activities would continue to support the day-to-day operations of the UMK mine while ensuring that environmental management principles are implemented during operation. The EIA process identifies the needs and interests of potentially affected parties and attempts to address issues and concerns raised through the course of the study. |
| (3) Development must be socially, environmentally, and economically sustainable. | Government has set development goals aimed at reducing poverty, unemployment, and inequality. The New Growth Path identifies the mining value chain as one of the seven key economic sectors for job creation. Mining is promoted in the national, regional, and local policy and planning frameworks; thus, the Section 24G activities support the continuation of the mine's operation and aims to find acceptable environmental management |

| National Environmental Management Principles | Comment |
|--|--|
| | strategies for that promotes sustainable development. |
| <p>(4)(a) Sustainable development requires the consideration of all relevant factors including the following:</p> <p>(i) That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</p> <p>(ii) that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;</p> <p>(iii) that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;</p> <p>(iv) that waste is avoided, or where it cannot be altogether avoided, minimised, and re-used or recycled where possible and otherwise disposed of in a responsible manner;</p> <p>(v) that the use and exploitation of non-renewable natural resources is responsible and equitable, and considers the consequences of the depletion of the resource;</p> <p>(vi) that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;</p> | <p>The EIA process considers resultant social, economic, biophysical impacts through the implementation of the mine's operational activities. Measures to avoid, minimise and/or remedy potential pollution and/or degradation of the environment that may occur as a result of the Project shall be detailed in the EMPr.</p> |
| <p>(4)(a)(vii) that a risk-averse and cautious approach is applied, which considers the limits of current knowledge about the consequences of decisions and actions; and</p> | <p>Assumptions, uncertainties, and limitations associated with the compilation of the Scoping Report are discussed within the report. Compliance with the various legislative requirements is presented in the report.</p> |
| <p>(4)(a)(viii) that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.</p> | <p>The EIA process considers and assesses the resultant social, economic, and biophysical impacts of the project. The EMPr provides the recommended management measures to mitigate the significance of identified impacts.</p> |

| National Environmental Management Principles | Comment |
|--|---|
| (4)(b) Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option. | The EIA process that is being followed recognises that all elements of the environment are linked and interrelated. The DMRE, as the decision-making authority, will be responsible for taking all aspects of the environment, including whether or not the impacts of the project would unfairly discriminate against any person, into consideration when deciding regarding the UMK project activities. |
| (4)(c) Environmental justice must be pursued 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. | |
| (4)(d) Equitable access to environmental resources, benefits, and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination. | The UMK Project activities do not limit access to environmental resources that meet basic human needs. |
| (4)(e) Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service, or activity exists throughout its life cycle. | UMK is committed to complying with environmental health and safety obligations of the for their operations. |
| (4)(f) The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured. | The public participation process will be undertaken in accordance with the requirements of the EIA Regulations 2014. |
| (4)(g) Decisions must consider the interests, needs and values of all interested and affected parties, and this includes recognizing all forms of knowledge, including traditional and ordinary knowledge. | The EIA process to be undertaken will take into the account the interests, needs and values of all I&APs, providing I&APs with an opportunity to submit comments on the project. Thus, the decision-makers will have all the necessary information before them on which to base an informed decision. |

| National Environmental Management Principles | Comment |
|---|---|
| (4)(h) Community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means. | The Scoping Report that has been prepared for the project will be made available to communities for review and comment. |
| (4)(i) The social, economic, and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed, and evaluated, and decisions must be appropriate in the light of such consideration and assessment. | The EIA process considers identified resultant social, economic, biophysical impacts of the project in an integrated manner. The significance of these impacts is presented in the Scoping Report. |
| (4)(j) The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected. | UMK (and its appointed contractors) would be required to continue complying with the Occupational requirements of the Mine Health and Safety Act. An Environmental Awareness Plan has been prepared, which requires that staff be informed about any aspects of their work that may pose a danger to the environment. |
| (4)(k) Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law. | As mentioned previously, the public consultation process is being undertaken in accordance with the requirements of the EIA Regulations 2014 (as amended) and will allow for the distribution of the Scoping Report for public review and comment. This information will be provided in an open and transparent manner. |
| (4)(l) There must be intergovernmental co-ordination and harmonisation of policies, legislation and actions relating to the environment. | The public participation process for the project provides an opportunity for the Organs of State to provide comment on the project and address any potential conflicts between policies or other developmental proposals administered by them that may be in conflict with the project before decision-making. |
| (4)(m) Actual or potential conflicts of interest between organs of state should be resolved through conflict resolution procedures. | It is not anticipated that the project would result in any conflicts between organs of state. |
| (4)(n) Global and international responsibilities relating to the environment must be discharged in the national interest. | The DMRE, as the decision-making authority, will be responsible for taking cognisance of any |

| National Environmental Management Principles | Comment |
|--|--|
| | international obligations that could have influenced project activities. |
| (4)(o) The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage. | The EIA process considers and assesses the identified resultant social, economic, biophysical impacts of the project. |
| (4)(p) The costs of remedying pollution, environmental degradation, and consequent adverse health effects and of preventing, controlling, or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. | As the holder of the authorisation, UMK will be responsible for the implementation of the measures included in the EMPr. |
| (4)(q) The vital role of women and youth in environment management and development must be recognised and their full participation therein must be promoted. | The public participation process for the project has been and will continue to be inclusive of women and the youth. |
| (4)(r) 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. | The EIA process to be undertaken for the proposed project will identify relevant sensitive and/or vulnerable areas and assess potential impacts. Appropriate mitigation measures will be proposed. |

6.4 SECURING ECOLOGICAL SUSTAINABLE DEVELOPMENT AND USE OF NATURAL RESOURCES

Mining is a necessary activity in order to extract natural resources required for manufacturing and development. Manganese is primarily used by the steel industry in deoxidizing and desulfurizing additives and as an alloying constituent, as such it is in high demand. Due to the nature of mining projects, impacts on biodiversity are inevitable.

The UMK mine has a direct impact on the biodiversity of terrestrial and freshwater ecosystems, however the potential indirect loss of species and habitats increases the significance of the impacts on the biodiversity. The proposed increase in infrastructure and mining operations are likely to affect the local biodiversity.

The impacts to the biodiversity, which are of concern with respect to the proposed amendments, are the potential loss of additional protected trees. The continued clearing of *Vachellia erioloba* and *Vachellia haematoxylon* woodlands in the region is a cause for concern as the exact extent of this resource is unknown. The project has the potential to directly disturb soils, vegetation, and fauna. The disturbances also have the potential to allow proliferation of alien and invasive plants.

In addition, the changes may further disrupt the ecological functions and ecosystem services derived from the site. The mine has already undertaken an offset investigation for the original mining area.

This process needs to be re-investigated and updated; to reflect the associated impacts on fauna and flora, to determine how these impacts may influence the outcome of the original offset investigation, and whether other alternatives should be investigated. Biodiversity and soil studies will be necessary to determine the sensitivity of the project area and potential impacts of the proposed changes. The biophysical impacts of the proposed project have been investigated further in this EIA Report. Measures to enhance the benefits and mitigate the impacts to these resources will be included in the Appendix D.

6.5 PROMOTING JUSTIFIABLE ECONOMIC AND SOCIAL DEVELOPMENT

According to DMRE (2011) South Africa has been a resource economy for in excess of a century. An independent evaluation of South Africa's non-energy *in situ* mineral wealth is estimated at US\$2.5 trillion (Citibank report, May 2010), making the country the wealthiest mining jurisdiction. However, a considerable amount of South Africa's mineral resources is exported as raw ores or only partially processed. Although South Africa has steadily improved its ratio of beneficiated to primary products exported since the 1970s, these ratios are still well below the potential suggested by the quality and quantity of its mineral resource's endowment.

The Government's industrialisation policy as outlined in the beneficiation strategy for the minerals industry for South Africa calls for the following:

- Paradigm shift in mineral development;
- Strategic investment in assets to maximise long-term growth beneficiation projects;
- Enhance value of exports;
- Increased sources for consumption of local content; and
- Creation of opportunities for sustainable jobs.

Minerals are a vital input to an industrialisation programme, which is intended to accelerate manufacturing in South Africa (for local consumption and export). Competitive access to minerals for local beneficiation is one of the key success factors for the country's industrialisation initiative. The government declared 2011 as the year of job creation and adopted the New Growth Path (NGP), which seeks to create more inclusive economic growth by systematically encouraging more labour absorptive economic activities. The NGP had a set target of 5 million new jobs to be created by 2020 within six priority sectors including mining. The NGP identifies mineral beneficiation as one of the priority growth nodes for job creation. Given that the Kalahari Manganese Field contains approximately 80% of the world's known high-grade manganese ore reserves, it is in high demand as it is primarily used by the steel industry in deoxidizing and desulfurizing additives and as an alloying constituent.

Mining of the manganese results in the production of ore for sale, creates sustainable jobs and supports economic activity. Direct economic benefits from the UMK Mine are derived from wages, taxes, and profits. Indirect economic benefits are derived from the procurement of goods and services and the spending power of employees. Further to these employees of the mine are afforded the opportunity to further their education through the skills development plan of the mine's social and labour plan (SLP). The skills development plan is not the extent of human resources development at the mine. Supplementary plans to enhance the socio-economic

benefits of the project are also in place, and these include a career progression plan, a mentorship plan and internships and bursaries. In addition to these social development plans, the mine also has in place an Employment Equity Plan and targets historically disadvantaged South Africans (HDSAs). The benefits not only contribute to the country's GDP but result in significant contributions to the economies and people of the Northern Cape Province, and specifically the Taolo Gaetsewe District.

Community priorities are officially expressed through public documents including the provincial growth and development strategy and spatial development framework documents. In this regard, the priorities of the Joe Morolong Local Municipality's Integrated Development Framework (IDP) and the John Taolo Gaetsewe District Municipality's Spatial Development Framework (SDF) (May 2016) are mainly focused on the reduction of unemployment and halving poverty, as well as establishing affordable accommodation in towns experiencing rapid expansion by investing in key sectors and developing and upgrading basic service delivery and infrastructure. In order to achieve this, development must be channelled into specific nodes and corridors (John Taolo Gaetsewe District Municipality, 2019). One of the Key Focus Areas for economic growth is the Gamagara Development Corridor, within which the UMK mine is located (Figure 6-1).

The socio-economic impacts of the proposed project have been assessed. Measures to enhance the benefits and mitigate the impacts to these resources are included in Appendix D.

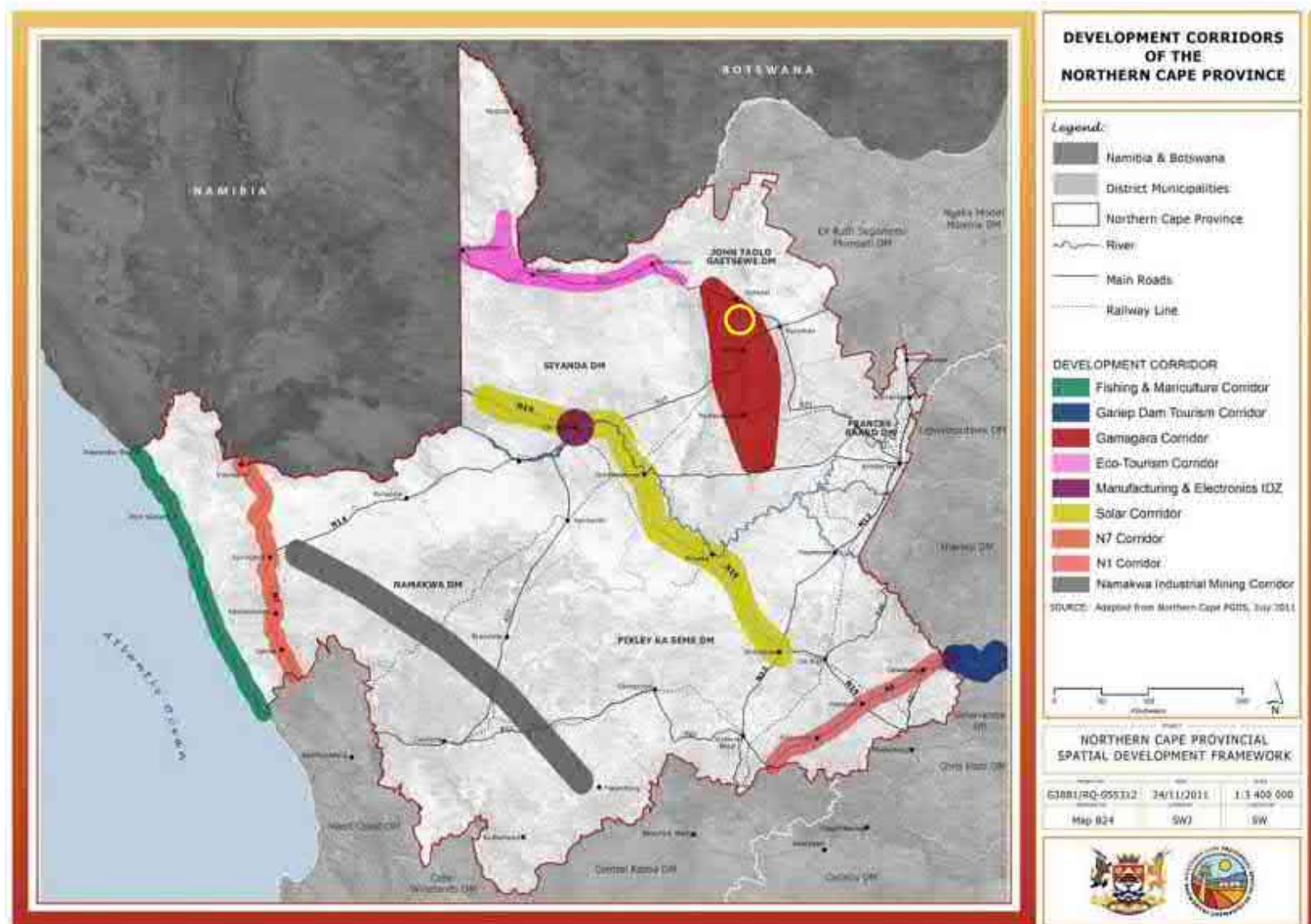


Figure 6-1 Key Focus Areas for economic growth is the Gamagara Development Corridor, within which the UMK mine is located

7. MOTIVATION FOR THE PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVES

This section provides a motivation for the preferred site, activities and technology alternatives relative to the proposed project.

No feasible alternatives exist for the proposed project and as such this section is not applicable. Refer to Section 8.3 for further detail.

8. PROCESS FOLLOWED TO REACH THE PREFERRED ALTERNATIVES WITHIN THE SITE

This chapter describes the alternatives to the proposed project, documents the information and process used to compare the alternatives and summarises the process being followed to reach the preferred alternatives.

8.1 MITIGATION HIERARCHY

Implementing the mitigation hierarchy is key when considering project alternatives and identifying the preferred alternative. The mitigation hierarchy is defined as:

- **Avoidance:** measures taken to avoid creating impacts from the outset, such as careful spatial or temporal placement of elements of infrastructure, in order to completely avoid impacts.
- **Minimisation:** measures taken to reduce the duration, intensity and / or extent of impacts (including direct, indirect, and cumulative impacts, as appropriate) that cannot be completely avoided, as far as is practically feasible.
- **Rehabilitation/restoration:** measures taken to rehabilitate degraded ecosystems or restore cleared ecosystems following exposure to impacts that cannot be completely avoided and/ or minimised.
- **Offset:** measures taken to compensate for any residual significant adverse impacts that cannot be avoided, minimised and / or rehabilitated or restored, in order to achieve no net loss (NNL) or a net gain (NG) of biodiversity. Offsets can take the form of positive management interventions such as restoration of degraded habitat, arrested degradation, or averted risk, protecting areas where there is imminent or projected loss of biodiversity.

The mitigation process for the project has largely adopted avoidance, minimisation, and rehabilitation as the preferred mechanisms to address project impacts. The 2010 Biodiversity Offset Study for the UMK Mine will be updated.

8.2 IDENTIFICATION OF ALTERNATIVES

A summary of the process being followed by UMK Mine to define the project, identify alternatives and reach the preferred alternatives for the proposed layout and activity changes is outlined in Table 8-1 below. Further detail on the alternatives is provided in the sections that follow.

Table 8-1: Process Followed To Reach The Proposed Preferred Alternative

| Objectives | Corresponding activities |
|--|---|
| Concept and screening phase | |
| Initiate the screening process | Options analysis studies for the proposed alternatives. Decision on the EIA Process to be followed and likely specialist studies to be undertaken. |
| Initiate the EIA process | |
| Identify interested and/or affected parties (IAPs) and involve them in the scoping and EIA process through information sharing | |
| Pre-feasibility phase | |

| Objectives | Corresponding activities |
|--|--|
| Develop conceptual rehabilitation and closure plan | Specialist and stakeholder inputs on the rehabilitation and closure plan. |
| Application and Scoping phase | |
| Identify potential environmental issues associated with the proposed project. Consider alternatives. Identify any fatal flaws. Determine the terms of reference for additional assessment work. | Baseline investigations by environmental team. Scoping meetings with authorities and IAPs. Compilation of draft scoping report. Distribute scoping report to relevant authorities and IAPs for review. Finalisation of scoping report. |

8.3 DETAILS OF ALL THE ALTERNATIVES CONSIDERED

8.3.1.1 Introduction

This section describes land use or development alternatives, alternative means of carrying out the operation, and the consequences of not proceeding with the project.

The main type of alternatives considered included: -

- Property or locality;
- Design or layout;
- Operational aspects; and
- The “no-go” alternative.

The alternatives considered are discussed further below:

8.3.1.2 Property or locality

The property on which the mining optimization related activities will take place is dependent on the location of the target mineral resource and existing approved mine. It follows that no alternatives localities could be considered for the project.

8.3.1.3 Design or layout

Infrastructure within the site layout has been optimised to improve efficiencies and productivity within the mine. Where proposed changes to the infrastructure layout still need to be implemented, no site layout alternatives are being considered. The Optimisation areas for the surface infrastructure are dictated by the location of the fixed ore body. No other layout or design alternatives are applicable.

8.3.1.4 Operational aspects

No alternatives in terms of operational service aspects were considered as the services already approved, constructed and/or in use by the UMK Mine will be utilized and where required extended to cater for the project.

8.3.1.5 The “no-go” alternative

The assessment of this option requires a comparison between the options of proceeding with the project with that of not proceeding with the project. Proceeding with the project attracts potential economic benefits and potential negative environmental and social impacts. Not proceeding with the project leaves the status quo. This will be detailed further in the EIA and EMPr report.

8.4 DETAILS OF THE PUBLIC PARTICIPATION PROCESS FOLLOWED

A summary of the public participation process undertaken to date or to be undertaken (i.e. project announcement, initial scoping phase and the current scoping phase amendment) is provided below:

8.4.1 Project Announcement

8.4.1.1 Competent Authority Consultation

A pre-application meeting was held with the DMRE in Kimberly on 11 July 2019. The purpose of the meeting was to discuss the requirements of the integrated regulatory process and the approach to the Scoping and EIA process for the application to ensure agreement and compliance. Additional meetings with the DMRE were held on 8 December 2020 and 15 February 2021 respectively. A copy of the presentation and minutes of this meeting are provided in Appendix C.

8.4.1.2 Interested and Affected Party Database

A preliminary I&AP database was compiled consisting of landowners, councillors, authorities (local, regional, and national, as applicable), Organs of State, Non-Government Organisations, Community-Based Organisations, and other key stakeholders. The database was compiled using databases from the UMK and previous projects undertaken in the broader study area.

The I&AP database was continually updated during the EIA process. Additional I&APs were added to the database based on responses to the site notices, advertisements, and notification letters, all of which are outlined below.

8.4.1.3 Protection of Personal Information

The Protection of Personal Information Act (No. 4 of 2013) (POPIA) introduces minimum requirements for the processing of personal information and aims to promote the protection of personal information processed by public and private bodies. Enforcement of POPIA commenced on 01 July 2021.

The NEMA provides for PP Process (“a process by which potential interested and affected parties are given opportunity to comment on, or raise issues relevant to, the application”) to be conducted for any application for an environmental authorisation. In order to fulfil the aforementioned legal requirement, the EAP must collect personal information; name and contact details (e.g. telephone number, email address, postal / street address) of potential I&APs in order to notify them of the project details and opportunity to comment on the environmental impact assessment process and outputs. I&APs provide their personal details on a voluntary basis, except where information is available publicly and can be sourced by the EAP indirectly (e.g. when an organisation is identified as a potential I&AP, and the organisation’s email address is available from their website).

I&APs were made aware of the type of personal information that is sourced, the purpose of the data collection, how the data will be used, and any other relevant information stipulated in Section 18 of the POPIA.

All personal information was collected and processed in accordance with the requirements of the POPIA and was safeguarded by the EAP. The collection of personal information for the purposes of PP Process for this project should therefore be considered lawful in terms of the POPIA.

8.4.1.4 Site Notices

Site notices, in English and Afrikaans, were placed at the Corner of R31 and R380 to Hotazel, Near Stokkies Draai Guest House, UMK Main Entrance, Back Gravel Road, Hotazel OK Grocer, Hotazel Slaghuis / Butchery and Hotazel Post Office to notify I&APs of the commencement of the Scoping and EIA process for the UMK Mine.

Additional site notices notifying the public of the availability of the amended Scoping Report were placed at similar locations.

8.4.1.5 Advertisements

Newspaper advertisements notifying the public of the proposed project and availability of the draft Reports for comment were placed in the Kalahari Bulletin and Kathu Gazette, in English and Afrikaans, respectively. The adverts were dated 13 and 14 August. Adverts were placed to notify the stakeholders of the following stages of the process:

- Announcement of the project;
- Availability of the Background Information Document for review; and
- Availability of Draft Scoping Report for review.

Additional newspaper adverts notifying the public of the availability of the amended Scoping Report were placed in Kalahari Bulletin and Kathu Gazette.

8.4.2 The Initial Scoping Phase

8.4.2.1 General I&AP notifications

A notification letter was sent to all potential I&APs included on the preliminary project database to inform them of the commencement of the EIA process and the availability of the draft Scoping Report and then the Draft Impact Assessment Report for a 30-day public review and comment period, respectively. The notification was sent via e-mail, SMS or post (depending on the contact information available) on the 14th of August 2020. The notification also contained a link to the SLR website (at <https://slrconsulting.com/za/slr-documents/>) and the data-free website (at <https://slrpublicdocs.datafree.co/public-documents/>) that I&APs were able to use to access and download the draft reports.

In terms of the previously mentioned directions (GN No. 650 of 5 June 2020), reports may not be made available at any public places or premises closed to the public, thus the placement of hard copy reports for public review in public libraries was not possible at this stage. Electronic copies were made available, on request, from SLR. All comments received in response to the draft reports have been collated and responded to in the Comments and Responses Report, which has been appended to this final report. The comments have been duly taken into consideration in the process of updating the draft reports. A copy of the final reports will be submitted to the competent authority for decision making. Thereafter, a notification will be sent to all registered I&APs on the project database to inform them of the submission. The notification will be sent via e-mail, SMS, post (depending on the contact information available). The notification will also contain a link to the SLR website that I&APs can use to access the final reports.

8.4.2.2 Authority notifications

A notification was sent to all commenting authorities on the project database to inform them of the availability of the Draft Scoping Report and Draft Impact Assessment Report for a 30-day authority review and comment period, respectively. The notification was sent via e-mail and/or courier.

The Draft Scoping Report was submitted for review and comment to the DMRE on the 4th of May 2021.

8.4.2.3 Public scoping meeting

Considering the current COVID regulations around social distancing, it was not recommended that Public Meetings be held for this project. However, SLR held webinars for the Scoping Phase public review period. These webinars were scheduled for the 17 September 2020 and allowed for presentation of the Scoping Report. These webinars were grouped into two sessions; one at 10am to accommodate Authorities, Municipalities, NGOs, and another at 18H00 to accommodate I&APs that cannot join the earlier meeting due to work.

The webinars were held at 10H00 and at 18H00 on 17 September 2020, but the stakeholders did not attend. The presentation from the webinar was made available to all stakeholders via access on the SLR website and the registered IAPs were notified of the availability of the presentation.

8.4.3 The Scoping Phase Amendment

8.4.3.1 General I&AP notifications

A notification letter was sent to all potential I&APs included on the preliminary project database to inform them of the commencement of the process to amend the Scoping Report and the availability of the amended Draft Scoping Report and then the Draft Impact Assessment Report for a 30-day public review and comment period, respectively. The notification was sent via e-mail, SMS, or post (depending on the contact information available) on the 29 April 2021. The notification contained a link to the SLR website (at <https://slrconsulting.com/za/slr-documents/>) and the data-free website (at <https://slrpublicdocs.datafree.co/public-documents/>) that I&APs can use to access and download the draft reports.

8.4.3.2 Authority notifications

A notification was sent to all commenting authorities on the project database to inform them of the availability of the Draft Scoping Report and Draft Impact Assessment Report for a 30-day authority review and comment period, respectively. The notification for the draft scoping report was sent via e-mail and/or courier on 29 April 2021.

The Draft Scoping Report was submitted to the DMRE for review and comment on 06 May 2021.

8.4.3.3 Public scoping meeting

Considering the current COVID regulations around social distancing, it was not recommended that Public Meetings be held for this project. However, SLR held webinars for the Scoping Phase public review period. These webinars were scheduled for the 19 May 2021 and allowed for presentation of the Scoping Report. These webinars were grouped into two sessions; one at 10H00am to accommodate landowners, municipalities and NGOs and another at 18H00pm to accommodate I&APs that cannot join the earlier meeting due to work. Stakeholders only attended the webinar held at 10H00am.

Furthermore, competent and commenting authorities were invited to attend the focused group sessions on 24-25 May 2021 to present the findings of the Scoping Report. However, no competent and commenting authorities expressed their interests in attending these focused group sessions.

8.4.3.4 Land claims

The Land Claims Commissioner was consulted to verify if any land claims have been lodged on the farms on which the project activities are located. No claims have been lodged on these farms. Refer to Appendix C for a copy of the correspondence received from the Land Claims Commissioner in July 2020.

8.4.4 The EIA Phase

8.4.4.1 General I&AP notifications

A notification letter was sent to all potential I&APs included on the project database to inform them of the availability of the EIA Report for a 30-day public review and comment period. The notification was sent via e-mail, SMS, or post (depending on the contact information available). The notification contained a link to the SLR website (at <https://slrconsulting.com/za/slr-documents/>) and the data-free website (at <https://slrpublicdocs.datafree.co/public-documents/>) that I&APs could use to access and download the reports.

Hard copies of the report were placed at the following locations:

- Kathu Library;
- Hotazel Post Office; and
- UMK Mine.

8.4.4.2 Authority notifications

A notification was sent to all commenting authorities on the project database to inform them of the availability of the Environmental Impact Assessment Report for a 30-day authority review and comment period. The notification for the draft scoping report was sent via e-mail.

8.5 SUMMARY OF ISSUES RAISED BY I&APS

The key issues that were identified through the public participation process and needed to be addressed during the EIA phase have been included in this Final EIA Report. These issues were identified through the engagement with stakeholders via the methods described in the preceding sections.

All comments and detailed responses to the issues raised have been included in the Comments and Response Report for this Final EIA Report.

Table 8-2 Summary of Issues and Comments Raised By I&APs

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|--|--|---|
| Comments from the Initial Scoping Report | | | | |
| Hauman Louis (Private) | 15 August 2020 | <p>How will contamination be limited by the new plan?</p> <p>How will the new plan affect the groundwater in the long run?</p> <p>How will evaporation be limited with the new plan?</p> | <p>Contamination of groundwater is inevitable. However, the impact can be limited by appropriate management measures. Apart from properly designed, constructed and maintained waste facilities (to ensure infiltration to groundwater is minimised) the following management measures are recommended:</p> <ul style="list-style-type: none"> Hydrogeological Assessments predicted the potential impacts on groundwater resources by evaluating all available site data and through the use of numerical groundwater modelling. Numerical groundwater | Section 10.4 |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|---------------|---|---|
| | | | <p>modelling incorporated results of a geochemical and waste classification assessment.</p> <ul style="list-style-type: none"> • Conduct hydrocensus investigation before proposed project commences. This will verify current groundwater conditions in terms of quality and groundwater levels of all third-party water users surrounding the mine. • UMK will continue with groundwater monitoring per existing requirements, which will ensure any potential contamination is detected and addressed. • Should any off-site contamination be detected, the mine will immediately notify DWS. The mine, in consultation | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|---------------|---|---|
| | | | <p>with DWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and the long term) and then implement these measures.</p> <ul style="list-style-type: none"> At decommissioning, the potential pollution sources (residual waste rock left on surface) will either be removed or rehabilitated to manage rainfall and seepage. <p>The proposed project has the potential to possible contaminate groundwater and affect groundwater quality. There are a number of sources in all mine phases that have the potential to pollute groundwater. Some sources are</p> | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|---------------|---|---|
| | | | <p>permanent (WRDs) and some sources are transient (starting later and at different time-steps) and becoming permanent (pit backfilling). Even though some sources are temporary in nature, related potential pollution can be long term. The operational phase will present more long-term potential sources (waste rock dumps, as the major source term) and the closure phase included in the period of simulation will present final land forms, such as the backfilled open pit may have the potential to pollute water resources through long term seepage and/or run-off.</p> <p>However, numerical groundwater modelling results predicted that the maximum sulphate plumes developed from the sources extend up to 1.7 km in</p> | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|--|-----------------------|---|---|---|
| | | | an eastern direction from the UMK Mine, at the end of the simulation at year 100. The predicted contamination plume did not predict an impact on third party water users. | |
| Natasha Higgitt South African Heritage Resources Agency | 17 August 2020 | As the proposed development is undergoing an EA Application process in terms of the National Environmental Management Act, 107 of 1998 (NEMA), NEMA Environmental Impact Assessment (EIA) Regulations as amended, it is incumbent on the developer to ensure that a Heritage Impact Assessment (HIA) is done as per section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) as required by section 24(4)b(iii) of NEMA. This must include an archaeological component, palaeontological component and any other applicable heritage components. The HIA must be conducted as part | A heritage impact assessment was undertaken by HCAC. | Appendix G Heritage Report |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p>of the EA Application in terms of NEMA and the NEMA EIA Regulations.</p> <p>SAHRA requests that an assessment of the impacts to heritage resources that complies with section 38(3) of the NHRA as required by section 38(8) of the NHRA and section 24(4)b(iii) of NEMA be conducted as part of the EA process. The assessment must include an assessment of the impact to archaeological and palaeontological resources. The assessment of archaeological resources must be conducted by a qualified archaeologist and the report comply with the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports (see www.aSapa.co.za or www.aphp.org.za for a list of qualified archaeologists). The proposed development is located within an area of moderate to high</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|---|---|---|
| | | <p>Palaeontological Sensitivity as per the SAHRIS PalaeoSensitivity map. As such, a desktop Palaeontological Impact Assessment (PIA) must be undertaken by a qualified palaeontologist. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments (see https://www.palaeosa.org/heritage-practitioners.html for a list of qualified palaeontologists).</p> <p>Any other heritage resources as defined in section 3 of the NHRA that may be impacted, such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and</p> <p>graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed. Further comments will be issued upon receipt of the NEMA EA documents inclusive of appendices.</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|---|---|---|
| Gabaitumele Mantwa Mvelaphande Trading | 19 August 2020 | <p>Our Client (Openserve)'s infrastructure is affected by this proposal and the route is marked in PINK on attached sketch as accurately as possible. We did our utmost to ensure that we indicate our route as accurate as possible and should you discover any of our cables that is not on the sketch please stop and contact us immediately to arrange a site meeting. In the event that our cables are exposed and damaged/stolen by a third party the damages will be repaired at the customer's account. Please make use of pilot holes in order not too damage our infrastructure. Therefore, any damages occurred during construction of work will be repaired at the customer's account.</p> <p>On completion of this project, please certify that all requirements as stipulated in this letter have been met. Please note that should any of our Client (Openserve) infrastructure has to be relocated or altered as a result of your activities the cost for</p> | Noted, Openserve's infrastructure adjacent to the project footprint will be taken into consideration during project planning and execution. | Section 9.6.13 and Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p>such alterations or relocation will be for your account in terms of section 25 of the Electronic Communications Act. Mr Vivian Groenewald must be contacted at telephone number 054 338 6501/081 362 6738, 2 (Two) weeks prior to commencement of proposed work. It's important that all services are shown on site before construction starts.</p> <p>Approval of the proposed route is valid for six months. If construction has not yet commenced within this period, then the file must be resubmitted for approval. Any changes / deviations from the original planning during or prior to construction must immediately be communicated to this office. Please notify this office and forward an as built plan, within 30 days of completion of construction. Mr Vivian Groenewald must be contacted at telephone number 054 338 6501/081 362 6738, 2 (Two) weeks prior to commencement</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|--|-----------------------|--|---|---|
| | | of proposed work. It's important that all services are shown on site before construction starts. | | |
| Gabaitumele Mantwa Mvelaphande Trading | 19 August 2020 | We acknowledge receipt of your application. Our reference: WI0119-20 for further enquiries. | Noted, thank you for the acknowledgement letter. | Appendix C Stakeholder Engagement |
| Montshusi Tshekedi Kudumane Manganese Resources | 20 August 2020 | Please register Tshekedi "Montshusi & Tshifiwa Nemakhavhani" from KMR as I&AP party. | Noted, you have been added to the project database. | Appendix C Stakeholder Engagement |
| Aaron Magonono | 08 September 2020 | Please include me on the meeting. (Webinars organised by SLR to present the findings of the Scoping Report.) | Noted, a meeting invite was forwarded to the stakeholder. | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|--|-----------------------|--|--|---|
| Tshifhiwa Nemakhavhani | 07 September 2020 | I will attend (the webinar organised by SLR to present the findings of the Scoping Report.) | Noted, a meeting invite was forwarded to the stakeholder. | Appendix C Stakeholder Engagement |
| Natasha Higgitt South African Heritage Resources Agency | 18 September 2020 | <p>A draft Scoping Report (DSR) has been submitted in terms of the National Environmental Management Act, 1998 (NEMA) and the 2014 EIA Regulations for activities that trigger the Mineral and Petroleum Resources Development Act, 2002 (MPRDA) (As amended). The proposed amendments include the extension of the EME workshop, development of hard park areas, expansion of the road truck staging area, development of Barlows Store, pit expansion and the establishment of four Waste Rock Dumps.</p> <p>The DSR notes heritage desktop reports are being conducted (see page 9-4 of the DSR) and will be submitted during the EIA phase of the application.</p> | Noted, the Draft Environmental Impact Assessment Report, inclusive of the Heritage Impact Assessment will be submitted to SAHRA for comment. | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|--|-----------------------|---|---|---|
| | | <p>SAHRA notes the pending heritage reports. Further comments will be issued upon receipt of the heritage reports and the NEMA EIA documents inclusive of appendices.</p> <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p> | | |
| Sharon Clark South32 | 08 September 2020 | Please note I would like to attend the 10h00 session on 17 September 2020. | Noted, a meeting invite was forwarded to the stakeholder. | Appendix C Stakeholder Engagement |
| Comments Received from the Revised Scoping Report | | | | |
| Ga Van Der Westhuizen John Taolo Gaetsewe | 29 April 2021 | <p>Thank you for your email. Please note the following:</p> <p>Joe Morolong Local Municipality should be informed, as they are responsible for land use</p> | Noted, a land development application in terms of SPLUMA and the Joe Morolong SPLUMA By-law will be submitted to Joe Morolong Local Municipality for consideration. | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|--|-----------------------|--|---|---|
| District Municipality | | <p>management in that area. Mrs Mulaudzi of Joe Morolong is copied on this reply.</p> <p>The authorisations you mentioned are noted. However, as far as I know (and speaking under correction) UMK has not submitted a land development application. If this is the case a land development application in terms of SPLUMA and the Joe Morolong SPLUMA By-law should be submitted to Joe Morolong, for consideration by the DMPT.</p> <p>All planning legislation must be adhered to.</p> <p>Trusting that you will find the above in order.</p> | | |
| Mantwa Gabaitumele Mvelaphande Trading | 04 May 2021 | With reference to your above- mentioned application, I hereby confirm that the proposed work installation is approved by our Client (Openserve) in terms of Section 22 of the Electronic Communications Act No. 36 of 2005 as amended. Our Client (Openserve)'s infrastructure | Noted, Openserve's infrastructure adjacent to the project footprint will be taken into consideration during project planning and execution. | Section 9.6.13 and Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p>is affected by this proposal and the route is marked in PINK on attached sketch as accurately as possible. We did our utmost to ensure that we indicate our route as accurate as possible and should you discover any of our cables that is not on the sketch please stop and contact us immediately to arrange a site meeting. In the event that our cables are exposed and damaged/stolen by a third party the damages will be repaired at the customer's account. Please make use of pilot holes in order not to damage our infrastructure. Therefore, any damages occurred during construction of work will be repaired at the customer's account.</p> <p>On completion of this project, please certify that all requirements as stipulated in this letter have been met. Please note that should any of our Client (Openserve) infrastructure has to be relocated or altered as a result of your activities the cost for</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p>such alterations or relocation will be for your account in terms of section 25 of the Electronic Communications Act.</p> <p>Mr Vivian Groenewald must be contacted at telephone number 054 338 6501 / 081 362 6738, 2 (Two) weeks prior to commencement of proposed work. It's important that all services are shown on site before construction starts. Approval of the proposed route is valid for six months. If construction has not yet commenced within this period, then the file must be resubmitted for approval. Any changes / deviations from the original planning during or prior to construction must immediately be communicated to this office. Please notify this office and forward an as built plan, within 30 days of completion of construction. Mr Vivian Groenewald must be contacted at telephone number 054 338 6501 / 081 362 6738, 2 (Two) weeks prior to commencement of proposed</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|--|---|---|
| | | work. It's important that all services are shown on site before construction starts. | | |
| Ryan Oliver Department of Agriculture, Land Reform and Rural Development: Land Claims Commission | 06 May 2021 | <p>We refer to your email received 29/04/2021.</p> <p>We confirm that as at the date of this letter that no land claims appear on our database in respect of the Properties. This includes the database for claims lodged by 31 December 1998; and those lodged between 1 July 2014 and 27 July 2016 in terms of the Restitution of Land Rights Amendment Act, 2014. Whilst the Commission takes reasonable care to ensure the accuracy of the information it provides, there are various factors that are beyond the Commission's control, particularly relating to claims that have lodged but not yet been gazetted such as:</p> <p>1. Some Claimants referred to properties they claim dispossession of rights in land against using</p> | Noted, thank you for the confirmation. | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|---|---|---|
| | | <p>historical property descriptions which may not match the current property description; and</p> <p>2. Some Claimants provided the geographic descriptions of the land they claim without mentioning the particular actual property description they claim dispossession of rights in land against.</p> <p>The Commission therefore does not accept any liability whatsoever if through the process of further investigation of claims it is found that there is in fact a land claim in respect of the above property. If you are aware of any change in the description of the above property after 19 June 1913 kindly supply us with such description so as to enable us to do a further search.</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|--|---|
| Alex Mooya South32 | 14 May 2021 | Email below regarding the subject matter refers. Attached is our registration as an I&AP on the subject matter. Key pickups on the <i>Background Information</i> and <i>Executive Summary Documents</i> submitted are as follows. The UMK Mining Area plans in the subject documents covers RE of Farm Middelplaats 332 and Portion 4 of farm Middelplaats 332. These two properties (or portions therefore) constitute our Middelplaats Mining Right Area therefore should not be reflected as part of the UMK mining right area. Attached Middelplaats Mining Right Area for your easy of reference. | The remaining extent (RE) of farm Middelplaats 332 does not constitute the UMK Mining Right Boundary. The project specific maps have been amended in this regard. | Section 4 |
| | | Please confirm the detail (if any) of any UMK infrastructure located on RE Middelplaats 332 and Portion 4 of farm Middelplaats 332. | The proposed project activities will be located within farm Botha 313, the RE of the farm Smartt 314, and portion 1 and RE of farm Rissik 330. There is no infrastructure that will be located on RE | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|---|--|---|
| | | | of the farm Middelplaats 332 and Portion 4 of farm Middelplaats 332. | |
| | | Please also confirm if a portion of Portion farm 4 Middelplaats 332 does not fall with UMK mining right area. If it is, then it should also be reflected as well in your Background Information and Executive Summary Documents . | <p>As per the DMRE Mining Rights Acceptance Letter and Approved Mine Works Programme, Portion 4 of farm Middelplaats 332 form part of the UMK mining rights.</p> <p>For ease of reference, only the relevant farm portions within the UMK Mining Right Area that will be affected by the proposed project activities have been included in the Background Information Document as well as the Executive Summary.</p> | Appendix C Stakeholder Engagement |
| Gert Theart | 17 May 2021 | Can I login on the 18:00 webinar please | Noted, a meeting invite was forwarded to the stakeholder. | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|--|---|---|
| Private | | UMK Amendment will not have any direct effect on my farming. You can remove me from the webinar. Sorry for inconvenience. | Noted, the stakeholder was removed from the webinar. | Appendix C Stakeholder Engagement |
| Comments Received from the EIA Report released for public review | | | | |
| Natasha Higgitt (SAHRA) | 22 March 2022 | Good morning, Please note that all development applications are processed via our online portal, the South African Heritage Resources Information System (SAHRIS) found at the following link: http://sahra.org.za/sahris/ . We do not accept emailed, posted, hardcopy, faxed, website links or DropBox links as official submissions. Please create an application on SAHRIS and upload all documents pertaining to the Environmental Authorisation Application Process. As per section 24(4)b(iii) of NEMA and section 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA), an assessment of heritage resources must form part of the process and the assessment must | Noted. An application has been created on SAHRIS and all documents pertaining to the Environmental Authorisation Application Process have been uploaded, including the Heritage and/or Paleontological Assessments. Furthermore, the final EIA Report and all its supporting appendices, as submitted to the DMRE, will also be uploaded on SAHRIS, | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|--|-----------------------|--|---|---|
| | | comply with section 38(3) of the NHRA. Once all documents including all appendices are uploaded to the case application, please ensure that the status of the case is changed from DRAFT to SUBMITTED. Please ensure that all documents produced as part of the EA process are submitted as part of the application. | | |
| Mothobi Martins (Mvelaphande Trading) | 25 March 2022 | Good day.We acknowledge the receipt of your application with ref 2022-03-14_UMK and our ref CHZL0146-22 in this regard. Regards | Noted, thank you for the acknowledgement letter. | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---------------------------------------|-----------------------|--|---|---|
| Mothobi Martins (Mvelaphande Trading) | 31 March 2022 | Attached find updated sketch and the cover letter Please contact Mr Vivian Groenewald at 081 362 6738, Two weeks before commencement of work. With reference to your above-mentioned application, I hereby inform you that our Client (OPENSERVE) approves the proposed work indicated on your drawings in terms Section 22 of the Electronic Communications Act 36 of 2005 as amended. Any changes/deviations from the original planning during or prior to construction must immediately be communicated to this office. Mr. Vivian Groenewald must be contacted at telephone number 081 362 6738,(Two) 2 weeks prior to commencement of proposed work from our Client (OPENSERVE)'s Network Field Services. | Noted, any changes/deviations from the original planning during or prior to construction will be communicated to your office. | Appendix C Stakeholder Engagement |
| Natasha Higgit (SAHRIS) | 22 April 2022 | United Manganese of Kalahari (Pty) Ltd (UMK) is an opencast manganese mine located on farm Botha313, the remaining extent (RE) of the lies on farm Smartt 314, and portion 1 and RE of the farm | Noted. These requirements have been recorded in the EIA (this table) and | Section 26 Appendix D: Detailed |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| | | <p>Rissik 330 near Hotazel in the Northern Cape Province and lies directly adjacent and to the west of the R380 provincial road. UMK currently holds the following authorisations: • A mining right (30/5/1/2/3/2/1(113) MR) issued by the Department of Mineral Resources and Energy (DMRE); • An Environmental Management Programme report (EMPr) approved by DMR; • Environmental Authorisations (NC/KGA/HOT7/15/2006 & NC 30/5/1/2/2/113 MR) issued by the Department of Environment and Nature Conservation (DENC) and the DMR respectively; and • A Water Use License (IWUL) (10/D41K/ABEGJ/2814) issued by the Department of Water and Sanitation (DWS).</p> <p>SLR Consulting (Pty) Ltd has been appointed by United Manganese of Kalahari (Pty) Ltd to conduct an Environmental Authorisation Application for the proposed amendment of the Environmental</p> | <p>addresses under Section 26 (Impact Management Section) of the EMPr.</p> <p>The Final EIA and a decision of the project will be uploaded to the SAHRIS website</p> | assessment of potential impacts |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p>Management Programme and related Environmental Authorisations at the UMK Mine, near Hotazel, Northern Cape Province.</p> <p>A draft Scoping Report (DSR) has been submitted in terms of the National Environmental Management Act, 1998 (NEMA) and the 2014 EIA Regulations for activities that trigger the Mineral and Petroleum Resources Development Act, 2002 (MPRDA)(As amended). The proposed amendments include the extension of the EME workshop, development of hard park areas, expansion of the road truck staging area, development of Barlows Store, pit expansion and the establishment of four Waste Rock Dumps.</p> <p>The DSR notes heritage desktop reports are being conducted (see page 9-4 of the DSR) and will be submitted during the EIA phase of the application.</p> <p>In an Interim Comment issued on the 18/09/2020, SAHRA noted the pending heritage reports. Since</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| | | <p>the issuing of the comment, the draft EIA, HIA and PIA have been submitted to SAHRA for review (25/03/2022).</p> <p><i>Bamford, M. 2022. Palaeontological Impact Assessment for the proposed Surface Infrastructure changes at the UMK Mine on Farm Botha 313, the Remaining Extent (Re) of the Farm Smartt 314, and Portion 1 and Remaining Extent (RE) of the Farm Rissik 330, Northern Cape Province.</i></p> <p>The proposed development area is underlain by banded iron formations that do not contain fossils with overlying aeolian Kalahari Group sands that do not preserve fossils very well. The area has been disturbed by previous mining operations. A Fossil Chance Finds Procedure is recommended to be followed and is provided in the report.</p> <p><i>Van der Walt, 2022. Heritage Impact Assessment for new surface infrastructure at United</i></p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p><i>Manganese Kalahari, Hotazel, Northern Cape Province.</i></p> <p>Three isolated, out-of-context surface scatters of Stone Age lithics of low heritage significance were identified within calcrete patches in the proposed development area.</p> <p>Recommendations provided in the report include the following:</p> <ul style="list-style-type: none"> • Implementation of a chance find procedure for both the archaeological and paleontological components; • Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist or by an EO trained by an archaeologist. <p>Final Comment</p> | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| | | <p>The following comments are made as a requirement in terms of section 3(4) of the NEMA Regulations and section 38(8) of the NHRA in the format provided in section 38(4) of the NHRA and must be included in the Final EIA and EMP:</p> <ul style="list-style-type: none"> • 38(4)a – The SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit has no objections to the proposed development; • 38(4)b – The recommendations of the specialists are supported and must be adhered to. Further additional specific conditions are provided for the development as follows: • Monitoring reports of the excavations of the aeolian sands that contain calcrete layers must be submitted to SAHRA upon completion of the construction phase; | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| | | <ul style="list-style-type: none"> 38(4)c(i) – If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; 38(4)c(ii) – If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/ Ngqabutho Madida 012 320 8490), must be alerted immediately as per | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|-------------------------------|-----------------------|--|---|---|
| | | <p>section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule;</p> <ul style="list-style-type: none"> • 38(4)d – See section 51(1) of the NHRA with regards to offences; • 38(4)e – The following conditions apply with regards to the appointment of specialists: • If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 | | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|--|---|---|
| | | <p>rescue operation may be required subject to permits issued by SAHRA;</p> <ul style="list-style-type: none"> • The Final EIA and EMPr must be submitted to SAHRA for record purposes; • The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application. <p>Should you have any further queries, please contact the designated official using the case number quoted above in the case header.</p> | | |
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | What is the validation period of the Mining Right (MR) and the Water Use License (WUL)? | <p>A Water Use License (IWUL) (10/D41K/ABEGJ/2814) was issued by the DWS on the 26th of April 2015. This IWUL is valid for a period 20 years (i.e. until April 2035).</p> <p>A mining right (Ref: 30/5/1/2/3/2/1(113) MR) was issued by the DMRE on the 8th</p> | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| | | | of February 2008. This MR is valid for a period of 30 years (i.e. until the 7 th of February 2038). | |
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | Are you going to have any amendments of the water uses because I see stockpiles and an extension of the pit on the Stormwater Management map/ layout? | As part of the project a separate application will be submitted for the water use licence. This application will be submitted to DWS in due course. | Section 27.4 |
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | Are you planning to expand the pit further north? When you are expanding the pits north, are you aware that you will be going towards the water resources (e.g. a river)? How close will the proposed pit be to the river during the expansion? | <p>The proposed project includes the expansion of the open pit further to the north. The expansion of the open pit will be approximately 250 m from the Wittelegte River. This river is non-perennial, ephemeral and highly seasonal.</p> <p>The Wittelegte is "largely modified". A large section of the water course in the area has been completely interrupted by</p> | Section 4 |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| | | | <p>the Sebilo Resources mining pit located on the boundary of the UMK MRA.</p> <p>In addition, the freshwater study assessed the impact of the proposed development in terms of sedimentation and contamination of freshwater ecosystems. The significance of the impact has been reduced to very low with mitigation.</p> | |
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | What is the purpose of the existing open pit at UMK mine? | The purpose of the open pits at UMK mine is for the extraction of manganese ore. | Section 4 |
| Ramusiya Tshedza (Department | 26 April 2022 | Does the Block D pit contain water at the moment? | The water from the Block D Pit is pumped as per the requirements of the IWUL. | Appendix C Stakeholder Engagement |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|------------------------------------|--|---|
| of Water and Sanitation) | | | | |
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | What is the soil type at UMK mine? | <p>The project area consists of three different soil these includes two natural soil forms with undisturbed soil horizon (Ermelo and Hutton) as well as soil that has undergone significant changes as a result of mining activities in the area (Technosols).</p> <p>The Hutton soil form found at the UMK Mine is homogeneous in terms of texture, structure, and soil depth. This soil form is a well-drained sandy soil which allows for high infiltration rates and low organic content. These soils are therefore highly erodible.</p> | Section 8.6.1.4 |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | Is the paddock going to serve as evaporation pond? | <p>The paddocks will serve as evaporation ponds and are designed to capture runoff from the waste rock dumps. This runoff will be allowed to evaporate.</p> <p>The berms/paddocks will be 2m high and greater than 3m wide (storing the 1 in 50-yr storm) and have a class D barrier/liner (base preparation and compaction).</p> | Appendix J Surface Water Study |
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | Do you currently have one of these paddocks on site? | Current stormwater management practices on site includes the use of paddocks that is utilised to capture runoff from the waste rock dumps. The proposed project will align with the current practices on site. | Appendix J Surface Water Study |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|---|--|---|
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | What is the evaporation rate and what does the rate depend on? I am worried that if there is high rainfall, the paddocks will not have capacity and will start to spill. | <p>The average monthly evaporation for the project site is based on the Evaporation Station D4E004 sourced from DWS. In this regard, the evaporation rates (annual lake evaporation: 1972 mm/annum) of the areas are higher than the amount of rainfall the area receives (368.8 mm/annum).</p> <p>The 1 in 50-yr design flood has been determined (107 mm) and has been used to size the paddocks. This will accommodate for high rainfall.</p> | Section 8.6.1.3 |
| Ramusiya Tshedza (Department) | 26 April 2022 | The water that is currently being used on the mine, is it surface or groundwater? With the proposed expansion, are you planning to increase the amount of water that you are currently using? | Water at UMK mine is sourced from the open pit as well as the Sedibeng Pipeline (which is the major source of water on site). The water from the open pit is used | Section 4.2.1.3 |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
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| of Water and Sanitation) | | | for dust suppression whereas the water from Sedibeng pipeline is used to support all other mining activities. It should be noted that pipeline is currently being upgraded. The pipeline upgrades may possibly result in an increase in the water supply for the mine. It should be noted that as part of the proposed project, solar equipped boreholes will be established for abstraction of groundwater. This activity will consist of two systems which consist of PV source, battery backup, three borehole pumps which feeds into two zinc steel tanks with a pumping rate of 5 L/s and 10 L/s. The capacity of zinc steel tanks is 543 m ³ and 210 m ³ respectively. This will accommodate any additional water requirements at the mine. | |

| Interested and affected party | Date comment received | Issues raised | Response provided by SLR unless otherwise indicated in brackets | Section and paragraph reference in this report where the issues/comments and or responses were incorporated |
|---|-----------------------|--|---|---|
| Ramusiya Tshedza (Department of Water and Sanitation) | 26 April 2022 | As you increase the operation, are you planning to increase the containment facilities for the wastewater? | The Storm Water Management Plan has been developed for the UMK Mine. This plan takes into account any additional storage requirements for wastewater. This report will be submitted as part of the Water Use Licence Application. | Appendix J Surface Water Study |

8.6 ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

8.6.1 Baseline environment

8.6.1.1 Geology

Introduction

Geology and associated structural features provide a basis from which to understand:

- The potential for sterilisation of mineral reserves;
- The geochemistry and related potential for the pollution of water from waste rock dumps; and
- The potential for geological lineaments such as faults and dykes. Faults, dykes, and other lineaments can act as preferential flow paths of groundwater, which can influence the dispersion of potential pollution plumes from waste rock dumps.

Geological processes also influence soils forms (see Section 8.6.1.4 and the potential for palaeontological resources (see Section 8.6.1.11).

Data sources

Information in this section was sourced from the 2017 EMPr Amendment Report (SLR, March 2017), the 2020 UMK Water Balance and Geochemical Modelling Study (SLR, July 2020a) and 2020 UMK Waste Rock Dump Design (SLR, July 2020b).

Description

Regional and Local geology

The UMK Mine is located on the Kalahari Manganese Field (KMF). Three beds of manganese ore are interbedded with the Banded Iron Formation (BIF) of the Hotazel Formation (Transvaal Supergroup). The mine is exploiting the manganese from the lower most bed. The BIF of the Hotazel Formation is underlain by basaltic lava of the Ongeluk Formation (Transvaal Supergroup) and directly overlain by dolomite of the Mooidraai Formation (Transvaal Supergroup). The Transvaal Supergroup is overlain unconformably by the Olifantshoek Supergroup that consists of arenaceous sediments, typically interbedded shale, quartzite, and lavas overlain by coarser quartzite and shale. The Olifantshoek Supergroup is overlain by Dwyka Formation, which forms the basal part of the Karoo Supergroup and in turn is typically covered by sands, claystone and calcrete of the Kalahari Group.

The manganese resource is hosted by the Hotazel Formation and consists of three ore bodies (Lower, Middle and Upper) that are intercalated with BIF and rhythmites. The Lower manganese orebody varies in thickness from 5 to 40 m and contains the highest manganese grades. It is the main ore horizon that is mined.

The Middle orebody has a maximum of 2 m thickness, is poorly mineralised and is considered uneconomic. The Upper orebody is moderately mineralised and is stockpiled at the mine for possible future use. The dominant ore minerals are braunite and hausmanite. The ore is carbonate rich and sulphide minerals are rare.

The overburden consists of the 0-84 m thick dolomites of the Mooidraai Formation, which overlie the Hotazel Formation. Above the dolomites is the Dwyka Group, which consists of glacial diamitites/tillites that vary in thickness from 0 m to 90 m. These are covered by 30-100 m thick gravels, clays, calcretes and aeolian sands of

the Kalahari Group. The Mooidraai Formation and upper parts of the Hotazel Formation have been eroded in the southern portion of the mine area.

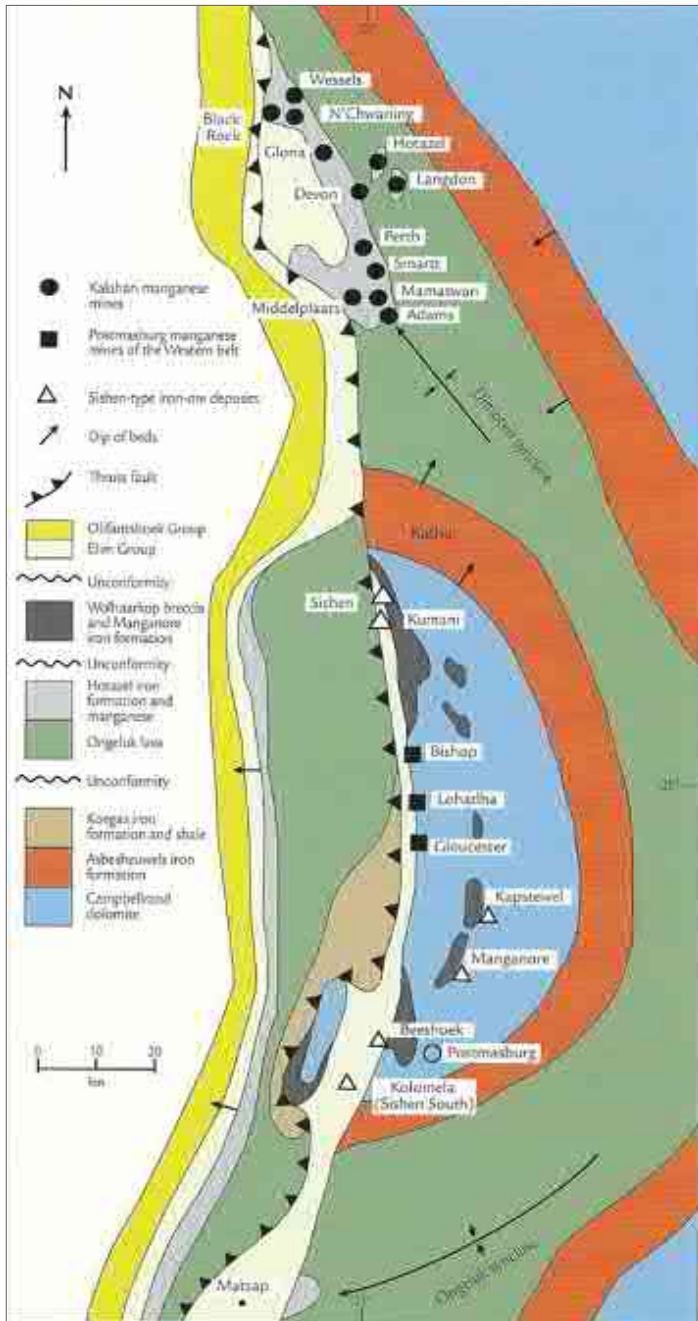


Figure 8-1 Geology of the Kalahari Manganese Fields (SLR, July 2020a)

Conclusion

Mineral resources can be sterilized and/or lost through the deposition of minerals onto waste disposal facilities such as waste rock dumps. This has been taken into account when optimizing the mining operations.

8.6.1.2 Topography

Introduction and link to impact

The topography of a particular area will determine the following factors:

- The flow of surface water, and in many cases, also groundwater;
- The depth of soils and the potential for soil erosion, for example, in the case of steep slopes soils are shallower and more prone to erosion;
- The type of land use, for example flat plains are more conducive to crop farming; and
- The aesthetic appearance of the area.

Topography can also influence climatic factors such as wind speeds and direction, for example, wind will be channelled in between mountains and along valleys. Changes in the topography caused by the mining activities could therefore alter all of the above-mentioned aspects of the environment. Project-related activities have the potential to alter the topography of the site through the establishment of additional infrastructure.

Data sources

Information in this section was sourced from the 2017 EMPr Amendment Report.

Description

The topography of the Kalahari Manganese Field (“KMF”) is predominately flat lying at 1100 m elevation, with relatively low relief. The area is characterised by several vegetated northwest and southwest trending red sand dunes, up to 10 m in height, up to 200 m wide and tens of kilometres in length. The regional drainage pattern is broadly northwards but water-flow in the streams is generally very rare. The general elevation of the project area is between 1056 m and 1092 m above mean sea level, and topography is sloping from the southeast and northwest.



Figure 8-2 Elevation Profile Within The Project Area (Google Earth)

The topography of the mining area is also relatively flat and therefore it is expected that the climate of Kuruman is predominately representative of the surrounding mining area.

Conclusion

While the topography has already been altered by infrastructural changes that have taken place, the establishment of additional facilities and activities has the potential to alter the topography and the natural state of undisturbed areas. In the absence of security and access control measures an alteration of the natural topography has the potential to present dangers to both animals and third parties. Changes to the surface infrastructure layout should be such that any changes to topography result in stable topographical features, which do not pose significant risk to third parties and animals and limit impacts on the visual character of the area.

8.6.1.3 Climate

Introduction and link to impact

Climate can influence the potential for environmental impacts and related design associated with mining projects. Specific issues are listed below:

- Rainfall can influence erosion, evaporation, vegetation growth, rehabilitation planning, dust suppression, and surface water management planning;
- Temperature can influence air dispersion through impacts on atmospheric stability and mixing layers, vegetation growth, and evaporation which could influence rehabilitation planning; and
- Wind can influence erosion, the dispersion of potential atmospheric pollutants, and rehabilitation planning.

This section provides a brief description of the climatic environment. More detailed information will be provided in the EIA and EMPr report.

Data sources

Information in this section was sourced from the 2017 EMPr Amendment Report and the Conceptual Stormwater Management Plan for the UMK Surface Infrastructure Changes at the UMK Mine (SLR, August 2021)

Description

Regional climate

The project area falls within the Northern Steppe Climatic Zone, as defined by the South African Weather Bureau. This is a semi-arid region characterised by seasonal rainfall, hot temperatures in summer, and colder temperatures in winter (SLR, March 2017). The Mine is characterised by hot summers and cool winters with rain generally occurring in the form of thunderstorms that last for short periods at a time during rainy periods.

High evaporation rates reduce infiltration, while rainfall events can increase the erosion potential and the formation of erosion gullies.

Rainfall, rainfall depths and evaporation

Monthly rainfall data and evaporation data for the Milner weather station is summarised in Table 8-3. The average rainfall at the Milner weather station is 369 mm per annum. Given the Milner weather station is only 3.6 km from the mine site, similar rainfall levels can be expected at the mine. The average evaporation rates recorded at the Station D4E004, DWS are 1972 mm per annum.

Table 8-3 Summary Of Monthly Rainfall Data (SLR, August 2021)

| Month | Average | Min | Max |
|--------------|---------|------|-------|
| Jan | 71.3 | 0.00 | 311.7 |
| Feb | 63.2 | 0.00 | 241 |
| Mar | 65.5 | 0.00 | 276 |
| Apr | 37.5 | 0.00 | 197.9 |
| May | 15.2 | 0.00 | 108.5 |
| Jun | 6.7 | 0.00 | 86.5 |
| Jul | 1.8 | 0.00 | 47.2 |
| Aug | 3.6 | 0.00 | 44.5 |
| Sep | 6.1 | 0.00 | 77.8 |
| Oct | 18.6 | 0.00 | 108.8 |
| Nov | 32.2 | 0.00 | 137 |
| Dec | 47.1 | 0.00 | 261 |
| Annual Total | 369 | - | - |

Evaporation

Monthly evaporation was used in the model. The mean annual Symons-pan evaporation for quaternary catchment D41K within which the mine is located. Mean monthly evaporation values for this catchment are presented in Table 8-4.

Table 8-4 Mean Monthly Evaporation (SLR, July 2020a)

| Month | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|-------|-------|
| S Pan Evaporation (mm) | 269.5 | 283.9 | 294.5 | 276.8 | 209.9 | 193.2 | 144.1 | 114.7 | 90.9 | 106.0 | 153.7 | 212.9 |
| Pan Coefficient WR90 | 0.81 | 0.82 | 0.83 | 0.84 | 0.88 | 0.88 | 0.88 | 0.87 | 0.83 | 0.85 | 0.81 | 0.81 |
| Lake Evaporation (mm) | 218.3 | 232.8 | 244.4 | 232.5 | 184.7 | 170.0 | 126.8 | 99.8 | 77.3 | 88.0 | 124.5 | 172.5 |

Temperature

The regional average daily maximum temperature varies between 27°C and 31°C in January and in July it is approximately 19°C. The regional average daily minimum temperature is about 16°C in January and in July it is roughly 1°C.

Wind

The prevailing wind direction at the project site is in a north easterly direction with significant winds also blowing from the north and northwest. The strongest winds up to 10m/s primarily during the summer.

Conclusion

The UMK Mine is characterised by hot summers and cool winters with rain generally occurring in the form of thunderstorms that last for short periods at a time during rainy periods. High evaporation rates reduce infiltration, while rainfall events can increase the erosion potential and the formation of erosion gullies. The presence of vegetation does however reduce the effects of erosion. The mixing of layers resulting in the formation of temperature inversions, and the presence of cloud cover limits the dispersion of pollutants in the atmosphere. Wind significantly affects the amount of material that is suspended from exposed surface to the atmosphere. Although wind speeds above 5.3m/s can occur, the data shows that on average they are below this value and therefore not able to carry dust particles. These climatic aspects need to be taken into consideration during operations, rehabilitation and surface water management planning.

8.6.1.4 Soils and Land capability

Introduction and link to impact

Soil is an important natural resource and provides ecosystem services that are critical for life, such as:

- Water filtering;
- Providing growth medium for plants, which in turn provide food for plant-eating animals; and
- Providing habitat for a wide variety of life forms.

Soil forms rather slowly by the breaking down of rock material and is therefore viewed as a non-renewable resource. Soil determines the type of land use the area is suitable for, for example, soil with low nutrients may not be able to support unassisted crop farming.

Soil resources are vulnerable to pollution, erosion (wind and water) and compaction, which could be caused by project-related activities.

The baseline soil information will be used to identify sensitive soil types, to guide the project planning in order to avoid sensitive soil types where possible, to determine how best to conserve the soil resources in the area and allow for proper rehabilitation of the site once mining ceases. The land capability of an area is based on the soil properties and related potential to support various land use activities. Mining operations have the potential to significantly transform the land capability.

A brief description of the soil types and land capability in the project area is provided below. More detailed information will be provided in the EIA and EMPr Report.

Data Sources

Information in this section was sourced from the 2021 Soil and Agricultural Assessment Report.

Description

Soil forms

The project area consists of three different soil forms (Table 8-5 and Figure 8-3), these includes two natural soil forms with undisturbed soil horizon (Ermelo and Hutton) as well as soil that has undergone significant changes as a result of mining activities in the area (Technosols). The project area can be classified as having sandy loam texture with the sand fractions ranging between 85 and 88% while the clay fractions were all measured as 11%.

Table 8-5 Soil Forms Within the Project Area

| Soil Form | Description |
|------------|---|
| Ermelo | Bleached to slightly chromic sandy topsoil that is underlain by yellow-brown apedal subsoil that is deeper than 1.5m. This is the most dominant soil form within the UMK Mining Right Area. |
| Hutton | Consist of an orthic A horizon on a red apedal B horizon overlying unspecified material with subsoil that is deeper than 1.5m without signs of wetness. Hutton soil forms are preferred by <i>Vachellia erioloba</i> (camel thorn) as it allows the tap root of these trees to grow down to deeply in search of water stored below the surface. |
| Technosols | The existing mining activities in UMK area that has already impacted on the <i>in situ</i> soil profiles include stripping and stockpiling of topsoil, compaction of haul road areas, erection of site offices and other buildings including a mechanical workshop. the entire area consists of possible four different type of Technosols. These are Transported Technosols (Witbank form), Chemically Polluted Technosols (Industria), Hydric Technosols (Stilfontein) and Anthropogenic Open Excavation Technosols (Cullinan). |



Figure 8-3 Soil Classification Map of the UMK Mine

Land Capability and Land Potential

The proposed surface infrastructure expansion areas consist largely of land with Low (Class 05) land capability. Smaller pockets distributed throughout the area consist of land with Low-Moderate (Class 06) land capability. Two areas with lower land capability are located north-east and south-east of the proposed final pit layout. These areas consist of Low-Very low (Classes 03 and 04) land capability.



Figure 8-4 Land Capability Of The Project Site And The Surrounding Area (Data Source: DALRRD, 2017)

Conclusion

The Hutton soil form found at the UMK Mine is homogeneous in terms of texture, structure, and soil depth. This soil form is a well-drained sandy soil which allows for high infiltration rates and low organic content. These soils are therefore highly erodible. The rapid drainage nature of the Hutton soil form reduces the dry production potential as well as the irrigation potential. The soil fertility is low due to a deficiency in key nutrients such as phosphorus. In general, the soil forms located at the UMK Mine are difficult to work and have a limited utilization potential. Taking the above into consideration soils located at the UMK Mine will require appropriate management measures to prevent the loss of soil resources through pollution and erosion as soil resources form a crucial role during rehabilitation.

The land capability at the UMK Mine is classified as having grazing and wilderness potential. The land capability at the UMK Mine has been changed due to the presence of approved infrastructure and activities. The establishment of additional surface infrastructure has the potential to influence the land capability of undisturbed areas. Therefore, impact management and rehabilitation planning are required to achieve acceptable post rehabilitation land capabilities

8.6.1.5 Biodiversity

Introduction and link to impact

Biodiversity refers to the flora (plants) and fauna (animals). According to the International Union for Conservation of Nature (IUCN) (2011), biodiversity is crucial for the functioning of ecosystems which provide us with products and services which sustain human life. Healthy ecosystems provide us with oxygen, food, fresh water, fertile soil, medicines, shelter, protection from storms and floods, stable climate, and recreation.

Data Sources

Information in this section was sourced from the 2021 UMK Biodiversity and Freshwater Assessment Report.

Description

The project area falls within the Kathu Bushveld, which is characterised by open savannah with *Camel Thorn*, *Vachellia erioloba* (formerly known as *Acacia erioloba*) and Shepherd's Tree, *Boscia albitrunca* as the prominent trees. The shrub layer contains the Grey Camel Thorn, *Vachellia haematoxylon* (formerly known as *Acacia haematoxylon*) Black thorn *Senegalia mellifera*, (formerly known as *Acacia mellifera*) Blue bush, *Diospyros lycioides* and *Lycium hirsutum*. The grass layer is very variable.

Flora

The project area has been disturbed by the existing mine. The vegetation within the site displays various slight structural changes and dominance in woody vegetation. The distinct broad vegetation communities identified within the project area are listed below:

- *Vachellia haematoxylon* Savannah;
- *Vachellia mellifera* Mixed Woodland;
- *Vachellia erioloba* Savannah;
- Riverine Vegetation;
- *Tarchonanthus camphorates* - *Vachellia karroo* Scrub; and
- *Tarchonanthus camphoratus* – *Schmidtia pappophoroides* Scrub.

A few of the dominant tree species present within these habitats includes *Vachellia erioloba*, *Vachellia haematoxylon* and *Boscia albitrunca* which are protected in terms of the National Forests Act of 1998.



Vachellia haematoxylon



Senegalia mellifera



Vachellia erioloba



Tarchonanthus camphorates

Figure 8-5 Vegetation Composition Within The Project Area

Fauna

Based on the bird species identified on-site, the project site hosts both grassland and bushveld bird species. Red data bird species that are likely to occur within the project area include the Martial Eagle, Secretary bird and the Ludwig's Bustard. The loose sandy soils which occur over a large portion of the study site, makes these areas suitable for burrowing mammals. Species such as, Suricate, Common Mole Rat, and ground squirrels were observed on site. During the site visit a fairly large group of Kudu were observed. Other than direct sightings, other observations such as droppings and tracks from animals such as warthog were noted and, the tell-tale signs of porcupine were also observed.

Summary of environmental sensitivities within the project area

- Kathu bushveld is classified as least threatened (target 16%). However, this vegetation type is not conserved in any statutory conservation areas and more than 1% has already been transformed, threats are from mining and to a lesser extent heavy grazing pressure;
- The project area falls within the Griqualand West Centre (GWC) of Endemism. The GWC is considered a priority in the Northern Cape, as the number of threats to the area is increasing rapidly and it has been little researched and is poorly understood;
- The project area does not fall into any biodiversity priority areas and is therefore not deemed a risk for mining;
- The UMK mine does not fall within a National Protected Area Expansion Strategy 2008 focus area but is located near an area identified as a potential protected area for the eastern Kalahari bushveld;
- The project area is not considered a threatened ecosystem in terms of NEM:BA and does not fall within a Freshwater Ecosystem Priority Area (NFEPA);
- The project area does not fall within a critical biodiversity area as identified in the Northern Cape Critical Biodiversity Areas project 2016;
- There are no identified NFEPA wetlands within the study area;
- The project area and surrounding area does not fall within an Important Bird and Biodiversity Area (IBA). IBAs are sites of international significance for the conservation of the world's birds and other biodiversity. It should be noted that a large section of this property has already been disturbed by the mining activity which has resulted in some disturbance to the faunal population on site.

Conclusion

The placement of infrastructure as well as mining activities in general have the potential to disturb and/or destroy vegetation, habitat units and related ecosystem functionality including the disturbance of sensitive/endangered species. The footprint of the waste rock dumps falls within sensitive biodiversity areas which provide habitat for protected tree species. During the design of the infrastructure layout, areas of sensitivity have been taken into consideration and avoided where possible in order to minimise the disturbance and destruction of these areas.

8.6.1.6 Surface Water

Introduction and link to impact

Surface water resources include drainage lines and paths of preferential flow of stormwater runoff. Mine-related activities have the potential to alter the drainage of surface water through the establishment of infrastructure and/or result in the contamination of the surface water resources through seepage and/or spillage of potentially polluting materials, non-mineralised waste and mineralised wastes (waste rock stockpiles).

As a baseline, this section provides a brief description of surface water resources in the project area in order to facilitate an understanding of the hydrological catchments within which the mine is located and the status of surface water resources in the project area.

Data Sources

Information in this section was sourced from the 2017 EMPr Amendment Report and the 2021 the Biodiversity and Freshwater Assessment Report for UMK Mine.

Description

Regional Hydrology

The project area is located in the Gamagara catchment of the Orange Basin which includes quaternary catchments D41J and D41K. The Mine is located in quaternary catchment D41K. Catchments identified in the project area include the Gamogara, Witleegte and Vlermuisleegte catchments. The project area is drained by the Gamogara and two of its tributaries, namely the Witleegte and Vlermuisleegte. All three watercourses are non-perennial, ephemeral and highly seasonal. The Ga-Mogara River, only flowing with a reoccurrence interval of around 13 years on average (local farmers have indicated flow episodes as only 3 times during the past 46 years, namely during the years 1974, 1976 and 1988).

Local hydrology

The Gamogara and Vlermuisleegte watercourses are situated about 7km to the west and southwest, respectively, of the mine. The Witleegte forms the north-eastern boundary of the UMK mining right area. The Witleegte and Vlermuisleegte both drain in a north westerly direction towards the Gamogara. The Gamogara then flows in a northerly direction and feeds into the Kuruman River approximately 15km downstream of the project site. The soils within the Ga-Mogara River and Witleegte consist of fine materials, with low moisture contents. The soil chemistry of soil in the Gamogara River has a clayey-sand texture consisting of 18 to 24% clay particles and 72 to 80% sand particles. This slows down the water infiltration rate resulting in higher organic carbon content in the topsoil layer (2.70%) as compared to the surrounding area. A perched water table has been identified on the Ga-Mogara at least 15 m beneath the riverbed, the depth of which indicates that the river loses surface water flow to ground water as opposed to gaining water from a shallow water table. As there is no shallow water table beneath the riverbed, as well as a very flat riverbed it can be deduced that there is no significant subsurface flow in the river for the Ga-Mogara and by assumption for the Witleegte.

The Ga-Mogara and Witleegte Rivers consists of two zones, the riverbed and the riparian zone. Riparian zones can be distinguished from adjacent terrestrial areas through their association with the physical structure (banks) of the river or stream, as well as the distinctive structural changes between the riparian and upland terrestrial areas. The dense grass cover in the riverbed clearly stands out from the surrounding vegetation where shrubs and trees predominate.

This can be explained by both the change in the substrate that makes up the riverbed and the advantage grass have in accessing shallow soil moisture over shrubs and trees which are better at accessing deeper water sources. Sections of the riverbed of both water courses are however extensively invaded by *Prosopis glandulosa*, in some areas forming a dense impenetrable thicket. Only small sections of both water courses actually traverse the mining right area.



Figure 8-6 Watercourses In And Around The UMK Mining Right Area (EMS, 2021)

Surface water quality

surface water quality is already impacted in terms of the siltation and sedimentation, from when it does rains. The sediment washes from mine into both the watercourses could occur.

Surface water use

No reliable water use is possible from any of the watercourses (Gamogara, Witleegte, Vlermuisleegte) due to the highly seasonal river flow.

Conclusion

Infrastructural changes that have already taken place at the UMK Mine present sources of contaminants that present a potential for the pollution of surface water resources. Further to this, natural run-off is collected in all areas that have been designed with water containment infrastructure as required by legislation. It follows that the natural run-off to the catchment has already been influenced by infrastructural changes that have taken place. The continued operation of the UMK Mine and the establishment of additional facilities and activities must be managed/implemented in a way that pollution of water resources is prevented. Moreover, care is required to ensure that surface run-off patterns are disturbed as little as possible to promote the continued flow of water and nutrients

8.6.1.7 Groundwater

Introduction and link to impact

Groundwater is a valuable resource and is defined as water which is located in cavities and fractures of rock formations in the lithosphere. Understanding the geology of the area provides a basis from which to understand the occurrence and distribution of groundwater resources. Project-related activities such as the expansion of the opencast mining areas, the handling, storage, and disposal of mineralised and non-mineralised wastes, have the potential to impact on groundwater resources, both to the environment and third-party users, through dewatering and pollution.

As a baseline, this section provides a brief description of the pre-mining groundwater conditions to facilitate an understanding of the potential for dewatering cones of depression and pollution plumes to occur as a result of project-related activities.

Data Sources

Information in this section was sourced from the 2017 EMPr Amendment Report.

Description

Local geohydrology

The main regional aquifer is the deep fractured aquifer, consisting of the weathered Dwyka tillite and the Mooidraai Formation dolomite. The Kalahari sand and the sediment beds that overlie the low permeability Dwyka tillite is also considered under certain circumstances as an aquifer. The aquifers are classified as poor to minor aquifers. Borehole yields in the deeper aquifer are low however, structural features such as faults and fractures can produce relatively high yielding boreholes.

The water management area under which this site falls is the Lower Vaal, within which the major rivers are the Harts, Malopa and Vaal. It falls into quaternary catchment D41K.

The non-perennial drainage line Gamagara River is located approximately 2 km to the west of the site, and the non-perennial drainage line Witleegte Stream is located approximately 1 km to the northeast of the site. Drainage from the site is likely to flow in a westerly direction following the local topography. Currently, no water is discharged from the site into regional water resources.

Typically, there are no influence on the groundwater level by the presence of the non-perennial streams, as groundwater levels do not become shallower with the presence of the stream. This indicates that the stream is not fed by baseflow from the aquifer (AGES, 2007).

Prior to mining, regional groundwater flow at the site was from southwest to northeast towards the Gamagara River with the average water level in the area approximately 25 metres below ground level (mbgl) (AGES, 2007).

Groundwater users

The majority of the groundwater in the broader region is used to supply drinking water for cattle and in some instances supply water for domestic use.



Figure 8-7 Borehole Sampling Location Diagram (SLR, July 2020a)

Conclusion

The nature of mining infrastructure and activities are such that they present potential for pollution of groundwater resources and the lowering of groundwater levels. Baseline groundwater quality results indicate that prior to the establishment of the UMK Mine, groundwater quality had been influenced by anthropogenic pollution from farming and surrounding mining activities. In terms of groundwater quantity, there has been an increase in the groundwater levels since the establishment of the UMK Mine. The project must be implemented/managed in a way that pollution and reduction of groundwater resources is taken into consideration.

8.6.1.8 Air Quality

Introduction and link to impact

A change in ambient air quality can result in a range of impacts, which in turn, may cause a disturbance to nearby receptors. As a baseline, this section provides a short description of existing conditions in the area from which to measure changes as a result of the project. More detailed information will be provided in the EIA and EMPr.

Data Sources

Information in this section was sourced from the 2017 EMPr Amendment Report.

Description

Emission sources associated with the project areas

Neighbouring land-use in the area surrounding the project area comprises predominantly of farming and mining activities. These land-uses contribute to baseline pollutant concentrations via the following sources:

- Existing mining operations comprising underground and opencast mining operations, stockpiles and tailings dams, an ore reduction facility, and a sintering plant;
- Fugitive sources including vehicle entrainment of dust from local paved and unpaved roads, veld fires, wind erosion from open areas and dust generated by agricultural activities;
- Vehicle tailpipe emissions from public roads (minor source given relatively low vehicle activity rates in the region);
- Household fuel combustion (particularly wood and paraffin); and
- Regionally transported aged aerosols (particulates).

Potential Air Quality receptors

Potential receptors could include the following:

- Residential settlements in the towns of Hotazel (located 8 km to the north) and Black Rock (located 20 km to the northwest);
- Scattered farmsteads around the project area; and
- The natural environment.

Conclusion

Air quality within and surrounding the UMK Mine has already been influenced through the presence of approved infrastructure and activities. The establishment of additional facilities and activities presents additional sources of pollutants that may influence existing pollutant concentrations. The activities should therefore be carefully managed to ensure that contributions from the project remain within acceptable limits with associated acceptable impacts.

8.6.1.9 Noise

Introduction and link to impact

Noise generating activities associated with mining projects may cause an increase in ambient noise levels in and around the site. This may cause a disturbance to nearby potential receptors. As a baseline, this section provides a short description of the currently approved baseline conditions in the area from which to measure changes as a result of project-related noise.

Data Sources

Information in this section was sourced from the 2017 EMPr Amendment Report.

Description

Existing sources of noise include mining operations, localised traffic and trains, farming activities and natural sounds. To determine pre-mining noise levels, noise measurements were taken at two potentially sensitive sampling points in the project area, namely at the Perth farmhouse (MP1) and the Steyn farmhouse (MP2), over a 24-hour period. Based on the measured results, ambient noise levels varied from 39dBa during the day (06h00 to 22h00) to 33 dBs at night (22h00 to 06h00) which is typical for a rural area (SLR, March 2017).

Conclusion

Mining activities and infrastructure have the potential to cause an increase in ambient noise levels that may cause a disturbance to nearby sensitive receptors during all phases prior to closure. The current ambient noise levels at the UMK mine are related to mining activities at UMK Mine (and neighbouring mines), handling and processing of mineral resources, traffic on mine roads. The establishment of additional surface infrastructure and waste rock dumps will not result in significant changes to the noise emission sources within the UMK mine.

8.6.1.10 Visual

Introduction and link to impact

Mining projects have the potential to alter the landscape character of an area through the establishment of both temporary and permanent infrastructure. As a baseline, this section provides an understanding of the currently approved visual character of the project area against which to measure potential change as a result of project infrastructure and activities. More detailed information will be provided in the EIA and EMPr.

Data Sources.

Information in this section was sourced from the 2017 EMPr Amendment Report.

Description

The UMK mine is located within the flat open plains of the Kalahari. The site is rural in nature in that it is sparsely populated with farmhouses scattered throughout the area. The main land use in the area is game and cattle farming. The project site is located within an area known as the manganese belt and as such the sense of place and natural visual character of the area has been altered by the presence of mining operations.

The mine is visible to the naked eye from the R380 road between Kathu and Hotazel. The R380 is directly adjacent and to the east of the site. From higher vantage point such as the Kurumanheuwels, the mine may be visible. The mine is to be however visible to people travelling along sections of the main roads (surfaced and gravel) that border the project area. The mine is also visible to residents and workers on adjacent farms and mines.

Conclusion

Mining infrastructure has the potential to alter the landscape character of an area through the establishment of infrastructure. It is however important to note, that that the establishment of infrastructure as a result of the proposed surface infrastructural changes will be absorbed by the existing mining infrastructure on site. The establishment of additional surface infrastructure dumps will not result in significant changes to the visual impacts of the UMK mine during construction and operation.

8.6.1.11 Heritage/cultural and palaeontological resources

Introduction and link to impact

This section describes the existing status of the heritage and cultural environment that may be affected by the project. Heritage and cultural resources include all human-made phenomena and intangible products that are the result of the human mind. Natural, technological, or industrial features may also be part of heritage resources as places that have made an outstanding contribution to the cultures, traditions and lifestyles of the people or groups of people of South Africa.

Paleontological resources are fossils and the remains or traces of prehistoric life preserved in the geological (rock stratigraphic) record. They range from the well-known and well publicised (such as dinosaur and mammoth bones) to the more obscure but nevertheless scientifically important fossils (such as palaeobotanical remains, trace fossils, and microfossils).

Paleontological resources include the casts or impressions of ancient animals and plants, their trace remains (for example, burrows and trackways), microfossils (for example, fossil pollen, ostracodes, and diatoms), and unmineralised remains (for example, bones of Ice Age mammals) (SLR, March 2017).

Data Sources

Information in this section was sourced from the 2017 EMPr Amendment Report, 2021 Heritage Impact Assessment for New Infrastructure at the United Manganese Kalahari and 2021 Paleontological Impact Assessment for New Infrastructure at the United Manganese Kalahari.

Description

Heritage resources identified in the project area are listed below:

- Remains of mining activities relating to the Perth and Smartt manganese mines; and
- Occurrences of stone tools dating from the Middle to Late Stone Ages.

The mining remains can be considered to be of low importance or insignificant as the remains do not possess any uncommon, rare or endangered aspects of South Africa's natural or cultural heritage; do not have the potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage; do not have any importance in demonstrating a high degree of creative or technical achievement at a particular period; and are not yet 60 years old. The Stone Age occurrences to the north and northwest of the project area have a medium to high significance but are not expected to be affected by the project.

Fossil resources are protected by the National Heritage Resources Act (No 25 of 1999) and may not be affected (demolished, altered, renovated, removed) without approval.

Heritage and cultural resources

The project is located in an arid area characterized by wind-blown aeolian sands and historically very limited human occupation. The immediate project area has been subjected to extensive mining activities in the last two decades. As part of the field survey undertaken, three isolated Stone Age find spots (Find Spot 1 to 3) were recorded (Figure 8-8). These find spots were recorded in areas where calcrete protrudes through the aeolian sand. The possibility exist that Stone Age artefacts could occur below the Aeolian sand similar to observations made by Webley & Halket (2008) in the area.

In addition, few formal tools were recorded apart from a possible spoke stove, but some flakes have faceted platforms, and these appear to be of MSA origin. The ephemeral occurrences of artefacts at these find spots are isolated, out of context and of no significance.

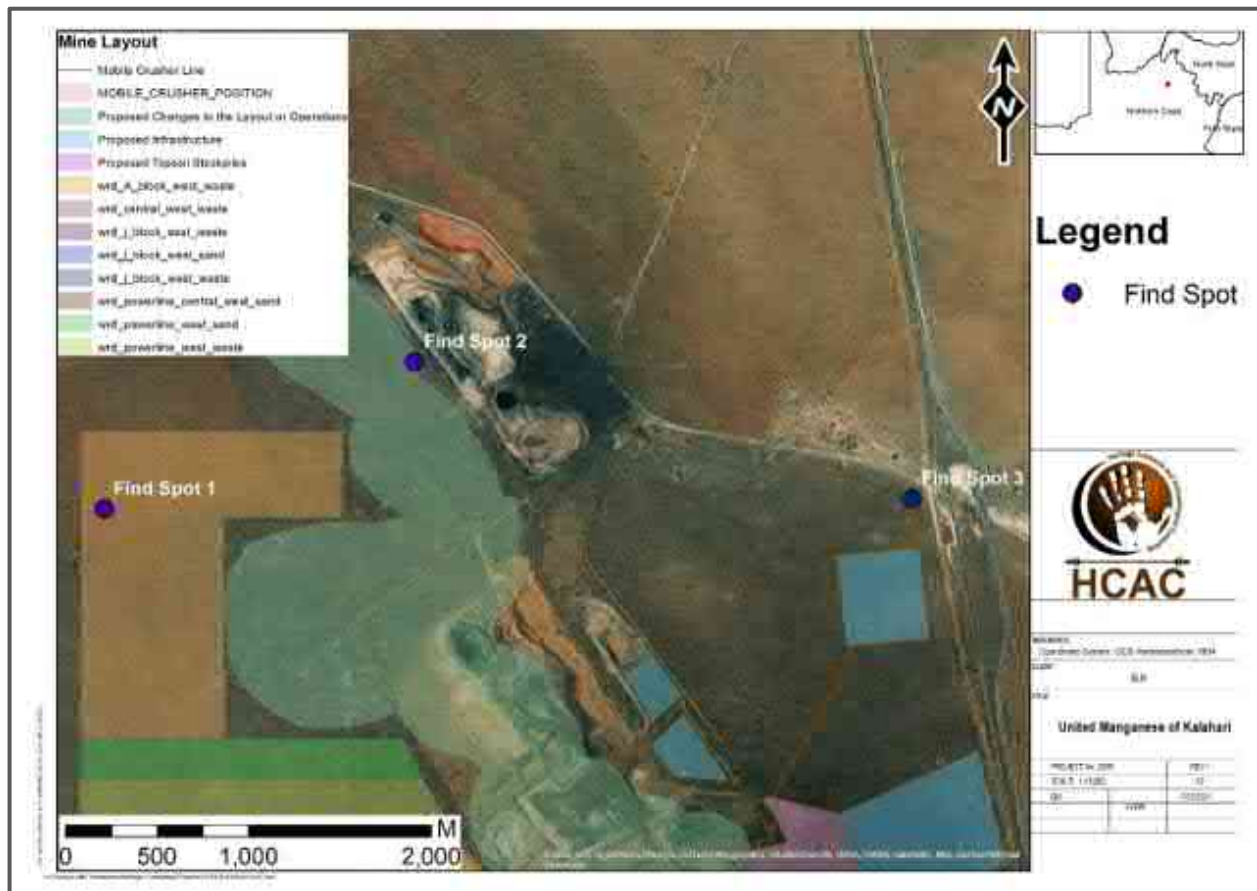


Figure 8-8 Find Spots Within UMK Mine (HCAC, 2021)

Palaeontological resources

The United Manganese of the Kalahari (UMK) Mine site is on the north-eastern margin of the Griqualand West Sequence of Neoarchaeon intrusive rocks, in the Prieska Subbasin of the Transvaal Basin that is filled with the sequence of the Transvaal Supergroup. Outcrops of the two main iron and manganese-bearing rocks are exposed to the east of the mine, but below the Kalahari sands are layers of banded iron formation (BIF) that is in primary context in the Kuruman Formation and reworked in the overlying Danielskuil Formation (Beukes et al., 2016). These ancient rocks are the target of the mining operation, but they are non-fossiliferous. Overlying much of the area are the Kalahari Group sands. This is the largest and most extensive palaeo-erg in the world (Partridge et al., 2006) and is composed of extensive aeolian and fluvial sands, sand dunes, calcrete, scree and colluvium. Periods of aridity have overprinted the sands, and calcrete and silcrete are common.

The project area is covered by aeolian Kalahari sands that were derived from farther to the northwest (Goudie and Wells, 1995) and finally deposited in this region during the Quaternary. Since they are windblown the sands are not in primary context, nor do they preserve any fossils. Fossils can only be preserved if there are palaeo-spring or palaeo-pan deposits where wood, plants or bones can be entrapped and preserved in the calcrete or silcrete that occasionally forms in such settings. No such deposits have been recorded from this site.

According to Goudie and Wells (1995) three factors are required for the formation of pans, namely a setting where the fluvial system is not fully integrated, and where salt weathering and aeolian deflation occur. The latter two conditions apply to this environmental setting, but the first does not as the site is on a slope and is far from any major river or drainage system. Therefore, it is extremely unlikely that there are any pans in the site or any fossils in the sands.

Conclusion

There is a low possibility of palaeontological resources occurring at the UMK Mine. In addition to this, any potential heritage resources located within the UMK mine are of low heritage significance. Paleontological and heritage resources are important to the history of South Africa and are protected by national legislation. It follows that in the event of any chance finds, SAHRA needs to be notified and where necessary permits need to be obtained prior to disturbance. This in particular applies to the establishment of additional facilities and activities as part of the project.

8.6.1.12 Socio Economic

Introduction and link to impact

Mines and related projects have the potential to result in both positive and negative socio-economic impacts. The positive impacts are usually economic in nature with mines contributing directly towards employment, procurement, skills development, and taxes on a local, regional, and national scale. In addition, mines indirectly contribute to economic growth in the local and regional economies because the increase in the number of income-earning people has a multiplying effect on the trade of other goods and services in other sectors.

The negative impacts can be both social and economic in nature. In this regard, mines can cause: -

- Influx of people seeking job opportunities which can lead to increased pressure on basic infrastructure and services (housing, health, sanitation, and education), informal settlement development, increased crime, introduction of diseases and disruption to the existing social structures within established communities; and
- A change to not only pre-existing land uses, but also social structure associated with these land uses and way of life.

To understand the basis of these potential impacts, a baseline situational analysis is described below.

Data Sources

Information in this section was sourced from Joe Morolong Local Municipality Integrated Development Plan of 2017 and StatsSA.

Description

UMK is located in the John Taolo Gaetsewe District Municipality and Joe Morolong Local Municipality of the Northern Cape Province. The nearest community to the mine is the town Hotazel, located approximately 10 km north of the UMK Mine. The Hotazel community has a population of 1 755, this population is low when compared to the local municipality population of 89 531 and the Northern Cape Province population of 1 145 861. This provides an indication of the remoteness of the project area.

The socio-economic environment within the John Taolo Gaetsewe District Municipality and Joe Morolong Local Municipality can be summarised as follows:

- Significant numbers of the population within the district and local municipalities have received no schooling or only limited primary education;
- The average number across the regions profiled of people completing high school education were relatively consistent; however, there is greater disparity when considering Grade 12 education, further education and training and tertiary education;
- The education profile within Hotazel is more positive in terms of the percentage of the population that have received further education and tertiary education when compared to the district and local municipalities.
- Majority of the population within the John Taolo Gaetsewe District Municipality and Joe Morolong Local Municipality are not economically active, while 48% of the Hotazel population is employed;
- There is a large dependency on subsistence agriculture, the public sector, seasonal workers, and employment in the mining sector;
- The population profile of the John Taolo Gaetsewe District Municipality and Joe Morolong Local Municipality demonstrates a consistent average household size of four people per household despite the significant decline in population numbers between the regional levels;
- The local community of Hotazel has an average of three members per household. These results are relatively typical of rural or semi-rural developing communities, however the low household density within Hotazel may be attributed to the fact that the town is largely a mining community established for and servicing surrounding mines;
- The most dominant type of dwelling utilized within the John Taolo Gaetsewe District Municipality, the Joe Morolong Local Municipality and Hotazel is a formally constructed house or brick structure. Traditional dwellings (e.g. huts/ structures made of traditional material) are the second highest used dwelling type in the district and local municipalities. No traditional dwellings are located within the town of Hotazel; rather the second highest used dwelling type is flats; and
- Hotazel is well formalised in terms of basic services. This may be attributed to the Hotazel area being more urbanized having been developed and supported by surrounding mines in recent years.

Conclusion

In general mining activities have the potential to influence socio-economic conditions both positively and negatively to which the approved mine already contributes. In the context of the approved mine, positive socio-economic influences include contributions in various ways to the local and regional economies. As part of the project care should be taken to avoid influencing negative socio-economic impacts further and allowing for the continuation of the positive socio-economic conditions.

8.6.2 Land Uses

Introduction and link to impact

Mining projects have the potential to affect land uses both on the project site and in the surrounding areas. This can be caused by physical land transformation and/or through direct or secondary impacts.

To understand the basis of the potential land use impacts, a brief baseline situational analysis is described below. More detailed information will be provided in the EIA and EMPr.

Data Sources

Information in this section was sourced from the 2017 EMPr Amendment Report and available baseline information.

Description

Mining rights

UMK holds the mining rights (NC 30/5/1/2/3/2/1(113) MR) on the farm portions outlined in Table 8-6 below.

Existing environmental authorisations in terms of NEMA

UMK holds an environmental authorisation (NC/KGA/HOT7/15/2006) in terms of NEMA on the farm portions outlined in Table 8-6 below.

Other rights and authorisations

Surface rights

The surface right owners within the project area are outlined in Table 8-6 below. There are also various servitudes (including a powerline and roads) throughout the study area.

Table 8-6 Landowners Located Within The Project Area

| Relevant farms | Relevant portion | Landowner |
|----------------|---|---|
| Rissik 330 | Portion 1 (Eastern portion) | Theresia Steyn |
| | Portion 1 (Western portion) | South 32 |
| Rissik 330 | Remaining extent (RE) (Eastern portion) | Theresia Steyn – Gideon Poolman Familie Trust |
| | RE (Western portion) | South 32 |
| Rissik 330 | Portion 2 | Transnet |
| Smartt 314 | RE | Terra Nominees (Pty) Ltd |
| Smartt 314 | Portion 1 | Transnet |
| Botha 313 | The farm | Terra Nominees (Pty) Ltd |

Land claims

As part of the project's public consultation process, the Department of Rural Development and Land Reform: Land Claim Commissioner was contacted in July 2020 to confirm if any land claims have been lodged on any of the farms located within the project area. No land claims have been lodged on the farms located within the project area.

Agriculture

Agricultural activities currently undertaken within the areas surrounding the UMK Mine includes game farming and livestock grazing.

Isolated residence/ residential area

With reference to Figure 8-10, the nearest towns / residential areas to the UMK include:

- The Black Rock mining community located approximately 20 km northwest of the UMK Mine;
- Hotazel situated approximately 15 km north of the UMK Mine;
- Kuruman located approximately 75 km south-east of the UMK Mine;
- Deben situated approximately 40 km to the southwest of the UMK mine; and
- Kathu located approximately 45 km to the south of the UMK Mine.

Infrastructure and servitudes

Two Eskom power lines (and the associated Eskom servitudes) occur in the project area. The first line enters the project site from the north and then traverses the centre of the project area in a south-westerly direction. This line supplied power to the old Middelplaats Mine on the farm Middelplaats 332. The second line cuts across the north-eastern corner of the project site on the farm Smartt 314.

Surrounding mines

Existing mining operations in the area include:

- The Nchwaning/Black Rock Mine (Assmang (Pty) Ltd) – Located northwest of the UMK Mine;
- The Sebilo Mine (Sebilo Resources (Pty) Ltd) – Located northwest of the UMK Mine;
- The Gloria Mine (Assmang (Pty) Ltd) – Located north of the UMK Mine;
- The Wessels Mine (South32) – Located north of the UMK Mine;
- The Tshipi Borwa Mine (Tshipi é Ntle Manganese Mining (Pty) Ltd) – located south of the UMK Mine.
- The Kalagadi Mine (Kalagadi Manganese (Pty) Ltd) – Located northwest of the UMK Mine;
- The Kudumane Mine (Kudumane Manganese Resources (Pty) Ltd) – Located north of the UMK Mine;
- The old Hotazel Mine (dormant/closed) – Located north of the UMK Mine;
- The old Devon mine (dormant/closed) – Located north of the UMK Mine;
- The old York Mine (dormant/closed) – Located north of the UMK Mine;
- The dormant / temporarily closed Middelplaats Mine – Located south of the UMK Mine; and
- The Mamatwan Mine (Hotazel Manganese Mines (Pty) Ltd) – Located south of the UMK Mine.

Solar plant

The Adams Solar Plant (Adams Solar PV Project Two (Pty) Ltd), owned by Enel Green Power (Pty) Ltd, is situated east of the UMK Mining Right boundary and approximately 2.5 km southeast of the UMK mine (Figure 8-9 and Figure 8-10).

The Adams Solar Plant will aid the new renewable generation capacity of the national grid. According to the strategy, 8.4 GW of new generation capacity in South Africa will be obtained from the Adams Solar Plant over the next twenty years.

Regional powerline infrastructure

Two Eskom power lines (and the associated Eskom servitudes) occur in the project area. The first line enters the project site from the north and then traverses the centre of the project area in a south-westerly direction. This line supplied power to the old Middelplaats Mine on the farm Middelplaats 332. The second line cuts across the northeastern corner of the project site on the farm Smartt 314.

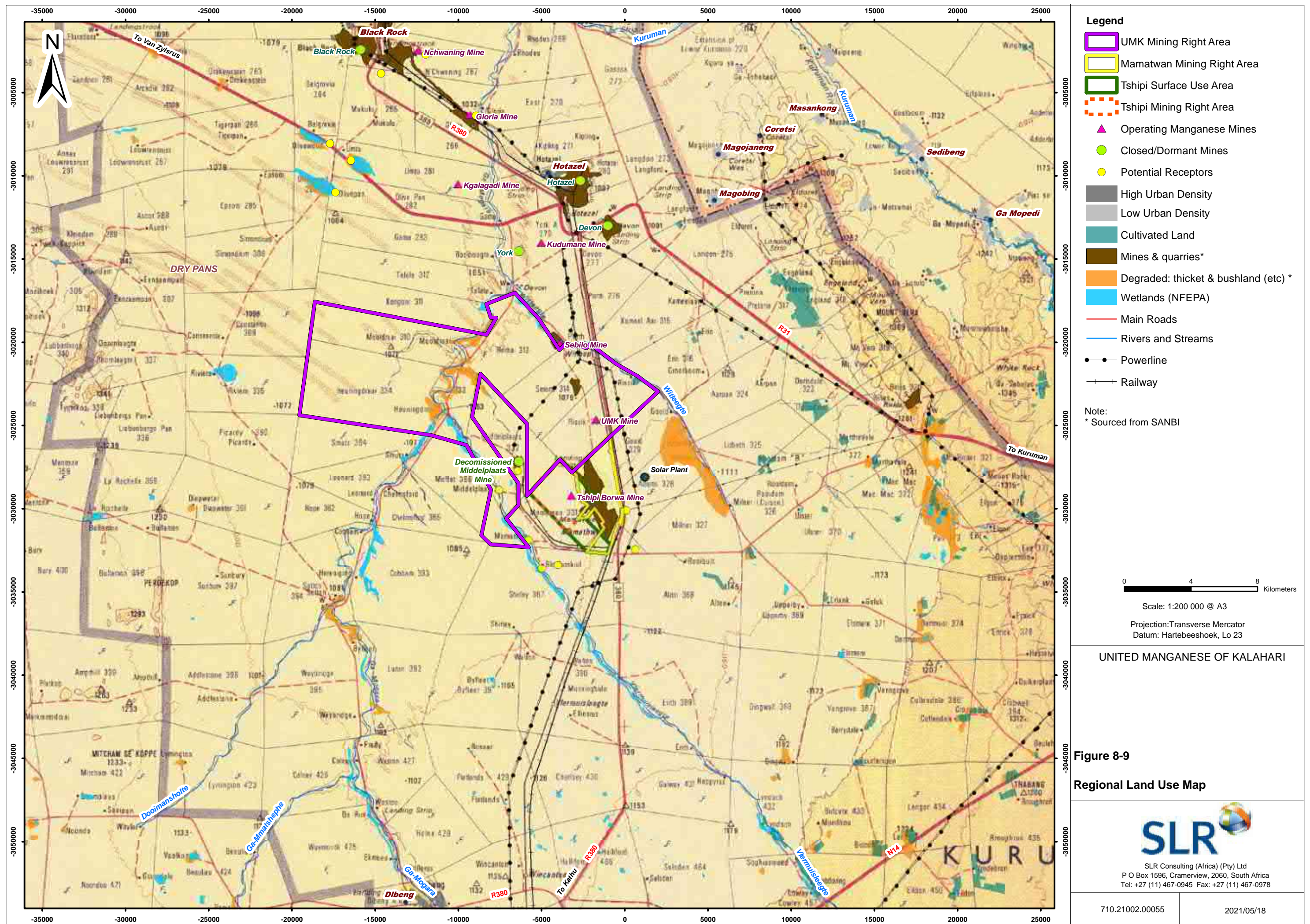
Local Road Network

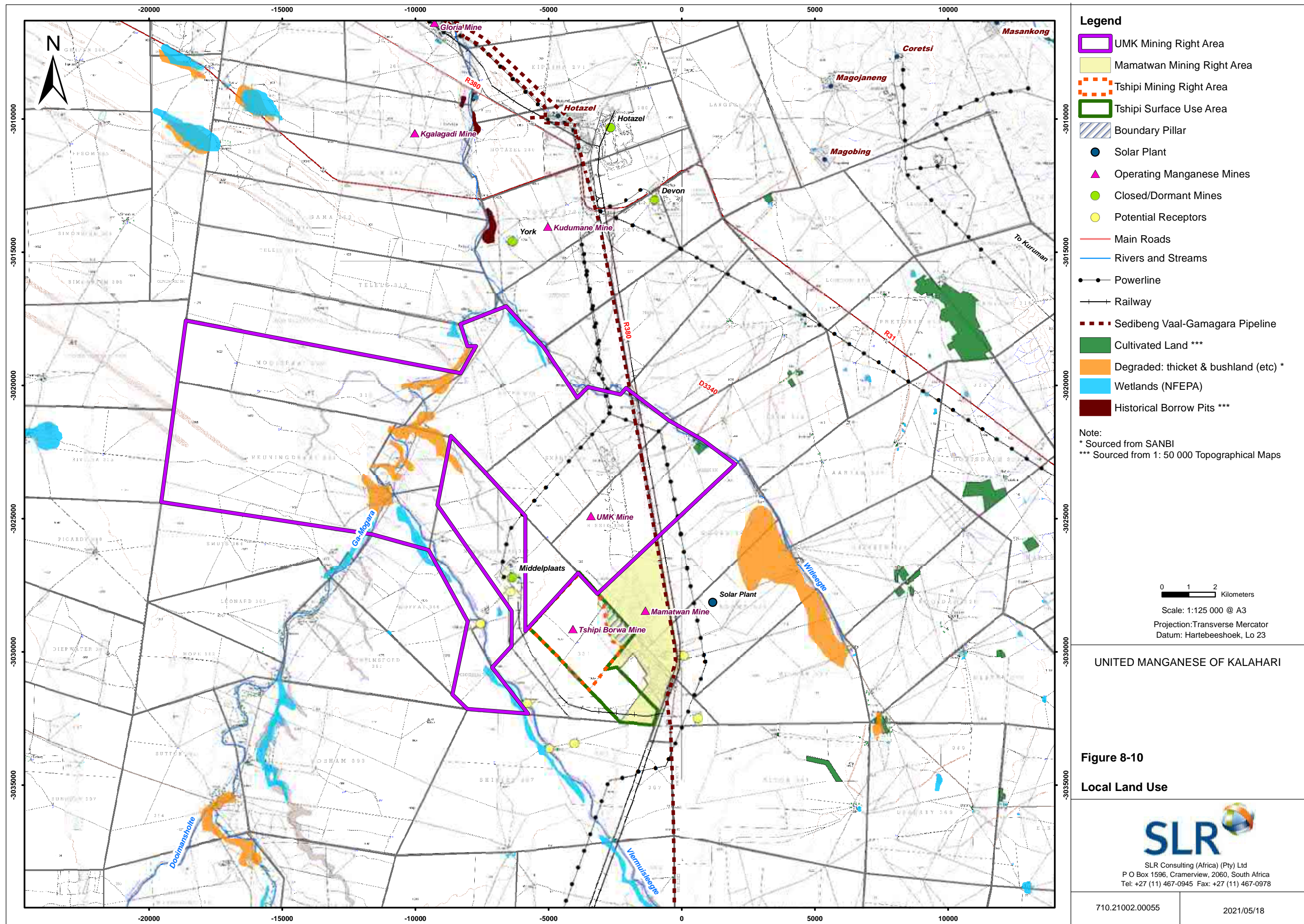
Existing roads within the vicinity of the UMK Mine include:

- The R380 provincial tar road directly adjacent and to the east of UMK Mine;
- The D3340 gravel road along the north-eastern boundary of the project area;
- A gravel road along the north-western boundary of the project area between Dibeng and the R31; and
- Gravel roads and several dirt tracks within the project boundary.

Conclusion

There are a number of land uses within and surrounding the UMK Mine which may be influenced by the mine and associated potential environmental impacts. It should however be noted that land has already been significantly influenced through mining, agricultural as well as infrastructure and servitudes.



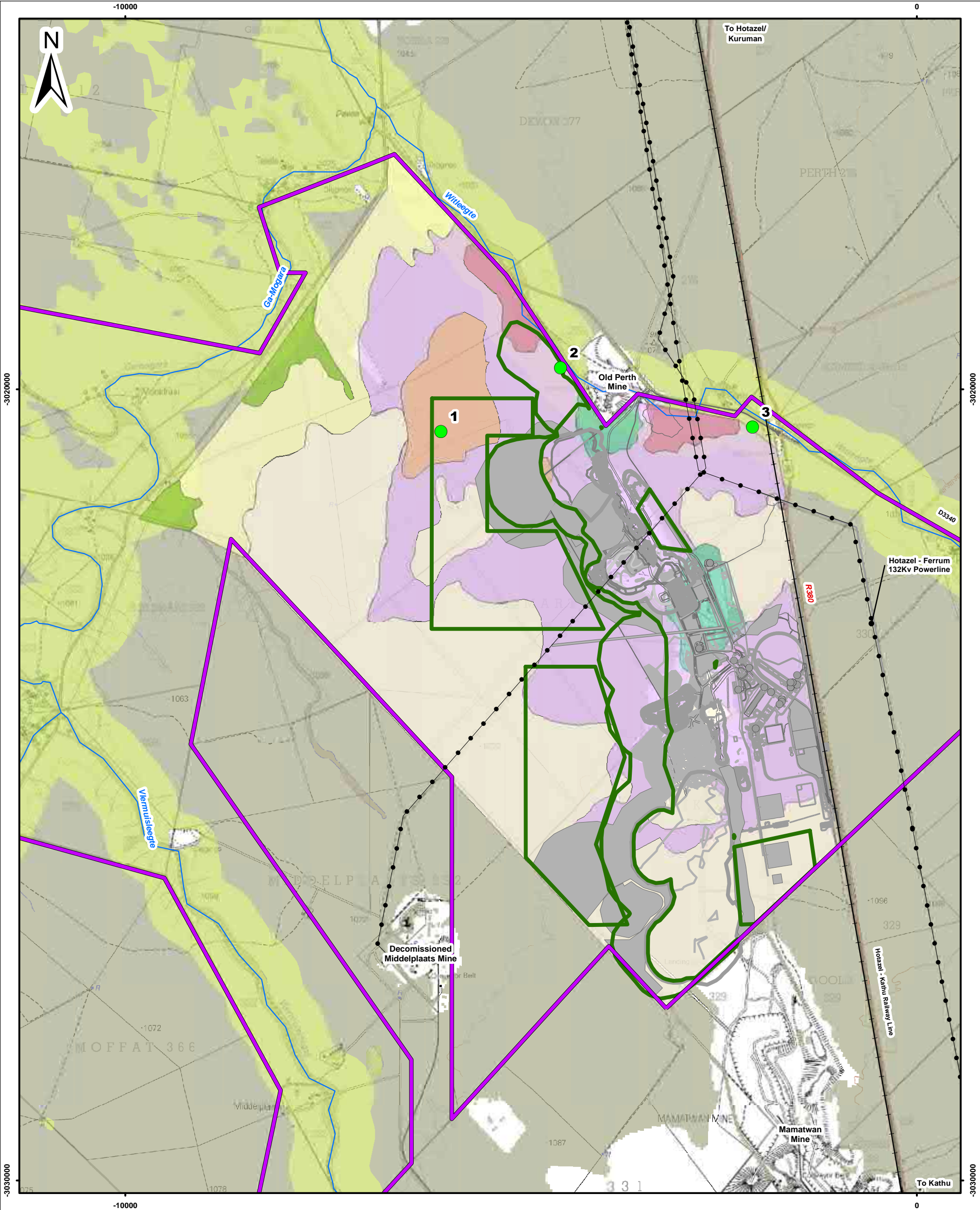


8.6.3 Description of specific environmental feature and infrastructure on site

The environmental features in the project area are described in Section 6.4.1 above. However, the notable environmental features are the Witleegte Spruit on the north-eastern boundary, and the Gamogara River on the north-western boundary of the UMK Mine. Infrastructure within and close to the project area is discussed in Section 9.6.13 above. The notable infrastructure within the project area is the Eskom power line that traverses the project site in a north easterly-south-westerly direction.

8.6.4 Environment and current land use map

A map illustrating the key features of the current environment and land use is included in Figure 8-11.



Legend

- UMK Mining Right Area
- Proposed changes to the layout or operations
- As per the approved infrastructure/facilities layout
- Main Roads
- Railway Line
- Power Line
- Rivers and Streams
- Critical Biodiversity Areas
- Ecological Support Area
- Other Natural Areas

- Heritage Resources
- Vegetation
 - Vachellia erioloba* Savannah
 - Vachellia haematoxylon* Savannah
 - Senegalia mellifera* Mixed Woodland
 - Schmidtia kalahariensis* – *Prosopis glandulosa* Shrubland
 - Secondary Vegetation
 - Tarchonanthus camphoratus* – *Vachellia karroo* Scrub
 - Tarchonanthus camphoratus* – *Schmidtia pappophoroides* Scrub

0 400 800 Meters
Scale: 1:47 000 @ A3
Projection: Transverse Mercator
Datum: WGS1984, Lo23

UNITED MANGANESE OF KALAHARI

Figure 8-11

Key Environmental Features and Land Use



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2021/11/16

8.7 ENVIRONMENTAL IMPACTS AND RISKS OF THE ALTERNATIVES

8.7.1 Methodology used in determining the significance of environmental impacts

The method used for the assessment of environmental issues is set out in Table 8-7. This assessment methodology enables the assessment of environmental issues including: cumulative impacts, the severity of impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated.

Table 8-7: Impact Assessment Methodology

Note: Part A provides the definition for determining impact consequence (combining intensity, spatial scale and duration) and impact significance (the overall rating of the impact). Impact consequence and significance are determined from Part B and C. The interpretation of the impact significance is given in Part D.

| PART A: DEFINITIONS AND CRITERIA* | | |
|--|----|---|
| Definition of SIGNIFICANCE | | Significance = consequence x probability |
| Definition of CONSEQUENCE | | Consequence is a function of intensity, spatial extent, and duration |
| Criteria for ranking of the INTENSITY of environmental impacts | VH | Severe change, disturbance, or degradation. Associated with severe consequences. May result in severe illness, injury, or death. Targets, limits, and thresholds of concern continually exceeded. Substantial intervention will be required. Vigorous/widespread community mobilization against project can be expected. May result in legal action if impact occurs. |
| | H | Prominent change, disturbance, or degradation. Associated with real and substantial consequences. May result in illness or injury. Targets, limits, and thresholds of concern regularly exceeded. Will definitely require intervention. Threats of community action. Regular complaints can be expected when the impact takes place. |
| | M | Moderate change, disturbance, or discomfort. Associated with real but not substantial consequences. Targets, limits, and thresholds of concern may occasionally be exceeded. Likely to require some intervention. Occasional complaints can be expected. |
| | L | Minor (Slight) change, disturbance, or nuisance. Associated with minor consequences or deterioration. Targets, limits, and thresholds of concern rarely exceeded. Require only minor interventions or clean-up actions. Sporadic complaints could be expected. |

| | | |
|--|-----|---|
| | VL | Negligible change, disturbance, or nuisance. Associated with very minor consequences or deterioration. Targets, limits, and thresholds of concern never exceeded. No interventions or clean-up actions required. No complaints anticipated. |
| | VL+ | Negligible change or improvement. Almost no benefits. Change not measurable/will remain in the current range. |
| | L+ | Minor change or improvement. Minor benefits. Change not measurable/will remain in the current range. Few people will experience benefits. |
| | M+ | Moderate change or improvement. Real but not substantial benefits. Will be within or marginally better than the current conditions. Small number of people will experience benefits. |
| | H+ | Prominent change or improvement. Real and substantial benefits. Will be better than current conditions. Many people will experience benefits. General community support. |
| | VH+ | Substantial, large-scale change or improvement. Considerable and widespread benefit. Will be much better than the current conditions. Favourable publicity and/or widespread support expected. |
| Criteria ranking DURATION for the of impacts | VL | Very short, always less than a year. Quickly reversible |
| | L | Short-term, occurs for more than 1 but less than 5 years. Reversible over time. |
| | M | Medium-term, 5 to 10 years. |
| | H | Long term, between 10 and 20 years (likely to cease at the end of the operational life of activity). |
| | VH | Very long, permanent, +20 years (Irreversible, Beyond closure). |
| Criteria ranking EXTENT for the of impacts | VL | A part of the site/property. |
| | L | Whole site. |
| | M | Beyond the site boundary, affecting immediate neighbours. |
| | H | Local area, extending far beyond site boundary. |
| | VH | Regional/National |

PART B: DETERMINING CONSEQUENCE

INTENSITY = VL

| | | | | | | | |
|----------|-------------|----|----------|-----|--------|--------|--------|
| DURATION | Very long | VH | Low | Low | Medium | Medium | High |
| | Long term | H | Low | Low | Low | Medium | Medium |
| | Medium term | M | Very Low | Low | Low | Low | Medium |

| VL | L | M | H | VH |
|-----------------------------|------------|------------------|----------------------|-----------------------|
| A part of the site/property | Whole site | Beyond the site, | Extending far beyond | Regional/ National |

| | | | | |
|--------|--|-------------------------|-----------------------|--|
| | | affecting neighbours | site but localised | |
| EXTENT | | | | |

| PART C: DETERMINING SIGNIFICANCE | | | | | | | |
|---|-------------------------|----|------------|----------|--------|-----------|-----------|
| PROBABILIT Y (of exposure to impacts) | Definite/ Continuous | VH | Medium | Medium | High | Very High | Very High |
| | Probable | H | Low | Medium | Medium | High | Very High |
| | Possible/ frequent | M | Low | Low | Medium | Medium | High |
| | Conceivable | L | Very Low | Low | Low | Medium | Medium |
| | Unlikely/ improbable | VL | Negligible | Very Low | Low | Low | Medium |
| | | | VL | L | M | H | VVH |
| CONSEQUENCE | | | | | | | |

| PART D: INTERPRETATION OF SIGNIFICANCE | |
|--|---|
| Significance | Decision guideline |
| Very High | Potential fatal flaw unless mitigated to lower significance. |
| High | It must have an influence on the decision. Substantial mitigation will be required. |
| Medium | It should have an influence on the decision. Mitigation will be required. |
| Low | Unlikely that it will have a real influence on the decision. Limited mitigation is likely required. |
| Very Low | It will not have an influence on the decision. Does not require any mitigation |
| Negligible | Inconsequential, not requiring any consideration. |

*VH = very high, H = high, M= medium, L= low and VL= very low and + denotes a positive impact.

8.7.2 Positive and negative impacts of the activity and alternatives

Noted in Section 8.3, no site alternatives were considered as the development footprint was determined by the location of the existing mining activities.

8.7.3 Possible management actions that could be applied and the level of risk

A summary of issues and concerns raised by I&APs during the Scoping phase is provided in Section 8.5. A list of the potential impacts identified by SLR and/or raised by I&APs, as well as the possible management and mitigation measures, is provided in Table 8-8. The level of residual risk after management or mitigation is also estimated.

Table 8-8: Possible Management Actions And The Anticipated Level Of Risk

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|---|--|---|-----------|
| | | Unmitigated | Mitigated |
| How will contamination be limited by the new plan? How will the new plan affect the groundwater in the long run? How will evaporation be limited with the new plan? | <ul style="list-style-type: none"> Update the hydrocensus to check for any new third-party water uses prior to initiating activities associated with the proposed surface infrastructural changes; Continue groundwater monitoring per existing monitoring protocols for the existing monitoring network, taking note of recommendation made in the Groundwater Monitoring Report; All potentially affected boreholes will be included in the water monitoring programme for boreholes located both on and off the mine site; If any mine related loss of water supply through a reduction in quality is experienced by third party borehole | Medium | Low |

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|--|---|---|-----------|
| | | Unmitigated | Mitigated |
| | <p>users, UMK will provide compensation which could include an alternative water supply of equivalent water quality;</p> <ul style="list-style-type: none"> Should any off-site contamination be detected, the mine will immediately notify DWS. The mine, in consultation with DWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and the long term) and then implement these measures; At decommissioning, the potential pollution sources (residual waste rock left on surface) will either be removed or rehabilitated to manage rainfall and seepage; and The environmental manager is responsible for implementing these actions from prior to construction through to closure. | | |
| As the proposed development is undergoing an EA Application process in terms of the National | <ul style="list-style-type: none"> Implementation of a chance find procedure for both the archaeological and paleontological resources. If fossils are | Low | Low |

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|--|--|---|-----------|
| | | Unmitigated | Mitigated |
| <p>Environmental Management Act, 107 of 1998 (NEMA), NEMA Environmental Impact Assessment (EIA) Regulations as amended, it is incumbent on the developer to ensure that a Heritage Impact Assessment (HIA) is done as per section 38(3) and 38(8) of the National Heritage Resources Act, Act 25 of 1999 (NHRA) as required by</p> <p>section 24(4)b(iii) of NEMA. This must include an archaeological component, palaeontological component and any other applicable heritage components. The HIA must be conducted as part of the EA Application in terms of NEMA and the NEMA EIA Regulations. SAHRA requests that an assessment of the impacts to heritage resources that complies with section 38(3) of the NHRA as required by section 38(8) of the NHRA and section 24(4)b(iii) of NEMA be conducted as part of the EA process. The assessment must include an assessment of the impact to archaeological and palaeontological resources. The assessment of archaeological resources must be conducted by a</p> | <p>found once drilling and excavations have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample; and</p> <ul style="list-style-type: none"> Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist. | | |

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|--|--|---|-----------|
| | | Unmitigated | Mitigated |
| <p>qualified archaeologist and the report comply with the SAHRA 2007 Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports (see www.aSapa.co.za or www.aphp.org.za for a list of qualified archaeologists). The proposed development is located within an area of moderate to high Palaeontological Sensitivity as per the SAHRIS PalaeoSensitivity map. As such, a desktop Palaeontological Impact Assessment (PIA) must be undertaken by a qualified palaeontologist. The report must comply with the 2012 Minimum Standards: Palaeontological Components of Heritage Impact Assessments (see https://www.palaeosa.org/heritage-practitioners.html for a list of qualified palaeontologists).</p> <p>Any other heritage resources as defined in section 3 of the NHRA that may be impacted, such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict,</p> | | | |

| Issue and concern raised | Possible management actions or alternatives to address issue | Impact significance of the possible management action before and after mitigation | |
|--|--|---|-----------|
| | | Unmitigated | Mitigated |
| and cultural landscapes or viewsapes must also be assessed. Further comments will be issued upon receipt of the NEMA EA documents inclusive of appendices. | | | |

8.7.4 Motivation where no alternative sites were considered

The development footprint was determined by the location of the existing mining operations at the UMK Mine. It follows that no site alternatives were considered.

8.7.5 Statement motivating the preferred alternative

No feasible alternatives exist for the proposed project and as such this section is not applicable. Refer to Section 7 for further details.

9. FULL DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY, ASSESS AND RANK THE IMPACTS AND RISKS THE ACTIVITY WILL IMPOSE ON THE PREFERRED SITE THROUGH THE LIFE OF THE ACTIVITY

This section provides a description of the process that was followed in order to identify the potential biophysical, cultural and socio-economic impacts that are assessed as part of the proposed project.

9.1 DESCRIPTION OF THE PROCESS UNDERTAKEN TO IDENTIFY IMPACTS

Biophysical and socio-economic impacts associated with the proposed project were identified through site visits undertaken by SLR and specialists, and the specialist studies.

As part of the public participation process, I&APs and commenting authorities (see Section 8.4) are being provided with opportunities to provide input into the S&EIA process and comment on the proposed project, including the identification of environmental and socio-economic impacts.

9.2 DESCRIPTION OF THE PROCESS UNDERTAKEN TO ASSESS AND RANK THE IMPACTS AND RISKS

A description of the assessment methodology used to assess the severity of identified impacts (including the nature of impacts and the degree to which impacts may cause irreplaceable loss of resources), the extent of the impacts, the duration and reversibility of impacts, the probability of the impact occurring, and the degree to which the impacts can be mitigated is provided in Section 8.7.1.

9.3 DESCRIPTION OF THE IMPACTS AND RISKS IDENTIFIED DURING THE ENVIRONMENTAL ASSESSMENT PROCESS

Table 9-1 below provides a description of the impacts on biophysical, cultural and socio-economic aspects in respect of each of the main project actions / activities and processes that will be assessed in Appendix D. Where potential impacts were considered but are deemed insignificant as a result of the proposed project these have been listed for completeness purposes but will not be associated with any activities or project phase.

Table 9-1: List Of Potential Impacts As they Related To The Project

| Potential impact | Activity | Project phases |
|---|---|---|
| Loss / sterilisation of mineral resources | Open pit mining Mineralised waste Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Safety to third parties and animals | Site preparation Earthworks Civil works | Construction Operation Decommissioning |

| Potential impact | Activity | Project phases |
|---------------------------------------|---|---|
| | Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Closure |
| Soil erosion | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Disturbance of original soil profiles | Site preparation Earthworks Civil works Open pit mining | Construction Operation Decommissioning Closure |

| Potential impact | Activity | Project phases |
|----------------------------|---|---|
| | Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | |
| Chemical pollution of soil | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Soil Compaction | Site preparation Earthworks Civil works Open pit mining Crushing plant | Construction Operation Decommissioning Closure |

| Potential impact | Activity | Project phases |
|---|---|---|
| | Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | |
| Loss of grazing capability | Site preparation Earthworks Civil works | Construction |
| Physical destruction of biodiversity | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Alteration of natural drainage patterns | Site preparation Earthworks Civil works | Construction Operation Decommissioning |

| Potential impact | Activity | Project phases |
|---|---|---|
| | Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Closure |
| Contamination of surface water resources | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Contamination of groundwater resources reducing availability to third parties | Site preparation Earthworks Civil works Open pit mining | Construction Operation Decommissioning Closure |

| Potential impact | Activity | Project phases |
|-------------------------------------|--|---|
| | Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | |
| Decrease in ambient air quality | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Increase in disturbing noise levels | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste | Construction Operation Decommissioning |

| Potential impact | Activity | Project phases |
|--|---|---|
| | Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | |
| Negative visual views | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Road disturbance and traffic safety | Transportation | Construction Operation Decommissioning |
| Loss of heritage/cultural and palaeontological resources | Site preparation Earthworks Civil works Open pit mining | Construction Operation Decommissioning Closure |

| Potential impact | Activity | Project phases |
|--------------------------------------|---|---|
| | Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | |
| Inward migration and economic impact | Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Construction Operation Decommissioning Closure |
| Change in land use | Site preparation Earthworks Civil works Open pit mining Crushing plant | Construction Operation Decommissioning Closure |

| Potential impact | Activity | Project phases |
|------------------|---|----------------|
| | Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | |

9.4 ASSESSMENT OF THE SIGNIFICANCE OF EACH IMPACT AND RISK AND AN INDICATION OF THE EXTENT OF TO WHICH THE ISSUE AND RISK CAN BE AVOIDED OR ADDRESSED BY THE ADOPTION OF MANAGEMENT ACTIONS

The assessment of the significance of potential biophysical, cultural and socio-economic impacts, including the extent to which impacts can be avoided or mitigated, is included in Section 9 and Appendix D

10.ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

The aim of this section is to list the various specialist studies undertaken for the Proposed project including the main findings of their reports, which are used to inform the compilation of this EIA Report.

A summary of the assessment of the biophysical and socio-economic impacts associated with the project is provided Table 10-1 below. A full description of the assessment is included in Appendix D.

Table 10-1: Assessment of Significant Impacts and Risks

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|------------------|---|----------------------------|---|--------------------------|--|
| Open pit mining Mineralised waste Maintenance and aftercare | Loss / sterilisation of mineral resources | Geology | Construction Operation Decommissioning Closure | Medium | Both the approved mine plan and infrastructure layout prevent sterilisation of third-party minerals. This issue will be considered by the mine geologist, environmental manager and mine manager in the pre-feasibility/planning stage of any proposed changes to the mine plan and infrastructure layout | Low | Likely with mitigation |
| Site preparation Earthworks Civil works Open pit mining | Safety to third parties and animals | Topography | Construction Operation | Insignificant | | | |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|------------------|--------------------------|---|----------------------------|--|--------------------------|--|
| Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | Decommissioning Closure | | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste | Soil erosion | Soil and Land Capability | Construction Operation Decommissioning Closure | High | <ul style="list-style-type: none"> Limit vegetation clearance to only the areas where the surface infrastructure will be constructed; Avoid parking of vehicles and equipment outside of designated parking areas; | Medium | Likely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---------------------------------------|--------------------------|---|----------------------------|---|--------------------------|--|
| Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | <ul style="list-style-type: none"> Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring); Design and implement a Stormwater Management System where run-off from surfaced areas is expected; Reduce the slope gradients along haul roads and other disturbed areas to gradients at or below the angle of repose. | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management | Disturbance of original soil profiles | Soil and Land Capability | Construction Operation Decommissioning Closure | High | <ul style="list-style-type: none"> Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; | Medium | Likely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|----------------------------|--------------------------|---|---|--|---|--|
| Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | <ul style="list-style-type: none"> Unnecessary land clearance must be avoided; and Level any remaining topsoil that were removed from the project area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation | Chemical pollution of soil | Soil and Land Capability | Construction Operation Decommissioning Closure | Medium (Construction) High (Operation) | <ul style="list-style-type: none"> Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing dried waste mud by burying it in a purpose-built containment area; | Very Low (Construction) Very Low (Operation) | Likely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|------------------|--------------------------|---|----------------------------|--|--------------------------|--|
| General site management Demolition Rehabilitation Maintenance and aftercare | | | | | <ul style="list-style-type: none"> Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; Containing potentially contaminating fluids and other wastes; and Cleaning up areas of spillage of potentially contaminating liquids and solids. | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation | Soil Compaction | Soil and Land Capability | Construction Operation Decommissioning Closure | High | <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout; and The activities of construction contractors or employees will be restricted to the planned areas. | Medium | Likely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|--|----------------------------|--------------------------|--------------|----------------------------|--|--------------------------|--|
| General site management Demolition Rehabilitation Maintenance and aftercare | | | | | | | |
| Site preparation Earthworks Civil works | Loss of grazing capability | Soil and Land Capability | Construction | High | <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout; The activities of construction contractors or employees will be restricted to the planned areas; Implement a rehabilitation plan in all areas of temporary disturbance that restore the natural vegetation of the area; and Conserve topsoil volumes and quality for use during the final rehabilitation to ensure that natural vegetation can be re-established in order to return the land to grazing land capability. | Medium | Likely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|------------------|---|----------------------------|--|--------------------------|--|
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Physical destruction of biodiversity | Biodiversity | Construction Operation Decommissioning Closure | High | <ul style="list-style-type: none"> Implement a comprehensive rehabilitation plan and revegetation plan; Where protected trees occur within the planned infrastructure areas, losses can be lessened by re-designing the infrastructure which will minimize the impact to individual trees. | Medium | Likely with mitigation |
| Site preparation Earthworks Civil works Open pit mining Crushing plant | Alteration of natural drainage patterns | Surface Water | Construction Operation | High | <ul style="list-style-type: none"> Implement stormwater management measures. | Medium | Unlikely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|--|--|------------------|---|----------------------------|---|--------------------------|--|
| Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/ services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | Decommissioning Closure | | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste | Contamination of surface water resources | Surface Water | Construction Operation Decommissioning Closure | High | <ul style="list-style-type: none"> Implement stormwater management measures. | Very low | Likely with mitigation |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---|------------------|---|----------------------------|--|--------------------------|--|
| Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services | Contamination of groundwater resources reducing availability to third parties | Groundwater | Construction Operation Decommissioning Closure | Medium | <ul style="list-style-type: none"> Update the hydrocensus to check for any new third-party water uses prior to initiating activities associated with the proposed surface infrastructural changes; Continue groundwater monitoring per existing monitoring protocols for the existing monitoring network, taking note of recommendation made in the Groundwater Monitoring Report; | Low | Low during operational phase, but impact can be minimised if management measures are put in place and followed. |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|--|------------------|------------------|-------|----------------------------|---|--------------------------|--|
| Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | <ul style="list-style-type: none"> All potentially affected boreholes will be included in the water monitoring programme for boreholes located both on and off the mine site; If any mine related loss of water supply through a reduction in quality is experienced by third party borehole users, UMK will provide compensation which could include an alternative water supply of equivalent water quality; Should any off-site contamination be detected, the mine will immediately notify DWS. The mine, in consultation with DWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and | | |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|---------------------------------|------------------|---|----------------------------|--|--------------------------|--|
| | | | | | <p>the long term) and then implement these measures;</p> <ul style="list-style-type: none"> At decommissioning, the potential pollution sources (residual waste rock left on surface) will either be removed or rehabilitated to manage rainfall and seepage; and The environmental manager is responsible for implementing these actions from prior to construction through to closure. | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Water supply, use and management | Decrease in ambient air quality | Air Quality | Construction Operation Decommissioning Closure | Medium | <ul style="list-style-type: none"> Continued Implementation of the approved dust control mitigation measures. | Low | Loss where mitigation measures are not correctly implemented |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|-------------------------------------|------------------|--|----------------------------|-------------------------|--------------------------|--|
| Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation | Increase in disturbing noise levels | Noise | Construction Operation Decommissioning | Insignificant | | | |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|--|-----------------------|------------------|---|----------------------------|-------------------------|--------------------------|--|
| General site management Demolition Rehabilitation Maintenance and aftercare | | | | | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation | Negative visual views | Visual | Construction Operation Decommissioning Closure | Insignificant | | | |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|--|--|--|---|----------------------------|--|--------------------------|--|
| Maintenance and aftercare | | | | | | | |
| Transportation | Road disturbance and traffic safety | Traffic | Construction Operation Decommissioning | Insignificant | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management | Loss of heritage/cultural and palaeontological resources | Heritage/Cultural and Palaeontological Resources | Construction Operation Decommissioning Closure | Low | <ul style="list-style-type: none"> Implementation of a chance find procedure for both the archaeological and paleontological resources. If fossils are found once drilling and excavations have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample. Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist. | Low | Irreversible |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|------------------|------------------|---|----------------------------|-------------------------|--------------------------|--|
| Demolition Rehabilitation Maintenance and aftercare | | | | | | | |
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Inward migration | Socio-economic | Construction Operation Decommissioning Closure | Insignificant | | | |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|--------------------|------------------|---|----------------------------|--|--------------------------|--|
| Site preparation Earthworks Civil works Open pit mining Crushing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Economic impact | Socio-economic | Construction Operation Decommissioning Closure | Low (Positive) | <ul style="list-style-type: none"> Continued implementation of the approved employment and procurement mitigation measures. | Medium (Positive) | Loss where mitigation measures are not correctly implemented |
| Site preparation Earthworks Civil works Open pit mining Crushing plant | Change in land use | Socio-economic | Construction Operation | Insignificant | | | |

| Activity | Potential impact | Aspects affected | Phase | Significance (Unmitigated) | Management actions type | Significance (Mitigated) | Extent to which the impact can be reversed, avoided or cause irreplaceable loss and the degree to which the impact and risk can be mitigated |
|---|------------------|------------------|----------------------------|----------------------------|-------------------------|--------------------------|--|
| Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | Decommissioning Closure | | | | |

11.SUMMARY OF SPECIALIST REPORT FINDINGS

The aim of this section is to list the various specialist studies undertaken for the Proposed project including the main findings of their reports, which are used to inform the compilation of this EIA Report.

The recommendations made by the specialist in support of the project are summarised in Table 11-1 below.

Table 11-1: Summary of specialist recommendations

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|---|---|--|
| Surface Water | <p>Management actions to be implemented during all project phases include:</p> <p>Mitigation by storm water management design measures:</p> <ul style="list-style-type: none"> The concept of the proposed stormwater management plan is to allow the dirty runoff, within the mine area, to flow across the dirty catchments of the site as surface flow before discharging into lined conveyance infrastructure. Confidence on the minimum risk to the environment is further provided in that the leachate from the proposed WRDs is considered non-hazardous. The WRDs, on the western side of the pit, need to be sloped as much as possible to allow | X | <ul style="list-style-type: none"> Section 0 (management actions) Section 31 (monitoring). |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|---|---|--|
| | <p>stormwater to flow towards the infrastructure provided.</p> <ul style="list-style-type: none"> • Reuse of stormwater from dirty catchments in the processing plant or for dust suppression. • The collection of dirty stormwater and water management strategy defined where the reuse of dirty water will be prioritised, thereby ideally reducing the impacts from the project on the surface water resources through planning for discharge of excess mine water; and • Management of silt. <ul style="list-style-type: none"> ○ In addition to the measures presented and discussed throughout this report, the following management measures should be implemented: • Infrastructure design: the design of all onsite access roads, plant areas, stockpiles, WRDs etc. should consider stormwater management and erosion control during both the construction and operational phases. • Good housekeeping practices should be implemented and maintained by clean-up of accidental spillages, as well as ensuring all dislodged material like run-of-mine stockpile is kept within the confined storage footprints. In | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|---|---|--|
| | <p>addition, clean-up material and materials safety data sheets for chemical and hazardous substances should be kept on site for immediate clean-up of accidental spillages of pollutants.</p> <ul style="list-style-type: none"> Regularly scheduled inspection and maintenance of water management facilities, to include inspection of drainage structures and liners for any in channel erosion or cracks; de-silting of silt traps/sumps and PCDs; and any pumps and pipelines should be maintained according to manufacturer's specifications. Vehicles or plant equipment servicing should be undertaken within suitably equipped facilities, either within workshops, or within bunded areas, from which any stormwater is conveyed to a pollution control dam, preferably after passing through an oil and silt interceptor. Pollutant Storage – any substances which may potentially pollute surface water should be stored within a suitably sized bunded area and where practicable covered by a roof to prevent contact with rainfall and/or runoff. Water Conservation and Water Demand Management (WC/WDM) measures to ensure that as much as is possible, water should be collected and reused, minimising the release of | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|--|---|---|
| | <p>any treated storm flows whilst also reducing the abstraction of water from external and potentially clean water sources (boreholes); and</p> <ul style="list-style-type: none"> From operations onwards, grading of disturbed area and, application of the final layers of growth medium, should be along the contour as far as can be achieved in a safe and practical manner; and vegetation of disturbed areas including seeding should be performed immediately following application of the growth medium to avoid erosion. | | |
| Groundwater | <p>Management actions to be implemented during all project phases include:</p> <ul style="list-style-type: none"> Update the hydrocensus to check for any new third-party water uses prior to initiating activities associated with the proposed surface infrastructural changes; Continue groundwater monitoring per existing monitoring protocols for the existing monitoring network, taking note of recommendation made in the Groundwater Monitoring Report; | X | <ul style="list-style-type: none"> Section 0 (management actions) Section 31 (monitoring) |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|---|---|--|
| | <ul style="list-style-type: none"> All potentially affected boreholes will be included in the water monitoring programme for boreholes located both on and off the mine site; If any mine related loss of water supply through a reduction in quality is experienced by third party borehole users, UMK will provide compensation which could include an alternative water supply of equivalent water quality; Should any off-site contamination be detected, the mine will immediately notify DWS. The mine, in consultation with DWS and an appropriately qualified person, will then notify potentially affected users, identify the source of contamination, identify measures for the prevention of this contamination (in the short term and the long term) and then implement these measures; At decommissioning, the potential pollution sources (residual waste rock | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|---|---|---|
| | <p>left on surface) will either be removed or rehabilitated to manage rainfall and seepage; and</p> <ul style="list-style-type: none"> The environmental manager is responsible for implementing these actions from prior to construction through to closure. | | |
| Biodiversity | <p>Management actions to be implemented during all project phases include:</p> <ul style="list-style-type: none"> Implement a comprehensive rehabilitation plan to revegetate the area will mitigate the impact to biodiversity to some extent. Generally, it is recommended that to mitigate the effects of mining a complete rehabilitation/restoration of an area to the pre-mining state is required. In arid and semi-arid environments however, the restorative process are often very slow and it can take several decades for a system to be restored its pre-mining state, but the likelihood of the area reaching this ideal state is not very high. In these arid systems its often more realistic to settle for a functioning state rather than a pre-mining state, which is | X | <ul style="list-style-type: none"> Section 0 (management actions) Section 31 (monitoring) |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|----------------------------|---|---|---|
| | <p>what is considered in terms of post mitigation assessment.</p> <ul style="list-style-type: none"> The re-vegetation plan must include the establishment of protected trees within the rehabilitated areas. The progress of tree growth and recruitment must be monitored and actively managed to ensure that the rehabilitated areas reflect the surrounding vegetation in terms of structure and composition. A search and rescue operation is not a feasible or practical option for these protected trees. Where protected trees occur within the planned infrastructure areas, losses can be lessened by re-designing the infrastructure which will minimize the impact to individual trees. | | |
| Heritage and palaeontology | <p>Management actions to be implemented during all project phases include:</p> <ul style="list-style-type: none"> Implementation of a chance find procedure for both the archaeological and paleontological resources. If fossils are found once drilling and excavations have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample; and | X | <ul style="list-style-type: none"> Section 0 (management actions) Section 31 (monitoring) |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|----------------------------------|---|---|---|
| | <ul style="list-style-type: none"> Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist. | | |
| Soils and Agricultural potential | <p>Management actions to be implemented during all project phases include:</p> <ul style="list-style-type: none"> Limit vegetation clearance to only the areas where the surface infrastructure will be constructed; Avoid parking of vehicles and equipment outside of designated parking areas; Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring); Design and implement a Stormwater Management System where run-off from surfaced areas is expected; Reduce the slope gradients along haul roads and other disturbed areas to gradients at or below the angle of repose; Re-establish vegetation along the proposed surface infrastructure to reduce the impact of run-off; Regularly check all stockpiles and bare surfaces around infrastructure areas, for | X | <ul style="list-style-type: none"> Section 0 (management actions) Section 31 (monitoring) |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|---|---|--|
| | <p>signs of soil erosion. In the case of any onset of soil erosion being detected, the surfaces must be rehabilitated through the use of geotextiles accompanied by seeding of indigenous vegetation;</p> <ul style="list-style-type: none"> • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; • Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; • Unnecessary land clearance must be avoided; • Level any remaining topsoil that were removed from the project area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface; • Using biodegradable hydraulic fluids, using lined sumps for collection of hydraulic fluids, recovering contaminated soils and treating them off-site, and securely storing | | |

| Specialist study | Recommendation of specialist | Specialist recommendations that have been included in the EIAR (mark with an x) | Reference to applicable section in this EIAR |
|------------------|--|---|--|
| | <p>dried waste mud by burying it in a purpose-built containment area;</p> <ul style="list-style-type: none"> • Avoiding waste disposal at the site wherever possible, by segregating, trucking out, and recycling waste; • Containing potentially contaminating fluids and other wastes; and • Cleaning up areas of spillage of potentially contaminating liquids and solids. | | |

12. ENVIRONMENTAL IMPACT STATEMENT

The aim of this section is to provide a summary of the potential biophysical, cultural and socio-economic impacts identified as well as their significance rating

12.1 SUMMARY OF KEY FINDINGS

This section provides a summary of the findings of identified and assessed potential impacts on the receiving environment in both the unmitigated and mitigated scenarios, including cumulative impacts. A summary of the potential impacts (as per Section 10), associated with the preferred alternative (as per Section 10), in the unmitigated and mitigated scenarios for all project phases is included in Table 12-1 below.

The assessment of the proposed project presents the potential for negative impacts to occur (in the unmitigated scenario in particular) on the biophysical, cultural and socio-economic environments both on the proposed project site and in the surrounding area. With management actions these potential impacts can be prevented or reduced to acceptable levels.

Provided the EMP is effectively implemented there is no biophysical, social, or economic reason why the proposed project should not proceed.

Table 12-1: Summary of Potential Impacts

| Aspect | Potential impact | Cumulative impact significance of the impact (the ratings are negative unless otherwise specified) | |
|--------------------------|---|--|---|
| | | Unmitigated | Mitigated |
| Geology | Loss and Sterilisation of Mineral Resources | Medium | Low |
| Topography | Hazardous Excavations and Infrastructure Resulting in Safety Risks to Third Parties and Animals | Insignificant | |
| Soil and land capability | Soil erosion | High | Medium |
| | Disturbance of original soil profiles | High | Medium |
| | Chemical pollution of soils | Medium (Construction) High (Operation) | Very Low (Construction) Very Low (Operation) |

| Aspect | Potential impact | Cumulative impact significance of the impact (the ratings are negative unless otherwise specified) | |
|--|--|--|-------------------|
| | | Unmitigated | Mitigated |
| | Soil compaction | High | Medium |
| | Loss of grazing capability | High | Medium |
| Biodiversity | Physical Destruction and General Disturbance of Terrestrial Biodiversity | High | Medium |
| Surface Water Resources | Alteration of Natural Drainage Patterns | High | Medium |
| | Pollution of Surface Water Resources | High | Very Low |
| Groundwater | Contamination of Groundwater Resources | Medium | Low |
| Air Quality | Air Pollution | Medium | Low |
| Noise | Increase in Disturbing Noise Levels | Insignificant | |
| Visual | Negative Visual Views | Insignificant | |
| Traffic | Road Disturbance and traffic safety | Insignificant | |
| Heritage/Cultural and Palaeontological Resources | Loss of Heritage/Cultural and Palaeontological Resources | Low | Low |
| Socio-Economic | Inward Migration | Insignificant | |
| | Economic Impact | Low (Positive) | Medium (Positive) |
| Land Use | Change in Land Uses | Insignificant | |

12.2 FINAL SITE MAP

The final layout illustrating the location of the project activities is included in Figure 4-1.

12.3 SUMMARY OF POSITIVE AND NEGATIVE IMPACTS AND RISKS OF THE ACTIVITY AND IDENTIFIED ALTERNATIVES

As noted in Section 7.1, no site alternatives were considered as the development footprint was determined by the location of the current mining operations at the UMK Mine.

13. IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES FOR INCLUSION IN THE EMPR

Based on the outcome of the impact assessment and where applicable the recommendations from specialists the proposed management objectives and outcomes specific to the proposed changes and for inclusion into the environmental management programme are detailed in this section.

13.1 PROPOSED MANAGEMENT OBJECTIVES AND OUTCOMES FOR ENVIRONMENTAL AND SOCIO-ECONOMIC IMPACTS

Specific environmental objectives to control, remedy or prevent potential impacts emanating from the project are provided in Table 13-1 below.

Table 13-1: Environmental Objectives And Outcomes

| Aspect | Impact objective | Outcome |
|--------------------------|--|---|
| Geology | To prevent unacceptable mineral sterilisation | Avoid mineral sterilisation |
| Soil and land capability | To prevent soil pollution and to minimise the loss of soil resources and related land capability through physical disturbance, erosion and compaction | To handle, manage and conserve soil resources to be used as part of rehabilitation and re-establishment of the pre-mining land capability |
| Biodiversity | To prevent the unacceptable disturbance and loss of biodiversity and related ecosystem functionality through physical destruction | To limit the area of disturbance as far as practically possible |
| Surface water | To prevent pollution of surface water resources and related harm to surface water users and to prevent unacceptable alteration of drainage patterns and related reduction of downstream surface water flow | To ensure surface water quality remains within acceptable limits for both domestic and agricultural purposes. To ensure that the reduction of the volume of run-off into the downstream catchment is limited to what is necessary and that natural drainage patterns are re-established as part of rehabilitation |
| Groundwater | To prevent pollution of groundwater resources and related harm to water users and to | To ensure groundwater quality remains within acceptable limits for both domestic and agricultural |

| Aspect | Impact objective | Outcome |
|-----------------------|--|---|
| | prevent losses to third party water users | purposes. To ensure that groundwater continues to be available to current users |
| Air | To prevent air pollution health impacts | To ensure that any pollutants emitted as a result of the project remains within acceptable limits |
| Heritage and cultural | To prevent unacceptable loss of heritage resources and related information | To protect heritage resources where possible. If disturbance is unavoidable, then mitigate impact in consultation with a specialist and the SAHRA and in line with regulatory requirements |
| Socio-economic | To enhance the positive economic impacts and limit the negative economic impacts | To work together with existing structures and organisations |

13.1.1 Impacts that require monitoring programmes

Outcomes of the environmental objectives are the implementation of monitoring programmes. Impacts that require monitoring include:

- Physical disturbance of biodiversity;
- Decrease in ambient air quality;
- Contamination of surface water resources; and
- Contamination of groundwater resources.

Environmental impacts requiring monitoring are discussed future in Section 0.

13.1.2 Activities and infrastructure

The source activities of potential impacts which require management are detailed in Section 211

13.1.3 Management actions

Management actions which will be implemented to control the project activities or processes which have the potential to pollute or result in environmental degradation are detailed in Section 0.

13.1.4 Roles and responsibilities

The key personnel to ensure compliance to this EMPr will be the mine manager and the environmental manager. As a minimum, these roles as they relate to the implementation of monitoring programmes and management activities will include:

- Ensure that the monitoring programmes and audits are scoped and included in the annual mine budget;
- Identify and appoint appropriately qualified specialists/engineers to undertake the programmes;
- Appoint specialists in a timeously manner to ensure work can be carried out to acceptable standards; and
- Stakeholder Engagement Department and SLP manager;
 - Liaise with the relevant structures in terms of the commitments in the SLP,
 - Ensure that commitments in the SLP are developed and implemented timeously,
 - Establish and maintain good working relations with surrounding communities and landowners, and
 - Facilitate stakeholder communication, information sharing and grievance mechanism.

14.FINAL ALTERNATIVES

This section requires an explanation for the final layout of the infrastructure and activities on the overall project site as shown on the final site layout together with reasons why the layout is the final alternative. The impact management measures, avoidance and mitigation measures identified throughout the assessment are identified for the final layout only.

The final site layout is illustrated in Figure 4-1 The impact management measures, avoidance and mitigation measures identified for the final site layout are included in Section 29.

15.ASPECTS FOR INCLUSION AS CONDITIONS OF THE AUTHORISATION

Management actions including monitoring requirements, as outlined in Section 0, should form part of the conditions of the environmental authorisation. With reference to Regulation 26 of GNR 982 of NEMA, additional conditions that should form part of the environmental authorisation that are not specifically included in the EMPr report include compliance with all applicable environmental legislation whether specifically mentioned in this document or not and which may be amended from time to time

16. ASSUMPTIONS, UNCERTAINTIES, LIMITATIONS AND GAPS IN KNOWLEDGE

This section outlines the assumptions and limitations applicable to this Proposed project.

16.1 ENVIRONMENTAL ASSESSMENT LIMIT

The EIA focuses on third parties only and does not assess health and safety impacts on employees and contractors because the assumption is made that these aspects are separately regulated by health and safety legislation, policies and standards, and that UMK will adhere to these.

16.2 PREDICTIVE MODELS IN GENERAL

All predictive models are only as accurate as the input data provided to the modellers. If any of the input data is found to be inaccurate or is not applicable because of proposed project design changes that occur over time, then the model predictions will be less accurate.

16.3 SOIL, LAND USE, LAND CAPABILITY AND LAND POTENTIAL

The following assumptions were made during the assessment and reporting phases:

- The assessment of the anticipated impacts assumes that the proposed surface footprint of the project will stay within the confines as depicted in the layout maps in this report.
- It was assumed that the layout will consist of the components stipulated in the final project layout and description that was provided by the applicant.
- Assumptions regarding the impacts of the proposed infrastructure were made and based on the author's knowledge of the nature and extent of the planned infrastructure.

The following knowledge gaps have been identified:

- There are no historical results on the soil pollution status of the land that was surveyed. As a result of the project area being part of a larger area of manganese mining activities, there may be elevated levels of possible pollutants as a result of polluted dust blowing into areas over a long period of time. Soil pollution assessment as a result of this was outside of the scope of this study.

16.4 BIODIVERSITY – TERRESTRIAL AND AQUATIC

The major potential limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant and animal species present are captured. However, this is rarely possible due to time and cost constraints. This survey has been conducted during July and represents the winter/dry season survey. This does limit the potential to encounter all the species that may be present and hinders the identification of some species. However, a previous survey undertaken for the mine was conducted in April (wet/summer season survey) which therefore augments the potential species data collected during this site visit, the data was further supplemented by a database of any listed species which are known from other studies to occur in the broad vicinity of the site. The lists of amphibians, reptiles and mammals for the site are based on those observed at the

site as well as those likely to occur in the area based on their distribution and habitat preferences. This represents a sufficiently conservative and cautious approach that takes account of the study limitations.

There is no quantitative analysis of the resource base for the protected trees (*Vachellia erioloba* and *Vachellia haematoxylon*) thus it is not known how many of the trees can be removed from an area without detrimentally affecting the overall population numbers. Once mining activities commence within an area the biodiversity within the area and its immediate surrounds is impacted. Impacts related to amendments need to consider the impacts to the biodiversity holistically and not just the impacts created by the amendment. An issue with assessing impacts related to biodiversity in terms of a phased approach is that areas become disturbed which results in biodiversity functionality degrading.

The loss of biodiversity as a result of the initial phase, alters the perceived sensitivity of the area, hence it is preferable to assess a development in its entirety, and not only the proposed amendments, to ensure that the cumulative impacts as a result of all the phases are adequately assessed.

This report deals exclusively with a defined assessment / study area and the nature and extent of water resources outside this focal area is largely informed by extrapolation of data collected and can be considered of low confidence. This is especially applicable for water resource units that extent well beyond the scope of this assessment (i.e. upstream or downstream). The riparian boundaries delineated are based on sampling points along transects and thus the outer boundary of water resource units between these transects / sampling points was extrapolated using knowledge of the site, aerial photography, contours and the ecologists' experience.

Sampling by its nature, means that generally not all aspects of ecosystems can be assessed and identified. The PES and EIS assessments undertaken are largely qualitative assessment tools and thus the results are open to professional opinion and interpretation. The Ecological Importance and Sensitivity assessment did not specifically address the finer-scale biological aspects of the watercourses such as fauna. The impact descriptions and assessment are based on the author's understanding of the proposed development based on the site visit and information provided. The assessment of impacts and recommendation of mitigation measures was informed by the site-specific ecological concerns arising from the field survey and based on the assessor's working knowledge and experience. Due to the complexities of ecological systems and the sensitive dependence on initial conditions, any predictions of the effects of perturbation are made with very low confidence. Evaluation of the significance of impacts with mitigation takes into account mitigation measures and best management practice.

16.5 HERITAGE

The authors acknowledge that the brief literature review is not exhaustive on the literature of the area. Due to the nature of heritage resources, the possibility exists that some features or artefacts may not have been discovered/recorded during the survey and the possible occurrence of graves/burials and other cultural material cannot be excluded. Similarly, the depth of the deposit of heritage sites cannot be accurately determined due its subsurface nature. This report only deals with the footprint area of the proposed development and consisted of non-intrusive surface surveys. This study did not assess the impact on medicinal plants and intangible heritage as it is assumed that these components would have been highlighted through the public consultation process if relevant. It is possible that new information could come to light in future, which might change the results of this Impact Assessment.

16.6 PALEONTOLOGY

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the banded iron formation, jaspilite and crocidolite, sandstones and aeolian sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The aeolian sands of the Quaternary period would not preserve fossils.

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

The aim of this section is to provide a reasoned independent opinion, whether or not the Proposed project should proceed or not. This opinion is informed by the outcome of the impact assessment and recommendations made by specialists, I&APs and commenting authorities.

17.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORIZED OR NOT

The assessment of the proposed project presents the potential for significant negative impacts to occur (in the unmitigated scenario in particular) on the biophysical, cultural and socio-economic environments both on the proposed project sites and in the surrounding area. With management actions, these potential impacts can be prevented or reduced to acceptable levels. It follows that provided the EMP is effectively implemented there is no biophysical, social or economic reason why the proposed project should not proceed.

17.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION

17.2.1 Specific conditions for inclusion in the EMP

Refer to Section 0.

17.2.2 Rehabilitation requirements

Refer to Section 0

18. PERIOD FOR WHICH AUTHORISATION IS REQUIRED

With specific reference to the listed activities identified in Table 4-1, these activities specifically related to the proposed surface infrastructural changes. It follows that authorisation is required for the remaining life of mine (until 2046, approximately 25 years).

19.UNDERTAKING

I, Sharon Meyer, the EAP's responsible for compiling this EIA, undertake that:

- The information provided herein is correct;
- Comments and inputs from I&APs and commenting authorities have been included and correctly recorded in this EIAR;
- Inputs and recommendations from the specialist reports have been included where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.

Unsigned Draft for public review

Signature of EAP

Date

Signature of commissioner of oath

Date

19. UNDERTAKING

I, Sharon Meyer, the EAP's responsible for compiling this EIA, undertake that:

- The information provided herein is correct;
- Comments and inputs from I&APs and commenting authorities have been included and correctly recorded in this EIAR;
- Inputs and recommendations from the specialist reports have been included where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.


Signature of EAP

26 April 2022
Date


Signature of commissioner of oath

26 APRIL 2022
Date

Greg Brown CA (SA)
Commissioner of Oaths (RSA)
3rd Floor, Block E, The Pivot
Montecasino Blvd, Fourways

20. FINANCIAL PROVISION

The aim of this section is to provide information pertaining to the methodology considered as part of the closure liability calculation determination.

20.1 METHOD TO DERIVE THE FINANCIAL PROVISION

The financial provision for the project has been incorporated into the financial provision for the overall UMK Mine in October 2017 and in accordance with the Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provision Provided by a Mine (DMR guideline). The next financial provision for the overall mine will be determined in accordance with the NEMA Regulations (1147 of 2015) pertaining to the financial provision for mining operations.

Further details are provided in Section 30.

20.2 CONFIRM THAT THE AMOUNT CAN BE PROVIDED FOR FROM OPERATING EXPENDITURE

The amount required in order to manage and rehabilitate the environment is provided for in the operating costs.

21.DEVIATION FROM THE APPROVED SCOPING REPORT AND PLAN OF STUDY

This section presents a summary of any deviations from the plan of study outlined in the scoping report.

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

The assessment methodology used in the assessment of potential impacts (see Section 8.7.1) is as per the approved Plan of Study for the EIA presented in the Final Scoping Report (DMRE Acceptance dated 10 October 2021).

21.2 MOTIVATIONS FOR DEVIATION

With reference to Section 21.1 above, this section is not applicable.

22. OTHER INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

22.1 IMPACT ON THE SOCIO-ECONOMIC CONDITIONS OF ANY DIRECTLY AFFECTED PERSON

No additional information has been requested by the Competent Authority.

22.2 IMPACT ON ANY NATIONAL ESTATE REFERRED TO IN SECTION 3(2) OF THE NATIONAL HERITAGE RESOURCES ACT

Not applicable. No national estate would be affected as part of the project.

22.3 DEPARTMENT OF ENVIRONMENTAL AFFAIRS SCREENING TOOL

As of 4 October 2019, it is compulsory to use DEFF online screening tool. The report generated by the DEFF screening tool was attached to the NEMA application for the proposed project as included in Appendix B. The screening tool report outlines specialist studies that need to be considered as part of the proposed project. In this regard, the table below outlines the specialist studies identified in the screening tool report along with an explanation pertaining to the applicability of these specialist studies in relation to the proposed project.

Table 22-1 DEA Screening Tool Results

| Theme | Sensitivity | Requirements | Comment |
|--------------------------------------|--|---|---|
| Agriculture | Medium | The screening tool protocol specifies that, for sites of medium significance, an Agricultural Compliance Statement is required. | A soil and agricultural potential study will be carried out. |
| Archaeological and Cultural Heritage | Not specified in the screening tool report | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | A cultural heritage and archaeology survey will be carried out. |
| Palaeontology | Medium | As no assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | A palaeontological study will be carried out. |
| Terrestrial Biodiversity | Low to Very High | The screening tool protocol specifies that, for sites of high significance, a Terrestrial | |

| Theme | Sensitivity | Requirements | Comment |
|---------------------------|--|---|--|
| | | Biodiversity Impact Assessment is required. | A Biodiversity and Freshwater Assessment study will be carried out. |
| Aquatic Biodiversity | Very High | The screening tool protocol specifies that, for sites of low significance, an Aquatic Biodiversity Impact Assessment is required. | |
| Animal Species Assessment | Low | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Plant Species | Low | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Ambient Air Quality | Not specified in screening tool report | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Noise | Not specified in screening tool report | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Hydrology | Not specified in screening tool report | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | A surface water model and stormwater management plan will be carried out. |

| Theme | Sensitivity | Requirements | Comment |
|------------------|--|---|--|
| Landscape/Visual | Not specified in screening tool report | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Traffic | Not specified in screening tool report | As no specific sensitivity/assessment protocol has been prescribed, the required level of assessment must be based on the findings of the Initial Site Sensitivity Verification and comply with Appendix 6 of the EIA Regulations | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Civil Aviation | High | The proposed project will not present any tall structures that could influence flight paths. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Climate | Not specified in screening tool report | Not applicable to the project activities. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Defence | Low | Not applicable to the project activities. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Geotechnical | Not specified in screening tool report | Not applicable to the project activities. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Health | Not specified in screening tool report | Not applicable to the project activities. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |
| Radioactivity | Not specified in screening tool report | Not applicable to the project activities. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |

| Theme | Sensitivity | Requirements | Comment |
|------------|--|---|--|
| Seismicity | Not specified in screening tool report | Not applicable to the project activities. No further investigation is proposed. | No specialist study required in terms of the Scoping Investigation of potential impacts. |

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

No other matters are required in terms of Section 24(4)(A) and (B) of the Act.

PART B - ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

24.DETAILS OF THE EAP

24.1 DETAILS OF THE EAP WHO PREPARED THE REPORT

The details of the EAPs who undertook the S&EIA process and prepared this EIAR are provided in Part A, Section 2.

25.DESCRPTION OF THE ASPECTS OF THE ACTIVITY

The requirements to describe the aspects of the activities that are covered in this EMP are included in Part A, Section 8.4.

26.COMPOSITE MAP

A composite map superimposed on the environmental sensitive areas is included in Appendix O.

27. DESCRIPTION OF THE IMPACT MANAGEMENT OBJECTIVES INCLUDING MANAGEMENT STATEMENT

27.1 DETERMINATION OF CLOSURE OBJECTIVES

The closure objectives for the project were determined taking into account the existing type of environment as described in Section 8.6.1, in order to ensure that the closure objectives strive to achieve a condition approximating its natural state as far as possible. Further information pertaining to the closure objectives identified for the Proposed project is provided in Section 30.

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

The management actions outlined in Section 0 have been identified in order to manage and reduce impacts associated with the project in order to prevent unnecessary damage to the environment as a result of the project activities. If incidents occur that may result in environmental damages the emergency response procedure as outlined in Section 32.3.2 will be implemented to avoid pollution or degradation.

27.3 VOLUMES AND RATE OF WATER USE FOR MINING

The volumes of water required as part of the project include the following:

- Potable water (approximately 1 048 m³/month);
- Dust suppression (approximately 22 967 444 m³/month); and
- Process plant water requirement (approximately 9 432 m³/month)

27.4 HAS A WUL BEEN APPLIED FOR?

As part of the project a separate application will be submitted for the water use licence.

27.5 IMPACTS TO BE MITIGATED IN THE EIAR RESPECTIVE PHASES

The assessment of impacts is summarised in Section 10 and detailed in Appendix D. Management actions which will be implemented to avoid and minimise potential impacts are detailed in Section 29. The section below focuses on mitigation measures that are specific to **listed activities** based on the actions outlined in Section 29.

Table 27-1. Measures To Rehabilitate The Environment Affected By The Undertaking Of Any Listed Activity

| Activity (Listed: NEMA and NEMWA) | | Phase | Size and scale of disturbance | Mitigation measures | Compliance with standards | Time period for implementation |
|-----------------------------------|---|-----------------------------|-------------------------------|--|--|--|
| Number | Description | | | | | |
| Listing Notice 1, 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. | Operational | 39.22 ha | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. |
| Listing Notice 1, Activity 27 | The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except 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. | Construction | 799 ha | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. |
| Listing Notice 1, Activity 34: | The expansion of existing facilities or infrastructure for any process or activity where such expansion will result in the need for a permit or licence or an amended permit or licence in terms of national or provincial | Construction Operational | 799 ha | Refer to Table 29-1 for the mitigation | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. |

| Activity (Listed: NEMA and NEMWA) | | Phase | Size and scale of disturbance | Mitigation measures | Compliance with standards | Time period for implementation |
|-----------------------------------|---|-------------|-------------------------------|---|--|--|
| Number | Description | | | | | |
| | legislation governing the release of emissions, effluent or pollution, excluding - (i) where the facility, infrastructure, process or activity is included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; | | | measures . | | |
| Listing Notice 2, 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, excluding - (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental | Operational | 799 ha | Refer to Table 29-1 for the mitigation measures . | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. |

| Activity (Listed: NEMA and NEMWA) | | Phase | Size and scale of disturbance | Mitigation measures | Compliance with standards | Time period for implementation |
|-----------------------------------|---|--------------|-------------------------------|--|--|--|
| Number | Description | | | | | |
| | Management: Waste Act, 2008 applies; (iii) the development of facilities or infrastructure for the treatment of effluent, polluted water, wastewater or sewage where such facilities have a daily throughput capacity of 2 000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day. | | | | | |
| Listing Notice 2, 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. | Construction | 799 ha | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. |
| Listing Notice 2, Activity 17 | Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including -(a) | Operational | 54.3 Ha | Refer to Table 29-1 for the mitigation | Refer to Table 29-1 for the mitigation measures. | Refer to Table 29-1 for the mitigation measures. |

| Activity (Listed: NEMA and NEMWA) | | Phase | Size and scale of disturbance | Mitigation measures | Compliance with standards | Time period for implementation |
|-----------------------------------|---|-------|-------------------------------|---------------------|---------------------------|--------------------------------|
| Number | Description | | | | | |
| | associated infrastructure, structures and earthworks, directly related to the extraction of a mineral resource; or (b) the primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this Notice applies. | | | measures . | | |

28. IMPACT MANAGEMENT OUTCOMES

Table 28-1 below provides a description of the outcomes and objective of management actions in order to manage, remedy, control or modify potential impacts. The management actions identified to achieve these outcomes and objectives are described in Section 0. Since the activities are already occurring on site, the construction phase is not applicable for management actions and thus only the operational phase is included in the table below. Refer to Appendix D Detailed Assessment of Impacts

for further detail.

Table 28-1. Description Of Impact Management Outcomes

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|--|---|-----------------|---|---|---|
| Open pit mining Mineralised waste Maintenance and aftercare | Loss and sterilisation of mineral resources | Geology | Construction Operation Decommissioning Closure | Control through facilities design and placement of ore body | Avoid sterilisation of mineral resources to prevent unacceptable mineral sterilisation. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management | Hazardous excavations and infrastructure resulting in safety risks to third parties and animals | Topography | Construction Operation Decommissioning Closure | Insignificant | |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|------------------|---------------------------|---|---|--|
| Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Soil erosion | Soils and land capability | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Limit vegetation clearance to only the areas where the surface infrastructure will be constructed; Avoid parking of vehicles and equipment outside of designated parking areas; Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring); Design and implement a Stormwater Management System where run-off from surfaced areas is expected; Reduce the slope gradients along haul roads and other | To ensure that soil resources are handled and managed properly in order to conserve these resources for use as part of rehabilitation which will assist with the restoration of pre-mining land capability as far as possible. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---------------------------------------|---------------------------|---|---|--|
| | | | | disturbed areas to gradients at or below the angle of repose. | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Disturbance of original soil profiles | Soils and land capability | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; Unnecessary land clearance must be avoided; and Level any remaining topsoil that were removed from the project area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | To ensure that soil resources are handled and managed properly in order to conserve these resources for use as part of rehabilitation which will assist with the restoration of pre-mining land capability as far as possible. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|----------------------------|---------------------------|---|---|--|
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Chemical pollution of soil | Soils and land capability | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; Unnecessary land clearance must be avoided; and Level any remaining topsoil that were removed from the project area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | To ensure that soil resources are handled and managed properly in order to conserve these resources for use as part of rehabilitation which will assist with the restoration of pre-mining land capability as far as possible. |
| Site preparation Earthworks Civil works Open pit mining Processing plant | Soil Compaction | Soils and land capability | Construction Operation Decommissioning | <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout; and | To ensure that soil resources are handled and managed properly in order to conserve these |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|--|----------------------------|---------------------------|--------------|--|--|
| Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | Closure | <ul style="list-style-type: none"> The activities of construction contractors or employees will be restricted to the planned areas. | resources for use as part of rehabilitation which will assist with the restoration of pre-mining land capability as far as possible. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management | Loss of grazing capability | Soils and land capability | Construction | <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout; The activities of construction contractors or employees will be restricted to the planned areas; Implement a rehabilitation plan in all areas of temporary disturbance that restore the natural vegetation of the area; and | To ensure that soil resources are handled and managed properly in order to conserve these resources for use as part of rehabilitation which will assist with the restoration of pre-mining land capability as far as possible. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|--|-----------------|---|--|--|
| Demolition Rehabilitation Maintenance and aftercare | | | | <ul style="list-style-type: none"> Conserve topsoil volumes and quality for use during the final rehabilitation to ensure that natural vegetation can be re-established in order to return the land to grazing land capability. | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Physical destruction and general disturbance of biodiversity | Biodiversity | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Implement a comprehensive rehabilitation plan and revegetation plan; Where protected trees occur within the planned infrastructure areas, losses can be lessened by re-designing the infrastructure which will minimize the impact to individual trees. | To prevent the unacceptable disturbance and loss of biodiversity and related ecosystem functionality through physical destruction and to limit the area of disturbance as far as possible. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|--|-----------------|---|---|--|
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Alteration of natural drainage patterns | Surface water | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Implement stormwater management measures | To ensure that the reduction of the volume of run-off into the downstream catchment is limited to what is necessary and that natural drainage patterns are re-established as part of rehabilitation in order to prevent unacceptable alteration of drainage patterns and related reduction of downstream surface water flow. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management | Contamination of surface water resources | Surface water | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Control through stormwater management and design Remedy through emergency procedure (Section 32.3.2) | To ensure surface water quality remains within acceptable limits for both domestic and agricultural purposes to prevent pollution of surface water resources and related harm to surface water users. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|--|-----------------|---|---|--|
| Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Contamination of groundwater resources | Groundwater | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Control through continued implementation of the groundwater monitoring programme. | To ensure groundwater quality remains within acceptable limits for both domestic and agricultural purposes to prevent harm to water users. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|--|-------------------------------------|-----------------|---|--|--|
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Air pollution | Air quality | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Continued Implementation of the approved dust control mitigation measures. | To ensure that any pollutants emitted as a result of the proposed project remain within acceptable limits so as to prevent health related impacts. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services | Increase in disturbing noise levels | Noise | Construction Operation Decommissioning | Insignificant | |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|-------------------------------------|-----------------|---|-------------------------|---|
| Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Negative visual views | Visual | Construction Operation Decommissioning Closure | Insignificant | |
| Transportation | Road disturbance and traffic safety | Traffic | Construction Operation | Insignificant | |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|---|---|---|---|---|
| | | | Decommissioning | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Loss of heritage/ cultural and palaeontological resources | Heritage/ cultural and palaeontological resources | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Implementation of a chance find procedure for both the archaeological and paleontological resources. If fossils are found once drilling and excavations have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample. Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist. Monitoring reports of the excavations of the aeolian sands that contain calcrete layers must be submitted to SAHRA upon completion of the construction phase. If any evidence of archaeological sites or | To avoid the disturbance of significant heritage resources. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|----------|------------------|-----------------|-------|--|---|
| | | | | <p>remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.</p> <ul style="list-style-type: none"> If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/ Ngqabutho Madida 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section | |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|--|------------------|-----------------|--|---|---|
| | | | | <p>of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; See section 51(1) of the NHRA with regards to offences.</p> <ul style="list-style-type: none"> If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. | |
| Site preparation Earthworks Civil works Open pit mining Processing plant | Inward migration | Socio-economic | Construction Operation Decommissioning | Insignificant | |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|--|------------------|-----------------|---|---|--|
| Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | Closure | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management | Economic impact | Socio-economic | Construction Operation Decommissioning Closure | <ul style="list-style-type: none"> Control through procurement programme and bursary and skill development programme | To enhance the positive economic impacts by working together with existing structures and organisations. |

| Activity | Potential Impact | Affected Aspect | Phase | Management actions Type | Standard to be Achieved (Impact management outcome/objectives) |
|---|--------------------|-----------------|---|-------------------------|---|
| Demolition Rehabilitation Maintenance and aftercare | | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Change in land use | Land use | Construction Operation Decommissioning Closure | Insignificant | |

29.IMPACT MANAGEMENT ACTIONS

Management actions identified to prevent, reduce, control or remedy the assessed impacts are presented in Table 29-1 below. The action plans include the timeframes for implementing the management actions together with a description of how management actions comply with relevant standards. Management actions and recommendations identified by specialists have been summarised and are included in the table below.

Table 29-1. Description of Impact Management Actions

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|--|---|---|--------------------------------|---------------------------|
| Open pit mining Mineralised waste Maintenance and aftercare | Loss and sterilisation of mineral resources | Management actions that have been identified for all project phases include the following: <ul style="list-style-type: none"> Both the approved mine plan and infrastructure layout prevent sterilisation of third-party minerals. This issue will be considered by the mine geologist, environmental manager and mine manager in the pre-feasibility/planning stage of any proposed changes to the mine plan and infrastructure layout. | Ongoing | Not applicable |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management | Hazardous excavations and infrastructure resulting in safety risks to third parties and animals | Not applicable | Not applicable | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|------------------|---|--------------------------------|---------------------------|
| Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Soil erosion | <p>Management actions that have been identified for all project phases include the following:</p> <ul style="list-style-type: none"> • Limit vegetation clearance to only the areas where the surface infrastructure will be constructed; • Avoid parking of vehicles and equipment outside of designated parking areas; • Plan vegetation clearance activities for dry seasons (late autumn, winter and early spring); • Design and implement a Stormwater Management System where run-off from surfaced areas is expected; and • Reduce the slope gradients along haul roads and other disturbed areas to gradients at or below the angle of repose. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|---------------------------------------|--|--------------------------------|---------------------------|
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Disturbance of original soil profiles | Management actions that have been identified for all project phases include the following: <ul style="list-style-type: none"> • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; • Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; • Unnecessary land clearance must be avoided; and • Level any remaining topsoil that were removed from the project area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | Ongoing | Not applicable |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services | Chemical pollution of soil | Management actions that have been identified for all project phases include the following: <ul style="list-style-type: none"> • Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment should be contained using a drip tray with plastic sheeting filled with absorbent material; | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|------------------|--|--------------------------------|---------------------------|
| Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | <ul style="list-style-type: none"> Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint; Unnecessary land clearance must be avoided; and Level any remaining topsoil that were removed from the project area and that remained on the surface instead of allowing small stockpiles of soil to remain on the surface. | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Soil Compaction | <p>Management actions that have been identified for all project phases include the following:</p> <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout; and The activities of construction contractors or employees will be restricted to the planned areas. | Ongoing | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|--|---|--------------------------------|--|
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Loss of grazing capability | Management actions that have been identified for the construction phase include the following: <ul style="list-style-type: none"> Minimize the areas of activity to that indicated in the infrastructure layout; The activities of construction contractors or employees will be restricted to the planned areas; Implement a rehabilitation plan in all areas of temporary disturbance that restore the natural vegetation of the area; and Conserve topsoil volumes and quality for use during the final rehabilitation to ensure that natural vegetation can be re-established in order to return the land to grazing land capability. | Ongoing | Not applicable |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management | Physical destruction and general disturbance of biodiversity | Management actions that have been identified for all project phases include the following: <ul style="list-style-type: none"> Implement a comprehensive rehabilitation plan and revegetation plan; and Where protected trees occur within the planned infrastructure areas, losses can be lessened by re-designing the infrastructure | Ongoing | The mitigation action to obtain a protected species removal permit from DAFF (currently known as Department of Forestry, Fisheries and the Environment (DFFE) and/or DENC in |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|--|--|--------------------------------|--|
| Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | which will minimize the impact to individual trees. | | accordance with the NFA and NCNCA that stipulates that no protected species may be removed without a permit. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Alteration of natural drainage patterns | Management actions that have been identified for all project phases include the following: <ul style="list-style-type: none"> Implement stormwater management measures. | Ongoing | Construct and operate stormwater management facilities so as to comply with the National Water Act (36 of 1998) and Regulation 704 (4 June 1999). The submission of a water use license for authorisation/exemption in terms of the National Water Act (36 of 1998) and Regulation 704. |
| Site preparation Earthworks Civil works Open pit mining | Contamination of surface water resources | Management actions that have been identified for all project phases include the following: | Ongoing | Construct and operate stormwater management facilities so |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|--|--|---|--------------------------------|--|
| Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | <ul style="list-style-type: none"> Implement stormwater management measures. | | <p>as to comply with the National Water Act (36 of 1998) and Regulation 704 (4 June 1999).</p> <p>The submission of a water use license for authorisation/exemption in terms of the National Water Act (36 of 1998) and Regulation 704.</p> |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation | Contamination of groundwater resources | <p>Management actions that have been identified for all project phases include the following:</p> <ul style="list-style-type: none"> Control through continued implementation of the groundwater monitoring programme. | Ongoing | <p>Implementation of the regulation regarding the planning and management of residue stockpiles from a mining operation, GNR. No. 632.</p> <p>The submission of a water use license for authorisation/exemption in terms of the National</p> |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|--|-------------------------------------|---|--------------------------------|--|
| Maintenance and aftercare | | | | Water Act (36 of 1998) and Regulation 704. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Air pollution | Management actions that have been identified for all project phases include the following: <ul style="list-style-type: none"> Continued Implementation of the approved dust control mitigation measures. | Ongoing | National Atmospheric Emission Reporting Regulations in terms of the National Environmental Management: Air Quality Act 39 of 2004 requires that holders of mining rights register on the National Atmospheric Emissions Inventory System (NAEIS) and to ensure that annual monitoring reports are uploaded onto the NAEIS. |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste | Increase in disturbing noise levels | Not applicable | Not applicable | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|-----------------------|--------------------|--------------------------------|---------------------------|
| Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Negative visual views | Not applicable | Not applicable | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|--|---|--------------------------------|---|
| Transportation | Road disturbance and traffic safety | Not applicable | Not applicable | Not applicable |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Loss of heritage/cultural and palaeontological resources | <p>Management actions that have been identified for all project phases include the following:</p> <ul style="list-style-type: none"> Implementation of a chance find procedure for both the archaeological and paleontological resources. If fossils are found once drilling and excavations have commenced, then they should be rescued, and a palaeontologist called to assess and collect a representative sample. Excavations through aeolian sands to the calcrete layer especially in the pit should be monitored by an archaeologist. Monitoring reports of the excavations of the aeolian sands that contain calcrete layers must be submitted to SAHRA upon completion of the construction phase. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, | As required | Compliance with the National Heritage Resource Act No. 25 of 1999 in the event of any chance finds. |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|----------|------------------|---|--------------------------------|---------------------------|
| | | <p>charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA APM Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.</p> <ul style="list-style-type: none"> • If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/ Ngqabutho Madida 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule; See section 51(1) of the NHRA with regards to offences. • If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---|------------------|--|--------------------------------|---------------------------|
| | | the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | Inward migration | Not applicable | Not applicable | Not applicable |
| Site preparation Earthworks Civil works Open pit mining Processing plant | Economic impact | Management actions that have been identified for all project phases include the following: | | |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|--|--------------------|--|--------------------------------|---------------------------|
| Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation Maintenance and aftercare | | <ul style="list-style-type: none"> Continued implementation of the approved employment and procurement mitigation measures. | | |
| Site preparation Earthworks Civil works Open pit mining Processing plant Mineralised ore and waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transportation General site management Demolition Rehabilitation | Change in land use | Not applicable | Not applicable | Not applicable |

| Activity | Potential Impact | Management actions | Time Period for Implementation | Compliance with Standards |
|---------------------------|------------------|--------------------|--------------------------------|---------------------------|
| Maintenance and aftercare | | | | |

30. FINANCIAL PROVISION

30.1 DETERMINATION OF THE AMOUNT OF THE FINANCIAL PROVISION

30.1.1 Closure objectives description and the alignment with the baseline environment

The preliminary closure plan objectives and principles have been developed against the background of the mine location in the Kuruman region of the Northern Cape, and include the following:

- To create a functioning ecosystem that supports a sustainable end land use of wilderness and grazing;
- Environmental impact and liability is minimised to the extent that it is acceptable to all parties involved;
- Mine closure is achieved efficiently, cost effectively and in compliance with the law; and
- The social and economic impacts resulting from mine closure are managed in such a way that negative socio-economic impacts are minimised.

The closure target outcomes for the UMK manganese mine site are therefore assumed to be as follows:

- Achieve chemical, physical and biological stability for an indefinite, extended time period over all disturbed landscapes and residual mining infrastructure;
- Protect surrounding surface water, groundwater, soils and other natural resources from loss of current utility value or environmental functioning;
- Limit the rate of emissions to the atmosphere of particulate matter to the extent that degradation of the surrounding areas' land capability or environmental functioning does not occur;
- Maximise visual 'harmony' with the surrounding landscape; and
- Create a final land use that has economic, environmental and social benefits for future generations that outweigh the long-term aftercare costs associated with the mine.

30.1.2 Confirmation that closure objectives have been consulted with I&APs

The closure objectives are outlined in this EIAR which will be made available to I&APs, including landowners for review and comment (Section 8.5).

To date no comments regarding the closure objectives (see Section 30.1.1) have been received from I&APs, including landowners (see Section 8.5).

30.1.3 Rehabilitation plan

The objective of annual rehabilitation planning is to:

- Review concurrent rehabilitation and remediation activities already implemented;
- Establish rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the gradual achievement of the post-mining land use, closure vision and objectives identified in the holder's final rehabilitation, decommissioning and mine closure plan;
- Establish a plan, schedule and budget for rehabilitation for the forthcoming 12 months;

- Identify and address shortcomings experienced in the preceding 12 months of rehabilitation; and
- Evaluate and update the cost of rehabilitation for the 12-month period and for closure, for purposes of supplementing the financial provision guarantee or other financial provision instrument.

Annual rehabilitation plans will be prepared in future updates of the mine closure plan, as part of the requirements of GNR 1147 (Financial Provisioning Regulations, 2015) - that only come into effect on 19 June 2022.

Annual rehabilitation and remediation activities associated with the annual rehabilitation plan will focus primarily on:

- Clearing of vegetation in accordance with the relevant vegetation management procedures;
- Destructing and disturbing as little vegetation and biodiversity as possible (i.e. limiting the footprint of the mines operations), and retaining as much natural vegetation as possible;
- Stripping and stockpiling of soil resources in areas designated for surface infrastructure in line with the soil conservation procedure;
- Backfilling of mined out pit areas in accordance with the mine plan;
- Rehabilitation of overburden dumps (no longer required) that are expected to remain post-closure;
- General, hazardous and medical waste collection, storage and disposal; and
- Ongoing monitoring of groundwater, surface water and air quality.

30.1.4 Compatibility of the rehabilitation plan with the closure objectives

It can be confirmed that the rehabilitation plan is compatible with the closure objectives given that the closure objectives were considered during the determination of the rehabilitation plan.

30.1.5 Calculate and state the quantum of the financial provision

The closure cost liability is considered to have an accuracy of at least 50% as a result of using the DMRE Guideline (i.e. acceptable for mines with a remaining life greater than 30 years). Future liability updates will therefore need to focus on improving the closure liability estimates to the required accuracy of at least 70% (i.e. for mines with a remaining life of between 10 and 30 years) by 19 June 2022 – when GNR 1147 (Financial Provisioning Regulations, 2015) becomes applicable for UMK Mine. GNR 1147 requires that the DMRE Guideline for calculating closure liabilities be discontinued, and that independent site-specific contractor rates be applied instead. The calculated quantum of financial provision is **R 353,443,347** for the UMK Mine, including VAT.

In addition, a further **R 7,717,788 (incl. VAT)** should be allowed for post-closure monitoring, auditing and reporting over a period of seven years following mine closure (See Section 13.2).

30.1.6 Confirmation that the financial provision will be provided

In terms of Section 41, Regulations 53 and 54 of the MPRDA, the project as part of the overall UMK Mine is required to make financial provision for the interim and final rehabilitation activities on the site. This provision is prepared and reviewed annually for adequacy and amended to compensate for new activities and/or inflation. During the annual review, confirmation will be provided that this amount can be provided for from operating expenditure.

31. MECHANISMS FOR MONITORING COMPLIANCE AND PERFORMANCE AGAINST THE EMPR

Environmental impacts requiring monitoring are listed in Table 31-1 below.

As a general approach, UMK will ensure that the monitoring programmes comprise the following:

- Adherence to a formal monitoring procedure;
- Use of appropriately calibrated equipment by personnel trained to use the equipment;
- The preservation of samples according to laboratory specifications by personnel trained to use the equipment, where samples require analysis;
- The identification of monitoring parameters in consultation with a specialist in the relevant field and/or the relevant authority;
- The amendment of monitoring parameters, where necessary, following the initial monitoring results and in consultation with a specialist and/or the relevant authority; and
- The interpretation of data and reporting of trends will be undertaken by an appropriately qualified person.

Table 31-1: Monitoring Of Compliance And Performance

| Activity | Impacts requiring monitoring | Functional requirements for monitoring | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions |
|---|--|---|----------------------------|--|
| Site preparation Earthworks Civil works Open pit mining Processing Mineralised waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transport system Continued use of approved facilities and services General site management Rehabilitation | Alteration of natural drainage patterns | <p>The IWUL requires that an operational water balance for the mine needs to be developed from recorded flow measurements and production figures. The water balance is used to check on an on-going basis that the capacity of the stormwater dam facilities is adequate.</p> <p>In addition to the above the IWUL requires that UMK updates the water balance on an annual basis to determine the loads of waste emanating from the activities. UMK shall determine the contribution of their activities to the mass balance for water resources and must furthermore co-operate with other water users in the catchment to determine the mass balance for the water resources reserve compliance point.</p> | Environmental Department | <p>Operational water balance must be updated on an annual basis for the duration of the mine. This information must be made available on request.</p> <p>Mass water balance to be updated on an annual basis for the duration of the mine. This information must be submitted to the DWS on an annual basis.</p> |
| | Contamination of surface water resources | Monitoring of surface water quality must be undertaken in the event that surface water flow is present in the Witleegte River. In this regard, samples should be taken from both upstream and downstream of the | Environmental Department | Monitoring will be undertaken on a quarterly basis when |

| Activity | Impacts requiring monitoring | Functional requirements for monitoring | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions | | | | | | | | | | | | | | |
|---|------------------------------|--|----------------------------|---|---|-----------------------------|---------------------------------------|---------------|---------------------------------|----------------|------------------------------|------------------|---------------------------------|-----------------|------------|-------------------|--|---|
| | | <p>Witleegte River. Refer to Figure 31-1 for the location of the surface water monitoring points.</p> <p>Monitoring of surface water within wash bay and stormwater dam facilities also needs to be undertaken on a quarterly basis.</p> <p>Water quality analyses results should be classified in terms of the SANS 241 (2015) Water Quality Standards and the DWAF Target Quality Range for Livestock Watering (1996), or whichever is applicable at the time. The monitoring results should be assessed by a suitably-qualified professional registered with the South African Council for Natural Scientific Professional (SACNASP). The parameters that need to be analysed are summarised in the table below.</p> <table><tr><td>pH</td><td>Chloride as Cl</td></tr><tr><td>Electrical Conductivity in mS/m at 25°C</td><td>Sulphate as SO₄</td></tr><tr><td>Total dissolved solids (TDS) at 180°C</td><td>Fluoride as F</td></tr><tr><td>Alkalinity as CaCO₃</td><td>Sodium as Na *</td></tr><tr><td>Carbonate as CO₃</td><td>Potassium as K *</td></tr><tr><td>Bicarbonate as HCO₃</td><td>Calcium as Ca *</td></tr><tr><td>Boron as B</td><td>Magnesium as Mg *</td></tr></table> | pH | Chloride as Cl | Electrical Conductivity in mS/m at 25°C | Sulphate as SO ₄ | Total dissolved solids (TDS) at 180°C | Fluoride as F | Alkalinity as CaCO ₃ | Sodium as Na * | Carbonate as CO ₃ | Potassium as K * | Bicarbonate as HCO ₃ | Calcium as Ca * | Boron as B | Magnesium as Mg * | | <p>the Witleegte River is in flow.</p> <p>Monitoring of the stormwater dam facilities must be undertaken on a quarterly basis.</p> <p>Monitoring reports need to be submitted to the DWS as per the conditions of the IWUL, on a quarterly basis. Monitoring reports need to cater for any reporting requirements stipulated in the IWUL.</p> |
| pH | Chloride as Cl | | | | | | | | | | | | | | | | | |
| Electrical Conductivity in mS/m at 25°C | Sulphate as SO ₄ | | | | | | | | | | | | | | | | | |
| Total dissolved solids (TDS) at 180°C | Fluoride as F | | | | | | | | | | | | | | | | | |
| Alkalinity as CaCO ₃ | Sodium as Na * | | | | | | | | | | | | | | | | | |
| Carbonate as CO ₃ | Potassium as K * | | | | | | | | | | | | | | | | | |
| Bicarbonate as HCO ₃ | Calcium as Ca * | | | | | | | | | | | | | | | | | |
| Boron as B | Magnesium as Mg * | | | | | | | | | | | | | | | | | |

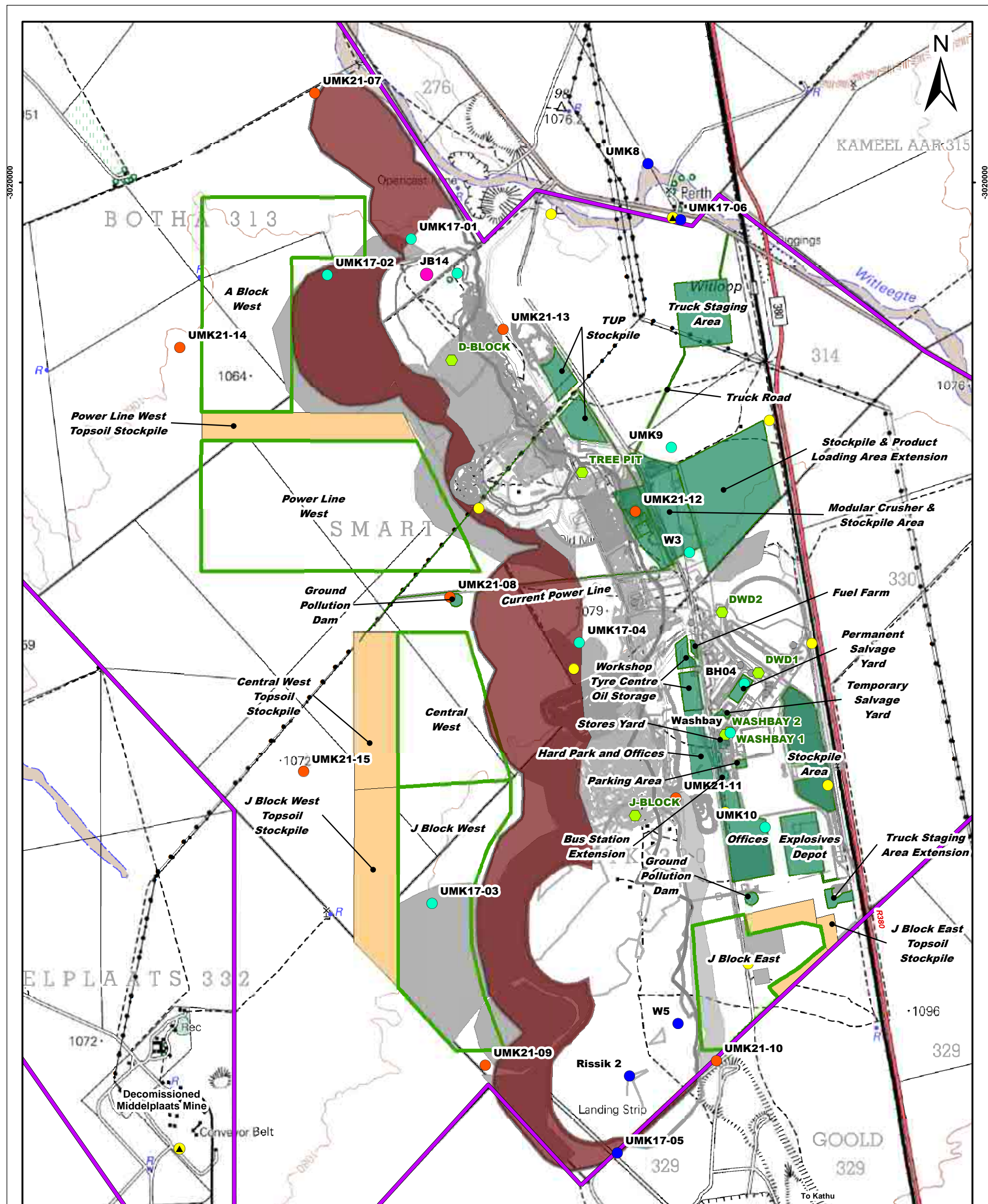
| Activity | Impacts requiring monitoring | Functional requirements for monitoring | | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions | | | | |
|---|--|---|--------------|---|--|--|--|--|--|
| | | <table><tr><td>Nitrate as N</td><td>Manganese as Mn *</td></tr><tr><td colspan="2">Full metal scan - Inter Coupled Plasma Scan (ICP) (via Mass Spectrometry (MS))</td></tr></table> | Nitrate as N | Manganese as Mn * | Full metal scan - Inter Coupled Plasma Scan (ICP) (via Mass Spectrometry (MS)) | | | | |
| Nitrate as N | Manganese as Mn * | | | | | | | | |
| Full metal scan - Inter Coupled Plasma Scan (ICP) (via Mass Spectrometry (MS)) | | | | | | | | | |
| | | <p>* These are also included in an ICP (MS) Scan. Measuring elements individually is more accurate than via the ICP (MS) scan.</p> <p>In the event that the IWUL is amended and changes to the surface water monitoring programme as outlined in this report are made, the requirements as per the IWUL should be adhered to.</p> | | | | | | | |
| Site preparation Earthworks Civil works Open pit mining Processing Mineralised waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transport system | Physical destruction and general disturbance of biodiversity | <p>Continued monitoring will be undertaken to ensure that the alien invasive species have been eradicated and are controlled for both controlled sites as well as rehabilitated areas.</p> <p>A comprehensive monitoring programme of the protected trees within the area will be implemented, on an individual tree basis as well as monitoring at a community level. Should this monitoring show significant water stress impacts on large trees, UMK will investigate further management measures with assistance from a suitability qualified professional. This may include measures to get water to affected tree roots systems or artificial recharge.</p> | | Environmental Department with input from qualified specialist | <p>The alien/invasive/weed management programme should be undertaken on an annual basis for the duration of the mine. This information should be made available to DFFE</p> <p>on request, unless otherwise specified.</p> | | | | |

| Activity | Impacts requiring monitoring | Functional requirements for monitoring | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions |
|--|------------------------------|---|----------------------------|---|
| Continued use of approved facilities and services General site management Rehabilitation | | | | <p>After closure, repeat surveys should be carried out annually for at least the first three years post-rehabilitation.</p> <p>Monitoring of protected trees should take place on an annual basis. The result must be submitted to DFFE on an annual basis.</p> |
| Site preparation Earthworks Civil works Open pit mining Processing Mineralised waste Non-mineralised waste | Air pollution | UMK should continue with the air quality monitoring programme in accordance with the existing EMPr. | Environmental Department | <p>Monitoring reports need to be uploaded onto the National Emissions Inventory System on annual basis.</p> <p>Dust fallout monitoring must be</p> |







| Activity | Impacts requiring monitoring | Functional requirements for monitoring | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions |
|---|------------------------------|--|----------------------------|---|
| Water supply, use and management Support infrastructure/services Transport system Continued use of approved facilities and services General site management Rehabilitation | | | | undertaken on a monthly basis for the duration of the mine. PM10 ambient monitoring must be undertaken on a monthly basis for the duration of the mine. A qualified specialist needs to advise on the frequency on monitoring for the passive samplers and the meteorological station |
| Site preparation Earthworks Civil works Open pit mining | Contamination of | Monitoring of groundwater quality and quantity must be undertaken on a quarterly basis respectively. Refer to Figure 31-1 for the location of the groundwater monitoring points. | Environmental Department | Groundwater quality and quantity must be monitored on a quarterly basis |

| Activity | Impacts requiring monitoring | Functional requirements for monitoring | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions | | | | | | | | | | | | | | |
|---|------------------------------|--|----------------------------|---|---|-----------------|---------------------------------------|---------------|---------------------|----------------|------------------|------------------|---------------------|-----------------|------------|-------------------|--|---|
| Processing Mineralised waste Non-mineralised waste Water supply, use and management Support infrastructure/services Transport system Continued use of approved facilities and services General site management Rehabilitation | groundwater resources | <p>Water quality analyses results should be classified in terms of the SANS 241 (2015) Water Quality Standards and the DWAF Target Quality Range for Livestock Watering (1996) or whichever is applicable at the time. The monitoring results should be assessed by a suitably-qualified professional registered with the South African Council for Natural Scientific Professional (SACNASP). The parameters that need to be analysed are summarised in the table below.</p> <table><tr><td>pH</td><td>Chloride as Cl</td></tr><tr><td>Electrical Conductivity in mS/m at 25°C</td><td>Sulphate as SO4</td></tr><tr><td>Total dissolved solids (TDS) at 180°C</td><td>Fluoride as F</td></tr><tr><td>Alkalinity as CaCO3</td><td>Sodium as Na *</td></tr><tr><td>Carbonate as CO3</td><td>Potassium as K *</td></tr><tr><td>Bicarbonate as HCO3</td><td>Calcium as Ca *</td></tr><tr><td>Boron as B</td><td>Magnesium as Mg *</td></tr></table> | pH | Chloride as Cl | Electrical Conductivity in mS/m at 25°C | Sulphate as SO4 | Total dissolved solids (TDS) at 180°C | Fluoride as F | Alkalinity as CaCO3 | Sodium as Na * | Carbonate as CO3 | Potassium as K * | Bicarbonate as HCO3 | Calcium as Ca * | Boron as B | Magnesium as Mg * | | <p>respectively as stipulated in the IWUL.</p> <p>Monitoring reports need to be submitted to the DWS as per the conditions of the IWUL, on a quarterly basis. Monitoring reports need to cater for any reporting requirements stipulated in the IWUL.</p> |
| pH | Chloride as Cl | | | | | | | | | | | | | | | | | |
| Electrical Conductivity in mS/m at 25°C | Sulphate as SO4 | | | | | | | | | | | | | | | | | |
| Total dissolved solids (TDS) at 180°C | Fluoride as F | | | | | | | | | | | | | | | | | |
| Alkalinity as CaCO3 | Sodium as Na * | | | | | | | | | | | | | | | | | |
| Carbonate as CO3 | Potassium as K * | | | | | | | | | | | | | | | | | |
| Bicarbonate as HCO3 | Calcium as Ca * | | | | | | | | | | | | | | | | | |
| Boron as B | Magnesium as Mg * | | | | | | | | | | | | | | | | | |






| Activity | Impacts requiring monitoring | Functional requirements for monitoring | | Roles and responsibilities | Monitoring and reporting frequency and time period for management actions |
|----------|------------------------------|---|-------------------|----------------------------|---|
| | | Nitrate as NO3 | Manganese as Mn * | | |
| | | Full metal scan - Inter Coupled Plasma Scan (ICP) (via Mass Spectrometry (MS) | | | |
| | | In the event that the IWUL is amended and changes to the groundwater monitoring programme as outlined in this report are made, the requirements as per the IWUL should be adhered to. | | | |



Legend

-  UMK Mining Right Area
-  As per the approved infrastructure/facilities layout
-  Main Roads
-  Railway Line
-  Power Line
-  Rivers and Streams

Proposed Changes to the Layout or Operations

-  Proposed Changes to the Layout or Operations
-  Proposed Topsoil Stockpiles
-  Proposed Infrastructure
-  Proposed Pit Expansion Area
-  Location of Solar Equipped Boreholes

Monitoring Programme

- Surface Water Monitoring Sites
- Dust Buckets
- PM₁₀ Sampling
- Ground Water Monitoring
 - Background
 - Plume
 - Proposed GW Monitoring Network

A horizontal scale bar with a black background. It has white tick marks at 0, 500, and 1 000. The word "Meters" is written in white at the right end.

Projection: Transverse Mercator
Datum: WGS1984, Lo23

UNITED MANGANESE OF KALAHARI

Figure 31-1

Monitoring Programme



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710.21002.00055

2021/11/16

31.1 FREQUENCY OF PERFORMANCE ASSESSMENT REPORT

UMK will for the period during which the environmental authorisation and the EMPr is valid, submit environmental audit reports to the DMRE. These audits will focus on the mines compliance with the conditions of the environmental authorisation and the commitments in the EMPr. These audits will be undertaken by a qualified independent person and will comply with the relevant NEMA Regulations 2014 (as amended).

The environmental manager will conduct internal management audits against the commitments in the EMPr in accordance with an annual audit plan. During the operational phase, these audits will be conducted on a quarterly basis. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

31.2 CLOSURE COST REPORTING

The financial provision for the mine will be updated on an annual basis and submitted to the DMRE for the duration of the operation in accordance with the relevant legislation.

32. ENVIRONMENTAL AWARENESS PLAN

This section outlines the environmental awareness plan that has been developed for the proposed project.

32.1 MANNER IN WHICH APPLICANT INTENDS TO INFORM EMPLOYEES OF THE ENVIRONMENTAL RISKS

This section includes an environmental awareness plan for the mine. The plan describes how employees will be informed of environmental risks which may result from their work, the manner in which the risk must be dealt with in order to avoid pollution or degradation of the environment and the training required for general environmental awareness and the dealing of emergency situations and remediation measures for such emergencies. All contractors that conduct work on behalf of UMK are bound by the content of the EMPr and a contractual condition to this effect will be included in all such contracts entered into by the mine. If contractors are used, the responsibility for ensuring compliance with the EMPr will remain with UMK.

The purpose of the environmental awareness plan is to ensure that all personnel and management understand the general environmental requirements of the site. In addition, greater environmental awareness must be communicated to personnel involved in specific activities which can have a significant impact on the environment and ensure that they are competent to carry out their tasks on the basis of appropriate education, training and/or experience. The environmental awareness plan should enable UMK to achieve the objectives of the environmental policy.

32.1.1 Environmental policy

UMK will display the environmental policy. To achieve world class environmental performance in a sustainable manner UMK is currently committed to:

- To minimise the impact of UMK's mining operations on the environment wherever possible;
- To comply with all applicable environmental legislation and the commitments contained in UMK's EMPr;
- To ensure that all UMK's employees, contractors and sub-contractors:
 - Are aware of the impact of their activities on the environment;
 - Are informed about the measures required to prevent, mitigate and manage environmental impacts; and
 - Apply these principles whilst carrying out their work.
- To establish and maintain a good relationship with surrounding communities, industries and other interested and affected parties, with regard to UMK's activities;
- To develop a localised environmental strategy with the local authority and nearby industries;
- To participate in environmental forums with neighbouring mines and the Kalagadi catchment forum with neighbouring mines, farmers and regulatory authorities (primarily DWS); and
- To provide relevant and constructive consultation/public participation on the management of the potential environmental impacts posed by the mine in the future. In addition to this, UMK will also participate in any relevant farmers' association.

32.2 STEPS TO ACHIEVE THE ENVIRONMENTAL POLICY OBJECTIVES

UMK's environmental policy is realised by setting specific and measurable objectives. It is proposed that new objectives are set throughout the life of mine, but initial objectives were as follows:

- Management of environmental responsibilities:
 - UMK will establish and appoint an Environmental Manager at an appropriate management level, who will be provided with all necessary resources to carry out the management of all environmental aspects of the site as a primary function, for example:
 - Compliance with environmental legislation and EMPr commitments
 - Implementing and maintaining an environmental management system
 - Developing environmental emergency response procedures and coordinating personnel during incidents
 - Manage routine environmental monitoring and data interpretation
 - Environmental trouble shooting and implementation of remediation strategies
 - Closure planning.
- Communication of environmental issues and information:
 - Meetings, consultations and progress reviews will be carried out, and especially UMK will:
 - Set the discussion of environmental issues and feedback on environmental projects as an agenda item at all company board meetings
 - Provide progress reports on the achievement of policy objectives and level of compliance with the approved EMPr to the DMRE
 - Ensure environmental issues are raised at monthly mine management executive committee meetings and all relevant mine wide meetings at all levels
 - Ensure environmental issues are discussed at all general liaison meetings with local communities and other interested and affected parties, where possible.
- Environmental awareness training:
 - UMK will provide environmental awareness training to individuals at a level of detail specific to the requirements of their job, but will generally comprise:
 - Basic awareness training for all prior to granting access to site (e.g. short video presentation requiring registration once completed). Employees and contractors who have not attended the training will not be allowed on site.
 - General environmental awareness training will be given to all employees and contractors as part of the Safety, Health and Environmental induction programme. All non-UMK personnel who will be on site for more than five days must undergo the SHE induction training.

- Specific environmental awareness training will be provided to personnel whose work activities can have a significant impact on the environment (e.g. workshops, waste handling and disposal, sanitation, etc.).
- Review and update the environmental topics already identified in the EMPr which currently includes the following purpose:
 - Geology (sterilisation of mineral resource)
 - Topography (hazardous excavations)
 - Land capability (loss of land with agricultural and conservation/ecotourism potential)
 - Management of biodiversity
 - Surface water management (alteration of surface drainage and pollution of surface water)
 - Groundwater management (reduction in groundwater levels/availability and groundwater contamination)
 - Management of air quality (dust generation)
 - Heritage resources (management of archaeological, cultural and historical sites)
 - Socio-economic impacts (management of positive and negative impacts)
 - Interested and affected parties
- All mine projects will be designed to minimise impact on the environment and to accomplish closure/rehabilitation objectives.
- UMK will maintain records of all environmental training, monitoring, incidents, corrective actions and reports.
- Contractors and employees will be contractually bound to participate in the achievement of environmental policy objectives and compliance with the EMPr.

32.2.1 Training objectives of the environmental awareness plan

The environmental awareness plan ensures that training needs are identified, and that appropriate training is provided. The environmental awareness plan should communicate:

- The importance of conformance with the environmental policy, procedures and other requirements of good environmental management
- The significant environmental impacts and risks of individuals work activities and explain the environmental benefits of improved performance
- Individuals roles and responsibilities in achieving the aims and objectives of the environmental policy
- The potential consequences of not complying with environmental procedures.

32.2.1.1 General contents of the environmental awareness plan

To achieve the objectives of the environmental awareness plan the general contents of the training plans are as follows:

- **Module 1** – Basic training plan applicable to all personnel entering the site:
 - Short (15 min) presentation to indicate the site layout and activities at specific business units together with their environmental aspects and potential impacts.
 - Individuals to sign off with site security on completion in order to gain access to the site.
- **Module 2** – General training plan applicable to all personnel at the site for longer than 5 days:
 - General understanding of the environmental setting of the mine (e.g. local communities and industries, nearby towns, isolated farmsteads and proximity to natural resources such as rivers)
 - Understanding the environmental impact of individuals activities on site (e.g. excessive production of waste, poor housekeeping, energy consumption, water use, noise, etc.)
 - Indicate potential site-specific environmental aspects and their impacts
 - UMK's environmental management strategy
 - Identifying poor environmental management and stopping work which presents significant risks
 - Reporting incidents
 - Examples of poor environmental management and environmental incidents
 - Procedures for emergency response and cleaning up minor leaks and spills.
- **Module 3** – Specific training plan:
 - Environmental setting of the workplace (e.g. proximity of watercourses, vulnerability of groundwater, proximity of local communities and industries, towns and isolated farmsteads etc.)
 - Specific environmental aspects such as:
 - Spillage of hydrocarbons at workshops
 - Spillage of explosive liquids in the open pits
 - Poor waste management such as mixing hazardous and general wastes, inappropriate storage and stockpiling large amounts of waste
 - Poor housekeeping practices
 - Poor working practices (e.g. not carrying out oil changes in designated bunded areas)
 - Impact of environmental aspects, for example:
 - Hydrocarbon contamination of local watercourses resulting in loss of resource (soil, water) to downstream users;
 - Groundwater contamination also resulting in loss of resource due to potential adverse aesthetic, taste and health effects;

- Dust impacts on local communities (nuisance and health implications)
- UMK's duty of care (specifically with respect to waste management); and
- Purpose and function of UMK's environmental management system.

Individuals required to complete Module 3 (Specific training module) will need to complete Modules 1 and 2 first. On completion of the Module 3, individuals will be subject to a short test (written or verbal) to ensure the level of competence has been achieved. Individuals who fail the test will be allowed to re-sit the test after further training by the training department.

The actual contents of the training modules will be developed based on a training needs analysis.

Key personnel will be required to undergo formal, external environmental management training (e.g. how to operate the environmental management system, waste management and legal compliance).

In addition to the above UMK will:

- Conduct refresher training/presentations on environmental issues for mine employees (permanent and contractors) at regular intervals.
- Promote environmental awareness using relevant environmental topic posters displayed at strategic locations on the mine. These topics will be changed monthly and will be reviewed annually by the Environmental Manager to ensure relevance.
- Participate and organise events which promote environmental awareness, some of which will be tied to national initiatives e.g. National Arbour Week, World Environment Day and National Water Week.

32.3 MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION

32.3.1 On-going monitoring and management actions

The monitoring programme as described in Section 31 will be undertaken to provide early warning systems necessary to avoid environmental emergencies.

32.3.2 Procedures in case of environmental emergencies

Emergency procedures apply to incidents that are unexpected and that may be sudden, and which lead to danger to the public and/or potential pollution of, or detriment to the environment (immediate and delayed). Procedures to be followed in case of environmental emergencies are described in the table below (Table 32-1).

32.3.2.1 General emergency procedure

The general procedure that should be followed in the event of all emergency situations is as follows.

- Applicable incident controller defined in emergency plans must be notified of an incident upon discovery;
- Area to be cordoned off to prevent unauthorised access and tampering of evidence;
- If residue facilities/dams, storm water diversions, etc. are partially or totally failing and this cannot be prevented, the emergency siren is to be sounded (nearest one available). After hours the Plant Manager on shift must be notified;

- Take photographs and samples as necessary to assist in investigation;
- Report the incident immediately to the responsible person of the Safety, Health, Environment (SHE) department (or equivalent);
- The SHE department must comply with Section 30 of the NEMA such that:
 - The SHE department must immediately notify the Director-General (DWS and DMRE and Inspectorate of Mines as appropriate), the South African Police Services, the relevant fire prevention service, the provincial head of DMRE, the head of the local municipality, the head of the regional DWS office and any persons whose health may be affected of:
 - The nature of the incident
 - Any risks posed to public health, safety and property
 - The toxicity of the substances or by-products released by the incident
 - Any steps taken to avoid or minimise the effects of the incident on public health and the environment.
 - The SHE department must as soon as is practical after the incident:
 - Take all reasonable measures to contain and minimise the effects of the incident including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
 - Undertake clean up procedures;
 - Remedy the effects of the incident;
 - Assess the immediate and long-term effects of the incident (environment and public health).
 - Within 14 days the SHE department must report to the Director-General DWS and DEA, the provincial head of DMRE, the regional manager of the DMRE, the head of the local and district municipality, the head of the regional DWS office such information as is available to enable an initial evaluation of the incident, including:
 - The nature of the incident;
 - The substances involved and an estimation of the quantity released;
 - The possible acute effects of the substances on the persons and the environment (including the data needed to assess these effects);
 - Initial measures taken to minimise the impacts;
 - Causes of the incident, whether direct or indirect, including equipment, technology, system or management failure;
 - Measures taken to avoid a recurrence of the incident.

32.3.2 Identification of emergency situations

The site wide emergency situations that have been identified together with specific emergency response procedures are outlined in Table 32-1.

Table 32-1: Emergency Response Procedures

| Item | Emergency | Response in addition to general procedures |
|------|---|---|
| 1 | Spillage of chemicals, engineering substances and waste | <p>Where there is a risk that contamination will contaminate the land (leading to a loss of resource), surface water and/or groundwater, UMK will:</p> <ul style="list-style-type: none"> • Notify residents/users downstream of the pollution incident. • Identify and provide alternative resources should contamination impact adversely on the existing environment. • Cut off the source if the spill is originating from a pump, pipeline or valve (e.g. refuelling tanker) and the infrastructure 'made safe'. • Contain the spill (e.g. construct temporary earth bund around source such as road tanker). • Pump excess hazardous liquids on the surface to temporary containers (e.g. 210 litre drums, mobile tanker, etc.) for appropriate disposal. • Remove hazardous substances from damaged infrastructure to an appropriate storage area before it is removed/repaired. |
| 2 | Pollution of surface water and/or spills | <p>To stop spillage from the dirty water system the mine will:</p> <ul style="list-style-type: none"> • Redirect excess water to other dirty water facilities where possible; • Pump dirty water to available containment in the clean water system, where there is no capacity in the dirty water system; • Carry out an emergency discharge of clean water and redirect the spillage to the emptied facility. • Apply for emergency discharge as a last resort. |
| 3 | Groundwater contamination | <ul style="list-style-type: none"> • Use the groundwater monitoring boreholes as scavenger wells to pump out the polluted groundwater for re-use in the process water circuit (hence containing the contamination and preventing further migration). |

| Item | Emergency | Response in addition to general procedures |
|------|--|--|
| | | <ul style="list-style-type: none"> Investigate the source of contamination and implement control/mitigation |
| 4 | Burst water pipes (loss of resource and erosion) | <ul style="list-style-type: none"> Notify authority responsible for the pipeline (if not mine responsibility). Shut off the water flowing through the damaged area and repair the damage (if UMK pipeline). Apply the principals listed for Item 1 above if spill is from the dirty/process water circuit. |
| 5 | Falling into hazardous excavations | <ul style="list-style-type: none"> Personnel discovering the fallen individual or animal must mobilise the emergency response team to the location of the incident and provide a general appraisal of the situation (e.g. human or animal, conscious or unconscious, etc.) The injured party should be recovered by trained professionals such as the mine emergency response team. A doctor (or appropriate medical practitioner)/ambulance should be present at the scene to provide first aid and transport individual to hospital. |
| 6 | Road / rail traffic accidents (on site) | <ul style="list-style-type: none"> The individual discovering the accident (be it bystander or able casualty) must raise the alarm giving the location of the incident. Able personnel at the scene should shut down vehicles where it is safe to do so. Access to the area should be restricted and access roads cleared for the emergency response team. Vehicles must be made safe first by trained professionals (e.g. crushed or overturned vehicles). Casualties will be moved to safety by trained professionals and provided with medical assistance. Medical centres in the vicinity with appropriate medical capabilities will be notified if multiple seriously injured casualties are expected. A nearby vet should be consulted in the case of animal injury. |
| 7 | Uncovering of fossils | <ul style="list-style-type: none"> Personnel discovering the fossil or potential site must inform the SHE department immediately. |

| Item | Emergency | Response in addition to general procedures |
|------|---|---|
| | | <ul style="list-style-type: none"> Should any fossils be uncovered during the development of the site, a palaeontologist will be consulted to identify the possibility for research |
| 8 | Uncovering of graves and archaeological sites | <ul style="list-style-type: none"> Personnel discovering the grave or site must inform the SHE department immediately. Prior to damaging or destroying any of the identified graves, permission for the exhumation and relocation of graves must be obtained from the relevant descendants (if known), the National Department of Health, the Provincial Department of Health, the Premier of the Province, the SAHRA and the local Police. |

32.3.3 Technical, management and financial options

Technical, management and financial options that will be put into place to deal with the remediation of impacts in cases of environmental emergencies are described above.

33. SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The following documents will be submitted to the DMRE from the start of construction until mine closure:

- As noted in Section 31.1, an environmental audit report, prepared by an independent person, will be submitted to the DMRE at intervals as indicated in the environmental authorisation. The purpose of the environmental audit report is to ensure compliance with the conditions of the environmental authorisation and the EMP; and
- The financial provision will be updated on an annual basis and submitted to the DMRE.

34.UNDERTAKING


I, Sharon Meyer, the EAP responsible for compiling this EIAR, undertake that:

The information provided herein is correct;

- Comments and inputs from I&APs and commenting authorities have been included and correctly recorded in this EIAR; .
- Inputs and recommendations from the specialist reports have been included where relevant; and
- Any information provided to I&APs and any responses to comments or inputs made is correct or was correct at that time.


Signature of EAP (Sharon Meyer)

26 April 2022
Date


Signature of Commissioner of Oaths
Greg Brown CA (SA)
Commissioner of Oaths (RSA)
3rd Floor, Block E, The Pivot
Montecasino Blvd, Fourways

21 APRIL 2022
Date

35. REFERENCES

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RECORD OF REPORT DISTRIBUTION

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